November 13, 2020

VIA EMAIL

Benjamin Davidson, Esq.
Law Offices of Benjamin Davidson, P.C.
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Re: Deposition Subpoena for Production of Business Records to University of Southern California re Case No. BC709376

Dear Mr. Davidson:

This letter and the accompanying records, bates-stamped USC00001 through USC000488, constitute the University of Southern California's (USC) objections and production of documents in response to the deposition subpoena for production of business records dated Sept. 18, 2020 in connection with Los Angeles Superior Court Case No. BC709376 (the "Subpoena"). Pursuant to the email correspondence received from you and from Mr. Adam Zaffos on November 12, 2020, USC is producing these objections and documents to you directly and exclusively, and through electronic delivery.

GENERAL OBJECTIONS

Any document that USC produces or makes in response to the Subpoena is produced subject to all objections of competence, relevance, materiality, propriety, admissibility, and any other objection on any ground that would require the exclusion of the document or other item, or any portion of the document or other item, if offered into evidence. All such objections are continuing in nature, incorporated into each specific response to the Subpoena's specifications, and are expressly reserved and may be interposed in connection with any motion or at the time of any trial. The fact that USC agrees to produce documents or provide information in response to any particular Subpoena request is not intended and shall not be construed as a waiver by USC of any objection to such request or of any general objection made in this Subpoena response.

No incidental or implied admissions are intended by USC's response to the Subpoena. The fact that USC agrees to produce documents or other items in response to a particular Subpoena request is not intended and shall not be construed as an admission that it accepts or admits the existence of any facts set forth in, or assumed by such request, or contained in any such documents or other items, or that any produced document or other item is admissible in evidence.

USC objects to the Subpoena and each of the Subpoena requests to the extent that they encompass documents protected by the attorney-client privilege and/or the work-product doctrine. USC further objects to the Subpoena and each of its requests to the extent they (a) seek irrelevant information not reasonably calculated to lead to the discovery of admissible evidence; (b) seek cumulative

evidence; (c) are overbroad and unduly burdensome; (d) seek confidential, proprietary or trade secret information; (e) seek information that, if disclosed, would constitute an unwarranted invasion of personal privacy, and (f) seek information equally accessible to the parties or information within the public domain. All such objections are continuing in nature, incorporated into each and every response below, and are expressly reserved and may be interposed in connection with any motion or at the time of any trial.

This response represents USC's diligent and best efforts to respond to the Subpoena based upon the factual investigation done by USC to date. There may exist additional documents responsive to the Subpoena that are not within the present knowledge of, or reasonably available to, USC, or that USC has not yet located, identified, or reviewed. USC will continue to produce responsive documents if and when such materials are located, identified, or reviewed; however, this response to the Subpoena should not be construed as an admission or representation by USC that additional responsive documents or other information do or do not exist.

USC RESPONSE TO SUBPOENA REQUESTS

SUBPOENA REQUEST NO. 1:

Any and all DOCUMENTS that RELATE TO any investigations made by USC CONCERNING HAO LI's representations during ACM SIGGRAPH Real-Time Live on August 1, 2017.

RESPONSE TO SUBPOENA REQUEST NO. 1:

USC objects to Request No. 1 to the extent that it requests information, the disclosure of which would constitute an unwarranted invasion of the affected persons' constitutional, statutory and/or common law rights to personal privacy and confidentiality. USC further objects to Request No. 1 on the ground that the terms "investigations" and "representations during" are vague and ambiguous. USC further objects to Request No. 1 on the ground that it seeks documents protected by the attorney-client privilege and/or the work-product doctrine. Subject to the General Objections stated above, which are incorporated by reference as though fully set forth herein, and without waiving any of them, USC responds that it will produce all responsive, non-privileged documents within its possession, custody, or control.

<p style="text-align:center">* * *</p>

Please give me a call or email me if you have any questions about USC's response and objections to the Subpoena.

Best regards,

Michael J. Stephan

Enclosures

PRINCIPALS:
>   **COMPLAINANT(S):**
>   Iman Sadeghi, Ph.D.
>   Former Vice President, Pinscreen
>
>   **RESPONDENT:**
>   Hao Li, Ph.D.
>   Associate Professor
>   Viterbi School of Engineering
>
>   Director of the Vision and Graphics Lab
>   *USC Institute for Creative Technologies*

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INVESTIGATION COMMITTEE:

INTRODUCTION

The USC Office of Research and the USC Research Misconduct Investigation Committee assigned to review this matter have reviewed allegations of research misconduct on the part of Dr. Hao Li, Ph.D., Associate Professor in the Computer Science Department, Viterbi School of Engineering and Director of the Vision and Graphics Lab, Institute for Creative Technologies, University of Southern California. He began his employment with USC in August, 2013. In addition to his role at USC, Dr. Li has served as Founder and CEO of Pinscreen Inc. since 2015. Pinscreen is a computer animation company focused on avatar development. The company website claims to develop "the most advanced artificial intelligence driven personalized avatars". Their website further claims to generate a personalized 3-D avatar in seconds.

On July 11, 2018, the Vice President of Research and the Office of Ethics and Compliance met with Dr. Iman Sadeghi, Ph.D., at which time he presented allegations of falsification and/or fabrication on the part of Dr. Li regarding two submitted manuscripts, an abstract submission and a live technology demonstration. Dr. Sadeghi was employed by Pinscreen as Vice President of Computer Graphics from February 2, 2017 through August 7, 2017 at which time he was terminated by Dr. Li. Dr. Sadeghi claims his termination was an act of whistleblower retaliation regarding the falsification of avatar generation capabilities developed by Dr. Li and his team (Att. 1).   On June 11, 2018, Dr. Sadeghi filed a complaint with the Superior Court of California, County of Los Angeles alleging multiple counts of fraud, violation of employment law and contracts, wrongful termination, assault and battery, and research misconduct. A Second Amended Complaint was filed on October 5, 2018. This lawsuit is pending.

On or about July 14, 2018, an Inquiry Panel was charged by USC to review the allegations for credibility and to carry out an initial review of evidence. The Inquiry Panel interviewed the Complainant on November 9, 2018, and the Respondent on September 25 and October 26, 2018. An Inquiry report was drafted and sent to Dr. Li for comment. Dr. Li responded to the Inquiry Report on January 24, 2019 (Att. 3).

The final inquiry report (Att. 2) was forwarded to the USC Provost on January 29, 2019 and approved January 30, 2019. An Investigation Committee was charged by USC with the investigation on or about February 26, 2019.

SUMMARY OF ALLEGATIONS

Four allegations of research misconduct were identified based on the Amended Report and further information from Dr. Sadeghi. The four allegations reviewed by the Investigation Committee are as follows:

1. Dr. Li knowingly and intentionally fabricated data, and/or instructed others to do so, in a manuscript submitted to SIGGRAPH 2017, a manuscript submitted to and published in

SIGGRAPH Asia 2017, and an abstract to SIGGRAPH Real-Time Live 2017 by representing manually prepared avatar hair shapes as being automatically generated.

2. Dr. Li knowingly and intentionally falsified data, and/or instructed others to do so, in a manuscript submitted to SIGGRAPH Asia 2017 by representing manually "fixed" avatar eye color, while the paper represented that eye color generation was accomplished through technology he developed based on advances in deep learning.

3. Dr. Li knowingly and intentionally falsified claims, and/or instructed others to do so, in an abstract submitted to SIGGRAPH Real-Time Live 2017 (Heretofore referred to as RTL abstract)by stating newly developed technology would be presented, when, in fact, Dr. Li and his team did not have the ability at the time to demonstrate these claims.

4. Dr. Li knowingly and intentionally falsified a presentation, and/or instructed others to do so, made at SIGGRAPH Real-Time Live demonstration 2017 (heretofore referred as RTL 2017) by claiming the demonstration to be a real-time presentation of newly developed computer graphics technology to create an avatar in a matter of seconds from a single photo, when in fact the avatars were manually created and pre-loaded.

This report of the committee refers only to allegations 3 and 4. The committee continues to review allegations 1 and 2.

FUNDING AND JURISDICTION
Dr. Li, as full-time faculty member at USC, received the following funding for the work presented in the abstract for, and the presentation at, SIGGRAPH RTL live:

- Office of Naval Research, Award No. N00014-15-1-2639; to USC, Dr. Hao Li, P.I. (Att. 4)
- U.S. Army Research Laboratory under contract W911NF-14-D-0005; to USC Institute for Creative Technologies, Randy Hill, P.I. (Att. 4)

The RTL abstract is entitled "Pinscreen: Creating Performance-Driven Avatars in Seconds". However, Dr. Li represents himself solely as associated with the University of Southern California. The work presented at SIGGRAPH RTL is a public presentation developed from the published work cited below. (Att. 6, 7)

- ███ 2017. Avatar Digitation From a Single Image For Real-Time Rendering. SIGGRAPH Asia. 36 (6).

This work cites the above two mentioned grants, awarded to USC.

██ are authors on both the SIGGRAPH Asia paper as well as the RTL abstract. All were USC Graduate students at the time of the above under Dr. Li's supervision. ███████ also an author on both, was a former Masters student under Dr Li's direction as a BSc Student in 2014.   As author, Dr. Li is credits himself both to Pinscreen and USC in the SilGGRAPH Asia paper and the RTL Presentation, and solely USC In the RTL abstract.

SCIENTIFIC BACKGROUND

The area of research in question is computer graphics. Computer graphics is a sub-discipline of computer science that focuses on capturing, storing, rendering, and manipulating digital images and video. The objective is to use computer hardware and software (in the form of algorithms and data structures) to create virtual environments that are reflective of the real world or that portray imaginary worlds. In fact, computer graphics have been used to produce visualizations of phenomena (e.g., computer-generated visualizations of a black hole bending spacetime) *before* such phenomena were actually observed in the real world; graphics have also been used to help create very realistic artificial worlds (e.g., in video games, movies, amusement parks, etc.).

Doing all of this is very challenging in a number of ways. The desired levels of detail mean that massive amounts of information need to be processed, very often in extremely short time spans. This requires optimizations both in the hardware and in the software. Since modern hardware is capacious and fast but ultimately bounded in its ability to perform computations, computer graphics researchers devote a lot of attention to developing improved software techniques for processing the needed information. The objective often boils down to driving up the quality at an acceptable cost. For example, in certain applications, this may mean, cutting down the time to render an image from weeks to hours; in other applications, it may mean, generating and processing series of high-quality images nearly instantaneously as the relevant information for them becomes available.

Dr. Li's own work has focused on such problems. Specifically, he has worked on such computationally expensive tasks as 3D human digitization from 2D artifacts (e.g., photographs), animation of digitized human faces, and developing models and algorithms that enable rendering of real world-like hair. Being able to drive down the computation time while improving the quality of the rendered results is a critical goal of this line of research, and is at the heart of this case.

RESPONDENT (Full Curriculum Vitae for Dr. Li, Att. 8)

Dr. Li started at USC in August, 2013 as Assistant Professor. In October, 2015 he co-founded Pinscreen where he has held the position of CEO to date. In August, 2016 he became Director of the USC Institute for Creative Technologies, Vision and Graphics Lab. Dr. Li became Associate Professor (with tenure) in the USC Computer science Department in May, 2019.

Dr. Li lectured graduate level courses in the USC Computer Science Department and was a guest lecturer for numerous other computer science courses at USC.

At the time of the investigation Dr. Li oversaw 13 post-doctoral trainees and has mentored 9 additional trainees here at USC.

At the time of this investigation Dr. Li held two active awards, one a corporate grant as well as a grant from the Office of Naval Research.

Dr. Li has published 9 first and 24 senior authored peer-reviewed journal and conference papers.

REDACTED

INVESTIGATION
Specific Allegations
That Dr. Li:

1. Dr. Li knowingly and intentionally falsified claims, and/or instructed others to do so, in an abstract submitted to SIGGRAPH Real-Time Live 2017 (Heretofore referred to as RTL abstract)by stating newly developed technology would be presented, when, in fact, Dr. Li and his team did not have the ability at the time to demonstrate these claims.
2. Dr. Li knowingly and intentionally falsified a presentation, and/or instructed others to do so, made at SIGGRAPH Real-Time Live demonstration 2017 (heretofore referred as RTL 2017) by claiming the demonstration to be a real-time presentation of newly developed computer graphics technology to create an avatar in a matter of seconds from a single photo, when in fact the avatars were manually created and pre-loaded.

Investigation Committee Analysis
For the purposes of this report the Investigation Committee reviewed the following evidence:
- Dr. Iman Sadeghi vs. Pinscreen, Inc., *et.al.;* Verified Second Amended Complaint filed on October 5, 2018. (Att. 1);
- The January 8, 2019 USC Inquiry Report. (Att 2);
- Dr. Li's response to the draft Inquiry Report. (Att 3);
- USC Institute of Creative Technologies, Information Security Summary, July 8, 2019. (Att. 9);
- USC Institute of Creative Technologies, Information Security Summary, July 29, 2019. (Att. 10);
- Report by an Quandary Peak Research, outside consultant, reviewing the code supplied by Dr. Li and the RTL Presentation. (Att. 11);
- YouTube SIGGRAPH RTL Presentation August 1, 2017 (https://www.youtube.com/watch?v=hpuEdXn_M0Q);
- ███████████████████████████████ 2017. Avatar Digitation From a Single Image For Real-Time Rendering. SIGGRAPH Asia. 36 (6) (Att. 6);
- Pinscreen: Creating Performance-Driven Avatars in Seconds (SIGGRAPH RTL 2017 abstract) (Att. 12);
- Dr. Li's April 6, 2020 response to the draft Investigation Report through his attorney (Att. 18)

Background:

1. ACM SIGGRAPH (Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques) is made up of members involved in a wide variety of fields, including scientific research, computer graphics research, software development, scientific visualization, digital art, interactive technology, game design, visual effects, graphic design, computer science, education, engineering, film and television production, and more (AMC SIGGRAPH website).

2. SIGGRAPH is the world's largest conference on computer graphics. It takes place once a year in a city somewhere in the U.S. or Canada, and is attended by tens of thousands of computer graphics professionals. SIGGRAPH claims to be one of the most highly respected venues for the presentation of new computer graphics technology and research (AMC SIGGRAPH website).

3. Real Time Live (RTL) is a showcase of new technology to the SIGGRAPH community of scientists, developers and enthusiasts. A panel of judges awards a best-in-show based on the presentations given during the 1.5 hour showcase.

4. In order to qualify for entry into the 2017 RTL show an abstract needed to be submitted in April and approved by SIGGRAPH for the mid-summer conference.

Observations:

5. For SIGGRAPH RTL 2017:
   a. Dr. Li's group submitted their abstract (Att. 12) on the 4/4/2017 deadline;
   b. Reviewers' comments were available on 5/17/2017 (Att. 13);
   c. Dr. Li's abstract was accepted on 6/02/2017;
   d. The RTL demonstrations were held on 8/01/2017.

6. The submitted and accepted abstract states:
   i. "With this fully automatic framework for creating a complete 3D avatar from a single unconstrained image, users can upload any photograph to build a high-quality Head model within seconds…"
   ii. "This system integrates state-of -the-art advances in facial-shape modeling, appearance inference, and a new pipeline for single-view hair generation based on hairstyle retrieval from a massive database, followed by a strand-to-hair-strip conversion method…"
   iii. "This live demonstration shows that compelling avatars and animations can be generated in very little time by anyone, with minimal effort."

7. The abstract and presentation were based on work described in a paper entitled "Avatar Digitization From a Single Image For Real-time Rendering" submitted to SIGGRAPH Asia on May 23, 2017.

8. Along with the abstract, the following video was submitted: https://www.youtube.com/watch?v=OZ2O3SXF0tE

9. No computer code was submitted along with the abstract, since code submission is not required for abstracts.

10. On May 17, 2017 Dr. Li received reviewer comments regarding the SIGGRAPH RTL 2017 abstract (Att. 13). In general, the reviewers were impressed at the speed of

the technology, but expressed concern regarding the overall avatar image quality, specifically as it relates to hair shape reconstruction and eye socket fitting.

11. The SIGGRAPH RTL 2017 Presentations (heretofore referred to as RTL 2017) can be found on YouTube at: https://www.youtube.com/watch?v=hpuEdXn_M0Q. The portion of this video relevant to this report can be found from 31:06-40:18.

12. On July 7, 2017 Dr. Li and others in his group participated in the RTL virtual rehearsal. At this time the SIGGRAPH RTL crew asked Dr. Li and others extra bandwidth or special equipment was needed to ensure that the Real-Time presentations would be executed smoothly. (Att. 14).

13. At the outset of the August 1, 2017 RTL presentations the moderator states; "All the presentations tonight will demonstrate amazing technology rendering beautiful graphics, and interactively controlling them in real-time live. Like I said, real-time, nothing pre-rendered, nothing pre-recorded." (RTL 2017 01:32)

14. Dr. Li's group was introduced, informing the audience that they would be demonstrating the creation of "performance-driven avatars in seconds" (RTL 2017 31:27)

15. Dr. Li introduces the production by stating "We are going to show you how to build a high-quality 3D avatar from a single image, fully rigged and animatable…" (RTL 2017 32: 32)

16. Dr. Sadeghi, presenting on behalf of Pinscreen, further states "we've been working on developing a fully automated pipeline to create a 3D avatar from a single image in a matter of seconds. And today I'm going to show you how it works." (RTL 2017 32:55)

17. Dr. Sadeghi continues to take a picture of himself with the computer camera, he waits 6 seconds while a progress bar rapidly moves across the screen and then presents the 3D avatar to the audience's applause.

18. He further illustrates animation, mesh, and skeletal view, and states that the avatars are "fully rigged, ready to be used in VR, games and animated movies." (RTL 2017 33:55).

19. Dr. Sadeghi claims to instantly generate three other instantaneously generated avatars from single stored images.

20. "We run multiple neural networks and pixel-wise optimizations to calculate hairstyle, geometry of the hair, polystrips, the facial geometry, textural map, the lighting, eye color, and so-on."

21. No information is presented to the audience that this is merely an illustration or "movie" of the technology or that the presentation has been pre-"cached" (recorded) for ease of presentation or to avoid any internet bandwidth issues.

22. There is no evidence during the presentation that there was any internet connectivity issues or that Dr. Li's team attempted their live presentation and then reverted to a cached presentation as a last resort.

Analysis:

23. At the request of the USC Office of Research, Dr. Li provided access to the code utilized to run the RTL 2017 demonstration. This code was housed on GitLab, an online code repository. It was not publicly accessible.

24. The Complainant and presenter of the code, Dr. Sadeghi, has stated that this was the code that he presented and the only code available to present (Att. 14)

25. At the request of the Committee, USC hired an outside, independent consulting firm to analyze this code in relation to the Dr. Li's claims, the allegations at hand, and the RTL presentation. The consultant's report ("Report") is attached. (Att. 11)

26. The summary of findings from this Report are as follows:
    a. The Demo Software does not include functionality for creating a 3D avatar from an image, either fully automatically or otherwise.
    b. The Demo Software includes at least eleven pre-built, pre-stored avatars. Four of these avatars – "Iman", "Hao", "JohnRoot", and "Christobal" – were displayed by Dr. Sadeghi during the Demo.
    c. The Demo Software allows the user to take a picture using an attached webcam. No matter what picture is taken with the webcam, the rtl-app will then display the pre-built "Iman" avatar.
    d. The Demo Software also allows the user to select a previously captured picture file. If the name of the picture file corresponds to one of the pre-built avatars (e.g.,"JohnRoot.jpeg"), then the app displays the corresponding pre-built avatar. If the name of the picture file does not correspond to one of the pre-built avatars (e.g.,"GeorgeEdwards.jpg"), no avatar is displayed.
    e. The Demo Software is designed to mislead the viewer. For example, the Demo Software includes a "progress bar" that appears to show the progress of an underlying computation to generate an avatar, when in fact there is no corresponding underlying computation and the progress bar simply fills up according to a timer. (Att. 11, P.2)

27. Specifically, the Report finds:
    a. The C# source code of the Demo Software shows that the first feature presented in the demo – the ability to generate an avatar in a few seconds from a webcam picture – did not actually exist in the software.
        i. After the user has taken a picture the function **GenerateAvatar** is called (line 24).
        ii. At line 96, the function **SetAvatar** is called with the hardcoded parameters avatarData["Iman"].Texture, "Iman".
        iii. At line 125 the **SetAvatar** function displays a progress bar on the screen. The progress bar's **update** function at line 70 shows that the progress bar is filled based on a timer, not based on the actual progress of any underlying computation.
        iv. Git repository logs indicate that specific efforts were made to make the progress bar more believable: code was added to the file on July 22, 2017, with the commit comment "replace Trump animation, make progress more natural". This revision caused the progress bar to increase at a variable speed, rather than increasing at a uniform speed.
        v. At line 202, a lookup is performed to retrieve an avatar **Transform** object from a collection of pre-built avatars. In this case, the value of the name parameter is "Iman" so the avatar named "Iman" is retrieved.

vi. The following function sets **visibleAvatar** to the avatar that was just retrieved from the pre-built collection and displays that avatar on the screen.

vii. Regardless of the picture taken, the "Iman" avatar is displayed.

b. The C# source code of the Demo Software also shows that the next feature presented in the demo – the ability to generate an avatar in a few seconds form a stored image file – likewise did not actually exist in the software.

i. The **setAvatar** function for this feature proceeds in the same manner as previously described: a lookup is performed to retrieve the appropriate avatar from the collection of pre-built avatars, based on the value of the name parameter.

ii. It does not matter what the contents of the named picture file actually is: it could be a picture of anything and the same avatar will be displayed. If a user selects an image file with a name that does not correspond to one of the pre-built avatars, no avatar is displayed.

28. The Report concludes that the software described in the RTL abstract and then presented at RTL 2017 did not have the capability to automatically generate complete 3D avatars from a single image.

29. The findings in the consultant's Report are consistent with the allegations presented by the Complainant and Skype conversations between Dr. Li and the team who prepared the presentation.

30. Said Skype conversations between Dr. Li and his team (███████████████████ ███████████████████████████) illustrate that the caching of the presentation was planned and premeditated.

31. Regarding the progress bar: (Att. 1: P. 191)

    i. [07/20/17] ███ : in that case is it necessary to have the file upload UI? Maybe just load the whole app with the thumbnails at the bottom?

    ii. [07/20/17] ███ : plus with many images, if we fake the loading time, it can add up.

    iii. [07/20/17] LI: I think file load is reasonable because it gives the people the feeling the avatar is not pre-built

    iv. [07/20/17] LI: we should give them the sense that it is computing

    v. [07/20/17] LI: if it is just loaded it's not impressive.

    b. Regarding the premeditated caching: (Att. 1: P. 194 - 196)

    i. [07/22/17] Sadeghi: So, for the live webcam avatar generation at RTL, are you thinking we will compute everything from scratch (approx. 90 seconds now with some risk for a hairstyle miss) or we cache some stuff?

    ii. [07/24/17] ██████ : anyway...it's important that we know exactly who is using the webcam to generate the avatar

    iii. [07/24/17] ██████ : since we are just using pre-cached avatars

    iv. [07/24/17] Sadeghi: Right. The plan is I'm using it.

    v. [07/24/17] ██████ : cool

32. In his response to the Inquiry report Dr. Li argues that secondary to email correspondence with the conference organizers, Dr. Li and his team decided to cache or

pre-record the presentation as a "fallback" plan in the event internet connectivity became problematic. (Att. 3; P. 8). Dr. Li stated that not only was this an acceptable practice, but encouraged by conference organizers. The Committee rejects this argument based of the following:

    a. In an email provided to the Committee by Dr. Hao Li, the RTL 2018 chair explains that it is valid for presenters to prepare "cache" as a fallback plan, and to perform their cache with explanation in case of some troubles." (Att. X)

    b. The YouTube video provides no evidence that there were any technical difficulties in the presentation or any other presentation during the RTL 2017.

    c. In an email conversation with Dr. Grace (Att. 14), Dr. Sadeghi, the RTL presenter of the technology expressly states:

        i. "There were no connectivity issues and all presentations were supposed to be in Real-Time and Live."

        ii. "In fact, SIGGRAPH RTL crew asked during the RTL Virtual Rehearsal, on July 7, 2017, if extra bandwidth was needed or special equipment to ensure that the Real-Time presentations would be executed smoothly."

        iii. "Pinscreen had no alternative code other than the https://gitlab.com/pinscreen/rtl-app.git for its avatar generation demo."

        iv. "Pinscreen intentionally misrepresented these manually prepared and pre-built avatars as autogenerated and in Real-Time."

28. Dr. Sadeghi further testified that there was no code available at the time that had the capability to do that which was being presented at RTL 2017.

        i. "There was no alternative code that would be able to actually autogenerate the avatars since Pinscreen did not have the capability: The actual autogenerated avatars would take around 90 seconds and would likely result in inaccurate hairstyles." (Att. 1, Paragraphs 184-188) Dr. Sedeghi confirmed this assertion in an e-mail conversation with Dr. Grace (Att. 14)

29. Skype conversations between Dr. Li and his team confirm Dr. Sadeghi's testimony and illustrate the fact that the technology was unable to accomplish what they were claiming at the time of the RTL 2017 abstract submission.

    a. One week before the RTL abstract submission regarding the RTL Demo Dr. Li had a discussion with 9 members of his team. (Att. 1, P.135)

        i. [03/27/17] Li: the issue is we don't have time we should start the collection asap
Items are:
    1)classification
we have never done this before, so no idea how long that will take
    2)we dunno if handpicked are good
    3)we still need hair rendering
    4)we also need some tracking
it's basically one day per task
if we don't parallelize it, there is no way we can make it
even if we fake things there is no time

      b. Just following Dr. Li had a conversation with 6 team members (P. 135)
          i. [03/27/17] ▮▮▮▮ maybe jens and I can setup meeting to see if it's even doable
          ii. [03/27/17] Li: yes we need a feasibility discussion first. I have doubts for now we could build the model on time (via cheating)
      c. Regarding hair modeling for the RTL 2017 presentation Dr. Li had the following conversation with 6 team members (P. 140)
          i. [03/27/17] Li: it s even better to have not good looking hair real-time than good looking non real-time hair
             But we should try to have some hair if we want to try to aim for it
             The reconstruction part we probably have no choice but to cheat.
      d. Two months before the RTL 2017 presentation:
          i. [06/29/17] Li: I'm really worried that nothing will work by the rehearsal and we have to [do] sic. some shitty cheating again. (P.137)
          ii. [05/05/17] Sadeghi: For the rehearsal, if we don't generate a brand new avatar then we have full control and everything can be cached. (P.190)

30. In his interview with the Inquiry Committee, Dr. Li presented the code he contends would reproduce the results presented at RTL 2017. This was the code he claims was used in the preparation for the May 23, 2017 SIGGRAPH Asia submission, *over two months after the RTL 2017 abstract submission*. This code took 5 minutes to generate an avatar and was reported as such in the SIGGRAPH Asia manuscript.

31. Allegations of falsifications regarding SIGGRAPH Asia 2017 are still under review and will be reported separately. However, Skype transcripts reveals that the technology for this manuscript (the basis for RTL 2017) was not available at the time of the manuscript submission.
      a. The following conversation was also shared with ▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ (Att. 1, P.138)
          i. [05/15/17] Li: our eyes are wrong, the colors, we need to use a deep neural net for that
          ii. [05/15/17] ▮▮▮▮ : for the SIGAsia paper
          iii. [05/15/17] Li: or we just do it manually for siggraph asia for now
          iv. [05/15/17] ▮▮▮▮ :do you need unity rendering
          v. [05/15/17] Li: let s do it manually for now, i think it s the only way

32. At the end of a lengthy skype conversations with Dr. Li and his team regarding software problems, just one day before submission was due, Dr. Li writes:
      a. [05/22/17] Li: if in an hour it s not working let s do it manually and give up on it I don't think we can make it automatic. (P. 141-143).

Aggravating and/or Mitigating Factors

On June 21, 2019 ▮▮▮▮▮▮▮▮▮ , requested of Dr Li access to his laptop and other hard drives or servers where the program codes relevant to the allegation may be found (Att. 16). On June 27, 2019 Dr. Li handed over a MacBook PRO serial number C02V20C9J93D to ICT Information Security (ICT IS). A report by ICT IS dated July 8, 2019 (Att. 9) found that the

machine contained very little data and appeared to have been reformatted just days earlier. This laptop serial number is not registered as a USC Asset. As the folder copied to the laptop contained last modified times pointing back to June 24, 2019 there was no way for ITC IS to gain visibility into the original creation time because the items had been tampered with since the copy was made from another media source to this laptop. Thus, the information contained on this laptop was useless to the investigation at hand.

On July 2, 2019, Dr. Grace sent a follow-up e-mail to Dr. Li (Att. 17) requesting that he turn in his University Laptop for copying. On July 10, 2019 Dr Li dropped off a MacBook Pro, serial Number C02XE11GTF1 and a Western Digital Elements External Hard Drive, Serial Number WXS1EC7EKWMF to ICT IS. A report by ICT IS dated July 29, 2019 finds a similar scenario to the first, where recent imaging also had taken place, making any data found on the computer impossible to verify (Att. 10).

USC Policy states that the subject of an allegation has the duty to furnish data, records and other documents as requested by the university so that a thorough review can be completed. The destruction, absence of, or any failure to provide research records adequately documenting the questioned research at any point in the process is evidence of research misconduct where it is established by a preponderance of the evidence that the subject of an allegation intentionally, knowingly, or recklessly had research records and destroyed them, had the opportunity to maintain the records but did not do so, or maintained the records and failed to produce them in a timely manner.

Investigation Committee Findings
The Committee finds that Dr. Hao Li, Associate Professor, Viterbi School of Engineering, USC, falsely presented his research in an abstract submitted to, and in a presentation at, SIGGRAPH Real-Time-Live 2017. Specifically, Dr. Li:

- Knowingly and intentionally submitted an abstract falsely claiming that he and his colleagues had developed software to automatically generate an avatar from a head shot in seconds and that it would be demonstrating such software at the SIGGRAPH Real-Time-Live show on August 1, 2017.
- Knowingly and intentionally presented a falsified demonstration of his software at the SIGGRAPH Real-Time-Live show on August 1, 2017 with the intention to mislead the audience into believing that they were viewing a real-time demonstration of the automatic avatar-generating software that he and his team claimed to have developed, when in fact, Dr. Li and his team presented pre-programmed, manually produced avatar generation.

Investigation Committee Recommendations
The Investigation Committee declines to recommend professional sanctions, as they will leave this to the appropriate sanctioning committee's discretion. REDACTED

REDACTED

In addition, it is recommended that USC forward a copy of any final findings to SIGGRAPH. Final findings will be communiticated to all relevant federal agencies.

Summary
The Investigation Committee recommends findings of Research Misconduct regarding the two allegations it has investigated. The Committee has reviewed the responses of Dr. Li to the draft investigation report (Att. 18) and holds to its findings. See the addendum to this report for the Committee's rebuttal to Dr. Li's responses.

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8
SUPERIOR COURT OF THE STATE OF CALIFORNIA

9
COUNTY OF LOS ANGELES—CENTRAL DISTRICT

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11
DR. IMAN SADEGHI, an individual,

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Plaintiff,

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v.

14
PINSCREEN, INC., a Delaware Corporation;
DR. HAO LI, an individual;
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YEN-CHUN CHEN, an individual;
LIWEN HU, an individual;
16
HAN-WEI KUNG, an individual;
and DOES 1-100,
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Defendants.
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Case No.: BC709376

VERIFIED AMENDED COMPLAINT FOR DAMAGES AND INJUNCTIVE RELIEF:

1. **Fraudulent Inducement of Employment Contract by Intentional Misrepresentation**
2. **Fraudulent Inducement of Employment Contract by Intentional Concealment**
3. **Battery**
4. **Violation of Cal. Labor Code § 1102.5 - Retaliation Against Whistleblowing**
5. **Breach of Employment Contract**
6. **Breach of Implied Contract for Research Integrity**
7. **Wrongful Termination in Violation of Public Policy**
8. **Intentional Interference with Contract**
9. **Intentional Infliction of Emotional Distress**
10. **Negligent Hiring, Supervision or Retention**
11. **Violation of Cal. Labor Code § 2802**
12. **Violation of Cal. Labor Code § 203**
13. **Breach of Constructive Bailment**
14. **Invasion of Privacy**
15. **Violation of Cal. Unfair Competition Law (UCL), Bus. & Prof. Code § 17200 et seq.**

DEMAND FOR JURY TRIAL

USC000014-287

USC University of Southern California
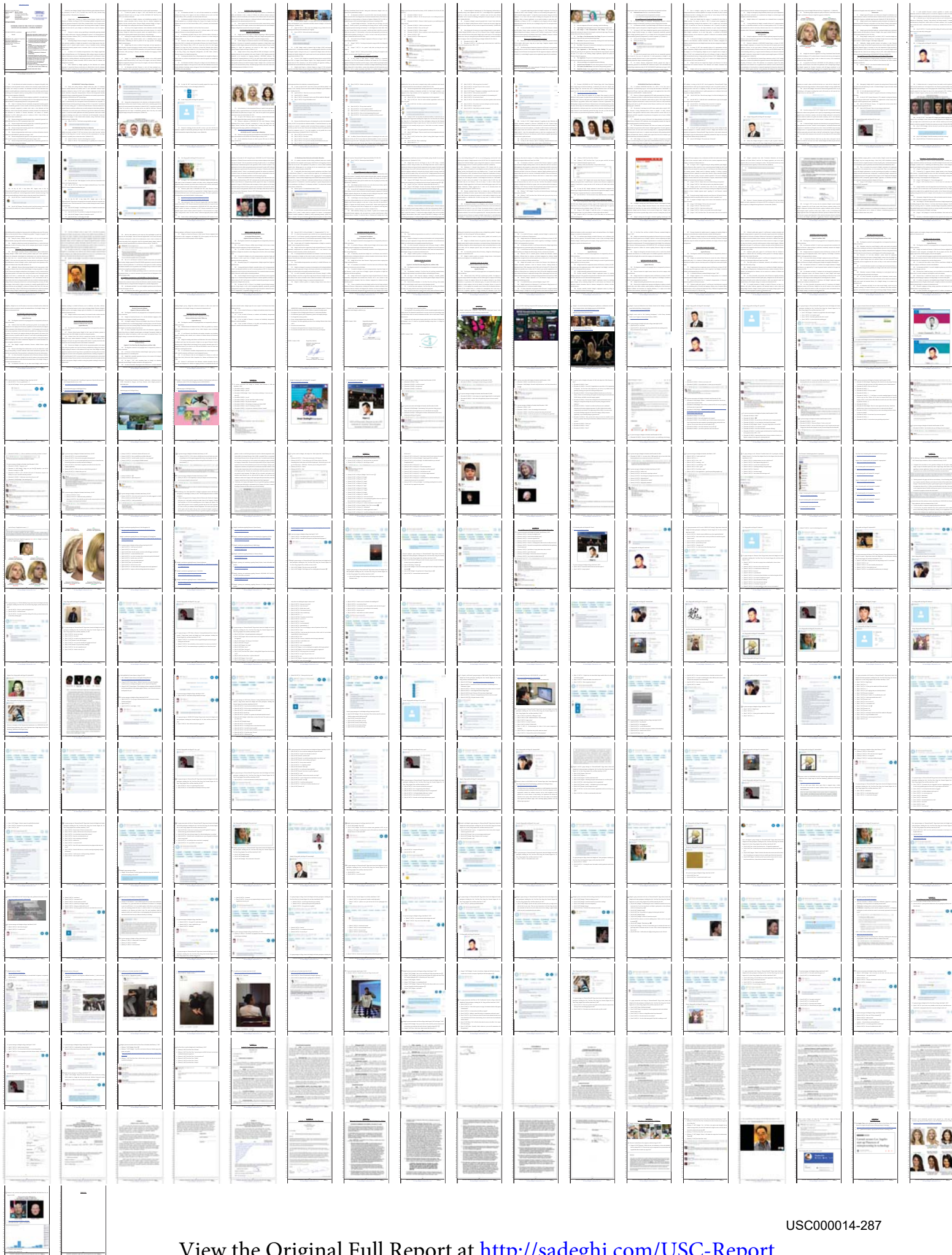
MEMORANDUM

To:	Randy Hall
	Yannis Yortsos
From:	Scientific Misconduct Inquiry Committee
Date:	January 8, 2019
Subject:	Preliminary Inquiry Report – Dr. Hao Li

This will constitute the report of the Scientific Misconduct Preliminary Inquiry committee convened to assess allegations of fabrication and/or falsification brought against Dr. Hao Li, Assistant Professor in the Viterbi School of Engineering. This report is made pursuant to USC's Policy on Scientific Misconduct (http://policy.usc.edu/scientific-misconduct/).

OVERVIEW

The allegations of fabrication and/or falsification against Dr. Li arise out of two papers, an abstract submission, and a live technology demonstration, as follows:

1. **SIGGRAPH 2017 Technical Papers Submission:** Dr. Li is alleged to have fabricated and/or falsified data by representing manually prepared hair shapes as automatically generated. This submission was not accepted for publication.

2. **SIGGRAPH Asia 2017 Technical Papers Submission:** Dr. Li allegedly revised his previously rejected submission to SIGGRAPH 2017 Technical Papers Submission for purposes of submitting to SIGGRAPH Asia 2017 Technical Papers. In connection with this submission, Dr. Li allegedly submitted manually-created hair models when asked by the journal to submit 100 avatars (including hair) automatically generated by his technology. Close in time to the submission deadline (May 23, 2017), Dr. Li allegedly ordered Pinscreen employees to "manually fix all the eye colors for the avatars", while the paper represented that eye color recognition was accomplished through his technology "due to recent advances in deep learning". In addition, Dr. Li allegedly fabricated the process of estimating hair color, and allegedly assigned a Pinscreen employee the task of "manually" picking up the hair color. The eventual submission claims that hair color classification is computed using a "similar convolutional neural network" as the one allegedly used for eye color. There were allegedly additional

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USC000288

3. misrepresentations of manually prepared data as automatically generated, which will be addressed in the Findings section of this report.

4. **SIGGRAPH Real-Time Live ("RTL") submission, dated April 4, 2017:** Dr. Li is alleged to have submitted an abstract in advance of a public demonstration of his technology at SIGGRAPH Real-Time Live ("RTL") where he falsely represented that he had developed a "fully automatic framework for creating a complete 3D avatar...to build a high-quality head model within seconds", when in fact the technology then in existence took approximately 90 seconds to generate an avatar. In addition, the abstract includes two example output images of actors Ryan Gosling and Haley Dunphy. Allegedly, the hair shapes for these examples were created manually by a hair artist based in Germany.

5. **SIGGRAPH Real-Time Live ("RTL") demo, August 1, 2017:** Dr. Li is alleged to have instructed Pinscreen personnel to "cache" or pre-load the avatar whose purported real-time creation was demonstrated at RTL in order to falsely give the impression that his technology was creating the avatar in real time in a matter of seconds. Dr. Li allegedly was also aware of and/or instructed his team to manually modify the outputs actually being generated to improve the avatars' quality such that the output demonstrated at RTL was not an accurate representation of the output his technology generated, regardless of whether it was cached or not.

PRELIMINARY INQUIRY COMMITTEE REPORT

Federal Grant Support

Office of Naval Research (ONR), Award No. N00014-15-1-2639
U.S. Army Research Laboratory (ARL) under contract W911NF-14-D-0005

Committee Members

Dr. Satyandra Gupta
Dr. Detlof Von Winterfeldt
Dr. Richard Leahy

Administrative Support

Daniel K. Shapiro (administrative support)
Dr. Mahta Moghaddam (representative for Dean's Office)

Information Obtained

In order to assist the Committee in conducting its Investigation, the Committee conducted the following interviews:

- **Dr. Hao Li**: September 25, 2018
- **Dr. Iman Sadeghi**: November 9, 2018

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Dr. Li also participated in a follow-up interview with Mahta Moghaddam and the Office of Compliance on October 26, 2018.

The Committee reviewed the following documents/videos:

- Dr. Iman Sadeghi vs. Pinscreen, Inc. and Dr. Hao Li; Verified Complaint filed on June 11, 2018.
- Dr. Iman Sadeghi vs. Pinscreen, Inc.; Dr. Hao Li; Yen-Chun Chen; Liwen Hu; and Han-Wei Kung; Verified Amended Complaint filed on October 5, 2018.
    - (Note: Dr. Li did not claim that any of the screenshots of texts and conversations in these complaints are not genuine; rather, he claims that this material was taken out of context).
- Curriculum vitae for Dr. Hao Li, available at http://www.hao-li.com/documents/resume.pdf
- Abstract submission titled "Pinscreen: Creating Performance-Driven Avatars in Seconds"; submitted April 4, 2017
- "Real-Time Live" presentation by Dr. Li and team (August 1, 2017); available at https://www.youtube.com/watch?v=hpuEdXn_M0Q (See from 31:06-40:18 of video). ;
- Paper accepted for publication to SIGGRAPH Asia 2017, titled "*Avatar Generation From a Single Image for Real-Time Rendering*", ACM Transactions on Graphics, Vol. 36, No. 6, Article 1 (Publication date: November, 2017)(Submission date: May 23, 2017)
- ACM/SIGGRAPH Reviews of "*Avatar Generation From a Single Image for Real-Time Rendering*"; accepted for publication to SIGGRAPH Asia 2017
- ACM/SIGGRAPH Reviews of "*Avatar Generation From a Single Image*"; rejected for publication to SIGGRAPH 2017 (North America)
- ACM/SIGGRAPH Reviews of Real-Time Live submission that was accepted to SIGGRAPH 2017
- E-mail from ACM SIGGRAPH addressing internet connectivity considerations at Real-Time Live.
- Time-line of events, provided by Dr. Li on 10.28.18.
- Comparison of SIGGRAPH/SIGGRAPH Asia Technical Paper vs. SIGGRAPH Real-Time Live, provided by Dr. Li on 10.28.18.

Dr. Li also provided a demonstration of software uploaded to GitHub in his follow-up interview with Mahta Moghaddam and the Office of Compliance on October 26, 2018.

Findings

1. SIGGRAPH 2017 Technical Papers Submission

Dr. Sadeghi alleges that Dr. Li included fabricated and falsified results in his submission to SIGGRAPH Technical Papers, 2017. Among other things, Dr. Sadeghi alleges that Pinscreen misrepresented manually prepared hair shapes as automatically generated. Dr. Sadeghi alleges

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that the submission was rejected and later re-submitted to SIGGRAPH Asia 2017 Technical Papers.[1]

Dr. Sadeghi alleges that he discussed these fabrications and falsifications with Dr. Li, who responded that the misrepresentations were not material because they were not public, and that he had been practicing a "fake it 'til you make it" strategy that had been working well up that point. Dr. Li also allegedly told Dr. Sadeghi that he and the Pinscreen team would have sufficient time to actually develop the claims prior to the eventual publication of the article.[2]

Dr. Sadeghi claimed that the conversation took place at a dinner meeting on March 9, 2017, and he showed the committee pictures of him and Dr. Li that he alleged were taken at the dinner. When asked why he suspected there were fabricated/falsified research results in the submission to begin with (i.e. what caused him to raise these issues), Dr. Sadeghi stated that hair rendering is an incredibly complex task, and that when he reviewed and tested the then-current hair algorithm, the geometry of the hair shapes generated was always "way off".

However, unlike his other claims, Dr. Sadeghi did not produce any evidence beyond his recollection of a conversation with Dr. Li, along with his characterization of how the algorithm performed at the time. Dr. Li denied that a conversation like this took place.

That said, the Office of Compliance obtained the peer reviews performed by ACM SIGGRAPH in connection with the rejected submission to assist in the determination of what claims were made, as well as the comments provided by the reviewers. According to the Summary Abstract of the rejected submission, Dr. Li and his team stated that the paper would show the following:

> We present a fully automatic framework for creating a complete 3D avatar from a single unconstrained image. We digitize the entire model using a textured mesh representation for the head and volumetric strips with transparency for the hair. Our digitized models also provide animation-friendly blendshapes and joint-based rigs. We present a fully automatic framework for creating a complete 3D avatar from a single unconstrained image.

> We digitize the entire model using a textured mesh representation for the head and volumetric strips with transparency for the hair. Our digitized models can be easily integrated into existing game engines and readily provide animation-friendly blendshapes and joint-based rigs. The proposed system integrates state-of-the-art advances in facial shape modeling, appearance inference, and a new pipeline for single-view hair generation based on hairstyle retrieval from a massive database, followed by a strand-to-hair strip conversion method.

> We also introduce a novel algorithm for realistic hair texture synthesis for the strips based on feature correlation analysis using a deep neural network. Our generated models are visually comparable to state-of-the-art game characters, as well as avatar generation techniques based on multiple input images.

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[1] See Verified Amended Complaint ("VAC", paragraph 112; p.19)
[2] See VAC, paragraph 113; p.19

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We demonstrate the effectiveness of our approach on a variety of images taken in the wild, and show that compelling avatars can be generated by anyone without effort.

(See reviews of SIGGRAPH 2017 paper submission attached hereto as Exhibit "A", p.1).

In its rejection of Dr. Li's submission, ACM SIGGRAPH informed Dr. Li that "[t]here was a very long discussion of the paper…The committee also agreed that it would be a great system paper for resubmission given the following additions: * Evaluate/compare for choice of hair system, e.g., compare to AutoHair * Explain how the eye balls, mouth was chosen * Present all the results for 100 photos that were tested (as the rebuttal states) *Explain how the chosen blend shapes method affects the animation across diverse people * present full models, front and back views. *show comparison to loom.ai" (See Exhibit "A", p. 11).

In preparation for the re-submission of the article in connection with SIGGRAPH Asia 2017 (due May 23, 2017), Dr. Li sent a Skype group message to Dr. Sadeghi and Shunsuke Saito on April 18, 2017 informing them that "for siggraph asia", "we need 100 fitted faces", which appears to indicate that Pinscreen did not have 100 fitted faces at that time.[3] Dr. Li asked Mr. Saito if he was able to prepare a database for benchmarking, and Mr. Saito replied "sure". In response, Dr. Li stated that it "…would be good to select 100 faces and we have similar hairstyles to our selection thing", and "then I have an artist create all 100 hairs […] ahahaha".[4]

Dr. Li also forwarded the reviewers' comments to his team on May 15, 2017, who at the time was working to complete the manuscript for re-submission.[5] Two days later, Dr. Li stated that "so basically I need to create 3D hair models for 100 people…[o]r get 3D modelers to do it".[6]

In the eventually accepted manuscript that was published in SIGGRAPH Asia 2017, the summary of the paper stated that it would show the following:

We present a fully automatic framework that digitizes a complete 3D head with hair from a single unconstrained image. Our system offers a practical and consumer-friendly end-to-end solution for avatar personalization in gaming and social VR applications. The reconstructed models include secondary components (eyes, teeth, tongue, and gums) and provide animation friendly blendshapes and joint-based rigs. While the generated face is a high-quality textured mesh, we propose a versatile and efficient polygonal strips (polystrips) representation for the hair. Polystrips are suitable for an extremely wide range of hairstyles and textures and are compatible with existing game engines for real-time rendering. In addition to integrating state-of-the-art advances in facial shape modeling and appearance inference, we propose a novel single-view hair generation pipeline, based on 3D-model and texture retrieval, shape refinement, and polystrip patching optimization. The performance of our hairstyle retrieval is enhanced using a deep convolutional neural network for semantic hair attribute classification.

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[3] See VAC, Exhibit "E", paragraph E.14, pp. 165, 166.
[4] Id.
[5] See VAC, Exhibit "E", paragraph E.13, pp. 163, 164.
[6] See VAC, paragraph 132, 133; pp. 23

Our generated models are visually comparable to state-of-the-art game characters designed by professional artists. For real-time settings, we demonstrate the flexibility of polystrips in handling hairstyle variations, as opposed to conventional strand-based representations. We further show the effectiveness of our approach on a large number of images taken in the wild, and how compelling avatars can be easily created by anyone.

(See http://www.hao-li.com/publications/papers/siggraphAsia2017ADFSIFRTR.pdf).

While the abstract from the rejected submission and the one from the accepted submission are similar, Dr. Li claimed in an e-mail dated 10.28.18 that "…SIGGRAPH 2017 vs SIGGRAPH RTL 2017 vs SIGGRAPH Asia 2017 are entirely different submissions and the methods/technical details are significantly different (as can be seen in the Submitted Papers). While SIGGRAPH Asia 2017 is a re-submission of the SIGGRAPH 2017 paper, it does not mean that the methods are the same, only that the reviewers can be the same, because we are allowed to opt for reviewer continuity." (See Exhibit "B" to this report).

The committee acknowledges that there are some differences in the claims (and potentially the methods) asserted in the rejected submission compared to the accepted one. That said, many of the claims appear to be very similar, including:

- Both submissions claim they will present a fully automatic framework for a complete 3D avatar with hair.
- Both submissions claim the digitized models will provide animation-friendly blendshapes and joint-based rigs.
- Both submissions claim to be able to generate hair shapes. The rejected submission claims to accomplish this through "…a new pipeline for single-view hair generation…followed by a strand-to-hair strip conversion method", while the later accepted submission states that "…we propose a versatile and efficient polygonal strips (polystrips representation for the hair)".
- Both submissions claim to introduce novel algorithms that enhance hairstyle synthesis/retrieval via "a deep neural network" (rejected submission) and "…a deep convolutional neural network for semantic hair attribute classification" (accepted submission).
- Both submissions claim that the respective papers show that compelling avatars can be created by anyone with little or no effort.

As will be shown in more detail below related to the committee's review of the eventually accepted SIGGRAPH Asia 2017 paper, Dr. Sadeghi presented evidence that, close in time to the submission deadline, there is evidence that Dr. Li informed his team that he would have an artist manually create hair shapes for 100 people (as noted above, ACM SIGGRAPH asked for the results of 100 tested photos), and also evidence that he instructed the team to manually fix all eye colors for the avatars, manually pick up the hair color for the avatars, and manually refine the automatic hair segmentation results, among other things.[7]

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[7] See VAC, paragraphs 129-167; pp.23-26

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Therefore, while there is insufficient evidence that Dr. Sadeghi's claimed conversation occurred on March 9, 2017 in the manner he describes in his complaint and subsequent interview in connection with this Preliminary Inquiry, the committee nevertheless concludes this claim must be fully investigated because of the following:

- In the rebuttal submitted by Dr. Li in connection with the rejected SIGGRAPH 2017 paper, he claims that he "…tested over 100 images including public data sets, celebrity photos, and some collected selfies, where most of them lead to plausible reconstructions." The reviewers picked up on this claim and asked Dr. Li to "…[p]resent all the results for 100 photos that were tested (as the rebuttal states)". However, as outlined above, subsequent to this time, Dr. Li forwarded the comments to his team in a manner suggesting that he did not in fact have 100 tested faces, necessitating that this testing occur, and also suggesting that he have an artist manually create all hairs for the 100 photos to be tested.
- The claims between the rejected article and the later re-submission are similar enough that, to the extent that in connection with the SIGGRAPH Asia re-submission, Dr. Li was unable to achieve the results claimed without manual alteration months later, then it is possible that the earlier manuscript required manual modification as well. As will be discussed below, Dr. Li has allowed the Office of Compliance and Dr. Moghaddam to view code uploaded to GitHub that is time-stamped very close in time to the submission deadline for the accepted manuscript that Dr. Li claims to be unmodifiable from what was uploaded at that time without creating a new version and new time-stamp. Dr. Li claims that, when run, the code demonstrates that he achieved each outcome claimed in the manuscript. As noted below, the committee recommends that in connection with a full investigation, Dr. Li be required to provide the code reflecting the claimed outputs from the earlier, rejected submission as well so that it can be independently tested.

2. SIGGRAPH Asia 2017 Technical Papers Submission

Dr. Sadeghi alleges that, in connection with the submission to SIGGRAPH Asia Technical Papers (deadline May 23, 2018), Dr. Li was asked to present 100 avatars generated by Pinscreen's software for 100 input images.[8] However, the complaint alleges that approximately one month earlier (April 18, 2017), Dr. Li informed Shunsuke Saito and Dr. Sadeghi that for SIGGRAPH Asia, Pinscreen needed to submit "100 fitted faces" and informed them both that he will "…have an artist create all 100 hairs…ahahaha".[9]

One month later (May 17, 2017), Dr. Sadeghi alleges that Dr. Li again discussed using 3D hair modelers to create the hair shapes for the 100 avatars to be submitted.[10] Initially, Dr. Li asked Jens Fursund (Pinscreen's Chief Technology Officer at the time) if he was able to assist in this task, but was told by Mr. Fursund that he did not know how to do so. Dr. Li responded by stating that he would need to retain 3D artists to create the hair models for the 100 avatars.[11]

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[8] See VAC, paragraph 129, p.22; Exhibit "E", paragraph E.13, p.163.
[9] See VAC, paragraph 129, p.22; Exhibit "E", paragraph E.14, pp. 165, 166.
[10] See VAC, paragraphs 132, 133, p.23; Exhibit "E"; paragraphs E.14 and E.15, pp. 165-174
[11] Id.

Dr. Sadeghi alleges that, in addition to manual creation of the hair models, Pinscreen also fabricated the process of estimating eye color. Dr. Sadeghi submitted text messages where Dr. Li stated that the eye color estimation in his software "was total shit", "completely random" and therefore instructed the team to "manually fix all the eye colors" for the avatars to be submitted with the manuscript.[12] As part of these conversations, Dr. Li had a Skype conversation with Jens Fursund on May 18, 2018 regarding the problems with the eye color generation capability of the software, where he said "we really need a better algorithm". When Fursund asked whether there was time to improve the algorithm given the proximity to the paper deadline, Dr. Li replied that "I guess a deep neural net would be the way to go". Fursund replied "so no [we don't have time]". Dr. Li responded by saying "…[let's] do them manually for now".[13]

Dr. Sadeghi also alleges that Pinscreen fabricated the process of estimating the hair color for the submission. On May 18, 2017, five days before the submission deadline for the manuscript, Dr. Li stated that "we also have nothing that can guess hair color".[14] The next day, Dr. Li instructed Jens Fursund to "manually pick up hair color and store it in .txt in Hex".[15]

Dr. Sadeghi next alleges that Pinscreen misrepresented other manually prepared data as automatically generated in its submission, including the "focal length" estimation and "hair segmentation".[16]

Finally, Dr. Sadeghi alleges that on May 22, 2017, one day prior to the submission deadline for the manuscript, Dr. Li instructed his team to fabricate the "Hair Polystrip Patch Optimization" process.[17] In paragraph E.8 of the Verified Amended Complaint, there is a lengthy Skype conversation between Dr. Li and members of his team, including Sadeghi, discussing patch optimization and errors associated with it. The team also discussed errors with "gamma correction". At the conclusion of this conversation, Dr. Li states that "if in an hour it's not working let's do it manually […] and give up on it […] i don't think we can make it automatic".

In his October 26, 2018 interview, Dr. Li claimed that notwithstanding these conversations close in time to the submission deadline, he has software source code in "GitHub" that is time stamped on or about May 21, 2017 that, when executed, performs each of the key claims in the manuscript. Subsequent to his October 26, 2018 interview, he provided a PDF to the Office of Compliance that contained, among other things, the nature of what he believes these key claims are:

- Algorithmic results
- Full dyn. head model
- Full texture maps
- Hair geometry
- Predicted hair/eye colors

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[12] See VAC, paragraphs 134-145, p.23; Exhibit "E"; paragraphs E.6, E.16-E.20; pp. 138, 139, pp. 174-181
[13] See VAC, Exhibit "E"; paragraph E.18, p. 176
[14] Id.
[15] See VAC, Exhibit "E"; paragraph E.21, p. 182
[16] See VAC, paragraphs 147-150, p.25; Exhibit "E", paragraphs E.19 and E.21; pp.178, 179, pp. 181-183
[17] See VAC, paragraphs 151-167, pp.25-26; Exhibit "E", paragraph E.8; pp.141-147

(See Exhibit "C" to this report).

In his October 26, 2018 interview, Dr. Li also downloaded/accessed a copy of the code uploaded to GitHub on May 21, and performed what he contended was an actual demo of the code creating an avatar from a source image that he had on his computer. This generated an avatar that he claimed was consistent with the key claims listed above.

Dr. Li also claimed that the texts indicate that all of the issues outlined above had been resolved, and that the remaining issue was not caused by any failures of his software, but rather by an issue caused by the export from Unity, a real-time game engine (https://unity3d.com/) to figures that could be represented in the paper. In support of this, Dr. Li demonstrated in Photoshop the "RGB" (Red, Green, Blue) values purportedly generated after export of the images, much the same way Liwen Hu and Koki Nagano stated they had done on May 22, 2017 in a text conversation with Dr. Li, Dr. Sadeghi, and others.[18] (Hu: "…once I checked the color of the png in Photoshop…it tells RGB(3,0,0)"; Nagano: "…so we are checking the new pipeline which export positions…but if we scale the value properly it might be ok"). Dr. Li claimed that the adjustment of the red tint was the only alteration necessary at that time, and that the software otherwise operated as represented in the manuscript.

The committee recommends that this allegation also be fully investigated, for the following reasons:

- The paper claims that "[t]he eye color texture (black, brown, green, blue) is computed using a similar convolutional neural network for semantic attribute inference as the one used for hair color classification". In his October 26, 2018 interview, Dr. Li characterized the creation of a "deep neural network" as a "simple" problem to solve because the basic framework for deep learning was in place.

  However, the evidence presented by Dr. Sadeghi includes a Skype conversation five days prior to the submission deadline between Dr. Li and Jens Fursund. In this conversation, Jens asks "but do we have time for a new algo?" in response to Dr. Li's observation that "we really need a better algorithm" due to the problems the research team was having with "eye generation" (e.g. "the eye color is total shit"). Dr. Li answered this question by stating that "I guess…a deep neural net[work] would be the way to go". Mr. Fursund replied by saying "so no [we don't have enough time]". This calls into question Dr. Li's characterization regarding the ease with which the neural network described in the paper could be achieved, as well as whether in fact it was.

  In addition, if as Dr. Li stated this was a "simple" problem to solve, it would be illogical for the research team to have spent as much time as the text messages indicate they did in manually modifying the output of the software to accomplish these same ends. This includes Dr. Li assigning "High Priority" to manually generating 100 hair models for purposes of the paper submission.

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[18] See VAC, Exhibit "E", paragraph E.8; pp.141, 142

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- The committee recommends that the software source code Dr. Li claims performs each of the key findings reported in the manuscript be tested by an independent third party with the requisite expertise to evaluate whether Dr. Li's claims are credible.

- The investigation committee should more fully evaluate Dr. Li's contention that the only issue remaining to be resolved was the slight alteration of color values necessitated by export issues from Unity to a format that would enable submitting the avatars with the manuscript. <u>After</u> the time Mr. Hu and Mr. Nagano identified the issue related to the color values, Dr. Li texted Mr. Hu, Mr. Nagano, and the remainder of the research team, informing them that "if in an hour it's not working let's do it manually…and give up on it…I don't think we can make it automatic". If, as Dr. Li represented in his interview, the code was operating as intended and in the manner reflected in his manuscript, there would have been no reason after the time he was informed of this issue to have suggested that "I don't think we can make it automatic", which suggests that problems with his code may have still remained.

- Even if the committee were to conclude that the source code does in fact perform each of the key claims in the manuscript, the definition of research misconduct under USC policy and applicable federal regulations includes "…fabrication, falsification, plagiarism in proposing, **performing**, or reviewing research, or in reporting research results" (Emphasis added).[19] Therefore, even if in the day or two prior to submission Dr. Li and his research team completed the deep neural network claimed in the manuscript, there remains evidence that there were efforts to fabricate and/or falsify data while the research was being performed.

3. SIGGRAPH Real-Time Live ("RTL") submission, dated April 4, 2017

Dr. Sadeghi alleges that, in preparation for the SIGGRAPH Real-Time Live ("RTL") submission titled "Pinscreen: Performance Driven Avatars in Seconds", due on April 4, 2017, Dr. Li wrote to his research team on March 27, 2017 that the "issue is that we don't have time" and that "even if we fake things there is no time". He then stated that, as to hair reconstruction, "we probably have no choice but to cheat".[20]

Three days later, on March 30, 2017, Dr. Li informed his research team that "i just interviewed and hired a hair modelerer [sic]" named Leszek to produce "five hair models", including Ryan Gosling and Haley Dunphy, both of whom are famous actors.[21] Pinscreen's April 4, 2017 submission to RTL uses avatars of both Mr. Gosling and Ms. Dunphy as examples of outputs from his "…fully automatic framework for completing a complete 3D avatar from a single unconstrained image…within seconds" that were "…visually comparable to state-of-the-art game characters". (See Exhibit "D" to this report; April 4, 2017 abstract submission to RTL).

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[19] See USC policy on Scientific Misconduct, https://policy.usc.edu/scientific-misconduct/.
[20] See VAC, paragraph 115, p.19; Exhibit "E", paragraphs E.3 and E.7; pp. 133, 134, 140, 141.
[21] See VAC, paragraph 118, p.20; Exhibit "E", paragraph E.11; pp.158, 159

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On April 18, 2017, Dr. Sadeghi alleges that Mr. Leszek shared with him his manually created hair shapes for Mr. Gosling and Ms. Dunphy.[22]

The committee recommends that this allegation also be fully investigated. Specifically, the committee recommends that the images and avatars of Mr. Gosling and Ms. Dunphy should be compared against all images and/or avatars provided to Mr. Leszek, as well as all images and/or avatars (or any other output) provided by Mr. Leszek to Dr. Li and/or his research team to determine whether they match the images and avatars contained in the abstract.

4. SIGGRAPH Real-Time Live ("RTL") demo, August 1, 2017:

Dr. Sadeghi alleges that, as the August 1, 2017 date for the RTL demo was approaching, Dr. Li realized that the claims put forth in the April 4, 2017 submission could not be met. In a June 29, 2017 Skype conversation, Dr. Li stated that "I'm really worried that nothing will work by [the] rehearsal and we have to [do] some shitty cheating again".[23]

Thereafter, Dr. Sadeghi alleges that on July 20, 2017, Dr. Li proposed pre-loading the avatar creation process on a Skype conversation when he stated that "I think file load is reasonable because it [gives] the people the feeling the avatar is not pre-built".[24] On July 22, 2017, Dr. Sadeghi alleges that he tested Pinscreen's avatar generation and that he told Dr. Li and others that it took approximately 90 seconds.[25]

Dr. Sadeghi alleges that later that evening, he had a conversation with Dr. Li, who disclosed a plan to fake the avatar generation and its speed by pre-caching manually prepared avatars and presenting them at the conference as being computed automatically and in real time.[26]

Dr. Sadeghi next alleges that on July 24, 2017, Jens Fursund, Pinscreen's CTO stated in a Skype thread that "it's important that we know exactly who is using the webcam to generate the avatar…since we're just using pre-cached avatars".[27] During this time period, Dr. Li allegedly assigned tasks such as "[c]reating all avatars, hair models, tweak for perfect hair color" to Carrie Sun and Liwen Hu.[28] Thereafter, Carrie Sun allegedly confirmed with Dr. Sadeghi that he "…created a hair for koki's avatar", and fixed Dr. Sadeghi's avatar in response to Dr. Sadeghi's observation that "…around my ears the hair is missing".[29] Ms. Sun also allegedly fixed her own hair as well as that of Mr. Koki Nagano and Cristobal.[30]

In his interview, Dr. Li admitted to pre-caching the avatars. He claimed that he did so because there were wireless internet connectivity concerns with respect to the conference facility within the Los Angeles Convention Center. According to Dr. Li, his software could perform as

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[22] See VAC, paragraph 119, p.21; Exhibit "E", paragraph E.11; pp. 160, 161
[23] See VAC, paragraph 175, p. 29 ; Exhibit "E", paragraph E.5; p.137
[24] See VAC, paragraphs 179-183, pp. 29, 30; Exhibit "E", paragraph E.26; p.191
[25] See VAC, paragraphs 184, 185, pp. 30, 31; Exhibit "E", paragraph E.27, pp. 192, 193
[26] See VAC, paragraphs, 189-191, pp. 32, 33
[27] See VAC, paragraphs 195-197, p. 33; Exhibit "E", paragraph E.30; p.196
[28] See VAC, paragraph 199, p.34; Exhibit "E", paragraph E.31; pp. 197, 198
[29] See VAC, paragraphs 200-203, pp. 34, 35; Exhibit "E", paragraphs E. 31 and E.39; pp. 197, 198 and p. 215
[30] See VAC, paragraphs 204-213, pp. 35-37; Exhibit "E", paragraph E.31 and E.40; pp. 200-202 and 216-219

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represented, but he did not want the unrelated issue of potentially spotty internet service to impact the presentation. In addition, Dr. Li stated that this presentation did not represent scientific output.

The committee does not find the wireless internet connectivity arguments persuasive for several reasons:

- According to the conference organizers for Real-Time Live, they offered all presenters a wired network option because it was the most reliable means for network access. The network option was based on network guidelines the GraphicNET program (conference network vendor) uses at the Los Angeles Convention Center. The organizers further stated that for presentations, "…a wired network all the way".
- Even if there were internet connectivity concerns, there is evidence that the Pinscreen team had sufficient computing capacity on the computers they brought on stage to perform avatar generation in real-time, rather than in cached fashion. At 34:50 of the RTL conference (viewable at https://www.youtube.com/watch?v=hpuEdXn_M0Q), Dr. Sadeghi states that "[f]or better performance, we run our neural networks and optimizations on the GPU". GPU renders graphics at a significantly faster speed than the CPU. There also appear to be several computers on stage in the video.
- Even if there were internet connectivity considerations and Pinscreen lacked sufficient computing capacity to generate the avatars in real-time, the committee believes that the research team had an ethical obligation to disclose to the audience that the avatars were not being generated in real-time. This is especially true because the essence of the conference is to present outputs in this fashion. See, e.g., https://s2018.siggraph.org/conference/conference-overview/real-time-live/ ("Watch as the best of the best in real-time graphics and interactivity come together for a live competition and share their innovations").
- Internet connectivity concerns only address the potential length of time necessary in order to create avatars. The evidence presented by Dr. Sadeghi raises issues not only with respect to the amount of time it took to generate the avatars, but the quality of the avatars created. As noted above, there appear to be several conversations related to manually modifying the avatars due to the quality of the output, most specifically with respect to Carrie Sun's apparent manual modifications to several avatars allegedly generated in real-time at the conference.

Similarly, the committee is not persuaded by Dr. Li's argument that the RTL venue did not represent a research output, for several reasons:

- Dr. Li stated his USC and ICT affiliations on the first slide of the presentation at RTL. (See https://www.youtube.com/watch?v=hpuEdXn_M0Q; 31:07).
- Dr. Li cites this presentation on his CV. (See http://www.hao-li.com/documents/resume.pdf, p. 16).
- In the same session at Real-Time Live at SIGGRAPH 2017, there were at least 3 other presentations from universities:

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- o "Direct 3D Stylization Pipelines"; Nanyang Technological University, Universite Grenoble Alpes, and Universite Bordeaux. (See (https://www.youtube.com/watch?v=hpuEdXn_M0Q&t=47m20s; 53:36)
  - o "Large-Scale Interactive Water Simulation With Directional Waves"; IST Austria (https://dl.acm.org/citation.cfm?id=3098916).
  - o "PhysicsForests: Real-Time Fluid Simulation Using Machine Learning"; ETH Zurich. (https://www.youtube.com/watch?v=hpuEdXn_M0Q&t=47m20s; 47:23).
- Dr. Li cited his RTL presentation in his SIGGRAPH Asia 2017 Technical Papers Submission (See https://dl.acm.org/citation.cfm?id=31310887; ACM Transactions on Graphics, Vol 36, No. 6, Article 195, p.3).
- Outputs need not be formally peer reviewed as a manuscript would be in order for the output to be considered research (e.g., invited talks, conference presentations such as this one). That said, in this case, there was a formal submission and review process. (See Exhibit "E" attached hereto, which is a copy of the reviews for Dr. Li and Pinscreen's RTL submission). Dr. Li himself appears to have stated that "realtime live…it's the hardest thing to get in…it's much harder than paper" (See VAC, complaint p.186, paragraph 23).

Conclusion

For the reasons stated above, the Preliminary Inquiry committee recommends that this matter proceed to a full Investigation under USC's Policy on Scientific Misconduct (https://policy.usc.edu/scientific-misconduct/), dated July 30, 2013.

Date: 1/24/2019
To: Yannis Yortsos, Randy Hall, Dan K. Shapiro, the Scientific Misconduct Inquiry Committee, Cyrush Shahabi, Mahta Moghaddam, Gaurav Sukhatme, and Randy Hill.
From: Hao Li

Re: Preliminary Inquiry Findings

Dear Dr. Yortsos, Members of the Scientific Misconduct Inquiry Committee, Dr. Hall, Mr. Shapiro, Dr. Shahabi, Dr. Moghaddam, Dr. Sukhatme, and Dr. Hill:

I have received and read your report regarding the Preliminary Inquiry of Mr. Sadeghi's allegations of fabrication and/or falsification against me. It goes without saying that I am deeply disappointed and that the Committee recommended a full investigation under USC's Policy on Scientific Misconduct.

Let me be very clear: there was absolutely NO fabrication and/or falsification from either our teams at USC or Pinscreen at any point in time. Nor did I or anyone associated with me mislead the public or the scientific community. It is my firm belief that Dr. Iman Sadeghi, who we have filed a motion to dismiss against, because his claims have no merit, approached USC simply to gain leverage in his shakedown lawsuit. Although I understand that USC must treat any complaint seriously, regardless of the source, it should take into account that Dr. Sadeghi's actions are driven by an ulterior motive of personal profit, rather than any legitimate concern for scientific integrity.

That being said, I will provide answers to all the concerns outlined in the January 8 Preliminary Inquiry Report (the "PIR"). In addition to my own rebuttal, I have attached receiving email exchanges, reports, and letters from top ACM SIGGRAPH leadership (SIGGRAPH Conference Chair, SIGGRAPH Real-Time Live Chair, SIGGRAPH Real-Time Live Committee) as well as recognized independent 3rd party experts (ACM SIGGRAPH Technical Papers Committee) who possess domain knowledge and are qualified to assess the authenticity of my research. Given the limited time provided to respond to the PIR, one of these responses (Prof. Dr. Etienne Vouga) may come shortly after the deadline of January 24, 2019, but I have attached the other ones to this response. I request that all submissions be considered, as this inquiry has a direct and tangible impact on my livelihood, my reputation, and my future with USC and, potentially, Pinscreen itself.

These submissions will be of great assistance in providing the technical backdrop to demonstrate that not only did nothing improper occur, but it would have been impossible for it to occur. USC's inquiry committee and its legal representative Dan K. Shapiro acknowledged during the earlier hearings that they lack domain knowledge in the field of Computer Graphics and Computer Vision, which is in my opinion critical in making a fair assessment of this inquiry. The third-party materials will assist in bridging that gap.

1.   Response re: SIGGRAPH / SIGGRAPH Asia 2017 Technical Papers Submission.
   a.   Proposed inquiry re: whether Pinscreen manually created 100 hairs following testing.

With respect to the SIGGRAPH and SIGGRAPH Asia 2017 submission, the PIR first stated the following:

> "In the rebuttal submitted by Dr. Li in connection with the rejected SIGGRAPH 2017 paper, he claims that he "...tested over 100 images including public data sets, celebrity photos, and some collected selfies, where most of them lead to plausible reconstructions." The reviewers picked up on this claim and asked Dr. Li to " ... [p]resent all the results for 100 photos that were tested (as the rebuttal states)." However, as outlined above, subsequent to this time, Dr. Li forwarded the comments to his team in a manner suggesting that he did not in fact have 100 tested faces, necessitating that this testing occur, and also suggesting that he have an artist manually create all hairs for the 100 photos to be tested."

First, the 100 photos tested had nothing to do with the comment about having an artist create hairs for 100 photos. In testing our programming, we tested over 100 faces to determine whether the software generated outputs correctly. While they were not to our satisfaction, it simply meant that the algorithms needed to be improved and that there was more work to do.

Separately, after the submission and before the rebuttal, we reconstructed roughly 100 head+hair models, where about 10 failed. We always test the results in batches. In fact, we have reconstructed thousands of faces in the past, and hundreds of hair separately. While we did not have 100 data that was to our own satisfaction after the submission, we were confident that we could produce those automatically in a revision period. There is nothing wrong with setting the bar high, to ensure that we can achieve the best possible results and further improving those.

Second, the comment about manually creating hairs for 100 photos was a sarcastic comment that reflected my frustration with the errors in reconstruction. Please understand that the time it takes to create a single reasonable quality hair model manually is minimum of a full day for a good digital artist, and in fact takes on **average** multiple days, if not weeks. This would aggregate to at least half a year to a year of work for an artist to create them manually. We did not have access to a team of artists that could produce such results, nor did we engage even a single artist to produce 100 hairs for these photos. We were also on deadline so there would have been no time to create hairs from scratch. Hence, my joking remark "hahaha." Simply put, neither I nor any of the co-authors would have risked to fabricate data and they have sufficient common sense to tell the difference if I'm joking or not.

You will receive reports (one is attached) from independent 3rd party experts (ACM SIGGRAPH Committee members) who will give evidence as a witness that my statements are correct**. [Lewis,Vouga]**

b.   Proposed inquiry re: manual alteration of hair modeling.

The committee further wrote the following:

> "The claims between the rejected article and the later re-submission are similar enough that, to the extent that in connection with the SIGGRAPH Asia re-submission, Dr. Li was unable to achieve the results claimed without manual alteration months later, then it is possible that the earlier manuscript required manual modification as well. As will be discussed below, Dr. Li has allowed the Office of Compliance and Dr. Moghaddam to view code uploaded to GitHub that is time-stamped very close in time to the submission deadline for the accepted manuscript that Dr. Li claims to be unmodifiable from what was uploaded at that time without creating a new version and new time-stamp."

Our hair models of our database are always created manually first. The algorithm then "selects" the appropriate hair model from the database to match to the photograph of the subject. The automatic part is the **retrieval** of the hair models and automatically molding those models to the head of the avatar. The more hair models that exist in the database, the greater the variety of users who would be satisfied with the resulting avatar, and the more accurate the resulting avatar. There is nothing wrong with improving the quality of the hair models manually in our database. This is how a database-driven method works and it is described as that in our paper. This is also a well-known technique in computer graphics that is used widely (see Chai et al. 2016, AutoHair: Fully Automatic Hair Modeling from a Single Image).

Note that Dr. Moghaddam confirmed during the hearing that the code cloned from the git repository cannot be modified, especially given that there are original time-stamps with the entire revision history. I have verified with our independent 3rd party experts that, while theoretically possible, such manipulation is not possible without extensive hacking and security systems skills and experiences, which neither me nor our team possess.

You will receive reports (one is attached) from independent 3rd party experts (ACM SIGGRAPH Committee members) who will give evidence as a witness that my statements are correct. **[Lewis,Vouga]**

c.   Finding re: achieving the outcome claimed in the manuscript.

Finally, the committee writes:

> "Dr. Li claims that, when run, the code demonstrates that he achieved each outcome claimed in the manuscript. As noted below, the committee recommends that in connection with a full investigation, Dr. Li be required to provide the code reflecting the claimed outputs from the earlier, rejected submission as well so that it can be independently tested."

You will receive reports (one is attached) from independent 3rd party experts (ACM SIGGRAPH Committee members) who will provide reports of his assessment to the committee about the source

code and the method in question, and which reflects that the code did in fact achieve the outcome claimed in the manuscript. **[Lewis,Vouga]**

2.   Response re: SIGGRAPH Asia 2017 Technical Papers Submission.

      a.   Proposed inquiry re: eye color generation.

The committee writes:

> "The paper claims that "[t]he eye color texture (black, brown, green, blue) is computed using a similar convolutional neural network for semantic attribute inference as the one used for hair color classification". In his October 26, 2018 interview, Dr. Li characterized the creation of a "deep neural network" as a "simple" problem to solve because the basic framework for deep learning was in place."

> "However, the evidence presented by Dr. Sadeghi includes a Skype conversation five days prior to the submission deadline between Dr. Li and Jens Fursund. In this conversation, Jens asks "but do we have time for a new algo?" in response to Dr. Li's observation that "we really need a better algorithm" due to the problems the research team was having with "eye generation" (e.g. "the eye color is total shit"). Dr. Li answered this question by stating that "I guess...a deep neural net[work] would be the way to go". Mr. Fursund replied by saying "so no [we don't have enough time]". This calls into question Dr.Li's characterization regarding the ease with which the neural network described in the paper could be achieved, as well as whether in fact it was."

> "In addition, if as Dr. Li stated this was a "simple" problem to solve, it would be illogical for the research team to have spent as much time as the text messages indicate they did in manually modifying the output of the software to accomplish these same ends. This includes Dr. Li assigning "High Priority" to manually generating 100 hair models for purposes of the paper submission."

First, an independent 3rd party expert (ACM SIGGRAPH Committee member), who we have shown the code, will give evidence as a witness that my statements during my meetings with the committee regarding eye color are correct. More specifically, the classification of eye colors is an easy task when using off-the-shelf public domain software code (in our case Resnet from He et al. 2016), which is a deep neural network for classification that can be trained in a few hours given a pre-trained model (which is also provided in public domain).

Second, I would like to address the alleged contradiction between the "simple" nature of creating an improved eye-color generation algorithm, and the apparent amount of time it took. Unlike Mr. Hu and Mr. Saito, who were involved in other tasks at the time, Mr. Fursund – who I asked if he could implement that algorithm –was not familiar with deep neural networks at that time, and hence the task would seem more difficult for him. He holds a Master degree in Digital Entertainment Engineering and his expertise is in real-time rendering and not machine learning. I

asked him if he could be in charge for this code, since others were busy with other tasks and he is the CTO of the company and was overseeing the overall pipeline.

In particular, we resolved the issue by adopting the deep neural network, ResNet (He et al. 2015), which is a well-established classification network, and can be trained in a few hours given a pre-trained model. This resulted in the achievement of the eye color result that was needed. For both hair and eye color estimation, we then used supervised learning to adopt the pre-trained network. Again, this will be borne out by the expert.

Since the team was focusing on other problems, and under time pressure, it may appear based on the correspondence, cherry-picked by Dr. Sadeghi, that creating the eye-color algorithm was a difficult task. But the reality was that the team was mostly focusing on other parts of the pipeline, and therefore needed to be reminded of this issue. Sending these reminders or assigning this task a high priority does not mean it could not have been done in a short time period or was not relatively simple. Unfortunately, Pinscreen did not have a "spare" employee to tackle the issue immediately. However, any computer vision or machine learning expert would agree that this is a trivial problem, and also that it was ultimately resolved to our satisfaction.

You will receive reports (one is attached) from independent 3rd party experts (ACM SIGGRAPH Committee members) who will give evidence as a witness that my statements are correct. **[Lewis,Vouga]**

        b.   **Proposed inquiry re: source code compared with manuscript.**

The committee writes: "

> "The committee recommends that the software source code Dr. Li claims performs each of the key findings reported in the manuscript be tested by an independent third party with the requisite expertise to evaluate whether Dr. Li's claims are credible."

You will receive reports (one is attached) from an independent 3rd party expert (ACM SIGGRAPH Committee member) who will provide a report of his assessment to the committee about the method in question. **[Lewis,Vouga]**

        c.   **Proposed inquiry re: slight alteration of color values.**

Also related to eye color, the committee writes:

> "The investigation committee should more fully evaluate Dr. Li's contention that the only issue remaining to be resolved was the slight alteration of color values necessitated by export issues from Unity to a format that would enable submitting the avatars with the manuscript. After the time Mr. Hu and Mr. Nagano identified the issue related to the color values, Dr. Li texted Mr. Hu, Mr. Nagano, and the remainder of the research team, informing them that "if in an hour it's not working let's do it manually...and give up on it.. .I don't think we can make it automatic". If, as Dr. Li represented in his interview, the code

was operating as intended and in the manner reflected in his manuscript, there would have been no reason after the time he was informed of this issue to have suggested that "I don't think we can make it automatic", which suggests that problems with his code may have still remained."

This is incorrect. The reconstruction output (the actual result of the paper) is correct, but our intermediate rendering failed, which would lead to some visualization inaccuracies that are unrelated to the overall performance and technical contribution of the paper. As I explained, the output of the game engine, Unity, had an issue with the Color Space Conversion, which had a different conversion value than the standard Color Space, which would lead to these minor visualization errors. The problem in rendering some figures does not mean that the results were not properly generated by the software itself, as we accurately claimed in our contributions to SIGGRAPH. The software performed as represented.

Independent 3rd party experts (ACM SIGGRAPH Committee members) will give evidence as a witness that these statements are correct. **[Lewis,Vouga]**

> d.   **Proposed inquiry re: alleged efforts to falsify data.**

Finally, the committee writes:

> "Even if the committee were to conclude that the source code does in fact perform each of the key claims in the manuscript, the definition of research misconduct under USC policy and applicable federal regulations includes" ... fabrication, falsification, plagiarism in proposing, performing, or reviewing research, or in reporting research results" (Emphasis added). Therefore, even if in the day or two prior to submission Dr. Li and his research team completed the deep neural network claimed in the manuscript, there remains evidence that there were efforts to fabricate and/or falsify data while the research was being performed."

Respectfully, the allegation that "there remains evidence that there were efforts to fabricate and/or falsify data while the research was being performed" is an unwarranted conclusion that is even more concerning because it implies that the Committee has already reached a conclusion on the issue rather than simply referring the issue to a full investigation. I categorically dispute that there is any evidence, much less any intension, at any point in the process to engage in fabrication or falsification.

- As for the chat message referencing the manual creation of 100 hair models, this was an obvious joke that everyone involved (even Dr. Sadeghi at the time) would have recognized was a sarcastic comment (hence "hahahahaha").

- As for the Color Space Conversion issue in Unity, it had nothing to do with Pinscreen's research output. The only adjustment came when the output needed to be rendered as an intermediate result figure rather than the actual performance or technical contribution of the paper.

- Also, although I was concerned that the eye color algorithm would not function properly by the time of the paper submission, there was never any attempt (or any implied attempt) to "solve" the issue through fabrication or falsification. And in the end, after continuing to work at the issue, eye color was resolved by adopting the deep neural network, ResNet (He et al. 2015), which is a well-established classification network.

- Neither I nor anyone on my team would ever fabricate/falsify data or even attempt to do so.

Again, independent 3rd party experts (ACM SIGGRAPH Committee members) will give evidence as a witness that these statements are correct. **[Lewis,Vouga]**

3.   Response re: SIGGRAPH Real-Time Live ("RTL") Submission, dated April 4, 2017.

The committee writes:

> The committee recommends that this allegation also be fully investigated. Specifically, the committee recommends that the images and avatars of Mr. Gosling and Ms. Dunphy should be compared against all images and/or avatars provided to Mr. Leszek, as well as all images and/or avatars (or any other output) provided by Mr. Leszek to Dr. Li and/or his research team to determine whether they match the images and avatars contained in the abstract.

First, I have provided all data in connection with these images and avatars. And the code I showed during our hearing can reproduce these results. The independent 3rd party expert (ACM SIGGRAPH Committee member) has also seen our system working. **[Lewis]**

Second, these images are taken from our submission to RTL. Even if we could not produce those (which we can), it is acceptable for SIGGRAPH RTL submissions to only show concept results that demonstrate the intend of what the actual presentation will show. The Chair of the SIGGRAPH Asia conference will confirm in his letter that this statement is correct. **[Anjyo]**

4.   Response re: SIGGRAPH Real-Time Live ("RTL") Demo, dated August 1, 2017.

a.   Proposed inquiry re: wireless internet connectivity.

The committee writes:

> "The committee does not find the wireless internet connectivity arguments persuasive for several reasons: According to the conference organizers for Real-Time Live, they offered all presenters a wired network option because it was the most reliable means for network access. The network option was based on network guidelines the GraphicNET program (conference network vendor) uses at the Los Angeles Convention Center. The organizers further stated that for presentations, " ... a wired network all the way."

The "internet connectivity argument," as you are aware, is that in order to ensure that the software performs "on demand" at Real-Time Live, the system needs to be re-built on a local machine which involves significant porting efforts since our code was designed to run on a scalable architecture

on AWS. This is because there was a very real risk that the software will not interact properly with the remote server or that this will cause delays that would render the presentation ineffective. Since the porting was too complex in that limited amount of time, we decided to cache the results, but the results were generated automatically beforehand. Also, creating a backup cached results on a local machine is a common practice that is not only accepted, but also encouraged, by the RTL organizers.

To repeat what I have previously stated, Pinscreen did request a wired connection, but we had every reason to believe that even a wired connection would cause issues based on the warnings of the conference organizers (see mail screenshot). To this end, we had to use a fallback plan, and at that time, we had to cache, since we did not have sufficient time to port the backend server algorithm to a local machine. As shown in the other evidence materials, this is a known and recurrent problem for SIGGRAPH real-time lives, because thousands of attendees are in the same room.

From: **Justin Stimatze** jstimatze@gmail.com
Subject: Re: Reminder - 2017 Real-Time Live! Virtual Rehearsals
Date: June 15, 2017 at 6:20 PM
To: Cristobal Cheng ccheng@siggraph.org
Cc: Hao Li hao@hao-li.com, maggie_Schutz@siggraph.org maggie_schutz@siggraph.org, Nathan Harling nathan.x.h@gmail.com

Hello Hao,

We'd be happy to provide you with an Ethernet cable (as many as needed) and strongly prefer that presenters use Ethernet instead of wireless.

However, we would like to know more about your listed bandwidth requirements. Can you give me some more information on minimum, average, and maximum bandwidth needs? Is the traffic rate consistent or are there spikes of sudden demand? Do you have an offline fall-back option if you encounter network issues during rehearsal?

To add some context: Conference networking is surprisingly different from other venues. We can provide fairly reliable service inside the building, 100Mbit or 1000Mbit wired connections depending on the exact rooms and requests etc. However, actual internet access is a different story. In years past, we have paid many tens of thousands of dollars for 18Mbit/s shared across the whole conference. We have been unable to guarantee even 1 Mbit/s to contributors without significant preplanning and associated cost to the conference, which has caused some challenges with presentations and frustration for all involved. Fortunately, things are looking more flexible this year but I hope that explains the concern! We want you to have a fantastic and successful presentation with as little stress as possible about networking risks.

- Justin

However, since the Committee appears to be unpersuaded by my own testimony, I will provide email exchanges between our Pinscreen team and SIGGRAPH Real-Time Live conference organizers who have raised this potential issue to us. **[Hasegawa et al., Stigmatze et al. Cardenas et al.]**

I have also provided responses from the SIGGRAPH Asia Conference Chair, SIGGRAPH Real-Time Live Chair and Committee that it is acceptable to cache, that there are known bandwidth issues, and that we are even encouraged to cache our data, and that there is no need to disclose such information during the show. **[Anjyo, Hasegawa et al., Seymour]**

I have provided letters from the SIGGRAPH Conference chair and Real-Time Live Chair that these practices are not only legitimate and acceptable, but even encouraged. **[Anjyo, Hasegawa et al., Seymour]**

      b.   **Proposed inquiry re: computer capacity.**

In connection with the same issue, the committee writes:

> "Even if there were internet connectivity concerns, there is evidence that the Pinscreen team had sufficient computing capacity on the computers they brought on stage to perform avatar generation in real-time, rather than in cached fashion. At 34:50 of the RTL conference (viewable at https://www.youtube.com/watch?v=hpuEdXn MOO), Dr. Sadeghi states that "[f]or better performance, we run our neural networks and optimizations on the GPU". GPU renders graphics at a significantly faster speed than the CPU. There also appear to be several computers on stage in the video."

Dr. Sadeghi's statement is a reference to computing capacity. However, the internet connectivity problem was not a problem of computing capacity. It was a problem of network transfer bandwidth, which is dependent on the organizers' network, not the performance capabilities of our local machine. Of course our reconstruction solution could have run on the local machine, but there was no time finishing the full porting of our backend code to the local system. Hence we used a combined local machine with server support (which is actually how it works now), but cached the results that were genuinely reconstructed. We have also demonstrated the non-cached pipeline on stage before the show for various people. I have provided these evidences, including time stamped reconstructions on the day of the event. In particular, the time stamps cannot be modified/manipulated since they are stored on Amazon S3. Even in later SIGGRAPH RTL presentations, we have explicitly asked Real-Time Live chairs if this hybrid approach was acceptable, and they strongly recommended to cache the results to ensure a smooth show.

I have provided additional material from the SIGGRAPH Conference Chair, SIGGRAPH Real-Time Live Conference Chair, SIGGRAPH RTL Committee Members, as well as independent 3rd party experts (ACM SIGGRAPH Committee members) who will give evidence as a witness that these statements are correct. **[Anjyo, Hasegawa et al., Seymour, Lewis]**

      b.   **Proposed inquiry re: quality of avatars.**

The committee further writes:

> "Internet connectivity concerns only address the potential length of time necessary in order to create avatars. The evidence presented by Dr. Sadeghi raises issues not only with respect to the amount of time it took to generate the avatars, but the quality of the avatars created. As noted above, there appear to be several conversations related to manually modifying the avatars due to the quality of the output, most specifically with respect to Carrie Sun's apparent manual modifications to several avatars allegedly generated in real-time at the conference."

Before the show, we have every right to fine tune the performance of our algorithm, and knowing beforehand which person would be digitized motivated us to improve the quality of relevant hair models in our database. Notice that hair models can be modeled manually and added to the database in order to ensure that the query would result in a higher quality model. As we have mentioned above, the query itself is the contribution part, not the fact that we model a hair manually or not. It does not matter, where that hair comes from and this is how the algorithm works and published as such.

I am also providing the following corroborating evidence:

- At the time of the RTL, we tested the technology backstage with several people who can confirm it really worked. The data has been also stored on Amazon S3, which timestamps are impossible to alter.

- Another example is, Dr. Ari Shapiro (USC/ICT) who also cached the results for rapid avatar capture at SIGGRAPH 2014 RTL.

- I have also attached an email exchange with SIGGRAPH Real-Time Live Chair/Committee who says that it is even acceptable to have video playbacks at the show.

- An independent 3rd party expert (ACM SIGGRAPH Committee member), SIGGRAPH Conference Chair, SIGGRAPH Real-Time Live Conference Chair, and SIGGRAPH RTL Committee members, will give evidence as a witness that these statements are correct.

b. Proposed inquiry re: RTL venue as a research output.

Finally, the committee writes:

> "Similarly, the committee is not persuaded by Dr. Li's argument that the RTL venue did not represent a research output, for several reasons:
> - Dr. Li stated his USC and ICT affiliations on the first slide of the presentation at RTL. (See https://www.youtube.com/watch?v=hpuEdXn MOO;31:07).
>
> - Dr. Li cites this presentation on his CV. (See http://www.hao-li.com/documents/resume.pdf, p. 16).
>
> - "In the same session at Real-Time Live at SIGGRAPH 2017, there were at least 3 other presentations from universities:
>
>   o "Direct 3D Stylization Pipelines"; Nanyang Technological University, Universite Grenoble Alpes, and Universite Bordeaux. (See (https://www.youtube.com/watch?v=hpuEdXn MOO&t=47m20s; 53:36);
>
>   o "Large-Scale Interactive Water Simulation With Directional Waves"; IST Austria (https://dl.acm.org/citation.cfm?id=3098916);

- o "PhysicsForests: Real-Time Fluid Simulation Using Machine Learning"; ETH Zurich. (https://www.youtube.com/watch?v=hpuEdXn MOQ&t=47m20s; 47:23)."

- Dr. Li cited his RTL presentation in his SIGGRAPH Asia 2017 Technical Papers Submission (See https://dl.acm.org/citation.cfm?id=3 1310887; ACM Transactions on Graphics, Vol 36, No. 6, Article 195, p.3).

- "Outputs need not be formally peer reviewed as a manuscript would be in order for the output to be considered research (e.g., invited talks, conference presentations such as this one). That said, in this case, there was a formal submission and review process. (See Exhibit "E" attached hereto, which is a copy of the reviews for Dr. Li and Pinscreen's RTL submission). Dr.Li himself appears to have stated that "realtime live...it's the hardest thing to get in...it's much harder than paper" (See VAC, complaint p.186, paragraph 23)."

I respond as follows:

- **USC and ICT affiliations:** I stated my affiliations properly. I am a USC professor. Having a presenter with University affiliation does not mean that the RTL presentations are understood to be research outputs. There is a research component deriving from the paper submissions, but the presentations themselves are general interactive demonstrations that are meant to provide entertainment to the audience. Indeed, most of the contributors come from industry, and are not research-related output. Regardless, the presentation accurately reflected the Pinscreen's technological functionality in a manner that was true to the actual user experience.

- **My CV:** Including this presentation in my CV does not mean that the venue represents research outputs. In particular, I have put it in the section "Course Notes, Tech Talks & **Exhibitions**", which is a different section than "Peer-Reviewed Journal & Conference Papers"(see screenshot).

COURSE NOTES, TECH TALKS & EXHIBITIONS

[20] PINSCREEN AVATARS IN YOUR POCKET: MOBILE PAGAN ENGINE AND PERSONALIZED GAMING
Koki Nagano, Shunsuke Saito, Mclean Goldwhite, Kyle San, Aaron Hong, Liwen Hu, Lingyu Wei, Jun Xing, Qingguo Xu, Hanwei Kung, Jiale Kuang, Aviral Agarwal, Erik Castellanos, Jaewoo Seo, Jens Fursund, Hao Li
ACM SIGGRAPH Asia 2018 Real-Time Live!, 12/2018

Hao **Li**   16

[19] DEEP LEARNING-BASED PHOTOREAL AVATARS FOR ONLINE VIRTUAL WORLDS ON IOS
Koki Nagano, Jaewoo Seo, Jun Xing, Kyle San, Aaron Hong, Mclean Goldwhite, Jiale Kuang, Aviral Agarwal, Caleb Arthur, Hanwei Kung, Stuti Rastogi, Carrie Sun, Stephen Chen, Jens Fursund, Hao Li
ACM SIGGRAPH 2018 Real-Time Live!, 08/2018

[18] TRUTH IN IMAGES, VIDEOS, AND GRAPHICS
Chris Bregler, Alyosha Efros, Irfan Essa, Hany Farid, Ira Kemelmacher-Shlizerman, Matthias Nießner, Luisa Verdoliva, Hao Li
ACM SIGGRAPH 2018 Sunday Workshop, 08/2018

[17] PINSCREEN: CREATING PERFORMANCE-DRIVEN AVATARS IN SECONDS
Hao Li, Liwen Hu, Koki Nagano, Jaewoo Seo, Shunsuke Saito, Lingyu Wei, Iman Sadeghi, Jens Fursund, Yen-Chun Chen, Stephen Chen, Carrie Sun
ACM SIGGRAPH 2017 Real-Time Live!, 08/2017

- **Other University presentations:** While there are other University-affiliated presentations, it does not convert the RTL from an exhibition to a research output. Again, the RTL is a general interactive demonstration that is expected to be entertaining. Most of the contributors come from industry, and are not research related output.

- **Peer review:** While there was a review process (see screenshot of an example), the output may not need a scientific or research contribution. For instance, the RTL submission Unity: Editor VR, demonstrated a new open-source feature that allows anyone to edit Unity scenes directly in VR. All the contributors are engineers at Unity, and the demo does not mark any research or scientific advancement. The definition of research is "systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions". The presented work demonstrates a new product, but not a scientific investigation.

  Having said that Real-time Live is extremely difficult to get in, equating the exhibition itself with a scientific work would be a false equivalency. SIGGRAPH RTL requires a huge amount of production work and storytelling, in which the presentation is paramount. The participants and audience understand that the purpose of RTL is to demonstrate what the technology looks like and how it works, but it is neither necessary nor expected that the technology employed on the stage will rely entirely on was is presented in a technical paper that is related to the presentation of RTL.

Reviewer #62:	
6) Public Comments	Nice demonstration for picture to 3D model. Although the model is a bit crude, and the facial animation can be better, this submission should be encouraged considering the complexity of putting the system together. I hope by the time of presentation, the work can be more polished.
8) Overall Score	4
Submission Information:	

I have provided letters/reports/mails from SIGGRAPH Conference chair and Real-Time Live Chair that these practices are not only legitimate and acceptable, but even encouraged. **[Anjyo, Hasegawa et al., Seymour, Lewis]**

In addition, I provide the following corroborating evidence in additionalEvidences.zip:

- **[Lewis]** I have attached a detailed interview/code-review report from a highly recognized 3rd party independent expert, J.P. Lewis, who has visited Pinscreen in Los Angeles, tested our system, and reviewed the source code, as well as interviewed the engineers in person, without my presence as I was out of the country. J.P. Lewis has also served as **ACM SIGGRAPH/SIGGRAPH Asia Technical papers committee member,. J.P. Lewis,** will also comment on the difference between SIGGRAPH Technical Papers and SIGGRAPH Real-Time Live Show. Also notice that the first author, Liwen Hu, who is my current PhD student, has only been at the Pinscreen location **for this specific interview** and is otherwise no longer working or present at Pinscreen, after his summer internship in 2018:
  JP_Lewis_SIGGRAPH_TechnicalPaperCommittee_PinscreenInterview.pdf

- **[Anjyo]** I have attached a letter from the last **SIGGRAPH Asia 2018 Conference Chair, Ken Anjyo,** who will comment on his familiarity of the allegations from Mr. Sadeghi, as well as details on the official guidelines for the SIGGRAPH Real-Time Live show (for any year) as well as its difference to SIGGRAPH technical papers. In particular, he will provide comments about caching practices, internet connectivity issues, and submission criterions.
Ken_Anjyo_SIGGRAPH_Asia_2018_Conference_Chair_Letter.pdf

- **[Seymour]** You should have received a letter of support from the upcoming **SIGGRAPH Asia Real-time Live 2019 Chair, Mike Seymour,** who has provided additional evidences as witness about our previous work at SIGGRAPH Asia 2017, and SIGGRAPH RTL 2017. He has provided additional details about the nature of RTL events as well as the validity of our presentations. I have added this letter as part of this response in case it is missing:
Mike_Seymour_SIGGRAPH_Asia_2019_RTL_Chair_LetterOfSupport.pdf

- **[Hasegawa et al.]** I have also attached an email confirmation from **SIGGRAPH Asia 2018 Real-Time Live Chair and the entire Committee, Isamu Hasegawa,** confirming that also for SIGGRAPH Asia 2018 RTL our practice of caching are valid and encouraged, that there was wireless issues, and that not everything needs to be real-time during the show, as some other teams even showed movie playbacks.
Isamu_Hasegawa_SIGGRAPH_Asia_2018_RTL_Chair_SIGGRAPHRealTime
LiveEmail.pdf

- **[Stigmatze et al.]** I have also attached two email exchanges from SIGGRAPH 2017 Real-Time Live, commenting on the need for backup plans, due to potential Wireless AND Wired connections during the Real-Time Live demonstration. Notice that the former **SIGGRAPH 2017 Real-Time Live! Chair, Cristobal Cheng**, was included in the email communication.
Justin_Stigmatze_Cristobal_Cheng_SIGGRAPH_2017_RTL_Chair_Email1.pdf
Justin_Stigmatze_Cristobal_Cheng_SIGGRAPH_2017_RTL_Chair_Email2.pdf

- **[Cardenas et al.]** I have also attached an email exchange from SIGGRAPH 2018 Real-Time Live, commenting again that there is a need for backup plans, due to potential Internet connection issues during the Real-Time Live demonstration. Notice that the former **SIGGRAPH 2018 Real-Time Live! Chair, Jesse Barker**, was included in the email communication.
Carlos_Cardenas_Jesse_Barker_SIGGRAPH_2018_RTL_Chair_Email.pdf

- **[Vouga]** you will also receive a letter/report from Prof. Dr. **Etienne Vouga** (UT Austin), who has in depth knowledge in geometric modeling, who is familiar with our research, and who has served at **ACM SIGGRAPH and SIGGRAPH Asia Technical Papers Committee**. He will provide additional evidences that our algorithms are not fake and also that there was no intention of fabrication and/or falsifying data. His letter/report will be sent to you shortly after today's deadline.

These letters, reports, email exchanges, from top authorities of ACM SIGGRAPH/ACM SIGGRAPH Asia, as well as both Technical Papers Committee members and Real-Time Live Show indicate that my position and statements are correct.

Thank you for taking the time to review this response and the evidence included therewith. I am hopeful that the Committee will revisit its decision and determine that a full investigation would be an unnecessary drain on resources that could be devoted elsewhere, as there simply is no evidence that myself or Pinscreen acted in any way that could be deemed scientific misconduct.

I would be happy to respond to any further questions.

Sincerely,
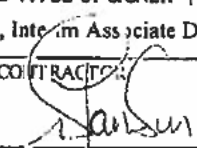
Dr. Hao Li
1/24/2019

AWARD/ MODIFICATION

3a. ISSUED BY:
Office of Naval Research
875 N. Randolph Street Suite 1425
Arlington VA 22203-1995

1. INSTRUMENT TYPE: Grant Award		3b. CFDA: 12.300
2. AUTHORITY: 10 USC 2358 and 31 USC 6304, as amended		3c. DUNS NUMBER: 072933393

4. AWARD NO.: N00014-18-1-2349	5. MODIFICATION NO.:	6. MODIFICATION TYPE: NEW	7. PR NO.: 1000009253	

8. ACTIVITY/AGENCY PROPOSAL NO.: GRANT12483394	9. RECIPIENT PROPOSAL NO.:	10. PROPOSAL DATE: 09152017	11. ACTIVITY TYPE: R&D	12. PROGRAM TYPE: YIP

13. ISSUED TO 13a. ADDRESS:	13b. CAGE: 1B729	13c. EDI/EFT NUMBER: N/A	14. REMITTANCE ADDRESS (IF DIFFERENT FROM BLOCK 13): Same as Block # 13

UNIVERSITY OF SOUTHERN CALIFORNIA
U S C
3720 S FLOWER STREET THIRD FLOOR
LOS ANGELES CA 90089-0001
UNITED STATES OF AMERICA

13d. BUSINESS OFFICE CONTACT:
Kalief Washington

13e. TELEPHONE NUMBER: +1 213 740 2875	13f. EMAIL ADDRESS: kaliefwa@usc.edu

15. RESEARCH TITLE AND/OR DESCRIPTION OF PROJECT AND/OR PROPOSAL TITLE:
Complete Human Digitization and Unconstrained Performance Capture

16. FUNDING	ACTIVITY/AGENCY SHARE	RECIPIENT SHARE	TOTAL	17. CURRENT FUNDING PERIOD
PREVIOUSLY OBLIGATED:			$0.00	N/A THROUGH N/A
OBLIGATED BY THIS ACTION:			$170,000.00	
TOTAL OBLIGATED ON AWARD:			$170,000.00	
FUTURE FUNDING:			$421,509.00	18. PERIOD OF PERFORMANCE 06/01/2018 THROUGH 05/31/2021
GRANT TOTAL:			$591,509.00	

19. ACCOUNTING AND APPROPRIATION DATA:
See Attached Financial Accounting Data Sheet(s)

20a. PRINCIPAL INVESTIGATOR/RECIPIENT TECHNICAL REPRESENTATIVE: Dr. Hao Li	21. TECHNICAL REPRESENTATIVE 21a. NAME: PETER SQUIRE	21b. CODE: 301
	21c. ADDRESS: ONR ASYMMETRIC WARFARE RESEARCH DIV 875 N. Randolph Street Arlington VA 22203-1995	

20b. TELEPHONE NUMBER: +1 213 740 4494	20c. EMAIL ADDRESS: hao@hao-li.com	21d. TELEPHONE NUMBER: 703-696-0407	21e. EMAIL ADDRESS: PETER.SQUIRE@NAVY.MIL

22. AWARDING OFFICE CONTACT 22a. NAME: ELIZABETH FORD	22b. CODE: BD255	23a. ADMINISTRATIVE OFFICE: ONR REG Office San Diego Telephone: (619) 221-5490 Email:ONR_San_Diego@navy.mil 140 Sylvester Road, Bldg. 140 Room 218 SAN DIEGO CA 92106	23b. CODE: N66018
22c. ADDRESS: Office of Naval Research 875 N. Randolph Street, Suite 1425 Arlington, VA 22203-1995			

22d. TELEPHONE NUMBER: 703-696-2576	22e. EMAIL ADDRESS: ELIZABETH.FORD@NAVY.MIL		

24. SUBMIT PAYMENT REQUEST TO: Same as block 23a	25a. PAYING OFFICE DFAS-CO/WEST ENTITLEMENT OPERATIONS HQ0339 PO Box 182381 COLUMBUS OH 43218	25b. CODE: HQ0339	26a. PATENT OFFICE: Office of Naval Research ATTN: ONR Office of Counsel Intellectual Property Section One Liberty Center 875 North Randolph Street, Suite 1425 Arlington, VA 22203-1995	26b. CODE: N00014

ONR AWARD FORM (10/99) - version 1.1

Page 1 of 5

AWARD/CONTRACT	1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)		RATING	PAGE	OF PAGES
				1	33

2. CONTRACT (Proc. Inst. Ident.) NO. W911NF-14-D-0005	3. EFFECTIVE DATE 29 September 2014	4. REQUISITION/PURCHASE REQUEST/PROJECT NO.

5. ISSUED BY CODE W911NF	6. ADMINISTERED BY (If other than Item 5) CODE N66018
US ARMY ACC-APG-RTP W911NF 4300 S. MIAMI BLVD DURHAM NC 27703	ONRRO SAN DIEGO 140 SYLVESTER ROAD BLDG 140 ROOM 218 SAN DIEGO CA 92106-3521

7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, state and zip code)	8. DELIVERY
UNIVERSITY OF SOUTHERN CALIFORNIA 3720 S FLOWER STREET THIRD FLOOR LOS ANGELES CA 90089-0001	[ ] FOB ORIGIN [X] OTHER (See below)
	9. DISCOUNT FOR PROMPT PAYMENT
	10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN: ITEM
CODE 1B729 FACILITY CODE	

11. SHIP TO/MARK FOR CODE W71B7J	12. PAYMENT WILL BE MADE BY CODE HQ0490
ARMY RESEARCH LABORATORY ARMY RESEARCH LABORATORY 4300 SOUTH MIAMI BLVD. DURHAM, NC MD 27703	DFAS INDIANAPOLIS-GFEBS 8899 EAST 56TH STREET DEPT. 3800 INDIANAPOLIS IN 46249-3800

13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: [X] 10 U.S.C. 2304(c)(3) [ ] 41 U.S.C. 253(c)( )	14. ACCOUNTING AND APPROPRIATION DATA

15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
	SEE SCHEDULE				
	15G. TOTAL AMOUNT OF CONTRACT				$141,000,000.00

16. TABLE OF CONTENTS

(X)	SEC.	DESCRIPTION	PAGE(S)	(X)	SEC.	DESCRIPTION	PAGE(S)
		PART I - THE SCHEDULE				**PART II - CONTRACT CLAUSES**	
X	A	SOLICITATION/CONTRACT FORM	1	X	I	CONTRACT CLAUSES	24 - 29
X	B	SUPPLIES OR SERVICES AND PRICES/COSTS	2 - 3			**PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.**	
X	C	DESCRIPTION/SPECS./WORK STATEMENT	4 - 8	X	J	LIST OF ATTACHMENTS	30 - 33
X	D	PACKAGING AND MARKING	9			**PART IV - REPRESENTATIONS AND INSTRUCTIONS**	
X	E	INSPECTION AND ACCEPTANCE	10		K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	
X	F	DELIVERIES OR PERFORMANCE	11 - 13				
X	G	CONTRACT ADMINISTRATION DATA	14 - 17		L	INSTRS., CONDS., AND NOTICES TO OFFERORS	
X	H	SPECIAL CONTRACT REQUIREMENTS	18 - 23		M	EVALUATION FACTORS FOR AWARD	

CONTRACTING OFFICER WILL COMPLETE ITEM 17 (SEALED-BID OR NEGOTIATED PROCUREMENT) OR 18 (SEALED-BID PROCUREMENT) AS APPLICABLE

17. [X] CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return ___ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)	18. [ ] SEALED-BID AWARD (Contractor is not required to sign this document) Your bid on Solicitation Number ___ including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the terms listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your bid, and (b) this award/contract. No further contractual document is necessary. (Block 18 should be checked only when awarding a sealed-bid contract)
19A. NAME AND TITLE OF SIGNER (Type or print) Teri Hansen, Interim Associate Director	20A. NAME OF CONTRACTING OFFICER VONETTA Y. GOODSON Contracting Officer TEL:
19B. NAME OF CONTRACTOR BY ___ (Signature of person authorized to sign)	19C. DATE SIGNED 9/26/2014	20B. UNITED STATES OF AMERICA BY ___ (Signature of Contracting Officer)	20C. DATE SIGNED 29 Sep 2014

AUTHORIZED FOR LOCAL REPRODUCTION
Previous edition is NOT usable

STANDARD FORM 26 (REV. 5/2011)
Prescribed by GSA – FAR (48 CFR) 53.214(a)

Attachment 5

Avatar Digitization From a Single Image For Real-Time Rendering

LIWEN HU*, Pinscreen, University of Southern California
SHUNSUKE SAITO*, Pinscreen, University of Southern California
LINGYU WEI*, Pinscreen, University of Southern California
KOKI NAGANO, Pinscreen
JAEWOO SEO, Pinscreen
JENS FURSUND, Pinscreen
IMAN SADEGHI, Pinscreen
CARRIE SUN, Pinscreen
YEN-CHUN CHEN, Pinscreen
HAO LI, Pinscreen, University of Southern California, USC Institute for Creative Technologies

Fig. 1. We introduce an end-to-end framework for modeling a complete 3D avatar from a single input image for real-time rendering. We infer fully rigged textured faces models and polygonal strips for hair. Our flexible and efficient mesh-based hair representation is suitable for a wide range of hairstyles and can be readily integrated into existing real-time game engines. All of the illustrations are rendered in realtime in Unity. President Trump's picture is obtained from whitehouse.gov and Kim Jong-un's photograph was published in the Rodong Sinmun. The other celebrity pictures are used with permission from Getty Images.

We present a fully automatic framework that digitizes a complete 3D head with hair from a single unconstrained image. Our system offers a practical and consumer-friendly end-to-end solution for avatar personalization in gaming and social VR applications. The reconstructed models include secondary components (eyes, teeth, tongue, and gums) and provide animation-friendly blendshapes and joint-based rigs. While the generated face is a high-quality textured mesh, we propose a versatile and efficient polygonal strips (polystrips) representation for the hair. Polystrips are suitable for an extremely wide range of hairstyles and textures and are compatible with existing game engines for real-time rendering. In addition to integrating state-of-the-art advances in facial shape modeling and appearance inference, we propose a novel single-view hair generation pipeline, based on 3D-model and texture retrieval, shape refinement, and polystrip patching optimization. The performance of our hairstyle retrieval is enhanced using a deep convolutional neural network for semantic hair attribute classification. Our generated models are visually comparable to state-of-the-art game characters designed by professional artists. For real-time settings, we demonstrate the flexibility of polystrips in handling hairstyle variations, as opposed to conventional strand-based representations. We further show the effectiveness of our approach on a large number of images taken in the wild, and how compelling avatars can be easily created by anyone.

* indicates equal contribution

Avatar Digitization From a Single Image For Real-Time Rendering

LIWEN HU, Pinscreen, University of Southern California
SHUNSUKE SAITO, Pinscreen, University of Southern California
LINGYU WEI, Pinscreen, University of Southern California
KOKI NAGANO, Pinscreen
JAEWOO SEO, Pinscreen
JENS FURSUND, Pinscreen
IMAN SADEGHI, Pinscreen
CARRIE SUN, Pinscreen
YEN-CHUN CHEN, Pinscreen
HAO LI, Pinscreen, University of Southern California, USC Institute for Creative Technologies

USC000361-374

Comparison SIGGRAPH Asia 2017 and ACM SIGGTAPH RTL:

(A) Hu et al. : "Avatar digitization from a single image for real-time rendering", ACM SIGGRAPH Asia 2017, 36(6), 195:1-195:14

(B) "Pinscreen: Creating Performance-Driven Avatars in Seconds", ACM SIGGRAPH Real-time Live 2017

https://www.youtube.com/watch?v=hpuEdXn_M0Q&t=2353s

http://s2017.siggraph.org/content/real-time-live.html

It appears both (A) and (B) present the same body of work. Parameters of the algorithms were tweaked, as is commonly done with such methods in computer graphics as it evolves over time and one tries it on new examples (or improves existing ones). However, both (A) and (B) come from the same research project with the same goal and core ideas.

*** Same goal ***

(A) and (B) share the same goal: create a human avatar with hair, facial textures and a facial rig from a single photograph. In work (B), they showed exactly what the title of (A) says: they digitized a human avatar using a single-image, and rendered it in real-time.

*** 10 out of 11 authors are the same ***

The authorship lists of the two projects match:

A: Liwen Hu, Shunsuke Saito, Lingyu Wei, Koki Nagano, Jaewoo Seo, Jens Fursund, Iman Sadeghi, Carrie Sun, Yen-Chun Chen, Hao Li [note: Pinscreen, USC, ICT affiliations]

B: Hao Li [note: Pinscreen, USC, ICT affiliations], Liwen Hu, Koki Nagano, Jaewoo Seo, Shunsuke Saito, Lingyu Wei, Iman Sadeghi, Jens Fursund, Yen-Chun Chen, Stephen Chen, Carrie Sun

List A has 10 authors and list B has 11 authors. The authors are the same, just re-ordered, except that B also has "Stephen Chen" ("Product Designer" at Pinscreen). This is strong evidence that it is the same research project. In academic research, one doesn't have 10 exact same people working on two different research projects at the period of time (and in the same institutions, and with exactly the same goal for the project).

*** The timelines match ***

The timelines of (A) and (B) match: (A) was first submitted to ACM SIGGRAPH in January 2017, then rejected in April 2017, then re-submitted in May 2017 to SIGGRAPH Asia, and presented at the SIGGRAPH Asia conference in November 2017. (B) was submitted in April

2017 to SIGGRAPH Real-time Live, and presented in July 2017 at ACM SIGGRAPH Real-time Live. This is a very typical natural evolution timeline for a research project in computer graphics.

*** Same title image ***

(A) and (B) use the same person / 3d model as their title image: For (B), see the image at 31:30 in the youtube video, vs for (A) see Figure 1 (the person at the top-left).

*** Same key technology: polystrips ***

Both (A) and (B) claim the ability to model hair as a key contribution. Both (A) and (B) use the same method to model hair: "**polystrips**" (long polygonal shapes; think of it as taking a ribbon tape and then bending, denting it somewhat, to model the shape of a wisp of hair). Note that "polystrips" are **not** the typical way to represent hair in computer graphics. The typical way done in prior work was to use "strands" (thin lines connected with joints.) In (A), they state, in the abstract, (quoted verbatim) "*While the generated face is a high-quality textured mesh, we propose a versatile and efficient polygonal strips (polystrips) representation for the hair... For real-time settings, we demonstrate the exibility of polystrips in handling hairstyle variations, as opposed to conventional strand-based representations.*".

You can see the polystrips in Figure 1 of (A). They are the long purple polygonal strips of hair. In presentation (B), Iman Sadeghi explicitly says that they use "polystrips" at 34:32. And you can see the polystrips of Hao's hair at 34:36 (the purple polygonal strips that model the hair). Note that both (A) and (B) render them in the same color (purple).

So, both (A) and (B) use **the same new technology**, namely using polystrips as opposed to strands to model and represent hair. This is a very compelling algorithmic similarity between (A) and (B) because it departs from prior work that typically used strands.

*** Same key technology: neural networks ***

Both (A) and (B) create the shape of the hair using a neutral network. In (A), they state in the abstract, "The performance of our hairstyle retrieval is enhanced using a deep convolutional neural network for semantic hair attribute classification." In (B), Iman Sadeghi says at 34:26 that they use a neural network to select the hairstyle, create the hair geometry (the polystrips), the face geometry, albedo texture map, the eye color. The same is done in paper (A). The face geometry, albedo texture map creation and eye color determination is described in Section 4 of paper (A), "Face Digitization". Selecting the hair style and geometry is described in Section 5 of paper (A) "Hair digitization".

** Same modeling complexity and rendering style ***

Results in (A) and (B) look visually similar, even when applied to different people. Neither is really photorealistic, instead, they both look like cartoonish versions of the person, and they are both equally cartoonish. If the works (A) and (B) were independent, one would not expect the results to be so visually similar. There is approximately the same level of detail

in the facial expressions in the results of (A) vs results of (B). Shading is very similar too. See, for example Figure 14 in (A) where they compare to other methods. See, for example, the results of loom.ai or "itSeez3D". See how they look very different to either (A) or (B), but (A) and (B) look very similar to each other (even when applied to different people). IMO, (A) and (B) employed similar or the same modeling complexity and rendering technology.

Hao**Li**

CEO & Co-Founder, Pinscreen Inc.
Associate Professor of Computer Science, USC
Director of the Vision and Graphics Lab, USC Institute for Creative Technologies

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Email	*hao@hao-li.com*
Home page	*http://www.hao-li.com/*
Facebook	*http://www.facebook.com/li.hao/*

PROFILE

Date of birth	17/01/1981
Place of birth	Saarbrücken, Germany
Citizenship	German
Languages	German, French, English, and Mandarin Chinese (all fluent and no accents)

COMMITMENT

I work at the intersection between Computer Graphics, Computer Vision, and Machine Learning, with focus on photorealistic human digitization and performance capture using deep learning and data-driven techniques. I'm known for my work on dynamic geometry processing, virtual avatar creation, facial performance capture, AI-driven 3D digitization, and deep fake detection. My research has led to the facial animation technology in Apple's iPhone X, I worked on the digital reenactment of Paul Walker in the movie Furious 7, and my algorithms on deformable shape alignment have improved the radiation treatment for cancer patients all over the world. I have been named one of the world's top 35 innovator under 35 by MIT Technology Review in 2013 and NextGen10: Innovators under 40 by C-Suite Quaterly in 2014. I received the Office of Naval Research (ONR) Young Investigator Award in 2018, the Google Faculty Research Award, the Okawa Foundation Research Grant, and the Andrew and Erna Viterbi Early Career Chair in 2015, the Swiss National Science Foundation fellowship for prospective researchers in 2011, and the best paper award at SCA 2009. I am ranked #1 on Microsoft Academic in 2016 on the top 10 leaderboard in Computer Graphics for the past five years. I am member of the Global Future Councils of the World Economic Forum (WEF) and have been named to the DARPA Information Science and Technology (ISAT) Study Group in 2019. I also serve as expert witness for IP litigation relating to Computer Vision and Graphics.

Google Scholar   https://scholar.google.com/citations?user=NFeigSoAAAAJ&hl=en

EDUCATION

Ph. D., Computer Science   07/2006 - 11/2010
ETH Zurich, Department of Computer Science

- Thesis: *Animation Reconstruction of Deformable Surfaces*
  Advisor: Prof. M. Pauly

M. Sc., Computer Science   10/2000 - 01/2006
Universität Karlsruhe (TH), Department of Computer Sciences

- Thesis: *Reconstruction of Colored Objects from Structured Illuminated Views*
  Advisor: Prof. H. Prautzsch
- Major 1: Computer graphics and geometric modeling
- Major 2: Cryptography and security
- Minor: Differential and projective geometry

ERASMUS Student Exchange, Computer Science   10/2002 - 09/2003
Institut National Polytechnique de Grenoble, ENSIMAG

French-German High School Diploma   09/1992 - 05/1999
Lycée Franco-Allemand de Sarrebruck, Germany

HaoLi

Institute of Creative Technologies (ICT)
Dr. Hao Li

Information Security Summary

July 8, 2019

Rob Groome – Director of Security Operations
Alan Hong – Senior Incident Response Analyst

Privileged and Confidential

Office of Compliance
University of Southern California
Los Angeles, CA 90089

Dear Dr. Grace,

We have completed our analysis of the MacBook Pro with Serial Number C02V20C9J93D. Our engagement was performed in accordance with our Incident Request Number, REQ0131116, and our procedures were as follows:
- Image the device
- Locate items of interest(s)
- Provide any further assistance you may need

The procedures and findings from our initial analysis are provided in this report.

We appreciate the cooperation and assistance provided to us during the course of our work. If you have any questions, please feel free to reach out to us.

Kind regards,
USC Information Security Office

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USC000409

Table of Contents

Executive Summary

History/Background

- On June 21, 2019, Rob Groome informed me, Alan Hong, about the need to acquire a device for an investigation for the Office of Compliance. Details of the data size were later revealed to provide an approximate time it would take to forensically image the device(s) and return them to the owner. Furthermore, details of evidence drop off were also discussed.
- Communications between the Information Security Office and the Office of Compliance has primarily been done over email with a few phone calls for verification purposes on scheduling
- Dr. Grace and Dr. Li both agreed to meet at the Carole Little Building on June 27, 2019 at 10:00 AM for the evidence hand off
- The only evidence that was presented and handed over with Dr. Grace present to witness, was the MacBook Pro with Serial Number C02V20C9J93D
- Chain of Custody documentation was filled out and the imaging process commence the same day June 27, 2019 at approximately 10:45 AM.

Findings

- It was discovered that the machine contains very little data and appears to have been recently re-imaged. The relevant data that was located was the exact folder that Dr. Li mentioned that he copied from his external hard drive to the laptop.
- The following is a summary of the important items/artifacts/information to gain a better understanding of the laptop:
  - The earliest system file times are all documented to be 2019-06-24 at 23:01:56 (PDT)
  - Internet History, Cookies, and Cache were all bare and contained little to no information
  - The User Account that was created for him by the "IT Group" to use, pinscreen, had a creation time of 2019-06-24 at 23:33:14 (PDT)
  - The SIGAsia17 Directory had the Date Modified as 2019-06-26 at 09:54:59 (PDT)

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USC000411

Scope and Analysis Considerations

This report summarizes the Information Security Office's analysis and findings related to the areas of investigation. The Information Security Office's engagement was limited by the amount of data provided by Dr. Hao Li.

Dr. Hao Li Provided the following:
- Apple MacBook Pro – 15" – Serial Number C02V20C9J93D

Areas of Interest / Relevant Areas of Analysis
- User account creation
    - Pinscreen account was created on 2019-06-24 at 23:33:14 (PDT)
- System File creation
    - System file creation times start at 2019-06-24 at 23:01:56 (PDT)
- Internet/Browser History
    - Contained the opening pages and little history by going to GitHub
- Research Folder – SIGAsia17
    - Folder is confirmed to be in the location mentioned. The folder has 309,830 items
    - The folder was added to the computer on 2019-06-25 at 18:26:18 (PDT)
- Desktop / Documents / Downloads Folder
    - They were all empty and contained no data

Items that should be noted are:
- It should be noted that the laptop referenced above, is not an USC Asset but one that Dr. Hao Li presented and claimed all his work was on there
- Furthermore, the folder that was copied (SIGAsia17) all has last modified times pointing back to 2019-06-25 at 18:26:18 (PDT) which means we do not have the visibility into the original creation time because the items have been tampered with since the copy was made from another media source to this laptop.
- If possible, it would be best if we were able to obtain the original sources
- Dr. Li mentioned during the time of evidence drop off that the laptop was worked on by the "IT Group". It is currently unknown which "IT Group" this is.

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USC000412

Institute of Creative Technologies (ICT)
Dr. Hao Li

Information Security Summary

July 29, 2019

Rob Groome – Director of Security Operations
Alan Hong – Senior Incident Response Analyst

Privileged and Confidential

Office of Compliance
University of Southern California
Los Angeles, CA 90089

Dear Dr. Grace,

We have completed our analysis of the following items:
- MacBook Pro with Serial Number C02V20C9J93D
- MacBook Pro with Serial Number C02SXE11GTF1
- Western Digital Elements External Hard Drive with Serial Number WXS1EC7EKWMF

Our engagement was performed in accordance with our Incident Request Number, REQ0131116, and our procedures were as follows:
- Image the device
- Locate items of interest(s)
- Provide any further assistance you may need

The procedures and findings from our initial analysis are provided in this report.

We appreciate the cooperation and assistance provided to us during the course of our work. If you have any questions, please feel free to reach out to us.

Kind regards,
USC Information Security Office

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USC000414

Table of Contents

Executive Summary

History/Background

- On June 21, 2019, Rob Groome informed me, Alan Hong, about the need to acquire a device for an investigation for the Office of Compliance. Details of the data size were later revealed to provide an approximate time it would take to forensically image the device(s) and return them to the owner. Furthermore, details of evidence drop off were also discussed.
- Communications between the Information Security Office and the Office of Compliance has primarily been done over email with a few phone calls for verification purposes on scheduling
- Dr. Grace and Dr. Li both agreed to meet at the Carole Little Building on June 27, 2019 at 10:00 AM for the evidence hand off
- The only evidence that was presented and handed over with Dr. Grace present to witness, was the MacBook Pro with Serial Number C02V20C9J93D
- Chain of Custody documentation was filled out and the imaging process commenced the same day June 27, 2019 at approximately 10:45 AM.
- Further communications occurred and there was an agreement that Dr. Li would bring his ICT assigned laptop for imaging as well as the external hard drive that contained the original research.
- Dr. Li handed over a MacBook Pro with Serial Number C02SXE11GTF1 and a Western Digital Elements External Hard Drive with Serial Number WXS1EC7EKWMF on July 10, 2019 and imaging commenced the same day.
- After imaging and verification of data, the devices were returned to Dr. Li on July 15, 2019.

Findings

- MacBook Pro with Serial Number C02V20C9J93D
  - It was discovered that the machine contains very little data and appears to have been recently re-imaged. The relevant data that was located was the exact folder that Dr. Li mentioned that he copied from his external hard drive to the laptop.
  - The following is a summary of the important items/artifacts/information to gain a better understanding of the laptop:
    - The earliest system file times are all documented to be 2019-06-24 at 23:01:56 (PDT)
    - Internet History, Cookies, and Cache were all bare and contained little to no information
    - The User Account that was created for him by the "IT Group" to use, pinscreen, had a creation time of 2019-06-24 at 23:33:14 (PDT)
    - The SIGAsia17 Directory had the Date Modified as 2019-06-26 at 09:54:59 (PDT)

- MacBook Pro with Serial Number C02SXE11GTF1
  - It was discovered that the machine had two separate partitions[1] on the computer and it was running both macOS and Windows 10 Enterprise. The same scenario, recent

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[1] Partitions can typically be referenced as logical separations of a hard drive. This allows for the installation of multiple Operating Systems on a single hard drive in this scenario.

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USC000416

imaging, appears to have also taken place with both partitions as the date stamps all traverse back to 2016/2017 activity and nothing recent.

- macOS Partition
  - The last event that occurred documented to 2016-01-01 at 14:10:43 (PDT) which was attributed to JAMFAgent, which is an imaging software.
  - There were 4 user accounts that were located: Administrator, bullfrog, li, shared. On all accounts the Desktop, Documents, Downloads directories were all empty
- Windows Partition – Windows 10 Enterprise
  - The system's last timestamp of change is 2017-01-17 at 15:42:09 (PDT)
  - There were 4 user accounts that were located: bullfrog, defaultuser0, ict, and public. All of which the directories of Desktop, Document, and Downloads were empty
- Western Digital Elements External Hard Drive with Serial Number WXS1EC7EKWMF
  - The hard drive was a 4TB external hard drive in which 115 GB was utilized.
  - This was a storage drive and per the previous engagement with Dr. Li, the directory of interest was labeled "SIGAsia17". The directory had the following attributes:
    - Date Created   - 2019-06-24 at 10:47:16 (PDT)
    - Date Modified   - 2019-06-24 at 10:47:16 (PDT)
    - Date Accessed   - 2019-07-09 at 15:49:52 (PDT)

Scope and Analysis Considerations

This report summarizes the Information Security Office's analysis and findings related to the areas of investigation. The Information Security Office's engagement was limited by the amount of data provided by Dr. Hao Li.

Dr. Hao Li Provided the following:
- Apple MacBook Pro – 15" – Serial Number C02V20C9J93D
- Apple MacBook Pro – 15" – Serial Number C02SXE11GTF1
- Western Digital Elements External Hard Drive – Serial Number WXS1EC7EKWMF

Areas of Interest / Relevant Areas of Analysis
- Apple MacBook Pro – 15" – Serial Number C02V20C9J93D
  - User account creation
    - Pinscreen account was created on 2019-06-24 at 23:33:14 (PDT)
  - System File creation
    - System file creation times start at 2019-06-24 at 23:01:56 (PDT)
  - Internet/Browser History
    - Contained the opening pages and little history by going to GitHub
  - Research Folder – SIGAsia17
    - Folder is confirmed to be in the location mentioned. The folder has 309,830 items
    - The folder was added to the computer on 2019-06-25 at 18:26:18 (PDT)
  - Desktop / Documents / Downloads Folder
    - They were all empty and contained no data
- Apple MacBook Pro – 15" – Serial Number C02SXE11GTF1
  - Running macOS and a Bootcamp partition. Both partitions have system dates pointing back to 2016 and 2017 which means that there is a high possibility that the Operating System(s) has been recently re-imaged.
    - macOS Partition
      - The last event that occurred documented to 2016-01-01 at 14:10:43 (PDT) which was attributed to JAMFAgent, which is an imaging software.
      - The Operating System Version was running macOS Sierra version 10.12.2. Which is an outdated version as of the current writing of this report, the most recent version Apple Inc has released is 10.14.5
      - There were 4 user accounts that were located: Administrator, bullfrog, li, shared. The Desktop, Documents, Downloads directories on all 4 accounts were all empty
    - Windows Partition
      - The system's earliest timestamp is 2017-01-17 at 12:22:54 (PDT)
      - The system's last timestamp of change is 2017-01-17 at 15:42:09 (PDT)
      - The operating system is running Windows 10 Enterprise
      - There were 4 user accounts that were located: bullfrog, defaultuser0, ict, and public. All of which the directories of Desktop, Document, and Downloads were empty

- Western Digital Elements External Hard Drive – Serial Number WXS1EC7EKWMF
  - The hard drive was a 4TB external hard drive in which 115 GB was utilized.
  - This was a storage drive and per the previous engagement with Dr. Li, the directory of interest was labeled "SIGAsia17". The directory had the following attributes:
    - Date Created - 2019-06-24 at 10:47:16 (PDT)
    - Date Modified - 2019-06-24 at 10:47:16 (PDT)
    - Date Accessed - 2019-07-09 at 15:49:52 (PDT)
    - Contains 4 folders (then each folder has a lot of their own details):
    - hair_data
      - Date Created - 2018-09-28 at 11:29:42 (PDT)
      - Date Modified - 2019-07-09 at 11:29:51 (PDT)
      - Date Accessed - 2019-07-09 at 15:50:03 (PDT)
    - hair_database
      - Date Created - 2018-09-28 at 09:58:17 (PDT)
      - Date Modified - 2018-09-28 at 11:19:41 (PDT)
      - Date Accessed - 2019-07-09 at 15:50:00 (PDT)
    - inputs
      - Date Created - 2017-03-05 at 02:02:16 (PDT)
      - Date Modified - 2018-10-20 at 20:56:13 (PDT)
      - Date Accessed - 2019-07-09 at 15:49:56 (PDT)
    - siga17
      - Date Created - 2018-09-26 at 16:18:47 (PDT)
      - Date Modified - 2018-09-26 at 17:29:17 (PDT)
      - Date Accessed - 2019-07-09 at 15:49:55 (PDT)

Items that should be noted are:
- It should be noted that the MacBook Pro with Serial Number C02V20C9J93D, is not an USC Asset but one that Dr. Hao Li presented and claimed all his work was on there
- Furthermore, the folder that was copied (SIGAsia17) all has last modified times pointing back to 2019-06-25 at 18:26:18 (PDT) which means we do not have the visibility into the original creation time because the items have been tampered with since the copy was made from another media source to MacBook Pro with Serial Number C02V20C9J93D.
- Dr. Li mentioned during the time of evidence drop off (June 27, 2019) that the laptop was worked on by the "IT Group". It is currently unknown which "IT Group" this is.
- The MacBook Pro with Serial Number C02SXE11GTF1, contains 2 partitions and both Operating Systems did not have any recent data and all system times points to a historical time space. Although we are unable to determine the exact date of when imaging occurred, it can be said that the action took place prior to the relinquishment of the machine.
- The external hard drive appears to have the relevant data for further queries and analysis.

Report on Analysis of Pinscreen Demonstration at SIGGRAPH RTL 2017

Date: November 21, 2019
Author: George Edwards, Ph.D.
Prepared for: USC Office of Research

1. Task

I was asked by Dr. Kristen Grace, M.D., Ph.D., Research Integrity Officer at USC's Office of Research (the "Research Integrity Officer") to analyze software that was demonstrated by Dr. Hao Li and Dr. Iman Sadeghi at the ACM SIGGRAPH 2017 Real Time Live! ("SIGGRAPH RTL 2017") conference which took place on August 1, 2017. The demo was titled "Pinscreen: Creating Performance-Driven Avatars in Seconds."

I understand from reviewing materials provided to me by the Research Integrity Officer that Dr. Li is alleged to have, *inter alia*:

1. Falsified data in an abstract to SIGGRAPH RTL 2017 by representing that he had developed a "fully automatic framework for creating a complete 3D avatar…to build a high-quality head model within seconds," when in fact the technology took approximately a minute and a half to generate; and
2. Falsified data in the live SIGGRAPH RTL 2017 demonstration by claiming that the creation of an avatar using his technology was in real time and accomplished in a matter of seconds, when in fact the avatar creation was pre-loaded ("cached") on the computer. In addition, it is alleged that Dr. Li instructed his team to manually modify the outputs actually being generated to improve the avatars' quality such that the output demonstrated was not an accurate representation of the output his technology generated.

I analyzed the actual capabilities of the Pinscreen software that was presented at SIGGRAPH RTL 2017 (the "Pinscreen Demo Software"). This report states the results of that analysis.

2. Information Analyzed

I received and reviewed the following information:

- USC's list of allegations
- Information provided to USC by Dr. Sadeghi
- USC ICT ITS report of forensic analysis of hard drives
- The Amended Complaint brought against Pinscreen by Dr. Sadeghi
- The USC Inquiry Report and attachments

- The manuscripts and abstract referenced in USC's list of allegations
- The Pinscreen Demo Software downloaded from https://gitlab.com/pinscreen/rtl-app
- "SIGGRAPH 2017 Real Time Live" video at:
  https://www.youtube.com/watch?v=hpuEdXn_M0Q

3. Summary of Findings

My analysis determined that:

1. The Pinscreen Demo Software does not include functionality for creating a 3D avatar from an image, either fully automatically or otherwise.
2. The Pinscreen Demo Software includes at least eleven pre-built, pre-stored avatars. Four of these avatars – "Iman", "Hao", "JohnRoot", and "Christobal" – were displayed by Dr. Sadeghi during the Pinscreen Demo.
3. The Pinscreen Demo Software allows the user to take a picture using an attached webcam. No matter what picture is taken with the webcam, the rtl-app will then display the pre-built the "Iman" avatar.
4. The Pinscreen Demo Software also allows the user to select a previously captured picture file. If the name of the picture file corresponds to one of the pre-built avatars (e.g., "JohnRoot.jpeg"), then the app displays the corresponding pre-built avatar. If the name of the picture file does not correspond to one of the pre-built avatars (e.g., "GeorgeEdwards.jpg"), no avatar is displayed.
5. The Pinscreen Demo Software is designed to mislead the viewer. For example, the Pinscreen Demo Software includes a "progress bar" that appears to show the progress of an underlying computation to generate an avatar, when in fact the progress bar simply fills up according to a timer.

4. Detailed Description of Findings

The Pinscreen Demo Software was provided to me in the form of a Git repository at gitlab.com/pinscreen/rtl-app. The Pinscreen Demo Software is implemented using an off-the-shelf game engine named Unity. Unity applications include components (such as 3D models and scenes) that are created within the Unity Editor as well as C# code files, called scripts, that define behaviors for those components.

The video of the live Pinscreen demonstration shows that the presentation included two main parts. In the first part (shown at 31:06 to 35:43 of the video), Dr. Sadeghi demonstrates the purported avatar generation capabilities of the software. He takes a picture of himself and then shows an avatar that was purportedly generated in real-time from that picture. He then selects image files of three other people and shows an avatar of each person purportedly generated from the image file. This first portion of the demo was the focus of my analysis since it included the functionality that was allegedly falsified.

In the second portion of the demo (shown at 35:43 to 40:16), other capabilities are demonstrated, such as the ability to animate avatars. I did not analyze this portion of the demo.

My analysis of the Pinscreen Demo Software included an inspection of the application's C# source code; Unity objects, assets, and settings; and Git repository logs. I also built and ran the application and experimented with different inputs. Instructions for inspecting, building, and running the Pinscreen Demo Software are provided in **Exhibit A**.

4.1. "Iman" Avatar Generated from Webcam Picture

The C# source code of the Pinscreen Demo Software shows that the first feature presented in the demo – the ability to generate an avatar in a few seconds from a webcam picture – did not actually exist in the software. The file rtl-app\Assets\RTLUI\RTLUIHack.cs shows the functions that are called after the user has taken a picture with the webcam. First, the function `GenerateAvatar` is called (line 94). At line 96, the function `SetAvatar` is called with the hardcoded parameters `avatarData["Iman"].texture, "Iman"`.

```
94    public void GenerateAvatar()
95    {
96        SetAvatar(avatarData["Iman"].texture, "Iman");
97    }
98
```

At line 125, the `SetAvatar` function displays a progress bar on the screen. The progress bar is implemented in the file rtl-app\Assets\RTLUI\ProgressBar.cs. The progress bar's `Update` function at line 70 shows that the progress bar is filled based on a timer, not based on the actual progress of any underlying computation. Moreover, the Git repository logs indicate that specific efforts were made to make the progress bar more believable: code was added to the file rtl-app\Assets\RTLUI\UI_AutoProgress.cs on July 22, 2017, with the commit comment "Replace Trump animation, make progress more " natural\". This revision caused the progress bar to increase at a variable speed, rather than increasing at a uniform speed. The progress is defined in the Segments array in Unity.

▼ ⓖ ☑ **UI_Auto Progress (Script)**	🔲 ⚙	
Script	ⓖ UI_AutoProgress	⊙
Progress	ⓖ Progress (ProgressBar)	⊙
Time	5	
▼ Segments		
Size	7	
▼ Element 0		
Time	0	
Percent	5	
▼ Element 1		
Time	1.5	
Percent	10	
▼ Element 2		
Time	0.5	
Percent	30	
▼ Element 3		
Time	2	
Percent	35	
▼ Element 4		
Time	1	
Percent	75	
▼ Element 5		
Time	0.5	
Percent	80	
▼ Element 6		
Time	0.5	
Percent	100	
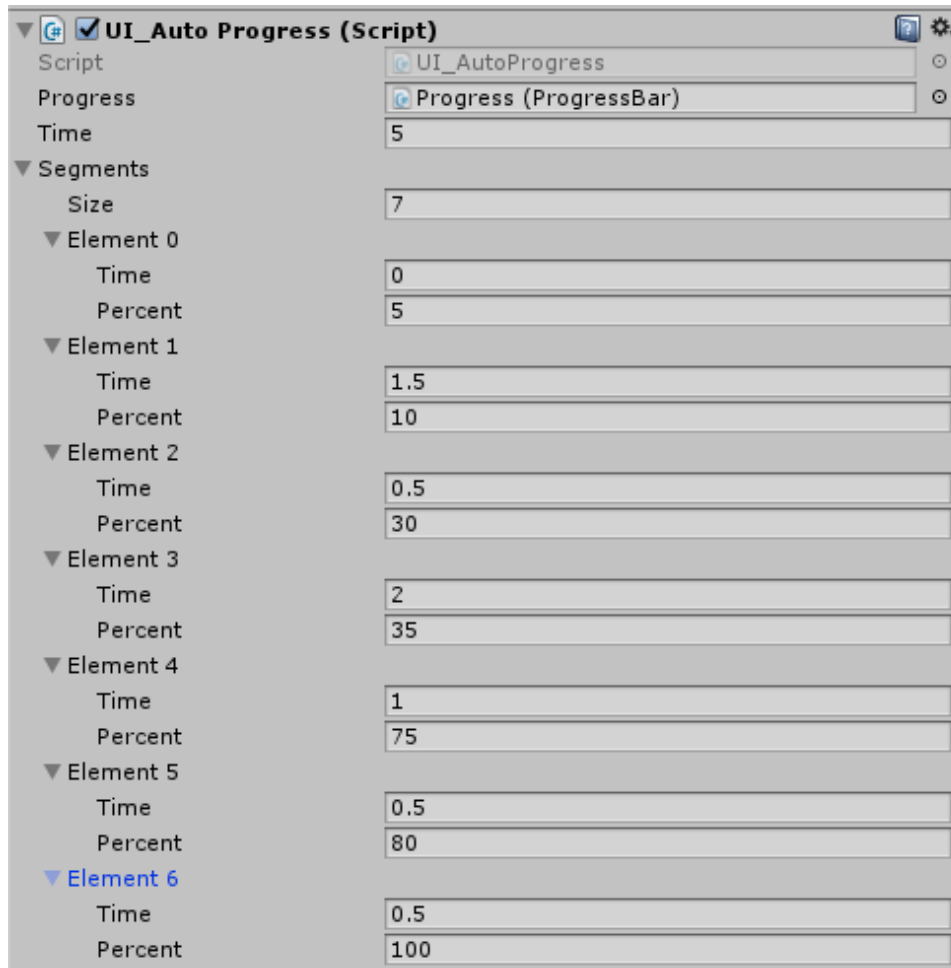
Returning to the `SetAvatar` function (line 125 of RTLUIHack.cs), when the progress bar completes, the `SelectAvatar` function is called at line 153. The `SelectAvatar` function begins at line 187. At line 202, a lookup is performed to retrieve an avatar `Transform` object from a collection of pre-built avatars. In this case, the value of the name parameter is "Iman" so the avatar named "Iman" is retrieved. The collection of pre-built avatars can be viewed in the "Hierarchy" window of Unity Editor (top left) under the Avatars item.
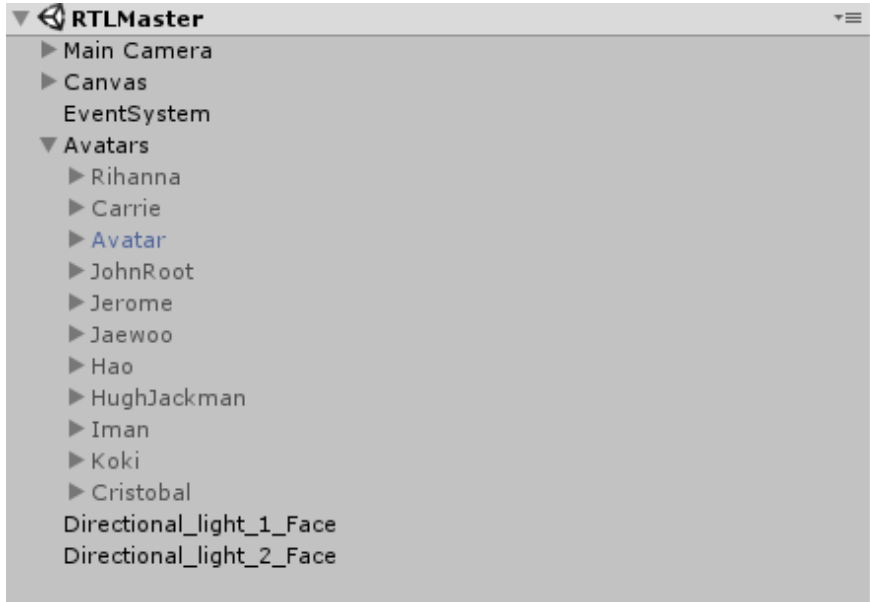
Next, the `SelectAvatar` function sets `visibleAvatar` to the avatar object that was just retrieved from the pre-built collection and displays that avatar on the screen.

I confirmed that the description above correctly characterizes the operation of the Pinscreen Demo Software by running the application with Script Debugging turned on. The generated output_log.txt file is attached as **Exhibit B**.

I also ran the Pinscreen Demo Software and took a picture of myself using my computer's webcam. As expected, once the progress bar completed, the "Iman" avatar was displayed.

Picture of George Edwards taken with webcam

"Iman" avatar displayed
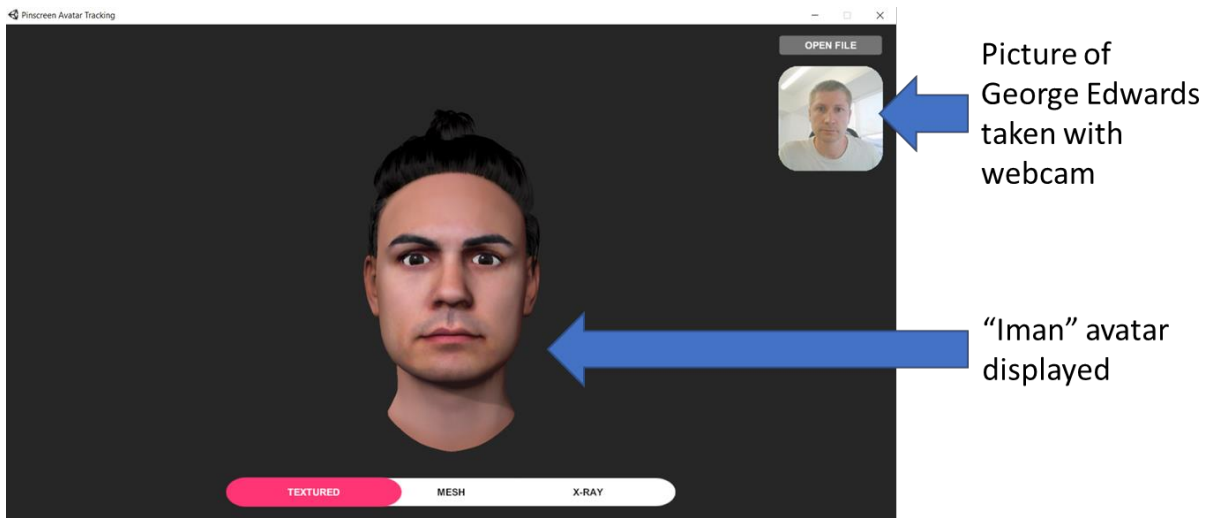
4.2. "Hao", "JohnRoot", and "Christobal" Avatars Generated from Image Files

The C# source code of the Pinscreen Demo Software also shows that the next feature presented in the demo – the ability to generate an avatar in a few seconds from a stored image file – also did not actually exist in the software. When the user clicks the OPEN FILE button in the demo, the **OpenFileWindow** function is called (rtl-app\rtl-app\Assets\RTLUI\OpenAvatarImage.cs, line 19). After a file is selected, the **SetAvatar** function is called at line 25.

The **SetAvatar** function called here is different than the one described above (the SetAvatar function is overloaded). This **SetAvatar** function begins at line 159 of RTLUIHack.cs. The function strips the file extension off the file name provided as a parameter and saves the name in the **name** variable.

```
159     public void SetAvatar(string file)
160     {
161         // set avatar image
162         string name = Path.GetFileNameWithoutExtension(file);
163
164         Texture2D texture = AvatarAnimationController.LoadPNG(file);
165         texture.Apply();
166
167         SetAvatar(texture, name);
168     }
```

Next, at line 167 **SetAvatar(texture, name)** is called, is the **SetAvatar** function described above in Section 4.1. At this point, the program proceeds in the same manner as previously described: a lookup is performed to retrieve the appropriate avatar from the collection of pre-built avatars, based on the value of the name parameter. For example, if the user selected the image file JohnRoot.jpeg, the JohnRoot avatar is displayed. It does not matter what the contents of the JohnRoot.jpeg file actually are – it could be a picture of anything and the same avatar will be displayed. Also, if the user selects an image file with a name that does not correspond to one of the pre-built avatars, no avatar is displayed.

I again confirmed that the description above correctly characterizes the operation of the Pinscreen Demo Software by running the application with Script Debugging turned on. The generated output_log.txt file is attached as **Exhibit B**.

I also ran the Pinscreen Demo Software and selected a picture of myself. As expected, once the progress bar completed, no avatar was displayed.
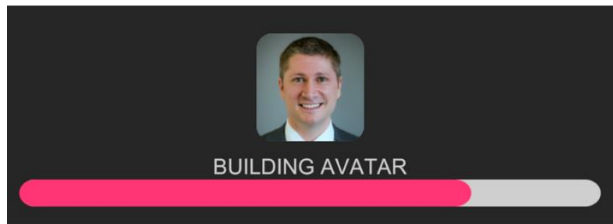
Image file of George Edwards selected;
BUILDING AVATAR progress bar displayed
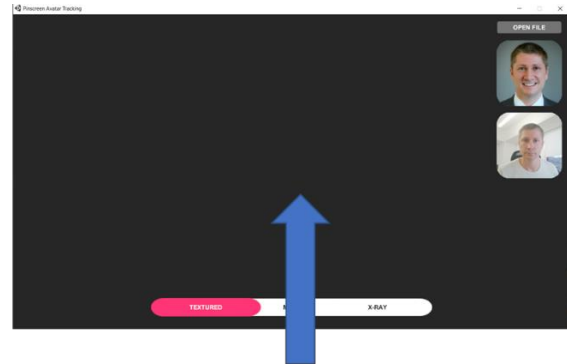
No avatar built or displayed

5. Conclusions

Based on my analysis of the Pinscreen Demo Software, Dr. Li and Dr. Sadeghi falsely claimed – both in the published abstract and in oral statements – that the software they presented at SIGGRAPH RTL 2017 had the capability to automatically generate complete 3D avatars from a single image. The false statements appear to be significant in that they go well beyond overstatements or exaggerations. Rather, the false statements claim capabilities that are completely absent in the software. Also, there is strong circumstantial evidence (such as the fake progress bar and Git repo logs) that the fabrication was intentional and premeditated.

The false statements relate to the core research contribution claimed by the authors. For example, even if the pre-built avatars were created using some other Pinscreen software program, and the demo was fabricated because the generation process took over a minute (as alluded to in USC's list of allegations) and was deemed too slow for a live demo, this would still represent a substantial fabrication because the authors claimed the speed of their system – the ability to generate an avatar "within seconds" – as a key innovation of their work.

Note that my analysis did not address the question of whether Dr. Li instructed his team to manually modify the avatar models to improve their quality. My analysis did not investigate the process that was actually used to create the pre-built models that were displayed during the demo, so I cannot at this time provide any information on the extent to which that process was fully automatic.

Exhibit A

To inspect, build, and run the Pinscreen Demo Software:

1. Download and install Unity 5.5.0 from https://unity3d.com/get-unity/download/archive.

2. Next, within the Unity Editor, select File→Open Scene and choose the file rtl-app\Assets\RTLMaster.unity.

3. Choose File→Build Settings… and ensure that under Scenes In Build only RTLMaster is checked. If RTLMaster is not listed, click Add Open Scene.

4. Make sure the Target Platform and Architecture drop-down menus are selected correctly for the computer on which you plan to run the application.

5. Choose Build and Run. For the application to work without further adjustments, you must choose to save the generated executable file in the rtl-app folder.

QUANDARY PEAK
RESEARCH

Exhibit B

```
Mono path[0] = 'C:/code/rtl-app/rtl-app/rtl-app_Data/Managed'
Mono path[1] = 'C:/code/rtl-app/rtl-app/rtl-app_Data/Mono'
Mono config path = 'C:/code/rtl-app/rtl-app/rtl-app_Data/Mono/etc'
PlayerConnection initialized from C:/code/rtl-app/rtl-app/rtl-app_Data (debug
= 0)
PlayerConnection initialized network socket : 0.0.0.0 55015
Multi-casting "[IP] 192.168.163.1 [Port] 55015 [Flags] 3 [Guid] 288996400
[EditorId] 957138342 [Version] 1048832 [Id] WindowsPlayer(DELL-E7470) [Debug]
1" to [225.0.0.222:54997]...
Waiting for connection from host on [0.0.0.0:55015]...
PlayerConnection accepted from [192.168.128.20] handle:0x3c4
Started listening to [0.0.0.0:55015]
Using monoOptions --debugger-
agent=transport=dt_socket,embedding=1,defer=y,address=0.0.0.0:56400
PlayerConnection already initialized - listening to [0.0.0.0:55015]
Initialize engine version: 5.5.0f3 (38b4efef76f0)
GfxDevice: creating device client; threaded=1
Direct3D:
    Version:  Direct3D 11.0 [level 11.0]
    Renderer: Intel(R) HD Graphics 520 (ID=0x1916)
    Vendor:   Intel
    VRAM:     4196 MB
    Driver:   22.20.16.4836
Begin MonoManager ReloadAssembly
Platform assembly: C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\UnityEngine.dll (this message is harmless)
Loading C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\UnityEngine.dll into
Unity Child Domain
Platform assembly: C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\Assembly-
CSharp-firstpass.dll (this message is harmless)
Loading C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\Assembly-CSharp-
firstpass.dll into Unity Child Domain
Platform assembly: C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\Assembly-
CSharp.dll (this message is harmless)
Loading C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\Assembly-CSharp.dll into
Unity Child Domain
Platform assembly: C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\UnityEngine.UI.dll (this message is harmless)
Loading C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\UnityEngine.UI.dll into
Unity Child Domain
Platform assembly: C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\UnityEngine.Networking.dll (this message is harmless)
Loading C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\UnityEngine.Networking.dll into Unity Child Domain
Platform assembly: C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\UnityEngine.PlaymodeTestsRunner.dll (this message is
harmless)
Loading C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\UnityEngine.PlaymodeTestsRunner.dll into Unity Child Domain
Platform assembly: C:\code\rtl-app\rtl-app\rtl-
app_Data\Managed\System.Windows.Forms.dll (this message is harmless)
Loading C:\code\rtl-app\rtl-app\rtl-app_Data\Managed\System.Windows.Forms.dll
into Unity Child Domain
```

Exhibit B

```
Mono path[0] = 'C:/code/rtl-app/rtl-app/rtl-app_Data/Managed'
Mono path[1] = 'C:/code/rtl-app/rtl-app/rtl-app_Data/Mono'
Mono config path = 'C:/code/rtl-app/rtl-app/rtl-app_Data/Mono/etc'
PlayerConnection initialized from C:/code/rtl-app/rtl-app/rtl-app_Data (debug
= 0)
PlayerConnection initialized network socket : 0.0.0.0 55015
Multi-casting "[IP] 192.168.163.1 [Port] 55015 [Flags] 3 [Guid] 288996400
[EditorId] 957136342 [Version] 1048832 [Id] WindowsPlayer(DELL-87470) [Debug]
1" to [225.0.0.222:54997]...
Waiting for connection from host on [0.0.0.0:55015]...
PlayerConnection accepted from [192.168.128.20] handle:0x3c4
Started listening to [0.0.0.0:55015]
Using monoOptions --debugger-
agent=transport=dt_socket,embedding=1,defer=y,address=0.0.0.0:56400
PlayerConnection already initialised - listening to [0.0.0.0:55015]
Initialize engine version: 5.6.5 (38b4efef76f0)
GfxDevice: creating device client; threaded=1
Direct3D:
    Version:  Direct3D 11.0 [level 11.0]
    Renderer: Intel(R) HD Graphics 520 (ID=0x1916)
    Vendor:   Intel
    VRAM:     4196 MB
    Driver:   22.20.16.4836
Begin MonoManager ReloadAssembly
```

(log content continues — dense Unity debug output across multiple columns)

USC000428-441

View the Original Full Report at http://sadeghi.com/USC-Report

PINSCREEN: CREATING PERFORMANCE-DRIVEN AVATARS IN SECONDS

Real-Time Live!

Contact:
pinscreen.com
Pinscreen

With this fully automatic framework for creating a complete 3D avatar from a single unconstrained image, users can upload any photograph to build a high-quality head model within seconds. The model can be immediately animated via performance capture using a webcam. It digitizes the entire model using a textured-mesh representation for the head and volumetric strips for the hair. A simple web interface uploads any photograph, and a high-quality head model, including animation-friendly blend shapes and joint-based rigs, is reconstructed within seconds. Several animation examples are instantly generated for preview purposes, and the model can be loaded into Unity for immediate performance capture using a webcam.

The system integrates state-of-the-art advances in facial-shape modeling, appearance inference, and a new pipeline for single-view hair generation based on hairstyle retrieval from a massive database, followed by a strand-to-hair-strip conversion method.

Pinscreen-generated models are visually comparable to state-of-the-art game characters. With its scalable and instant asset generation, the method can significantly influence next-generation virtual film and game production, as well as VR applications, in which personalized avatars can be used for social interactions.

This live demonstration shows that compelling avatars and animations can be generated in very little time by anyone, with minimal effort.

Hao Li
University of Southern California

Shunsuke Saito
Lingyu Wei
Iman Sadeghi
Liwen Hu
Jaewoo Seo

Koki Nagano
Jens Fursund
Yen-Chun Chen
Stephen Chen
Pinscreen, Inc.

Attachment 13

Reviewer ID	Role	Submission	Title	QuestionNum	Question	Answer
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	1	Innovative use of Real Time rendering (pushes the boundaries)	5
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	2	Technical achievement within Real Time context	4
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	3	Creativity/originality of submission	3
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	4	Interest/Entertainment value for conference participants	4
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	5	Production Values (appropriate to its context)	2
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	6	Public Comments	Impressive tech, and the capture of the facial geometry from a single image, plus rigging and real-time animation, is remarkable in that short amount of time. Hair shape reproduction is a really good start and it doesn't seem production ready just yet. Blending some hair color on the scalp of the head texture would help ease the sharp delineation between hair and head. Further work on glints, texture variability, and alpha/softness would be critical for getting this up to par with state-of-the-art game characters. Eyes would be another good place to improve - proper fitting in the sockets would do wonders for the overall visual quality. The character rendering and animation is impressive given the single source image, but it's not up to state-of-the-art yet. Still seems like an interesting real-time demo.
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	7	Private Comments	Live demonstration during the TED talk was kind of neat: https://youtu.be/RBytZiKSiSU?t=10m15s
45729	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	8	Overall Score	3.6
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	1	Innovative use of Real Time rendering (pushes the boundaries)	4
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	2	Technical achievement within Real Time context	4
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	3	Creativity/originality of submission	4
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	4	Interest/Entertainment value for conference participants	4
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	5	Production Values (appropriate to its context)	4

ID	Type	Code	Title	#	Category	Value
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	6	Public Comments	This is really interesting and has some fantastic potential use in social VR and beyond. This reminds me of some research coming out of Industrial Light & Magic where they were looking to drive automated facial rigs for their characters - this solution has seemingly made it generic and easy to use, which is exciting. It'd be great to hear more detail about the underlying technology involved with evaluating the images and how the rigs are generated based on the inputs.
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	7	Private Comments	Could be a lot of fun as a live demo for RTL - good entertainment value potential.
39557	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	8	Overall Score	4
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	1	Innovative use of Real Time rendering (pushes the boundaries)	2
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	2	Technical achievement within Real Time context	5
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	3	Creativity/originality of submission	3
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	4	Interest/Entertainment value for conference participants	4
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	5	Production Values (appropriate to its context)	4
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	6	Public Comments	There's a lot of amazing tech going on here. Honestly the categories in which I can judge it don't really apply to this technology so it gets kinda low marks. The magic doesn't actually happen in real-time, but it does generate something that does. I dunno how to judge this!
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	7	Private Comments	
45728	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	8	Overall Score	3.6
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	1	Innovative use of Real Time rendering (pushes the boundaries)	2
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	2	Technical achievement within Real Time context	4
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	3	Creativity/originality of submission	2
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	4	Interest/Entertainment value for conference participants	3
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	5	Production Values (appropriate to its context)	2
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	6	Public Comments	Perhaps not the most technically advanced solution, but it did put a smile on my face :)

ID	Track	Session	Title	#	Criterion	Score
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	7	Private Comments	
27791	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	8	Overall Score	2.6
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	1	Innovative use of Real Time rendering (pushes the boundaries)	2
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	2	Technical achievement within Real Time context	2
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	3	Creativity/originality of submission	2
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	4	Interest/Entertainment value for conference participants	3
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	5	Production Values (appropriate to its context)	3
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	6	Public Comments	The presentation will provide an automatic capture and reconstruction of low-resolution and low-animation-/rigging quality avatars from a single image. That is actually quite an impressive achievement (especially since the rig is automatically created). However, the rendering elements are not that impressive. The authors also claim that they generate visually comparable models to state of the art video game characters, which is just outrageously wrong (take a look at any game shipping on PS4 currently). The capture and reconstruction technology is quite innovative and interesting.
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	7	Private Comments	I'm not convinced this would be an exciting RTL presentation. Without a doubt, there is a ton of excellent research in the reconstruction tech, but the rest of the presentation is very bare-bones.
23345	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	8	Overall Score	2.4
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	1	Innovative use of Real Time rendering (pushes the boundaries)	4
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	2	Technical achievement within Real Time context	4
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	3	Creativity/originality of submission	4
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	4	Interest/Entertainment value for conference participants	4
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	5	Production Values (appropriate to its context)	4
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	6	Public Comments	Nice demonstration for picture to 3D model. Although the model is a bit crude, and the facial animation can be better, this submission should be encouraged considering the complexity of putting the system together. I hope by the time of presentation, the work can be more polished.

31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	7	Private Comments		
31519	primary	realtime_0027	Pinscreen: Creating Performance-Driven Avatars in Seconds	8	Overall Score		4

From:	Iman Sadeghi
To:	Kristen Grace
Subject:	Re: Question
Date:	Monday, December 9, 2019 2:36:42 PM

Dear Kristen,

You are correct.

There were no connectivity issues at RTL and all presentations were supposed to be in Real-Time and Live.

In fact, SIGGRAPH RTL crew asked Pinscreen during the RTL Virtual Rehearsal, on July 7, 2017, if Pinscreen needed extra bandwidth or special equipment to ensure that the Real-Time presentations would be executed smoothly:
https://docs.google.com/spreadsheets/d/14bMnCvs9NvIb3OLpOL4Jauf1XEQZxzOLXX6du7Wza74/edit#gid=0

Pinscreen had no alternative code other than the https://gitlab.com/pinscreen/rtl-app.git for its avatar generation demo. If needed I can provide Skype messages in support of this.

Pinscreen intentionally misrepresented these manually prepared and pre-built avatars as autogenerated and in Real-Time. "Li revealed his intention to deceive the RTL audience, in writing, on July 20, 2017, when he proposed on 'PinscreenTeamAll' Skype thread that Pinscreen would 'give the people the feeling the avatar is not pre-built' and that 'we should give them a sense that it is computing.' " (See FAC PP 179-183)

Would you be able to share if you have been able to interview Carrie Sun? And to inquire Li about Leszek's hair model (Haley_017.obj) which was misrepresented as automatic in Pinscreen's RTL submission, on April 4, 2017?

Regards,
-Iman

On Mon, Dec 9, 2019 at 1:05 PM Kristen Grace <gracekri@usc.edu> wrote:
> Thanks for the info. What I meant to ask relates to the claim that Pinscreen was pre-recording avatar creation in the event there were internet issues. The conference organizers indicated to him that it was acceptable to do IF there was a problem. This would mean that the full working code was available, but that code was not able to be implemented after running in real-time and having internet issues. At this point the decision would be made to used a cashed version instead. If this were the case, the presenter should explain this to the audience. According to you, the presenter, and the Skype conversations, there were no attempts to run a working code at SIGGRAPH RTL, one that actually does what you presented, but could not run effectively due to connectivity issues.
>
> I'm just trying to counter Li's argument that it is acceptable to present a non-realtime presentation based on problems with connectivity. That argument is moot if there was no test at SIGGRAPH for any connectivity problems. Either way, the presentation itself was misrepresented with no explanation to the audience. As presentation of a newly researched and developed computer science technology, that in-and-of itself is falsification and research misconduct. Verifying from you the presenter that the
> https://gitlab.com/pinscreen/rtl-app.git was the only code available at the time and the one you presented to the audience is a key piece of information. Also that you, as presenter, knew and admit that Pinscreen was knowingly misleading the audience (under Li's direction) by not informing them that the presentation was manually created and pre-recorded and not a RT demo, as was introduced by the moderator, Li and you at the time.
> Kristen
>
>
>> On Dec 9, 2019, at 12:36 PM, Iman Sadeghi <sadeghi@gmail.com> wrote:
>>
>> Dear Kristen,

There was no alternative code that would be able to actually autogenerate the avatars since Pinscreen did not have the capability:
- The actual autogenerated avatars would take around 90 seconds and would likely result in inaccurate hairstyles. (See First Amended Complaint Paragraphs 184-188)

The next step would be to request the code as it existed on https://gitlab.com/pinscreen/rtl-app.git branch master on each day from July 24, to Aug 1, 2017:
- The historical snapshots of the code from July 24, to Aug 1, 2017, which are available through Gitlab, would confirm that Carrie Sun manually and gradually improved the avatars and their hair models. (See First Amended Complaint Paragraphs 200-214)
- If Pinscreen could actually autogenerate these avatars, there would have been no need for Carrie Sun to manually create and gradually improve them.

Just to clarify your statement:
"As the presenter, it was obvious that there were no attempts by you to run a *non-cashed* code, nor did you inform the audience that you were presenting an illustration of the technology."
Did you mean to say ... there were no attempts by you to run a *cached* version of the presentation?

Regards,
-Iman

On Mon, Dec 9, 2019 at 11:30 AM Kristen Grace <gracekri@usc.edu> wrote:

> Dear Dr. Sadeghi,
>
> Thank you for getting back to me. We have done a full analysis of the code below, and it is as you described. Dr. Li's defense is the presentation was cashed in the event of internet connectivity issues. This would indicate (as suggested by a conference coordinator) that if there were an issue in this regard that the presenter could present a pre-cashed illustration or movie of the technology but also making it clear to alert the audience to this fact. As the presenter, it was obvious that there were no attempts by you to run a non-cashed code, nor did you inform the audience that you were presenting an illustration of the technology.
>
>
> While it is obvious from the Skype conversations that the cashing of pre-constructed avatars and a false progress bar was premeditated, my question for you, as presenter, was there another code (besides the Gitlab code) that you had access to at that time that could successfully run in the event connectivity and band-with issues were no problem?
>
>
> Thanks,
>
> Kristen
>
> ---
>
> **From:** Iman Sadeghi <sadeghi@gmail.com>
> **Date:** Monday, December 9, 2019 at 11:18 AM
> **To:** Kristen Grace <gracekri@usc.edu>
> **Subject:** Re: Question

Dear Dr. Grace,

The main repository related to Pinscreen's RTL 2017 presentation was stored at:
https://gitlab.com/pinscreen/rtl-app.git

The stored code corresponding to August 1, 2017 in this repository demonstrates that the webcam avatar generation was fake:

"No matter who uses this version of the application to generate their own avatar from a webcam—as Pinscreen demonstrated—the pre-built avatar of Sadeghi will be displayed every time." (See Second Amended Complaint Paragraph 93)

The commit history of this repository prior to to August 1, 2017 demonstrates that all supposedly autogenerated avatars presented during the demo were manually prepared by Pinscreen employees including Carrie Sun.

If the code that you received does not match this description, then you have received an inauthentic code.

Gitlab's legal department would be able to confirm the authenticity of the code that you have received.

I am available to answer further questions via email or phone.

Regards,
-Iman Sadeghi, PhD

On Fri, Dec 6, 2019 at 1:22 PM Kristen Grace <gracekri@usc.edu> wrote:

> Dear Dr. Sadeghi,
>
>
> As USC finalizes one portion of its Investigation regarding the RTL 2017 presentation a question has arisen. I have gained access to the GitLab code that was utilized for the presentation and have had it fully analyzed. Was there any other code that was presented to the SIGGRAPH RTL committee or stored elsewhere to be made available for RTL 2017? Or a code stored elsewhere that would illustrate, at the time, that the ability to perform that which was presented at RTL 2017 was impossible at that time?
>
>
> Kristen Grace, M.D , Ph.D.
>
> *Research Integrity Officer*
>
> *Office of Research*
>
>
> University of Southern California
>
> 3720 S Flower Street, Suite 325
>
> (213) 821 7297

View the Original Full Report at http://sadeghi.com/USC-Report

Attachment 15

From: **Hao Li** hao@p nscreen.com
Subject: Re: SIGGRAPH Rea -T me L ve quest on
Date: January 19, 2019 at 5:34 PM
To: Hasegawa Isamu hase sam@square-en x.com
Cc: jun.kato@a st.go.jp

HL

On Jan 15, 2019, at 3:14 AM, Hasegawa Isamu <hase sam@square-en x.com> wrote:

H Hao,

Our rep y as SIGGRAPH As a 2018 Rea -T me L ve! cha r and comm ttee are as fo ows:

Regard ng 1/A:
We(SA18 RTL comm ttee) supposed that w re ess network connect on that we prov ded dur ng SA18 m ght be unre ab e, and to d you that dur ng the on ne rehearsa .

Regard ng 2/A and 3/A:
I, as the SA18 RTL cha r, determ ned that t s va d for SA18 RTL presenters to prepare "cache" as a fa back p an, and to perform the r cache w th the r exp anat on n case of some troub es, s nce we(SA18 RTL comm ttee) a ready confirmed that each presenters techno ogy s su tab e for SA18 RTL at the po nt of our curat on, and the unre ab ty of the W F s not presenter s fau t.
In add t on, we have never requ red the cond t on "everyth ng must be Rea -T me" to presenters. Actua y some teams showed mov es to exp a n the r context.

Regard ng 4/A:
At east n SIGGRAPH As a 2018, Rea -T me L ve! does not necessar y present presenter s "research outputs" as s.
And I, as the SA18 RTL cha r, judged that your presentat on dur ng SA18 RTL meets the requ rements of SA18 RTL.

If you have any further quest ons, p ease et us know.

Regards,

Isamu HASEGAWA
SIGGRAPH As a 2018 Rea -T me L ve! Cha r
SQUARE ENIX

> On Jan 9, 2019, at 1:39 AM, Hao L <hao@p nscreen.com> wrote:
>
> Dear Kato-San,
>
> hope th ngs are we + Happy New year!
> BTW can you prov de the fo ow ng confirmat ons?
>
> 1/ A confirmat on that dur ng SIGGRAPH As a, there cou d be unre ab e w re ess connect on, hence t s recommended that SIGGRAPH Rea -T me L ve demos do not re y on w re ess.
>
> 2/ A confirmat on that dur ng our on ne rehearsa , I exp c t y asked you f we shou d cache our resu ts as a fa back, s nce we p anned to not used cach ng, but n case someth ng wou d go wrong t m ght be better, and you sa d "yes defin te y cache".
>
> 3/ A confirmat on, that you as a cha r for SIGGRAPH As a Rea -T me L ve, cach ng s okay to perform, s nce t s more a show than a research presentat on, and a so there wou d be no need of exp c t y d sc os ng f someth ng wou d have been cached.
>
> 4/ SIGGRAPH Rea -T me ve does not necessar y present "research outputs", but most y mpress ve nteract ve demos, more s m ar to a tradeshow.

View the Original Full Report at http://sadeghi.com/USC-Report

USC University of Southern California

June 21, 2019

Dr. Hao Li
Computer Science
University Park Campus
SAL 300 MC 0781

Dear Dr. Li,

As you are aware the University has conducted an inquiry into allegations of research misconduct against you and has determined that an investigation is warranted. According to the University Policy on Scientific Misconduct (see attached) the subject of an allegation has the duty to furnish data, records and other documents as requested by the university so that a thorough review can be completed. The destruction, absence of, or any failure to provide research records adequately documenting the questioned research at any point in the process is evidence of research misconduct where it is established by a preponderance of the evidence that the subject of an allegation intentionally, knowingly, or recklessly had research records and destroyed them, had the opportunity to maintain the records but did not do so, or maintained the records and failed to produce them in a timely manner, and that the subject's conduct constitutes a significant departure from accepted practices (Policy 4.1.4).

The Investigation Committee has requested access to your laptop and any other hard drives (e.g., group servers, on the cloud or elsewhere) where the program codes relevant to the allegations being reviewed (see attached) may be found. You may do so in person. All hard drives will be immediately copied and returned to you. Please provide the requested items and any other materials you think would be relevant to the Committee's investigation to the Office of the Vice President of Research by July 8. Non-compliance with this request will subject you to University Policy violations and appropriate disciplinary actions.

We appreciate your cooperation with this request.

Sincerely,

Randolph Hall, PhD
Vice President, Research

CC: Dr. Kristen Grace, USC Research Integrity Officer

Hao Li, PhD, Assistant Professor of Engineering, is alleged of falsification and/or fabrication in two papers, an abstract submission and a live technology demonstration.

Specifically, Dr. Li is alleged to have:

1. Fabricated data in a paper submitted to SIGGRAPH 2017, a paper submitted to SIGGRAPH Asia 2017 and an abstract to SIGGRAPH Real-Time Live 2017 by representing manually prepared avatar hair shapes as being automatically generated;

2. Falsified data in a paper submitted to SIGGRAPH Asia 2017 by representing manually "fixed" avatar eye color, while the paper represented that eye color recognition was accomplished through technology he developed based on advances in deep learning;

3. Falsified data in an abstract to SIGGRAPH Real-Time Live 2017 by representing that he had developed a "fully automatic framework for creating a complete 3D avatar...to build a high-quality head model within seconds", when in-fact the technology took approximately a minute and a half to generate;

4. Falsified data in a SIGGRAPH Real-Time Live demonstration 2017 by claiming that the demonstration represented that the creation of an avatar using his technology was in real time and accomplished in a matter of seconds, when in fact the avatar creation was pre-loaded ("cashed") on the computer. In addition it is alleged that Dr. Li instructed his team to manually modify the outputs actually being generated to improve the avatars' quality such that the output demonstrated was not an accurate representation of the output his technology generated.

July 30, 2013

Scientific Misconduct
1. Purpose

USC faculty, staff and students are expected to conduct research in accordance with the highest ethical standards. The university does not tolerate misconduct in any aspect of research, and will promptly investigate all such allegations.

This document defines the behaviors that constitute research misconduct and describes the university's policies and procedures for investigating such allegations, including actions the university may take depending on the outcome. The policies and procedures in this document adhere to federal requirements of our research sponsors as well as the university's due process considerations.

2. Scope

This policy applies to all university faculty members (including part-time and visiting faculty), staff and other employees, (such as postdoctoral scholars) who propose, conduct, report, or review research on behalf of the university regardless of funding source.

In addition, USC subcontractors, collaborators, and other third parties are expected to comply with their respective policies and procedures for investigating scientific misconduct allegations. Such policies should comply with federal regulations and be consistent with USC's policy.

This policy does not address and specifically excludes fiscal improprieties, issues concerning the ethical treatment of human or animal subjects, authorship disputes, sexual harassment or discrimination, general matters not within the definition of scientific misconduct, and criminal matters.

3. Definitions

3.1 Research

Research includes all basic, applied, and demonstration research, including but not limited to all fields of science, medicine, engineering, mathematics and social sciences and encompassing research training, applications or proposals for support of research or research training regardless of whether an application or proposal resulted in a grant, contract, cooperative agreement, or other form of support, and related research activities.

3.2 Research Misconduct

Research misconduct is defined as fabrication, falsification, plagiarism in proposing, performing, or reviewing research, or in reporting research results. It does not include honest error or honest differences of opinion.

1.   **Fabrication** is making up data or results and recording or reporting them.

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Research misconduct is defined as fabrication, falsification, plagiarism in proposing, performing, or in reviewing research, or in reporting research results. It does not include honest error or honest differences of opinion.

1. **Fabrication** is making up data or results and recording or reporting them.

2. **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

3. **Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

3.3 Research Record

The Research Record is defined as the record of data or results that embodies the facts resulting from scientific inquiry, including, for example, laboratory records, research proposals, reports, abstracts, theses, oral presentations, journal articles, and any documents or materials provided to the university by the subject of the allegations in the course of a research misconduct proceeding.

The Research Record also includes all records secured in connection with a Preliminary Inquiry or Investigation, documentation of the determination of irrelevant or duplicate records not retained, the Preliminary Inquiry report and final documents produced in the course of preparing that report, and the Investigation report and all records (other than drafts of the report) in support of that report, including the recordings or transcriptions of interviews conducted in the course of an Investigation.

4. Process

4.1 Receipt of an Allegation

4.1.1 **Making an Allegation**. An individual with an allegation of research misconduct involving a USC faculty member, staff, or student employee may make an allegation orally or in writing, and must bring the allegation to either the **Vice President of Research** or the **University Compliance Officer**. The Vice President of Research will determine whether the allegation is sufficiently credible, specific, and falls within the scope of this policy. The Vice President of Research should ensure that he or she does not have an actual or potential personal, professional, or financial conflict of interest with the complainant, respondent, or witnesses. If the Vice President of Research determines that he or she does have such a conflict, he or she shall disclose such actual or potential conflicts to the Provost, who shall determine whether someone other than the Vice President of Research should assume the responsibilities assigned to the Vice President of Research under this policy.

The university will provide confidentiality, to the extent possible and allowed by law, to those who in good faith report apparent misconduct, to the subject of a research misconduct allegation(s), and to research subjects identifiable from research records or evidence, by limiting disclosure of their identities to those who need to know, consistent with a thorough, competent, objective, and fair research misconduct proceeding.

4.1.2 **Contents of Allegation**. An allegation of research misconduct must include a detailed description of the alleged misconduct, the individual(s) who is (are) the subject(s) of the allegation, as well as supporting evidence or documentation, if available. An allegation may be made orally or in writing.

4.1.3 **Pursuit of Allegations**. Inquiries and Investigations begun in response to an allegation will continue even if the subject of the allegation leaves the university before the process is completed. The university has the authority to obtain all relevant documentation, data and other records in connection with the allegations of research misconduct, and to request that the appropriate department, unit or school sequester all such materials.

4.1.4 **Duty to Cooperate and Provide Evidence**. The subject(s) of an allegation has the duty to furnish data, records, and other documents as requested by the university so that a thorough review can be completed. The destruction, absence of, or any failure to provide research records adequately documenting the questioned research at any point in the process is evidence of research misconduct where it is established by a preponderance of the evidence that the subject(s) of an allegation intentionally, knowingly, or recklessly had research records and destroyed them, had the opportunity to maintain the records but did not do so, or maintained the records and failed to produce them in a timely manner, and that the subject's conduct constitutes a significant departure from accepted practices of the relevant research community.

4.2 Step 1—Preliminary Inquiry

Should the Vice President of Research determine that an allegation falls within the scope of this policy and is sufficiently credible and specific to go forward with evidence of research misconduct may be identified, he or she will refer the matter to the appropriate dean who has the responsibility to promptly initiate a Preliminary Inquiry (appoint a Preliminary Inquiry Committee) into the allegation or other evidence of possible misconduct in scientific research. The purpose of the Preliminary Inquiry is to determine whether a formal investigation into the allegation is warranted.

The dean shall forward to the Provost the Preliminary Inquiry report, conclusions, and recommendations, any comments submitted by the complainant and/or subject of the allegations, the documentation of the Preliminary Inquiry, and the dean's comments on the Committee's recommendations. The Committee's report is only a recommendation to the Provost. The Provost will complete the Preliminary Inquiry by determining whether or not to affirm the recommendations of the Preliminary Inquiry Committee, or to take different action.

The procedures and conditions of a Preliminary Inquiry are described in Appendix 2.

4.3 Step 2—Investigation

Should the Provost decide to proceed with an Investigation, the Vice President of Research will appoint a special committee to investigate the allegations. The purpose of the Investigation is the formal development of a record, and the examination of that record to determine whether to recommend a finding that research misconduct occurred.

A finding of research misconduct requires that:

1. There be a significant departure from accepted practices of the relevant research community for maintaining the integrity of the research record;

2. The misconduct be committed intentionally, knowingly, or recklessly; and

3. The allegation be proven by a preponderance of the evidence.

The Vice President of Research will forward the Investigation Committee's report to the Provost. The Committee's report is only a recommendation to the Provost. The Provost will complete the Investigation by determining whether or not to affirm the recommendation(s) by the Investigation Committee, or to take different action.

If the Provost determines that research misconduct took place, he or she will require the investigator to notify any journals where the research was reported and request that any articles related to the research be retracted.

The procedures and conditions of an Investigation are described in Appendix 3.

4.4 Step 3—Resolution

Resolution of an Investigation by the Provost may involve a finding that either the allegation(s) of misconduct cannot be substantiated or further action is necessary, and that disciplinary action, up through and including formal proceedings for dismissal, should commence. The nature of the disciplinary action taken will take into account the seriousness of the misconduct, including but not limited to:

1. The degree to which the misconduct was knowing, intentional, or reckless;

2. Whether the misconduct was an isolated event or part of a pattern; and/or

3. If the misconduct had a significant impact on the research record, research subjects, other researchers, institutions, or the public welfare.

The nature of disciplinary actions taken will also depend on whether the subject of the allegation(s) is a faculty member, staff or other non-faculty employee, postdoctoral fellow, or student employee. The respective actions and formal proceedings for dismissal or application of other sanctions are described in Appendix 4.

If the Provost or President determines, following a Preliminary Inquiry, Investigation or Hearing, that there has been a failure to substantiate an allegation of research misconduct, the university will make appropriate and reasonable efforts to protect the reputation of the person alleged to have engaged in the misconduct. Depending on the case, this may include communicating the university's findings to the complainant, respondent and any witnesses who are aware of the allegations.

In all cases, the university will undertake reasonable and appropriate efforts to seek to protect the positions and reputations of those persons who, in good faith, make allegations, submit evidence, or otherwise participate in the process. This may include communicating its determination that allegations were made in good faith to the complainant, respondent, and any witnesses who are aware of the findings. The university will also seek to appropriately discipline any member of the university community who retaliates against someone who makes allegations of research misconduct, gives evidence, or participates in the proceedings.

5. Reporting to Government

5.1 Notification

When the university receives an allegation of research misconduct that involves federally funded research (or an application for federal funding) the Provost will:

1. Upon completion of the Preliminary Inquiry through the Provost's action, notify the relevant federal agency (or agencies) in writing within the required time frames of the agency (or agencies), including but not limited to the Office of Research Integrity (ORI), if the allegation meets the definition of research misconduct above, and there is sufficient evidence to proceed to an Investigation.

2. Upon completion of the Investigation through the Provost's action, forward to the relevant agency (or agencies) a copy of the Investigation report and the university's action.

3. Upon completion of the adjudication phase through a Hearing and the President's or Provost's action, forward the university's decision and notify the agency (or agencies) of any corrective action taken or planned.

The Provost is also responsible for notifying the appropriate government agency (or agencies) within the agency's required time frames if he/she ascertains at any stage of the Preliminary Inquiry, Investigation, or Hearing that any of the following conditions exist:

1. There is an immediate public safety or health risk involved, including an immediate need to protect human or animal subjects;

2. There is an immediate need to protect Federal funds or equipment;

3. There is a need to suspend research activities;

4. There is a need for Federal action to protect the interests of those involved in the research misconduct proceeding;

5. It is probable that the alleged incident is going to be reported prematurely to the public, so that appropriate steps are needed to safeguard evidence and protect the rights of those involved;

6. The research community or public should be informed; or

7. There is a reasonable indication of possible violations of civil or criminal law.

5.2 Final Reporting

The final report submitted by the Provost to the government shall address each of the items set forth in Appendix 3 of this Policy.

5.3 Additional Sanctions

The relevant federal agency has the right under federal regulations to impose additional sanctions, beyond those applied by the institution, upon investigators or institutions, if it deems such action appropriate in situations involving funding from the agency.

Responsible office

Appendix 1: Web Resources

Additional resources regarding this subject include the following:

USC Resources
- USC Faculty Handbook
- SCampus
- Misappropriation of University Assets policy
- Office of Research
- Conflict of Interest in Research policy
- Office for Protection of Research Subjects
- USC Stevens Center for Innovation

Government Resources
- Office of Research Integrity
- Office of Science and Technology Policy
- Public Health Service (PHS Regulations issued in 2005)
- National Science Foundation (scientific misconduct policy)

Appendix 2: Procedures and Conditions of a Preliminary Inquiry of Research Misconduct

A.2.1 Notification of External Funding Source.

Upon initiation of a Preliminary Inquiry, the Vice President of Research or his or her designee will determine whether there is any outside funding source(s) for the research that is the subject of the Preliminary Inquiry. The Vice President of Research will advise the Provost if it is necessary to notify the appropriate government agency (or agencies) under the terms of this policy.

A.2.2 Discussion with Subject.

At the time of or before beginning the Preliminary Inquiry, the dean or his or her designee will make a good faith effort to notify the subject(s) in writing of the allegations against them. The dean or his or her designee will also make a good faith effort to meet with the subject(s) to discuss the university process for inquiring into and investigating the allegation(s). If the Preliminary Inquiry subsequently identifies additional subject(s) of allegation(s) of research misconduct, the dean shall, in the same manner as with the original subject(s) of allegation(s) of research misconduct, make a good faith effort to notify such additional subject(s) of the allegations against them. The dean or his or her designee will make a good faith effort to meet with any such additional subject(s) and discuss the university process for inquiring into and

A.2.3 Custody of the Research Record.

On or before the date on which the subject is notified of the allegations or when the Preliminary Inquiry begins, whichever is earlier, the dean or his or her designee will promptly take all reasonable and practical steps to obtain custody of all research records and evidence needed to conduct the research misconduct proceeding, inventory the records and evidence, and sequester them in a secure manner, except that where the research records or evidence encompass scientific instruments shared by a number of users, custody may be limited to copies of the data or evidence on such instruments, so long as those copies are substantially equivalent to the evidentiary value of the instruments themselves. The dean or his or her designee will also take all reasonable and practical steps to take custody of additional research records or evidence discovered during the course of a research misconduct proceeding. If needed, the dean should consult with the Vice President for Research Advancement for assistance.

A.2.4 Preliminary Inquiry Committee Appointment.

The dean will designate a faculty member, ad hoc committee under the practices of that school with the appropriate expertise to conduct a Preliminary Inquiry into the allegations. If the subject of the allegation is a faculty member with tenure or whose contract or term of appointment has not yet expired, the faculty committee may include a faculty member from outside the school drawn from either the Faculty Rights and Responsibilities Committee or the University Committee on Faculty Tenure and Privileges Appeals, to the extent appropriate. The dean should consult with the Vice President of Research for assistance. The dean shall take reasonable steps to confirm that neither he or she nor the members of the Preliminary Inquiry Committee have an actual or potential personal, professional, or financial conflict of interest with the complainant, respondent, or witnesses. The members of the Preliminary Inquiry Committee will be reminded of the importance of strict confidentiality during the Preliminary Inquiry and the right to privacy for those under Investigation. As a necessary, the Preliminary Inquiry Committee may also rely on the opinion of third party subject matter experts to assist in its assessment.

A.2.5 Preliminary Inquiry Process.

The purpose of the Preliminary Inquiry is to gather relevant information to determine if the allegations appear to have substance and if an Investigation is warranted. An Investigation is warranted if there is a reasonable basis for concluding that the allegation falls within the definition of research misconduct, and preliminary information-gathering and fact-finding from the Preliminary Inquiry indicates that the allegation may have substance. A Preliminary Inquiry does not require a full review of all the evidence related to an allegation.

Any individuals with information relevant to the Preliminary Inquiry, including the individual(s) who raised the concern and the subject of the allegations, should be interviewed if possible. Witnesses should be reminded of the importance of strict confidentiality during the Preliminary Inquiry and the right to privacy for those under investigation.

A.2.6 Rights of the Subject.

The Preliminary Inquiry Committee should inform the subject of the allegation of the content of the allegations and should provide the subject with an opportunity to comment on the allegations. The Preliminary Inquiry Committee should also assure the subject(s) of an allegation that their rights are protected and that an allegation in itself will not be the basis for disciplinary action.

In the event that the subject of the allegation is a faculty member with tenure or whose term of appointment or contract has not yet expired, the chair of the Academic Senate Committee on Appointment or contract may consult with the Vice President for Student Affairs or his or her designee of the allegation.

A.2.7 Preliminary Inquiry Report.

The Preliminary Inquiry Committee shall prepare a written report to the dean that includes the following information:

- The name and position of the subject of the complaint,
- A description of the allegations of research misconduct,
- A description of the federal support (if any), including, for example, grant numbers, grant applications, contracts, and publications listing federal support,
- A summary of what evidence was reviewed,
- A summary of information obtained from relevant interviews, and
- The recommendations of the Preliminary Inquiry Committee and the basis for them.

The Preliminary Inquiry report should include sufficiently detailed documentation to permit a later assessment, if necessary, of the reasons for determining that an Investigation was or was not warranted. The Preliminary Inquiry Committee may also consider whether the allegations were made in good faith and may include its recommended findings on that issue in the Preliminary Inquiry report.

After receiving a copy of the Preliminary Inquiry Report, the dean must make a good faith attempt to notify the subject in writing of the findings of the Preliminary Inquiry Committee, and must include a copy of its Preliminary Inquiry report with any such notice. The dean must provide an opportunity for the subject to submit written comments on the Preliminary Inquiry report and attach any comments received to it. The dean may notify the complainant who made the allegation of the findings of the Preliminary Inquiry, and may provide relevant portions of the Preliminary Inquiry report for comment to the complainant for comment. Any comments on the report by the complainant should be included in the Preliminary Inquiry report.

A.2.8 Completion of the Preliminary Inquiry.

The Preliminary Inquiry should be completed within 60 days (or within the time frames established by the relevant federal agency), including conducting the Preliminary Inquiry, preparing a report of findings, and obtaining comments. If the Committee determines that it will not be able to complete the Preliminary Inquiry within the applicable time frames, the Committee must notify the dean as soon as possible and request a reasonable extension. If the dean grants an extension, the Preliminary Inquiry report must document the reasons for exceeding the applicable time frames. If federal funds are involved, the Provost may be required to seek an extension from the relevant federal agency.

Within 30 days of any finding that an Investigation is warranted, the Provost will provide ORI with the written finding and a copy of its Preliminary Inquiry report if the possible research misconduct relates to federally supported research.

The Office of the Provost shall secure the research record of the Preliminary Inquiry for a period of at least seven years after termination of the Preliminary Inquiry, including sufficiently detailed documentation of inquiries where the university decides not to conduct an investigation, and upon request, provide them to ORI or other authorized HHS personnel.

Appendix 3: Procedures and Conditions of an Investigation of Research Misconduct

A.3.1 Investigation Committee.

The Investigation Committee shall be appointed by the Vice President of Research and consist of no fewer than three individuals with appropriate expertise to investigate the allegations. No more than one person from the Preliminary Inquiry Committee can serve on the Investigation Committee. If the subject of the allegation is a faculty member, the Vice President of Research will consult with the President of the Academic Senate regarding the membership of the committee. The Vice President of Research shall take reasonable steps to confirm that neither he or she nor the members of the Investigation Committee have an actual or potential personal, professional, or financial conflict of interest with the complainant, respondent, or witnesses, and that the Investigation Committee has an appropriate level of scientific expertise to competently analyze the allegations. The members of the Investigation Committee will be reminded of the importance of strict confidentiality during the Investigation and the right to privacy for those under Investigation.

A.3.2 Process for Investigation.

The Investigation should begin within 30 calendar days following completion of the Preliminary Inquiry, and should examine all available relevant documentation, including but not necessarily limited to research data and proposals, publications, correspondence, and memoranda of telephone calls.

To the extent it has not been done at the allegation or Preliminary Inquiry stages, the Investigation Committee shall take all reasonable and practical steps to obtain custody of all the research records and evidence needed to conduct the research misconduct proceeding, inventory the records and evidence, and sequester them in a secure manner, except that where the research records or evidence encompass scientific instruments shared by a number of users, custody may be limited to copies of the data or evidence on such instruments, so long as those copies are substantially equivalent to the evidentiary value of the instruments themselves. Whenever possible, the Investigation Committee must take custody of the records either before or at the time the university notifies the subject of the allegations, or whenever additional items become known or relevant to the Investigation.

The Committee should interview any individuals who have been reasonably identified as having information regarding any relevant aspects of the Investigation, including both the individual(s) who raised the allegation(s) and the subject of the allegations, if possible. Witnesses should be reminded of the importance of strict confidentiality during the Investigation and the right to privacy for those under Investigation.

For investigations involving HHS-supported research, each interview conducted should be recorded or transcribed. Each such recording or transcription should be provided to the interviewee for correction, and included in the record of the Investigation. The Committee is expected to pursue Investigations diligently, and carry its Investigations through to completion. It is important that the Investigation Committee consider whether the allegations were made in good faith.

The Vice President of Research, the Office of General Counsel and the Office of Compliance are available to provide administrative and legal support to the Investigation Committee. The Vice Provost for Faculty Affairs and the President of the Academic Senate also are available resources if faculty members are involved. The Investigation Committee may also elicit the opinion of third party subject matter experts to assist in its assessment.

A.3.3 Rights of the Subject of the Allegation and Complainant.

Within a reasonable amount of time after determining that an Investigation is warranted, but before the Investigation begins, the Vice President of Research, or his or her designee, shall notify the subject in writing of the allegations against him or her.

The Committee must also give the subject(s) of the allegations written notice of any new allegations of research misconduct within a reasonable amount of time of deciding to pursue allegations not addressed during the Preliminary Inquiry or in the course of Investigation.

During the course of the Investigation, the Committee shall provide the subject(s) with an opportunity to address the Committee. The Committee shall also provide the subject(s) with either copies of, or supervised access to, the data and other evidence supporting the allegation, as well as an opportunity to respond to the allegation and supporting evidence. In addition, the Committee shall make its entire report available for comment by the subject(s) of the allegation prior to its final submission to the Provost. Any comments by the subject(s) must be submitted within 30 days of the date on which the subject(s) received the draft Investigation report. The Investigation Committee will consider and address the comments before issuing its final report.

A.3.4 Investigatory Report.

The Investigation Committee shall prepare a written report of its recommended findings for the Provost. If the Investigation Committee decides to recommend a finding of misconduct, it should also make recommendations concerning:

- The seriousness of the misconduct, including (but not limited to) consideration of the degree to which the misconduct was knowing, intentional, or reckless;
- Whether it was an isolated event or part of a pattern; or
- Whether it had significant impact on the research record, research subjects, other researchers, institutions, or the public welfare.

The final report shall:

- Describe the nature of the allegations of misconduct, as well as the specific allegations of misconduct that were considered in the investigation;
- Describe and document any federal support for the research at issue, including, for example, any grant numbers, grant applications, contracts, and publications listing federal support;
- To the extent not provided with the Preliminary Inquiry report, include the institutional policies and procedures under which the Investigation was conducted;
- Identify and summarize the research records and evidence reviewed, and identify any evidence taken into custody but not reviewed;
- For each separate allegation of research misconduct identified during the Investigation, provide a finding as to whether research misconduct did or did not occur, and if so:
  - Identify whether research misconduct was falsification, fabrication, or plagiarism, and if it was intentional, knowing, or in reckless disregard;
  - Summarize the facts and the analysis which support the conclusion and consider the merits of any reasonable explanation by the respondent;
  - Identify the specific federal support, if any;
  - Identify whether any publications need correction or retraction;
  - Identify the person(s) responsible for the misconduct; and
  - List any current support or known applications or proposals for support that the respondent has pending.
- Include and consider any comments made by the respondent and complainant on the draft Investigation report.

The person(s) who raised the allegation may be provided with those portions of the report that address their role and opinions in the Investigation, and given the opportunity to submit comments. If a draft copy of the report is provided to the complainant, the comments of the complainant, if any, must be submitted within 30 days of the date on which the complainant received the draft Investigation report or relevant portions of it.

A.3.5 Completion of Investigation.

Completion of the Investigation includes conducting the Investigation, preparing the report of findings, obtaining comments, and sending the final Investigation report to the Provost of the possible research misconduct relates to federally supported research. If the Committee determines that it will not be able to complete the Investigation in 120 calendar days (or within the relevant federal agency's time frame if federal funding is involved, the Investigation Committee must notify the Provost as soon as possible and request a reasonable extension.

When federal funding is involved, and the Provost deems an extension necessary, he/she will submit:

- A written request to the relevant federal agency (or agencies) for an extension as appropriate;
- An explanation for the delay; and
- An estimate for the date of completion of the report and other necessary steps.

The Provost will notify ORI in advance if he or she plans to close a case at the Preliminary Inquiry or Investigation stage on the basis that the subject of the allegations has admitted guilt, a settlement with the subject has been reached, or for any other reason, except the closing of a case at the Preliminary Inquiry stage on the basis that an Investigation is not warranted or a finding of no misconduct at the Investigation stage. As to findings of no misconduct at the Investigation stage, the university will notify ORI within the required time frame after making such a finding.

The Office of the Provost shall secure the records of the Investigation for a period of at least seven years after termination of the Investigation.

Appendix 4: Formal Actions and Proceedings for Employee Scientific Misconduct

A.4.1 Faculty.

In the case of a faculty member with tenure or whose contract or appointment has not expired, if the Provost determines that formal proceedings for dismissal should commence, the Provost will make a formal statement of charges and a Hearing by the University Committee on Faculty Tenure and Privileges Appeals will be held as provided in the Faculty Handbook. The burden of proof in dismissal shall be as stated in the Faculty Handbook. If the Provost determines that discipline short of dismissal should be imposed, the subject of the allegation may obtain a review through the grievance procedures of the University Committee on Faculty Tenure and Privileges Appeals under Section 7 of the Faculty Handbook. All reports of the University Committee on Faculty Tenure and Privileges Appeals are recommendations to the President of the university. The President shall retain ultimate decision-making authority and the discretion to accept or reject panel recommendations.

A.4.2 Staff or Other Non-Faculty Employee.

In the case of a staff member or other non-faculty employee (e.g., postdoctoral research associate) whom the Provost finds following the Investigation to have committed research misconduct, the Provost will refer the findings to the Associate Senior Vice President for Human Resources who will prescribe the remedial or disciplinary action, up to and including termination, and will notify both the department and the non-faculty employee of the prescribed action. Departments are required to implement the remedial or disciplinary action prescribed by the Associate Senior Vice President of Human Resources. A non-faculty employee may file a written appeal with the Senior Vice President for Administration within ten business days of his or her receipt of notice of the disciplinary action. The Senior Vice President for Administration must respond to the employee's appeal within 20 business days.

A.4.3 Postdoctoral Fellow.

In the case of a postdoctoral fellow who the Provost finds following the Investigation to have committed research misconduct, the Provost will take appropriate disciplinary action, up to and including termination of the postdoctoral appointment. Alternatively, the Provost, at his or her discretion, can refer the matter to the dean for a determination regarding the appropriate disciplinary action.

A.4.4 Students.

In the event the Provost finds, following the Investigation, that a graduate, professional or other student employee to whom this policy applies has committed research misconduct, the matter shall be referred to the Office of Student Conduct for resolution pursuant to the procedures identified in SCampus. In the case of a graduate or professional student employee, the Provost, at his or her discretion, can refer the matter to the dean for a determination regarding the appropriate disciplinary action.

Attachment 17

From:	Kristen Grace
To:	Hao Li
Cc:	Randolph W. Hall; Marty Levine; Rob Groome; Alan Hong
Subject:	USC Mac Book Pro
Date:	Tuesday, July 2, 2019 11:25:43 AM

Dear Dr. Li,

It has come to my attention that the laptop you dropped off to ITS last week was not, in fact, your ICT machine. We need you to drop off your university MacBook Pro with ICT tag "T06270" and serial of C02SXE11GTF1 to ITS tomorrow morning. Please let me know what time you will be arriving and I will have Alan available to collect and fill out the chain of evidence form.

Sincerely,
Kristen Grace

Kristen Grace, M.D., Ph.D.
Research Integrity Officer
Office of Research

University of Southern California
3720 S Flower Street, Suite 325
(213) 821 7297
gracekri@usc.edu

Michael J. DeNiro
  Lawyer in Private Practice
  Emeritus Professor of Stable Isotopy, University of California

April 6, 2020

To: Research Integrity Officer Kristen Grace

From: Michael J. DeNiro, Hao Li's lawyer

Re: Response of Associate Prof. Hao Li to the Draft Research Misconduct
         Investigation Report you provided on 3/6/2020

We present the response of Associate Professor Hao Li to the Draft Research Misconduct
Investigation Report ("Draft Report") that Prof. Li received from you on 3/6/2020.

EXECUTIVE SUMMARY

In **Part I**, we raise for the third time the ethical and policy obligation the Investigation
Committee ("IC") breached by failing to recuse itself before producing the Draft Report
because one of its members, Prof. Nenad Medvidovic, had an undisclosed actual or potential
conflict of interest with the forensic firm Quandary Peak Research, which provided key
analytical evidence to the IC. This undisclosed conflict of interest is in direct violation of
Section ("§") A.3.1 of the USC Scientific Misconduct Policy ("SMP"). Although USC has
agreed to have the analysis tainted by conflict of interest re-done by a third party firm with no
ties to Prof. Medvidovic, this does not go far enough to resolve the conflict, as Prof.
Medvidovic remains on the IC despite his failure to recuse himself.

Part II discusses additional material violations of the SMP by the Office of Research in the
course of its investigation, and/or by the Investigation Committee in drafting its report. *First*,
the duration of this investigation (which is not complete) has more than tripled the 120-day
time period required under SMP § A.3.5, without any evidence that an extension was requested
and approved as required. *Second*, the Office of Research failed to provide Prof. Li with any
of the newly acquired evidence (including Attachments 9-11 and 14 to its Draft Report) during
the course of the investigation, depriving him of the opportunity to respond, as required under
SMP § A.3.3. *Third*, the IC has improperly rendered an opinion o REDACTED

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REDACTED 3.   *Fourth*, the IC has improperly and prejudicially issued its Draft Report
(mislabeled Final Report) while the investigation remains ongoing as to two of the four
allegations, in violation of SMP § A.3.4, which requires that the Final Report include "a finding
to wither research conduct did or did not occur" as to "each separate allegation . . . identified
during the investigation."

Part III discusses a further material shortcoming of the IC and Office of Research in failing
to meaningfully investigate or seek corroboration of any of the charges against Prof. Li; instead
the IC blindly relied almost exclusively on Dr. Iman Sadeghi, the plaintiff in an ongoing
litigation against Prof. Li and his startup Pinscreen (that is going very badly for Dr. Sadeghi),
and purposefully ignoring contrary evidence submitted by and on behalf of Prof. Li. The
failure to account for Dr. Sadeghi's motives, his own participation in the alleged conduct of
which he now complains, or the negative views of Dr. Sadeghi's integrity and credibility held
by executives of SIGGRAPH, and other leading figures in computer graphics, undermines the
duty to consider whether the allegations were made in "good faith" and "sufficiently credible,"
as required under SMP § A.3.4 and § 4.2 Step 1, respectively.

Part IV responds directly to the allegations against Prof. Li and the erroneous conclusions
drawn by the IC.[1] *First*, the Committee concludes contrary to the evidence that Pinscreen's
4/4/2017 abstract should have reflected the state of Pinscreen's technology at the time of the
submission rather than at the time of the *presentation*, four months later. It compounds this
error by relying on the wording in SIGGRAPH's RTL marketing materials of July 2017 rather
than Pinscreen's actual submission of 4/4/2017 that explicitly refers to the technology as a
"Proposed System." It also ignores corroborating statements that RTL submissions are not
"research papers" and that the submissions may describe a proof of concept rather than current
capabilities, which is precisely what Pinscreen's submission was.

Second, the Committee erroneously concludes the SMP even applies to an entertainment-
oriented spectacle such as Real Time Live, despite multiple testimonials – including by a
Professor at UT Austin – that RTL is in no way held out to be a scientific venue (otherwise,
SIGGRAPH would not be freely offering to "enhance" presentations). Further, even if the
SMP did apply to RTL shows (which it does not), the Committee improperly concludes
(including by relying on Quandary's report tainted by conflict of interest) that presenting a
"cached" avatar during Pinscreen's RTL performance constituted research misconduct. In so
doing, the Committee ignores evidence that there is no requirement to announce cached images

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[1] However, since the forensic Quandary Peak Research report (Attachment 11 to the Draft Report) will be
supplemented by a new report by a second research lab, we do not respond to the Quandary report or to conclusions
drawn therefrom but expect that we will have an opportunity do so at such time that the new report is rendered.

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as such (and that no one at the show would be misled), and that the likelihood of internet connectivity issues was understood to be a sufficient reason to permit caching,

Third, as to both the abstract and the RTL presentation, the Committee improperly concludes that Pinscreen did not have the capability to quickly produce avatars from a single image as of August 2017, despite Prof. Li having submitted evidence (which the IC misinterprets) to the contrary.

For these reasons, the investigation should either be dismissed, the draft report withdrawn, or the report amended to determine that the evidence does not support a finding that Prof. Li engaged in scientific misconduct.

RESPONSE TO THE DRAFT RESEARCH MISCONDUCT INVESTIGATION REPORT

I.   The Investigation Committee Must Recuse Itself Because One of Its Members Had an Undisclosed Actual or Potential Conflict of Interest in Violation of Section A.3.1 of the Scientific Misconduct Policy.

USC *Scientific Misconduct Policy* (https://policy.usc.edu/scientific-misconduct/) at § A.3.1. requires "[t]he Vice President of Research take reasonable steps to confirm that neither he or she nor the members of the Investigation Committee have an actual or potential personal, professional, or financial conflict of interest with the complainant, respondent, *or witnesses*, …" (Emphasis added.)

Investigation Committee member Nenad Medvidovic had an actual or potential personal and/or professional conflict of interest with a *witness for the Committee*. The author of the Quandary Peak Research Consulting Report ("Attachment 11" to the Draft Report) is George Edwards, Ph.D. George Edwards was Investigation Committee member Medvidovic's Ph.D. student, per the first page of Dr. Medvidovic's Wikipedia entry as of 4/4/2020 (https://en.wikipedia.org/wiki/Nenad_Medvidovi%C4%87), which lists on the first page George Edwards as a Ph.D. student of Dr. Medvidovic.

The Vice President of Research (Former Vice President of Research Randolph Hall) did not take reasonable steps to confirm that one of the members of the Investigation Committee does not have an actual or potential personal and/or professional conflict of interest with a witness.

In response to my protesting to Research Integrity Officer Kristen Grace Investigation Committee member Medvidovic's actual or potential conflict of interest, The Office of

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Research decided not to honor my request that it dismiss the Investigation Committee and appoint another Investigation Committee with no undisclosed actual or potential conflict of interest.

The Office of Research did, however, admit the existence of an undisclosed conflict of interest, deciding:

> to demonstrate the Office of Research's commitment to the integrity of the process, the University will immediately engage a different third-party consulting firm to carry out the analysis that had initially been completed by Quandary.

> Pending the completion of this analysis, the Committee's recommended findings stand as stated in the Draft Investigation Report. Therefore Prof. Li should respond to the committee's report within the 30-day period.

> In the event that the new third-party analysis leads the committee to revise its report, Prof. Li would be given a new opportunity to respond to the revised report. If the new analysis does not lead to any revision, there will not be an additional opportunity for Prof. Li to respond.

(See Att. S at p. 4 of the .pdf file.) [Note the Attachments referred to herein ("Att." or plural "Atts.) are in a .pdf portfolio "Attachments A-S re Prof. Li's Response to Draft Report (4.6.2020)" attached to the email to which this document was also attached.)

I pointed out to USC Associate General Counsel Dawn Kennedy, who answered my request to Research Integrity Officer Grace, that the Office of Research decision that "Prof. Li should respond to the committee's report within the 30-day period"

> falls short of a fair resolution of what is a serious violation of the USC *Scientific Misconduct Policy* by USC itself.

> It is impossible, for example, that a different third-party consulting firm could reach the same conclusion as Quandary Research Consulting did, at any but the most superficial level. Look at the fine-grain analysis in Attachment 11. It is unfair for Prof. Li to have to respond to the fine-grain analysis of the Quandary Research Consulting report when it is a given that the

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> fine-grain analysis of a different third-party consulting firm will differ substantially in the details.

(See Att. S at p. 2 of the .pdf file.)

Thus, even if the Investigation Committee does not recuse itself, it will have to re-do the Draft Report *de novo* if and inevitably when the third-party consulting firm report differs substantially from the Quandary Peak Research Consulting Report.

The Investigation Committee should do what the Office of Research refused to require it to do, and recuse itself because one of its members had an undisclosed actual or potential conflict of interest in violation of Section A.3.1 of the SMP.

II.   The Office of Research Flouted the *Scientific Misconduct Policy "Procedures and Conditions of an Investigation of Research Misconduct"* in Myriad Substantive Ways that Prejudiced Prof. Li.

As we have already pointed out, the Investigation Committee and others at USC are abusing their authority by authorizing a conflict of interest between a member of the Investigation Committee and the supposedly "outside, independent consulting firm" that was paid to produce "Attachment 11" to the Draft Report, that Attachment authored by a Ph.D. student of a member of the Investigation Committee. But this is not the only abuse in a process rife with violations of the *Scientific Misconduct Policy*.

First, the *Scientific Misconduct Policy* states the following:

> If the Committee determines that it will not be able to complete the Investigation **in 120 calendar days of its initiation** or within the relevant federal agency's time frame[2] if federal funding is involved, **the Investigation Committee must notify the Provost as soon as possible and request a reasonable extension**.

(SMP § A.3.5) (Emphasis added.)

Here, the Draft Report was circulated on 3/6/2020, which is at least **374 calendar days** after the Investigation Committee was charged on or before 2/26/2019. As to the two allegations

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[2] With respect to grant funding from the Office of Naval Research, the most recent R&D General Terms and Conditions (available at https://www.onr.navy mil/-/media/Files/Contracts-Grants/docs/DoD-Research-General-Terms-and-Conditions-July-2018.ashx?la=en) refer to the Federal Research Misconduct Policy (available at https://ori.hhs.gov/federal-research-misconduct-policy and https://ori.hhs.gov/federal-research-misconduct-policy), which in turn generally defer to the time limits of the particular institution.

that continue to be researched, **404 calendar days** will have elapsed by the date Prof. Li is providing this response, with no end in sight. Absent one or more timely extension requests – of which Prof. Li was never informed and which were not included with or referenced in the Draft Report – the Investigation has proceeded at least 254 days longer than permitted under the *Scientific Misconduct Policy*. Be on notice that the extension request under the *Scientific Misconduct Policy* is not optional.

Moreover, there is no evidence that the Provost ever submitted "a written request to the relevant federal agency . . . for an extension," "an explanation for the delay," and "an estimate for the date of completion," all required under SMP § A.3.5. Prof. Li is entitled to proof that extensions were requested and granted in accordance with the policy and, if they were not requested and granted, the Investigation must be terminated and the allegations dismissed.

Second, the *Scientific Misconduct Policy* provides:

> ***During the course of the Investigation***, the Committee shall provide the subject(s) with an opportunity to address the Committee" and "shall also provide the subject(s) with either ***copies of, or supervised access to, the data and other evidence supporting the allegation, as well as an opportunity to respond*** to the allegation and supporting evidence."

(SMP§ A.3.3.) (Emphasis added.)

Here, however, much of the evidence relied upon was never disclosed to Prof. Li – particularly the aforementioned Quandary Peak Research Report dated 11/21/2019 (Attachment 11); the Information Security Summaries dated 7/8/2019 and 7/29/2019 (Attachments 9 & 10); and the email chain between Dr. Grace and Dr. Sadeghi dated 12/9/2019 (Attachment 14) – until RIO Grace provided him access to them on March 6, 2020. The "opportunity to respond" to this data should have been provided during the Investigation process, not once the investigation had already been completed and the Investigation Committee already having decided that Prof. Li committed research misconduct.

This critical failure is a subversion of the investigatory process and deprived Prof. Li of the ability to respond to these erroneous findings, and conclusions based on them, *before* the IC rendered its determination.

Third, the *Scientific Misconduct Policy* provides:

> The Committee must also give the subject of the allegations ***written notice of any new allegations of research misconduct*** within a reasonable amount of time of ***deciding to pursue***

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> *allegations not addressed during the Preliminary Inquiry* or in
> the initial notice of Investigation.

(SMP § A.3.3.) (Emphasis added.)

Here, the Investigation Committee, after rendering its findings, suddenly switched gears and rendered a conclusion on a subject that was not even part of the Inquiry or Notice: REDACTED

(Draft Report at p. 13.)

REDACTED

The Draft Report contends that Prof. Li REDACTED

outside the scope of this Investigation, REDACTED

Fourth, it is unfair and prejudicial to require a response to an incomplete Investigation, in which only two of the four allegations have been investigated. (The Investigation Committee states "This interim report of the committee refers only to allegations 3 and 4. The committee continues to review allegations 1 and 2." at p. 3 of the Draft Report.) However, SMP § A.3.4 requires that the "final report" include "a finding to whether research conduct did or did not occur" as to "each separate allegation . . . identified during the investigation." What Prof. Li

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[3] Note that the University conducted a separate REDACTED

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was forwarded on 3/6/2020 is thus best described as an "interim report," which is a stark deviation from the actual requirements of the SMP. The reasonable resolution of this issue would either be that Prof. Li's response deadline be delayed until all four allegations are investigated (assuming that the IC itself has requested the proper extensions), or that the 1st and 2nd allegations be dismissed outright. As it stands, the implication is that Prof. Li will be expected to expend his time and resources to respond at least one if not two additional times, when the Investigation Committee deems it has completed another portion of its task. This is in no way contemplated by the SMP itself nor does due process contemplate such a result.

III.   **The Committee Improperly Relies, Often Exclusively, on the Statements of Dr. Sadeghi, Including Those in His Stricken First Amended Complaint, Even Though Dr. Sadeghi Has a Substantial Motive to Present Only Selected Facts or to Not Tell the Truth..**

Section A.3.4 of the SMP authorizes the IC to "consider whether the allegations were made in good faith." Although this is (surprisingly) not an affirmative obligation, the thrust of any investigation must be to evaluate any potential motivations behind the complaint and to render a credibility determination regarding the complainant himself or herself (see, e.g., SMP § 4.1 (allegation must be "sufficiently credible"). This was not done here.

As you know, on 6/11/2018, a month before Dr. Sadeghi came to USC, he had filed a 160-page lawsuit entitled *Dr. Iman Sadeghi v. Pinscreen, Inc. and Dr. Hao Li*. On 10/5/2018, after Defendants' counsel informed Dr. Sadeghi's attorneys of the numerous defects in his Complaint, he filed a 274-page First Amended Complaint (the FAC, erroneously referred to in the Draft Report as the "Second Amended Complaint"[4]), asserting 15 causes of action against five defendants, three of them newly named. It is the FAC, attached as Exhibit 1 to the Draft Report, that is the Committee's source for the bulk of the allegations and evidence.[5] Most of that evidence is uncorroborated and, particularly such crucial points as internet connectivity at RTL 2017 and the state of Pinscreen's technology leading up to RTL 2017, Dr. Sadeghi is the *only* source of information. (Report at ¶¶ 32-1(c), 28-2.)

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[4] See Dr. Li's Attachment A (the Superior Court docket for the matter of *Sadeghi v. Pinscreen, et al.*) The docket is a public document accessible by anyone. Thus, referring to an "Amended Complaint" as a "Second Amended Complaint," and consistently misrepresenting or ignoring the actual procedural posture of the case as discussed, is inexcusable and epitomizes the lack of care displayed generally throughout the report. That lack of care is further illustrated by duplicative numbering of paragraphs 28-32 (see pp. 9-11). These will be referred to here as paragraph 28-1 vs. paragraph 28-2, etc.

[5] See, e.g., paragraphs 29-1 – 32-1, 28-2 – 32-2.

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Dr. Sadeghi is a litigant with a direct pecuniary interest in USC rendering an adverse finding. Yet there is nothing to suggest that Dr. Sadeghi's integrity or the veracity of the FAC have ever been questioned. This is a major problem because the very FAC that the IC relies upon extensively **was stricken in its *entirety* by the Court on its *own motion* nearly a year ago**. (See Att. B.) On 4/11/2019, after reviewing the FAC's 15 causes of action spread over 439 paragraphs and 274 pages, including 200 pages of exhibits, the Court held that "[t]he complaint does not comply with the letter or spirit" of the law, and "the court strikes the complaint as not drawn in conformity with the laws of the state and rules of court and contains irrelevant and improper material." (Att. C) For a court to strike an entire pleading (rather than just portions) because it is so poorly drafted is extraordinary. And for this key development to be suppressed in an official report is shocking.

Nor is that the end of the story. On 5/1/2019, Dr. Sadeghi filed the actual Second Amended Complaint ("SAC"). It was far shorter than the FAC but its fate was even worse. In two hearings on 11/20 and 11/21/2019, *Judge Martin sustained Defendants' demurrers and dismissed as to all but one[6] of Dr. Sadeghi's 15 causes of action*. The dismissed claims included the claims of "fraud, violation of employment law and contracts, wrongful termination, assault and battery, and research misconduct" referenced on page 2 of the Draft Report. (See Atts. C and D.) For each of these claims, the Court agreed with Prof. Li, Pinscreen, and their co-defendants that the SAC does not state facts sufficient to constitute a cause of action and, as to several claims, no amendment could save it.

- As to his fraudulent misrepresentation claim (based on alleged "academic misconduct" and "data fabrication"), the Court held, "There is no allegation of a [false] representation that Pinscreen made" and "plaintiff has not pleaded any cognizable damages."
- As to his fraudulent concealment claim, the Court held that "there is no sufficient description of representations that Pinscreen made" and again Dr. Sadeghi had not pled any cognizable damages.
- As to the whistleblower and wrongful termination claims (alleging a retaliatory termination for objecting to "academic misconduct," "data fabrication," etc.), the Court held that "Plaintiff has not specified the protected activity in which plaintiff was engaged or adequately alleged the nexus between the protected activity and the adverse action the company took against him." (Att. C, p. 3.)

Although Judge Martin gave Sadeghi a final chance to see if he could "fix" his fraud, wrongful termination, and whistleblower claims, she denied leave to amend the assault, battery,

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[6] The sole exception was alleged negligence in its post-termination handling of his Mickey Mouse sculpture. (See Att. C, pp. 5-6 (13th cause of action).)

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infliction of emotional distress, invasion of privacy, Labor Code §§ 203 and 2802, and Unfair Business Practices claims. She was especially harsh in her criticism of the battery claim, which she excoriated as a ***"sham pleading"*** and criticized Sadeghi for cynically changing the "time and location" of the alleged battery between one version of the complaint. (Att. C, pp. 6-7 [Pinscreen]; Att. D, p. 6 [Prof. Li and individual defendants].)

But even that is not the end. On 12/6/2019, Dr. Sadeghi filed his **Third** Amended Complaint ("TAC"), which with 30 pages, 135 paragraphs, and 6 causes of action (two fraud claims, whistleblowing, breach of contract, wrongful termination, and negligence, the only claims Judge Martin gave him a chance to try to "fix") is a shell of the FAC and SAC. (Att. E.) The three new defendants have been dismissed. Prof. Li and Pinscreen have again filed demurrers, arguing that Sadeghi's newest "changes" have done nothing to help him state a cause of action and that the entire case (save the Mickey Mouse claim) should be dismissed. (Att. F.) The demurrer will be heard on 10/2/2020. Meanwhile the three former defendants who have been dismissed from the case, including Pinscreen employees and USC students Liwen Hu and Han-Wei Kung, intend to seek a judgment and recovery of costs against Dr. Sadeghi.

Thus, as it stands, despite four bites at the apple, and after two years of litigation, Dr. Sadeghi has yet to pass through the initial threshold of filing a viable lawsuit. Yet the allegations in his long-stricken FAC are inexplicably relied upon as gospel in the Draft Report, even though there are others who directly question Dr. Sadeghi's veracity and integrity. For example, Dr. Etienne Vouga, Assistant Professor in Computer Science at the University of Texas at Austin, and a member of the papers committee of SIGGRAPH, in a detailed responsa directed to the USC Misconduct Inquiry Committee in January 2019, noted that ***"Iman's actions over the past year have struck me as very unusual, out of line with standards of professional conduct in our research community, and more characteristic of a retaliation campaign than of a well-intentioned whistleblower shining a light on scientific misconduct."*** (Att. L, at p. 5.)

Dr. Vouga noted that Dr. Sadeghi's smear campaign included "sen[ding] copies of his lawsuit, unsolicited, to me and a large number of other prominent members of the computer graphics community"; "post[ing] sensationalist comments and articles on his web site and social media, including a 'Truth Challenge' to Hao and Pinscreen"; "publicizing his lawsuit and his 'Truth Challenge to attendees" of SIGGRAPH events; and that his lawsuit "contains unnecessary, sensationalist elements … ***whose purpose seem to be solely to embarrass Hao, rather than to advance any valid concerns*** about Hao's scientific conduct." (Att. L, at p. 5.) Similarly, Ken Anjyo, Conference Chair of SIGGRAPH Asia 2018, noted that Dr. Sadeghi's antics and threats required SIGGRAPH to "***provide[] additional security guards*** for Hao and his team's presentations to reduce the possibility of a situation arising." (Att. H, at p. 1.) Mike Seymour (Chair of Real Time Live 2019 Brisbane) stated point-blank that Dr. Sadeghi was engaged in

a "*campaign of harassment*" that is "grossly unfair and insulting to your researchers and our organization." (Att. K, at p. 5.)

Dr. Sadeghi's communicating with USC should be viewed in their proper context as simply a means to leverage (extort would be a better word) a windfall settlement against Prof. Li and Pinscreen, or alternatively to ruin Prof. Li's career in revenge for terminating him. And in fact on 1/8/2018, six months before he came to USC, Dr. Sadeghi sent an 80-page "demand" letter to counsel for Pinscreen and Prof. Li. (Att. G.) In that letter, he demanded three immediate monetary payments, that Pinscreen and Prof. Li sign a "mutual non-disclosure agreement," and that Pinscreen provide a "meaningful response" to his letter. (Id. at pp. 79-80.)[7]

And, if Pinscreen and Prof. Li did not comply with all of Dr. Sadeghi's demands, he threatened to file a lawsuit and only at that point tell USC about it:

> **If Dr. Sadeghi's counsel does not receive [the demanded payments**, etc.], [he] will proceed with filing the lawsuit. [¶] **Dr. Sadeghi will also contact University of Southern California (USC), USC Viterbi Department of Computer Science, USC Institute for Creative Technologies (ICT)**, Pinscreen's investors (Softbank Ventures Korea, Colopl Next, and Lux Capital), the SIGGRAPH community, ETH Zurich Computer Science Department and the tech news media outlets and share the content of the lawsuit. (Att. G, p. 80 (emphasis added).)

We understand that USC has an obligation to conduct an investigation into Dr. Sadeghi's allegations. But that does **not** mean that Dr. Sadeghi and his lawsuit should be the **only** source of information, or that his uncorroborated statements given a level of credence denied to Prof. Li and those who wrote letters of support. Yet we note a disturbing level of credulity in connection with Dr. Sadeghi's assertions, reflecting the IC's own bias toward a predetermined result.

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[7] He also provided an extravagant and frequently bizarre wish-list for a negotiated settlement. Of special interest is his request to "keep the unlawful termination of Dr. Sadeghi fully confidential and *to list Dr. Sadeghi as the VP of Engineering in all representations*." (Id. at pp. 78, 79.) In other words, he wanted Pinscreen – the company who he claims defrauded himself and others and whose CEO engaged in academic misconduct – to continue holding him out to the world as its **current** VP of Engineering, five months after his termination.

He also complained that Dr. Li's "unfriending" and "blocking" him on Facebook and *not tagging Dr. Sadeghi's picture* on a post stating "Great Job to the entire team" for SIGGRAPH Asia 2017. (Id. at p. 79.) In other words, although he complained to USC about purported "academic misconduct" in association with SIGGRAPH Asia 2017, he was upset that Dr. Li did not publicly hold him out as a member of the SIGGRAPH Asia team. Not to mention that he also demanded compensation for betrayal of his "polar bear heart," reflecting a questionable grip on reality. (Att. G, p. 78.)

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Thus, on 12/9/2019, the investigator states to Dr. Sadeghi, **"I'm just trying to counter Li's argument that it is acceptable to present a non-realtime presentation based on problems with connectivity."** This is the role of an advocate, not an investigator. Similarly, when Dr. Sadeghi refused to explain the contradiction between his complain of fabrication and his own failure to "as the presenter to run a non-cashed {sic} code, nor did [to] inform the audience that [he was] presenting an illustration of the technology," the investigator failed to follow up.

In providing undeserved credence to Dr. Sadeghi, while painting Prof. Li in the worst possible light, the Office of Research and the Committee fail in their mandate to conduct "a thorough, competent, objective, and fair research misconduct proceeding." (SLP § 4.1.)

IV.   There Is No Scientific Misconduct Associated with Either the RTL Abstract or the RTL Performance.

   A.   The Committee's allegations are predicated on a document that is not even the RTL abstract submitted by Pinscreen, which describes the technology as a "Proposed System" rather than as existing technology.

In connection with the purported RTL Abstract, the Committee concluded the following:

> The Committee finds that Dr. Hao Li falsely presented his research in an abstract submitted to . . . SIGGRAPH Real-Time-Live 2017. Specifically, ***Dr. Li:*** [¶] Knowingly and intentionally submitted an abstract falsely claiming that he and his colleagues ***had developed software*** to automatically generate an avatar from a head shot in seconds and that it ***would be demonstrating such software*** at the SIGGRAPH Real-Time-Live show on August 1, 2017. (Draft Report at p. 12 (emphases added).)

There are two aspects to this. First, the report asserts Prof. Li claimed back on 4/4/2017 that he "had developed software to automatically generate an avatar . . . in seconds." Second, the report asserts that Prof. Li claimed that this precise software "would be demonstrat[ed]" at the 2017 RTL. Both of these are gross misrepresentations.

First, the document is not an abstract at all – rather, it is Pinscreen's submission statement "used for marketing" on the SIGGRAPH website and compiled by SIGGRAPH in or around July 2017, shortly in advance of the event itself. (Exhibits P, R.) The pdf is a composite document that introduces each of the Real Time Live presenters. It was produced The pamphlet was produced contemporaneously with RTL to act as a companion for the 8/01/2017 show. Thus, on page 16, the introduction by RTL Chair Cristobal Cheng states, "On behalf of ACM SIGGRAPH and my team, welcome to SIGGRAPH 2017 Real-Time Live! [¶ . . . ¶] My committee and I sincerely hope that you enjoy the show."

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Pinscreen's actual abstract from 4/4/2017 is a completely different document that the Draft Report does not attach as an exhibit, even though Dr. Li provided it as evidence prior to the completion of the Preliminary Inquiry. It is attached again hereto as Attachment Q. In the actual abstract, Pinscreen stated the following in relevant part:

> A simple web interface allows us to upload any photograph and a high-quality head model, including animation-friendly blendshapes and joint-based rigs, is reconstructed ***within seconds*** . . . . The ***proposed system*** integrates state-of-the-art advances in facial shape modeling, appearance interface, and a new pipeline for single-view hair generation based on hairstyle retrieval from a massive database, followed by a strand-to-hair-strip conversion method. (Att. Q.)

Thus, although much of the language reads as present tense, it can only reasonably be read as a description of the "***proposed system***." Yet the Draft Report ignores Pinscreen's actual submission and instead quoting from the version of the abstract altered and published by SIGGRAPH four months later as though this were the original language. (See Draft Report ¶¶ 6(i)–6(iii).[8]) Indeed, the video that accompanied the submission (https://www.youtube.com/watch?v=OZ2O3SXF0tE) reflects a wait time of at least 18 seconds (and in fact there is no representation that the wait time from 0:20 to 0:38 was the entire elapsed time).

In describing a "proposed system," rather than a completed system, Pinscreen was indeed operating within the guidelines of the RTL submission process. Per USC's policy, a claim of scientific misconduct requires, *a priori*, that there be misconduct connection with "**research**," as defined. Yet SIGGRAPH's own administrators are adamant in their testimonials that the abstracts and video submissions connected with the RTL Show are not themselves research. Moreover, the abstracts/submissions are entitled to demonstrate proof of a concept, rather than a "research output." Thus, Ken Anjyo, Conference Chair of SIGGRAPH Asia 2018, succinctly described this distinction in his letter of 1/24/2019:

> RTL! in SIGGRAPH (North America) selects the live performances through
> a review process similar to the papers program. However, **RTL! does not**

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[8] The Draft Report also states that the RTL **abstract** was "based on work described in a paper entitled 'Avatar Digitization From a Single Image For Real-time Rendering' submitted to SIGGRAPH Asia on May 23, 2017." (Draft Report ¶ 7.) But that cannot be the case considering that the abstract preceded the paper by nearly two months, a contradiction that is never explained by the Committee (nor is the relevance clear). Equally erroneous is the statement that "[o]n May 17, 2017, Dr. Li received reviewer comments regarding the SIGGRAPH RTL 2017 *abstract*." (Draft Report ¶ 10 & Att. 13.) But the reviewers were not commenting on the abstract itself. Rather, they were commenting on the video "Creating Performance-Driven Avatars in Seconds" (linked above), and the mixed nature of the reviews accurately reflects the developmental stage of the technology.

> **necessarily have to be a research output**… Unlike a SIGGRAPH paper, **an RTL! submission video may contain material that are proof of concept**, rather than technical/theoretical evidences. In particular**, illustrations of the submission do not need to be final outputs of the submitted** technology, but need to depict the intended outcome in a reasonable way. **Then it will be accepted, if the committee can be convinced by the authors that they can demonstrate their high-quality content by the day of their live performance.**

(Att. H, p. 2 (emphases added).) Similarly, speaking specifically about the 2017 RTL, Dr. Vouga, himself an academic researcher, stated, "Real-time Live! is not a publication venue for academic research" and "[t]here are *no academic papers associated with Real-time Live* presentations," which are not peer-reviewed. (Att. L, pp. 1-2 (emphasis added).)

For the same reason, SIGGRAPHS letter to Pinscreen dated 6/1/2017 advising that its submission had been accepted (after it was initially rejected), Real Time Live! Chair Cristobal Cheng wrote that, Pinscreen (just like all other RTL presenters) could make "Changes to Your Submission" and to "upload a new version of your abstract." (Att. R.) This shows that the "abstract" and the submissions themselves were very fluid and changes could be made to both into June. Thus, it would be doubly unfair to critique the abstract submitted in April (which nevertheless announced the technology as a "Proposed System") as though it were set in stone – RTL clearly envisioned a fluid, dynamic process.

For these reasons, (1) the RTL submission process is not a scientific presentation of "research" and thus the abstract and video fall outside the Scientific Misconduct Policy; and (2) even if they fell within the policy, Pinscreen's submission did not falsify, fabricate, or mislead as to the actual state of technology because it described a "proposed system," and the submission video constituted a "proof of concept," all of which is explicitly in line with RTL standards.

B. There Is No Scientific Misconduct Associated with the RTL Show.

In connection with Pinscreen's RTL 2017 presentation of 8/1/2017, the IC determined the following:

> Dr. Li . .. [k]nowingly and intentionally presented a *falsified demonstration of his software* at the SIGGRAPH Real-Time-Live show on August 1, 2017 with the *intention to mislead* the audience into believing that they were viewing a real-time demonstration of the automatic avatar-generating software that he and his team claimed to have developed, when in fact, Dr.

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> Li and his team presented ***pre-programmed, manually produced avatar generation***.

(Draft Report, p. 12.) The conclusions underpinning this determination are (1) that Prof. Li was "performing research" or "reporting research results" at RTL; (2) that "caching" the avatar of Dr. Sadeghi was improper absent actual evidence of technology issues; (3) that not informing the audience that the avatar was cached was misleading. These conclusions are all wrong.

1. <u>Prof. Li Was Not "Performing Research" or "Reporting Research Results" at RTL.</u>

Similar to the abstract submission process, the RTL performance is neither expected nor intended to constitute "research" or the "reporting of research," the threshold requirement of SMP § 3.2. Prof. Li has testified to this fact, and indeed not even Dr. Sadeghi explains why RTL performances should be held to scientific research standards. Most significantly, ***all*** of the statements submitted in support of Prof. Li by respected SIGGRAPH conference organizers, chairs, and committee members, emphasize this fact:

- Ken Anjyo: "The technical papers program at SIGGRAPH (and SIGGRAPH Asia) provides leading technical research papers . . . under a double-blind, peer review process. On the other hand, ***RTL! presents cutting-edge realtime technologies and/or entertainment though live performances***." (Att. H.)

- Isamu Hasegawa: "Real-Time Live ***does not necessarily present presenter's 'research outputs'*** as is." (Att. I.)

- J.P. Lewis: "From the point of view of someone questioning Pinscreen's work, this allegation is at best a grey area. SIGGRAPH is part scientific conference and part trade show, and the ***RTL event has an entertainment aspect*** to it." (Att. J.)

- Mike Seymour: "This is not a traditional academic double blind process" and that "RTL is not a benchmarking technical event but a ***joyous celebration of the latest advances in technology***." (Att. K.)

- Etienne Vouga, Ph.D, Assistant Professor at UT Austin: "Real-time Live! is not a publication venue for academic research. There are no academic papers associated with Real-time Live! presentations, and though they are selected by a jury, they are not peer-reviewed. The event is a ***pageant/celebration*** of cutting edge technology (contributed

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by both academia and industry) *and neither the conference organizers, attendees, nor the computer graphics research community consider contributions to this event as constituting computer graphics academic literature*." (Att. L.)[9]

Moreover, in the 6/1/2020 acceptance letter by RTL Chair Cristobal Cheng, Mr. Cheng writes that in connection with the "Virtual Rehearsal" in June, "*The Real-Time Live! committee will aid you in enhancing your presentation to make it even more impressive and energetic*." (Att. R.) If RTL was a truly scientific venue, the RTL staff itself would never interfere by offering to "enhance" the presentation or make it "more impressive and energetic." Are we to assume that RTL is actively conspiring to suborn academic misconduct by offering to "enhance" or make "more impressive" the empirical results of scientific research ? Of course not. But since RTL is an entertainment spectacle, such an offer makes perfect sense.

Since all of the above state with absolute certainty that RTL performances are not academic presentations, why does USC seek to shoehorn a non-academic performance into an academic misconduct inquiry? If the answer is that USC believes some work performed for RTL may have derived from grants to USC or been assisted by USC students, that is a separate question that Prof. Li is fully capable of responding to, but that fact itself does not convert RTL into something it is not. Nor does Prof. Li's or RTL's organizers' truthful representations of his affiliation with USC constitute any sort of misrepresentation or confer an academic status on RTL. Prof. Li is a USC professor. If USC would like to prohibit any of its faculty members from identifying themselves as such in any non-research conduct (presumably including off-topic Facebook posts or tweets), USC should make that position clear. But it is a vital error to attribute the same expectations to a live RTL performance (and "performance" is the operative word) as to a research paper. Yet this is precisely what the Investigation Committee has done.

2.   Caching Images Is Acceptable at RTL.

Using charged and terms such as "planned" and "premeditated" (usually reserved for first degree murder), the Draft Report claims that Pinscreen's use of a "cached" avatar of Dr. Sadeghi during a live show, without announcing that fact to the audience, constitutes academic misconduct. There are two questions which the Draft Report does a poor job of separating: first, whether using a cached image is inherently problematic; and second, whether using a cached image without informing the audience is inherently problematic.

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[9] There is no indication that the Office of Research ever reached out to any of the individuals who wrote letters supportive of Prof. Li, although though each provided their contact information and openly invited such a dialogue.

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As to both questions, as discussed above, RTL is not a "research output," so whether the avatar was cached or created live is immaterial. There is no need to announce such, and the claim that anyone in the audience was deluded but the failure to announce ignores the reality of RTL's role as a "pageant" or "celebration" of technology, where the audience comes to be entertained. Moreover, there is no question that, once rendered, the "tracking" of the avatar was live, and this tracking was indeed a major aspect of the show.

Even if we were to accept the premise that an RTL show implicates the SMP, there is still no misconduct. Even the Investigative Committee concedes that it would be acceptable to have used caching as a "fallback plan," but only if there were "internet connectivity issues." (See Draft Report ¶ 22.) It concludes that in the absence of such issues, caching was prohibited even under RTL's guidelines. It is incorrect.

According to the committee, RTL 2018 chair Isamu Hasegawa states "that it is valid for presenters to prepare 'cache' as a fallback plan, and to ***perform their cache with explanation*** in case of some troubles." (Draft Report ¶ 32-1; see Att. I.) This is virtually the only acknowledgment of any letter supporting Prof. Li, since the IC bends over backwards to suppress Prof. Li's corroborating evidence. And the committee *misquotes* Mr. Hasegawa, whose letter actually states that in RTL 2018, presenters were permitted "to ***perform their cache with their explanation*** in case of some troubles." (<u>Id.</u>) The IC omitted the word "their" to distort Mr. Hasegawa's meeting. But in context, "perform their cache with **their** explanation," simply means, perform their cached image with their explanation of the technology (i.e., the same explanation that would be used in the absence of caching). Mr. Hasegawa goes on to state that caching was acceptable, "***since we . . . already confirmed that each presenter['s technology is suitable for SA18 RTL at the point of our curation, and unreliability of the WiFi is not presenter's fault.***" Indeed, Mr. Hasegawa reports warning the presenters during rehearsal that "wireless network connection . . . might be unreliable."

Therefore, the expectation for RTL 2018 was that there *would* likely be connectivity issues, and it is not at all clear that Mr. Hasegawa meant that the presenters would only be able to use cached images if they themselves experienced problems during the presentation. Rather, the guidance was, "We can't guarantee connectivity so you should just go with your fallback."[10] This is confirmed even more forcefully by Ken Anjyo, Conference Chair of SIGGRAPH Asia 2018, who Anjyo states that "While RTL! presents live performances, **caching is acceptable and there is no obligation to disclose during the show**. Rather we encourage the presenters to do caching in case the event does not run smoothly." (Att. I.) Mike Seymour stated, "The committee wants the demonstrations to not be adversely affected by internet problems or Wifi

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[10] Pinscreen's RTL 2018 performance is available at https://www.youtube.com/watch?v=rPam5CHFQMQ (starting at approximately 1:15:53).

connections given the vast audience (many of whom are on their devices during the event). *As such it is not uncommon for the organisers to encourage backups at rehearsals so the event does run smoothly*." (Att. K) In other words, once the actual technology is demonstrated to SIGGRAPH, it is preferable to use the backup at the actual show because it is possible or even likely that there would be connectivity issues.

Most convincing is Professor Vouga's statement that for purposes of RTL, the key is

> The main concern of Real-Time Live! organizers and contributors is ensuring the demos are entertaining and compelling and that the event runs smoothly. To that end, *precomputing some results offline, or even recording videos beforehand and playing back those videos during the event, is acceptable and expected practice for mitigating against embarrassing failures during the live presentation* (due to hardware or software faults, problems with the notoriously poor conference Internet connection, etc.).

(Att. L.) Whatever the situation, it is clear that none of the chairs or organizers of SIGGRAPH – who set and apply the rules policies – express any concern that Pinscreen cached Dr. Sadeghi's avatar (just as Dr. Sadeghi himself would have expressed no concern had Prof. Li and Pinscreen paid him off). While each of these statements is slightly different, the thread running through each of these is that SIGGRAPH did not want anything to go awry during RTL, and caching was acceptable if there was any chance that internet connectivity could be a problem.

The email correspondence between Pinscreen's team and the SIGGRAPH committee, reveals how noncommittal the committee was on the ability to guarantee reliable connectivity. In Justin Stimatze's email dated June 15, 2017, after advising on a fall-back option, he states the following, after Pinscreen had requested a bandwidth of 50 MBps for downloads and 20 MBps for uploads (Att. Q):

> In years past, we have paid many tens of thousands of dollars for 18Mbit/s shared across the whole conference. *We have been unable to guarantee even 1 Mbit/s to contributors* . . ., which has caused some challenges with presentations and frustration for all involved. Fortunately, things are looking more flexible this year but I hope that explains the concern! We want you to have a fantastic and successful presentation with as little stress as possible about networking risks.

(Att. M; see also Att. N (June 27, 2017 organizer email stating, "I am cautiously optimistic *but cannot guarantee 20Mbit/s*." (although 50 MBps had originally been requested).) "More

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flexible" does not mean that bandwidth is guaranteed, and "as little stress as possible about networking risks" means for presenters to fashion their presentations so as **not** to rely on networking. These same points were reiterated in the run-up to the 2018 RTL, when the organizers warned Prof. Li that "there are other *risks introduced by establishing a temporary connection* to external corporation and making sure is reliable and sorting out last minute connection issue *due to the unknown unknowns* that can come up." (Att. O.)

Dr. Grace never bothered to contact Mr. Stimatze, or anyone else involved with RTL 2017 (or RTL 2018), to discuss these points, yet the Committee concluded that connectivity was not a problem, or that caching was only permissible in the event of a technical disaster. The record simply does not bear that out, and since Pinscreen could not be assured of stable bandwidth, the only viable – and reasonable – option was to rely on a cached image. This is not the stuff that scientific misconduct is made of.

3. <u>Prof. Li's Technology Was Capable of Producing Avatars in the Speed and Quality of the Sadeghi Avatar.</u>

The **only** person who claims that Pinscreen's technology was not capable of producing high-quality avatars as of the time of the show is Dr. Sadeghi himself. The IC claims that Prof. Li's technology took five minutes to create an avatar, but as Prof. Li discussed, the technology being prepared for SIGGRAPH Asia was far more robust than that used for RTL, as the RTL show utilized a scaled-down version of the technology.

Prof. Li has consistently argued that the avatars displayed at SIGGRAPH accurately reflected Pinscreen's technology. *In fact, before the RTL show began, Pinscreen invited curious attendees to sample the actual technology for themselves*. The technology successfully created realistic avatars for these random audience members, the results of which Pinscreen still maintains and which it has provided to the Committee. (See Draft Report, Attach. 3 ("We have also demonstrated the non-cached pipeline on stage before the show for various people. I have provided these evidences, including time stamped reconstructions on the day of the event.").) Prof. Li has already shared time-stamped results of these contemporaneous demonstrations, which is ignored by the Committee. Indeed, Prof. Li is also authorized by Pinscreen to share its Amazon Web Services ("AWS") password for USC to be able to recreate the results itself. Please advise.

Finally, the assertion that Prof. Li should have somehow announced (or demanded that Dr. Sadeghi announce) that Dr. Sadeghi's avatar image was cached, or that the status bar would be inappropriate and bizarre during an entertainment-oriented show. Prof. Li would have no expectation that USC would hold RTL itself to the same standard as research paper. And having watched the RTL performances of all presenters, it is clear that all viewed it as

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spectacle, as a celebration of their technology rather than a scientific demonstration of that technology.

The only question is whether the cached technology presented approximated Pinscreen's capabilities at the time, and to that question SIGGRAPH's executives have answered affirmatively, because Prof. Li was required to demonstrate the technology before being permitted to participate in the presentation, and he previously produced evidence of the avatars created from live audience members before the show. Relying on Dr. Sadeghi's allegations, the Committee incorrectly insists that this is not the case, and also that the technology took 5 minutes to create the avatar, as (accurately) described in Prof. Li's SIGGRAPH Asia paper.[11] However, it refuses to accept that the avatar technology for purposes of SIGGRAPH Asia – several months down the road – was intended to be, and was, far more robust and complex than that used for RTL. The most hardware-intensive processes involving approximately 97% of the computing time were not part of the RTL framework. Thus:

SIGGRAPH RTL 2017	SIGGRAPH Asia 2017

SIGGRAPH 2017 RTL:
1/ face model fitting: <1-2 sec
2/ secondary component fitting and facial rigging: 1 sec
3/ hair digitization:
        * retrieving closest exemplar: < 5 sec
	1/ face model fitting (fine tuned): 0.5 sec
	2/ secondary component fitting and facial rigging: 1 sec
	3/ hair digitization:
	        * hair polystrip reconstruction: 1 sec
	        * retrieving closest exemplar (accelerated datastructure): 1 sec
	        * deformation of hairstyle: 10 sec
	        * collision handling: 5 sec
	        * polystrip patching optimization: 1 min
	4/ neural facial texture synthesis:
	        * feture correlation extraction: 75 sec
	        * convex blending weight: 14 sec
	        * final synthesis: 172 sec

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[11] Finally, the Committee also improperly concludes that Prof. Li engaged in some type of malfeasance by imaging the electronic devices he submitted in connection with the investigation, thus "aggravating" the severity of the alleged violation. There is nothing untoward in creating a backup of hardware submitted for an investigation. Creating a backup is not "tampering" with a device, and even if some dates became inadvertently altered in the process, the investigator should still determine what the technology actually does. Moreover, the fact that Prof. Li did not use his USC-issued computer is not evidence of malfeasance. He simply did not use his USC laptop – why should he have submitted it in the first instance? He was only asked to submit relevant evidence, which in connection with the RTL show was on Pinscreen devices. However, Prof. Li will fully address this issue after the results of a new forensic are completed, as the IC's determination is largely influenced by the conflict-compromised report of Quandary Peak Research.

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Total: 7-8 seconds	Total: Approx. 4.7 minutes (280.5 seconds)

Once again, as the question of *how much time* it took to create the avatar (rather than whether it was cached) was not a central point of the inquiry, Dr. Li will provide his AWS password so that the IC can replicate the actual computation time as of August 2017.

V.   Conclusion.

This investigation is a tempest in a teapot. It seeks to punish an esteemed, tenured university professor whose reputation has been built on creating cutting-edge technology because his company allegedly did not apply empirical research methodologies to an entertainment-driven trade show. The investigators have found no actual evidence of malfeasance, and their conclusions are based purely on uncorroborated testimony and ignore contrary evidence that is highly corroborated. The only person it will benefit is a single self-interested litigant, who *himself was the presenter of the technology that he claims was fabricated,* and who for nearly three years has sought to leverage his "whistleblowing" to extract a windfall settlement. This is a monumental waste of resources, at a time where the University should prioritize matters of greater significance, and in multiple respects the Committee has violated the Scientific Misconduct Policy's investigatory and reporting requirements. These violations themselves warrant dismissal of part or all of the complaint, the dissolution of the current committee, and/or extensions in time to respond to newly disclosed evidence. However, the most straightforward resolution would be for the Committee to acknowledge that none of the allegations are substantiated and to dismiss the matter on the merits, which is what the facts warrant.