

# HARRISON JESSE SMITH, PH.D.

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San Mateo, CA

## EDUCATION

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**University of California, Davis** Davis, CA  
Ph.D. Candidate, Computer Science. Cumulative GPA: 3.95/4.00 2019  
*Dissertation: Evaluating and Enhancing Embodied, Avatar-Mediated Interaction*  
M.S. Computer Science 2018

**Tufts University** Somerville, MA  
B.S. Environmental Engineering. *Cum Laude* 2009

## INDUSTRY EXPERIENCE

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**Facebook AI Research** Spring 2020 - Present  
*Postdoctoral Researcher Supervisor: Jessica Hodgins Ph.D.* Pittsburgh, PA  
Perform ongoing research at the intersection of deep learning and animation, focused on automatic rigging and skinning of highly varied user-generated content.

**Snap, Inc.** Summer 2018  
*Research Intern. Supervisor: Yingying Wang, Ph.D.* Venice, CA  
Designed and implemented algorithms relevant to Snap's Bitmoji intellectual property. Presented results as an oral paper at a top-tier computer animation conference and published in a technical journal. Company was granted a patent based on the research I conducted here.

**Oculus Research (Facebook Reality Labs)** Fall 2016 - Spring 2017  
*Research Intern. Supervisors: Michael Neff, Ph.D., Carsten Stoll, Ph.D.* Sausalito, CA  
Designed and implemented large-scale multi-user embodied VR study using OptiTrack, Oculus Rifts, and Unity. Conducted analyses and created software to support offsite annotation teams. Presented results as an oral paper at a top-tier HCI conference.

**Army Research Lab - West and USC Institute for Creative Technologies** Summer 2016  
*Visiting Research Assistant. Mentor: Philipp Djang, Ph.D.* Playa Vista, CA  
Designed a reinforcement learning-based finite gradient difference approach to discover optimal aiming policies for different types of targets. Implemented the design using Python and OpenAI Gym. Presented results directly to Army Research Lab's Survivability/Lethality Analysis Directorate.

## SELECT LANGUAGES AND TOOLS

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Python, PyTorch, Keras, Pandas, Scikit-Learn, SciPy, Matplotlib, OpenGL, Unity, Autodesk Maya

## SELECT PROJECTS

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### **Animating Children's Sketches**

2020 - 2021

*Facebook AI Research*

A Creative AI research project exploring the steps necessary to animating children's hand-drawn figures and proposing automatic and fast solutions for each step. As the lead researcher, I was responsible for setting project goals and developing solutions for each step of the pipeline. In addition, I oversaw internal data collection efforts, guided and worked collaboratively alongside engineers, designers, marketers, and lawyers, and mentored two research interns. A working demonstration of the project has been released internally within Meta (<https://fburl.com/sketch-animations>), and it will be externally released later this year. A paper submission is planned for SIGGRAPH 2022.

### **Multi-Character Story Distribution and Gesture on Children's Engagement**

2019

*University of California, Davis*

A study investigating best-practices for enhancing embodied character-based storytelling software. As the lead researcher, I was responsible for developing the storyteller with Unity (C#) and Amazon Polly Text-To-Speech, experimental design, and data collection and analysis. I managed a team of researchers who collected and annotated in-classroom data from K-2 students. Accepted as an oral paper in *12th International Conference on Interactive Digital Storytelling (ICIDS) 2019*.

### **Efficient Neural Networks for Real-time Motion Style Transfer**

2018

*Snap, Inc.*

Developed a deep learning-based algorithm for human motion style transfer and control. The approach was orders of magnitude faster and smaller than existing methods. As the lead researcher, I was responsible for designing and implementing the system in Python and PyTorch. Accepted as an oral paper in *ACM SIGGRAPH / Eurographics Symposium on Computer Animation 2019*.

### **Communication Behavior in Embodied Virtual Reality**

2016 - 2017

*Oculus Research (Facebook Reality Labs)*

Designed and conducted a large-scale user study investigating the influence of full-body, motion capture-driven avatars on remote communication behavior. I co-designed the experiment, created experimental stimuli in Unity, oversaw data collection using an OptiTrak motion capture system, created new annotation tools in JavaScript/React to support the annotation team, and designed/conducted data analysis in Python. Presented as an oral paper at *Proceedings of CHI / ACM Conference on Human Factors in Computing Systems, 2018*.

### **Understanding the Impact of Gesture Performance on Personality Perception** 2015 - 2016

*University of California, Davis*

Designed and executed series of perceptual experiments characterizing perceptions of virtual agent personality as a function of procedural motion capture adjustments. I created new pipelines for automated stimuli generation with Python and AutoHotKey, collected data through custom JavaScript experiments on Amazon Mechanical Turk, and designed/conducted data analysis in Python. Presented as an oral paper at *SIGGRAPH 2017*.

## REFEREED PAPERS

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**The Impact of Multi-Character Story Distribution and Gesture on Children's Engagement**  
Harrison Jesse Smith, Brian K. Riley, Lena Reed, Vrindavan Harrison, Marilyn Walker, Michael Neff  
Proceedings of International Conference on Interactive Digital Storytelling 2019. (*Nominated for Best Long Paper, top 10% of all submissions*)

**Efficient Neural Networks for Real-time Motion Style Transfer** Harrison Jesse Smith, Chen Cao, Michael Neff, Yingying Wang  
Proc. ACM Comput. Graph. Interact. Tech. 2, 2, Article 13 (July 2019), 17 pages.

**Communication Behavior in Embodied Virtual Reality** Harrison Jesse Smith and Michael Neff  
Proceedings of CHI / ACM Conference on Human Factors in Computing Systems, 2018. (*Honorable Mention Award, top 5% of all submissions*)

**Understanding the Impact of Animated Gesture Performance on Personality Perceptions**  
Harrison Jesse Smith and Michael Neff  
ACM Transactions on Graphics, Vol. 36, No. 4, Article 49, 2017.

## INVITED TALKS / POSTERS

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ARDIN International Conference on Interactive Digital Storytelling (ICIDS) 2019, Embodiment and Affect Session *The Impact of Multi-Character Story Distribution and Gesture on Children's Engagement* November 20th, 2019 (Conference Presentation)

ACM SIGGRAPH / Eurographics Symposium on Computer Animation (SCA) 2019, Learning & (Mostly) Faces Session. *Efficient Neural Networks for Real-time Motion Style Transfer* July 26, 2019 (Conference Presentation)

ARCS Scholar Symposium, *The Value of Embodiment in Virtual Reality*. April 29, 2019 (Poster Presentation)

University of California, Berkeley, Institute of Design. *Communication Behavior in Embodied Virtual Reality* November 28, 2018 (Invited Presentation)

University of California, Davis, Technocultural Studies. *Communication Behavior in Embodied Virtual Reality* January 24, 2018 (Invited Presentation)

CHI 2018, Virtual Reality Session. *Communication Behavior in Embodied Virtual Reality* April 25, 2018 (Conference Presentation)

SIGGRAPH 2017, People Power Session. *Understanding the Impact of Animated Gesture Performance on Personality Perceptions*. July 31, 2017 (Conference Presentation)

ARCS Scholar Symposium, *Understanding the Impact of Animated Gesture Performance on Personality Perceptions*. April 24, 2017 (Poster Presentation)

## TEACHING EXPERIENCE

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**Associate Instructor** Spring 2019  
*Character Animation (TCS 131)* University of California, Davis

Created syllabus, materials, assignments, and grading rubrics for upper-division undergraduate course (6 classtime hours per week)

Introduced complex topics and software through lectures and studio practical assignments.

**Associate Instructor** Summer 2017  
*Intro/Advanced Digital Imaging* University of California, Davis

Created syllabus, materials, assignments, and grading rubrics for twenty hours of in-class workshops. Introduced students to basics of photo editing workflows and best practices in Adobe Photoshop.

**Teaching Assistant** Spring 2016, Spring 2018  
*Character Animation (TCS 131)* *University of California, Davis*

Helped students to create animations in Autodesk Maya. Graded and critiqued assignments.

**Associate Instructor** Summer 2016, Summer 2017  
*Intro/Advanced Web Design* *University of California, Davis*

Created syllabus, materials, assignments, and grading rubrics for twenty hours of in-class workshops. Introduced students to HTML, CSS, and JavaScript through examples and hands-on exercises.

**Teaching Assistant** Spring 2014, Spring 2015  
*Introduction to Web Development* *University of California, Davis*

Co-developed syllabus for the course during the first and second times it was offered to students. Prepared discussion section lecture materials, held office hours, graded assignments.

## SERVICE

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International Conference on Interactive Digital Storytelling (ICIDS), 2020, 2021 *Program Committee*

International Conference on Advances in Computer-Human Interactions 2020, *Program Committee*

Transactions on Graphics 2018, 2019, 2020, *Paper Reviewer*

Transactions on Affective Computing 2019, *Paper Reviewer*

Conference on Computer Animation and Social Agents (CASA) 2016, *Paper Reviewer*

## HONORS AND AWARDS

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**Achievement Rewards for College Scientists (ARCS) Fellowship Recipient** 2016-2019  
*University of California, Davis*

ARCS Foundation provides scholarships to outstanding students in science, medicine, and engineering. 14 fellowships awarded annually amongst the 4,500 UC Davis graduates students in all departments.

**Researcher Of The Year (Runner Up), Graduate Group in Computer Science** 2018  
*University of California, Davis*

Departmental award recognizing research contributions of current graduate students.

**Leaders For The Future, Cohort 3** 2018  
*University of California, Davis*

A selective program for doctoral candidates providing development in leadership skills, business communication, project management, innovation, and intrapreneurship.

**Graduate Group in Computer Science Travel Awards** 2017-2019  
*University of California, Davis*

Interdepartmental awards to facilitate travel and presentation at conferences.

## PROFESSIONAL REFERENCES

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**Michael Neff, Ph.D.**

*Professor, University of California, Davis*

Ph.D. thesis advisor.

(530) 754-9510  
*mpneff@ucdavis.edu*

**Jessica Hodgins, Ph.D.**

*Research Director, Meta.*

Supervising manager and mentor during 2020-2022 postdoc at Meta.

*jkh@fb.com*

**Yingying Wang, Ph.D.**

*Research Engineer, Snap, Inc.*

Supervising manager during summer 2018 research internship at Snap, Inc.

*ywang@snap.com*