

The 2019 VGTC Virtual Reality Best Dissertation Award

The 2019 VGTC Virtual Reality Best Dissertation Award goes to Qi Sun, a 2018 graduate from Stony Brook University, for his dissertation entitled, “Computational Methods for Immersive Perception.”



Qi Sun

Adobe Research, San Jose

Qi Sun is a Research Scientist at Adobe Research, San Jose. He received his Ph.D. under the supervision of Distinguished Professor Arie Kaufman. His dissertation bridges human perception, visual optics, and fundamental graphical algorithms for the future VR experience. It addresses both spatial limitations and simulator sickness via answering two questions: “what we see” and “where we are.”

For the first question, understanding how the eye perceives immersive stimuli is a major challenge for delivering comfortable VR/AR experiences. Our eyes have a complex and varied set of behaviors, such as vergence and accommodation. The conflict between them may cause simulator sickness. Dr. Sun’s research on accelerated foveated light field displays renders only 16-30% of rays without compromising accommodation support.

For the second question, he presented a series of VR redirected locomotion systems. These are techniques allowing users to explore large virtual environments from small physical environments via real walking. The first idea is to warp the virtual scene such that users perceive a different world, and thus are automatically guided to avoid physical obstacles.

Then, utilizing the discoveries from answering both questions, he presented another innovative infinite walking approach. It significantly expands the allowable size difference

between the virtual and physical environments by exploiting temporary blindness in human visual systems during saccades (rapid eye movements).

Beyond academic publications, Dr. Sun’s research has been demonstrated to hundreds of users, featured by major media (e.g., BBC), granted US patents, and transferred to commercial products. More details regarding Dr. Sun’s work can be found on his website: <http://qisun.me/>.

Award Information

The IEEE VGTC Virtual Reality Best Dissertation Award was established in 2016. This award is given every year to the author of the best doctoral dissertation in the broad field of virtual reality, defended within the preceding two calendar years. Eligible nominees for the 2019 award included the authors of all relevant dissertations defended between January 1, 2017 and December 31, 2018. A total of twelve nominations were received and were carefully reviewed by the IEEE VR Best Dissertation awards committee, which consisted of twelve leading experts in the field. Each dissertation was read in full by three panel members, and after an initial binning process, the top-ranked dissertations were subsequently read (or re-read) by all panelists to determine the winner.

2019 VGTC Virtual Reality Best Dissertation Honorable Mentions



Mahdi Azmandian

The University of Southern California

Dissertation Title

Design and Evaluation of Adaptive Redirected Walking Systems

Advisor

Evan Suma Rosenberg

Dr. Azmandian's dissertation focused on the science and engineering of redirection, providing a theoretical foundation along with a framework for "redirected walking systems," bridging the gap between understanding redirection and employing it. This work addressed practical matters such as understanding physical space requirements by introducing an evaluation framework, thus shedding light on how redirection factors interact. This culminated in proposing an adaptive system that adjusts the redirection strategy based on the context of the experience.



James Baumeister

University of South Australia

Dissertation Title

Toward Consistent Measurement of Cognitive Load in Augmented Reality Research

Advisor

Bruce Thomas

Dr Baumeister's thesis considered the question "Why does Augmented Reality (AR) improve a user's ability to perform tasks?", drawing on computer science, neuroscience, and psychology. A key question was whether working with AR was accompanied by a reduction in cognitive load. Dr. Baumeister showed that this was the case. He also demonstrated that, if correctly implemented, AR can provide substantial improvements to cognitive load, including being a countermeasure for the effects of sleep deprivation.