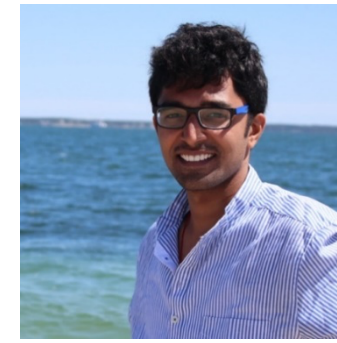
IEEE VR 2023

VGTC Virtual Reality Best Dissertation Award

Praneeth Kumar Chakravarthula

University of North Carolina Chapel Hill



The 2023 VGTC Virtual Reality Best Dissertation Award goes to Praneeth Kumar Chakravarthula, a 2021 graduate from the University of North Carolina at Chapel Hill, for his dissertation entitled "Towards Everyday-use Augmented Reality Eyeglasses", under the supervision of Prof. Henry Fuchs.

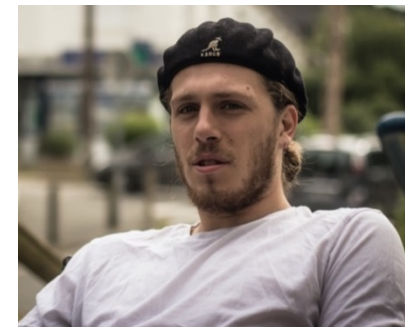
Praneeth Chakravarthula is currently a research fellow at Princeton University and a Research Assistant Professor at the University of North Carolina at Chapel Hill. His research interests lie at the intersection of optics, graphics, perception, optimization and machine learning. Dr. Chakravarthula obtained his Ph.D. from UNC Chapel Hill under the supervision of Prof. Henry Fuchs. His Ph.D. dissertation makes progress *"towards everyday-use augmented reality eyeglasses"* and makes significant advances in three distinct areas: 1) holographic displays and advanced algorithms for generating high-quality true 3D holographic images, 2) hardware and software for robust and comprehensive 3D eye tracking via Purkinje images and 3) automatic focus adjusting AR display eyeglasses for well-focused virtual and real imagery, towards potentially achieving 20/20 vision for users of all ages.

Since the eyes cannot focus at very near distances, existing AR/VR head mounted displays use bulky lenses to virtually project the display panel at a long distance that the eyes can comfortably focus. However, this results in not only uncomfortably increasing the bulk of the display but also results in severely affecting the natural functioning of the human visual system by causing what is known as the vergence-accommodation conflict. Moreover, the existing displays cater to only audiences with normal 20/20 vision and not to users with refractive errors such as near and far sightedness or older population developing presbyopia. However, such a population forms more than 60% of the AR/VR consumers. Dr. Chakravarthula's dissertation research overcomes these problems by designing and implementing both hardware systems and software algorithms.

VGTC Virtual Reality Best Dissertation Honorable Mentions

Hugo Brument

University of Rennes, France



Dissertation Title: Towards User-Adapted Navigation Techniques in Virtual Environments: Study of Factors Influencing Users Behavior in Virtual Reality

Advisors: Ferran Argelaguet, Anne-Hélène Olivier, Maud Marchal

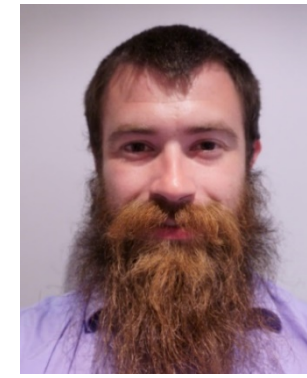
Hugo Brument is currently a postdoc researcher at TU Wien, in the Virtual and Augmented research unit led by Prof. Hannes Kaufmann. Dr. Brument received his Ph.D. degree in Computer Science from the University of Rennes, France, in 2021. His thesis aimed at (1) providing new insights about the influence of the design of navigation techniques (e.g., control law, rotation gains) on user's navigation in VR (e.g., body coordination, motion perception), (2) proposing new analysis methods for assessing navigation techniques to have a better understanding of human perception and action while navigating in VR (e.g., eye-body coordination and model of unintended positional drift with steering techniques). The thesis provided new guidelines and recommendations for improving navigation in VR, as well as highlighting the importance of considering users' behavior and human locomotion laws in the design and evaluation of navigation techniques in VR.

Jonathan Sutton

University of Otago, New Zealand

Dissertation Title: Computational Glasses: Repurposing Augmented Reality Glasses for Vision Assistance

Advisor: Tobias Langlotz



Dr. Sutton is a postdoctoral fellow at the University of Otago, New Zealand, working with Prof. Tobias Langlotz. His thesis investigates computational glasses that utilize modern AR technology to assist our visual system with precise modulations of the environment. These go beyond traditional glasses, such as optics correcting refraction errors. The thesis demonstrates how AR glasses can be modified to achieve pixel precise aids for visual impairments and augmentations of users' capabilities. The thesis details investigations into the AR devices adopted for visual assistance, and then investigates the means in which they can be used to provide aid and augmentation. This is achieved by presenting: 1) the concept and ways to realize computational glasses, surveying the state of optical see-through AR glasses used; 2) a series of studies into their use to aid color vision deficiency (CVD); 3) an investigation into augmenting attention and supporting users via visual guidance. The findings of the thesis have direct impacts on aids for CVD and providing visual guidance. It also has impacts on the wider potential for new forms of vision assistance by illustrating the research space and demonstrating initial steps.

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. Eligible nominees for the 2023 awards included the authors of all relevant dissertations defended between January 1, 2020 and July 1, 2022. A total of sixteen nominations were received and were carefully reviewed by the IEEE VR Best Dissertation Award Committee, which consisted of sixteen 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 and two honorable mentions.