The 2021 VGTC Virtual Reality Technical Achievement Award

David P. Luebke

The 2021 IEEE VGTC Virtual Reality Technical Achievement Award goes to David Luebke of NVIDIA, in recognition of his research and leadership at the intersection of rendering algorithms, display technology, and human perception. With an interdisciplinary orientation, Dr. Luebke and his team have advanced the state of virtual reality across topics as diverse as real-time rendering, low-latency display, foveated resolution, redirected walking, haptics, and focus-supporting displays.

David Luebke has been researching and leading research teams on topics relevant to Virtual Reality since his first published paper in 1995. Originally a chemist by training, he was inspired by the concept of VR to switch fields and pursue graduate work in computer graphics at the University of North Carolina. Finding that graphics horsepower was the primary technical factor limiting VR performance, Luebke focused his early research on algorithms for accelerating real-time rendering. At the University of Virginia, Luebke continued his real-time rendering research, putting it into VR practice with UNC colleagues in the large-scale 2003 museum exhibit “Virtual Monticello”. During this time, Luebke also became interested in general-purpose GPU computing and in guiding rendering with human visual perception, beginning with a foveated rendering system published in 2001. Arriving at NVIDIA in 2006, Luebke unified these interests in helping to establish GPU ray tracing research and products, and also began work on what he perceived as the new bottleneck of VR systems: display technology. Starting with a seminal 2013 paper on near-eye light field displays, Luebke has focused on the co-design of optics, display electronics, and rendering algorithms that match the constraints and opportunities of human vision. Most recently, Luebke’s team has also focused on using generative deep neural networks for photorealistic human avatars.

David Luebke is the vice president of graphics research at NVIDIA, where he was a founding member of NVIDIA Research in 2006. He earned a B.A. magna cum laude in Chemistry from Colorado College in 1993, and an M.S. in 1997 and Ph.D. in 1998 under the supervision of Frederick P. Brooks, Jr. from the University of North Carolina at Chapel Hill. He joined the faculty of the Department of Computer Science at the University of Virginia that same year, where he received a National Science Foundation CAREER Award and the parallel Department of Energy Early Career Principal Investigator award, as well as multiple awards and fellowships for undergraduate teaching. After eight years Luebke left Virginia to join NVIDIA as a founding member of NVIDIA Research, where he now leads a long-term research group spanning all aspects of computer graphics.

Together with his colleagues, Luebke has co-authored a book on mesh simplification techniques, a SIGGRAPH Electronic Theater piece on realistic human skin rendering, a major New Orleans Museum of Art exhibit (visited by over 110,000 people) on Thomas Jefferson’s Monticello, several SIGGRAPH Emerging Technologies exhibits on display technology for virtual and augmented reality, and approximately two hundred papers, articles, chapters, and patents. He was instrumental in the development of NVIDIA GPU ray tracing technology, embodied in the 2009 release of the NVIDIA OptiX software platform and the 2018 release of the NVIDIA RTX hardware platform, showcased in NVIDIA’s 20X0 “Turing” GPUs. Luebke is a Fellow of the IEEE. His other honors include the NVIDIA Distinguished Inventor award, the aforementioned NSF CAREER and DOE ECPI awards, and the ACM Symposium on Interactive 3D Graphics “Test of Time Award” for that first 1995 paper motivated by efficient rendering for VR architectural walkthroughs.

Award Information

The IEEE VGTC Virtual Reality Technical Achievement Award was established in 2005. It is given every year to recognize an individual for a seminal technical achievement in virtual and augmented reality. VGTC members may nominate individuals for the Virtual Reality Technical Achievement Award by contacting the awards chair, Henry Fuchs, at vgtc-vr-awards@vgtc.org.