

# Visual Computing Colloquium

## June 19th, 2017

### Beyond Fun and Games: VR and Visualization as a Tool of the Trade



**Monday, June 19th, 2017, 3:00 pm**  
**Visual Computing Lab C061**

Bonn-Rhein-Sieg  
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**Prof. Dr. Carolina Cruz-Neira**

**Prof. Dr. Dirk Reiners**  
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#### Abstract

The recent resurgence of VR is exciting and encouraging because the technology is at a point that it soon will be available for a wider range of industries and uses and will be driven by the consumer market and therefore more robust and at much lower cost than the large-scale systems from the early 2000's. However, it has also been a little bit disappointing to see that VR technology is mostly being portrayed as the ultimate gaming environment and the new way to experience movies. VR is much more than that, there has been a wide number of groups around the world using VR for the past twenty years in engineering, design, training, medical treatments and many other areas beyond gaming and entertainment that seem to have been forgotten in the public perception. Furthermore, VR technology is also much more than goggles, there are many ways to build devices and systems to immerse users in virtual environments. And finally, there are also a lot of challenges in aspects related to creating engaging, effective, and safe VR applications. This talk will present our experiences in developing VR technology, creating applications for industry, exploring the effect of VR exposure to users, and experimenting with different immersive interaction models. The talk will provide a much wider perspective on what VR is, its benefits and limitations, and how it has the potential to become a key technology to improve many aspects of human life.

In addition to VR becoming more prevalent, we are experiencing an exponential growth of data in all aspects of human life to the point that the vast amounts of data are becoming overwhelming to manage as well as are starting to be unused due to our lack of tools to extract meaningful information from the raw data. Social media, advances in sensors, new computational models, web surveys, electronic transactions, are just examples of data generation/collection technologies that are capturing much more than we can handle with the current approaches for data analysis. Clearly the human cognitive system only enable us to scrutinize and analyze a limited amount of the raw data we generate, and therefore limiting also the quality of our scientific insight on the problem at hand. Consequently, our data-rich world is developing a critical need for visualization as a key component of the scientists' tool set for discovery and insight into their areas of expertise.

Visualization, and especially interactive visualization, takes advantage of the bandwidth of the human visual system, our ability to visually identify patterns and relationships, and how we interact with the data to extract information. This presentation explores the power of visualization to extract information from big data by presenting an introduction to visual analytics, to current methods and techniques and some illustrative examples of work being done at the Emerging Analytics Center at the University of Arkansas at Little Rock. The presentation seeks to stimulate the audience's imagination about what's possible as well as to pursue future research with a multidisciplinary approach in which visualization and visual analytics takes as much as a central role as the data gathering approaches model and analyze a wide variety of problems, phenomena, situations, training and other disciplines of human life.

#### Vitae

**Dr. Carolina Cruz-Neira** is a pioneer in the areas of virtual reality and interactive visualization, having created and deployed a variety of technologies that have become standard tools in industry, government and academia. She is known world-wide for being the creator of the CAVE virtual reality system, which was her PhD work, and for VR Juggler, an open source VR application development environment. Her work with advanced technologies is driven by simplicity, applicability, and providing value to a wide range of disciplines and businesses. This drive makes her work highly multi-disciplinary and collaborative, having receiving multi-million dollar awards from the National Science Foundation, the Army Research Lab, the Department of Energy, Deere and Company, and others. She has dedicated a part of her career to transfer research results in virtual reality into daily use in industry and research organizations and to lead entrepreneurial initiatives to commercialize results of her VR research. She is also recognized for having founded and led very successful virtual reality research centers, like the Virtual Reality Applications Center at Iowa State University, the Louisiana Immersive Technologies Enterprise and now the Emerging Analytics Center. She serves in many international technology boards, government technology advisory committees, and outside the lab, she enjoys extrapolating her technology research with the arts and the humanities through forward-looking public performances and installations. She has been named by BusinessWeek magazine as a "rising research star" in the next generation of computer science pioneers, has been inducted as an ACM Computer Pioneer, received the IEEE Virtual Reality Technical Achievement Award and the Distinguished Career Award from the International Digital Media & Arts Society among other national and international recognitions.

Currently, Dr. Cruz is the Donaghey Professor and the Director of the Emerging Analytics Center at the University of Arkansas at Little Rock and an Arkansas Research Scholar through the Arkansas Research Alliance.

**Dr. Dirk Reiners** has been at the heart of immersive visualization and Virtual Reality (VR) for more than 20 years. He has a MS and PhD in Computer Graphics from the Technical University Darmstadt, Germany, and worked at the Fraunhofer Institute for Computer Graphics, the largest Computer Graphics research institute in the world, for more than 10 years on different topics in interactive graphics and VR. He was instrumental in pioneering VR deployment for many of the German car manufacturers. His primary research interests are in interactive 3D graphics, immersive and high-resolution display systems and the software fundamentals needed to do all of this effectively and efficiently. He was the initiator and project lead for the OpenSG Open Source scenegraph project. He has been an active member of the virtual reality community and has been the Chair for Demos, Videos, Exhibits and the Program Chair at IEEE Virtual Reality and other conferences.

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