Lecture Series
Winter Term 2015/2016

SFB-TRR 161
Quantitative Methods for Visual Computing

The Transregional Collaborative Research Center (SFB-TRR) 161 invites all colleagues and interested people to the upcoming Lecture Series. During these events renowned scientists will talk about their research findings in the field of visual computing.

Quality and Beyond

Invitation to a talk
within the SFB-TRR 161 Lecture Series

14-12-2015
4:30 p.m.

University of Stuttgart
VISUS-Building
Allmandring 19, Vaihingen
Powerwall Room -01.116

University of Konstanz,
Universitätsstr. 10, Konstanz
Powerwall C202
(Live Transmission)

Amitabh Varshney, University of Maryland
Revealing Patterns in the Injured Brain

I will give an overview of our collaboration with radiologists in developing new visualization tools to detect previously unseen patterns of injuries in the human brain. This allows researchers and clinicians to better identify the extent of neural injuries - whether those injuries are from trauma or other neurological disorders. This better method of visualization allows for more timely therapeutic interventions. And, these same visualization tools can gauge any improvement in someone who has suffered a brain injury. Diffusion kurtosis imaging (DKI) can reveal subtle changes in both gray and white matter. It has shown promising results in studies on changes in gray matter and mild traumatic brain injuries, where the traditional, Diffusion Tensor Imaging (DTI), is often found to be inadequate. However, the highly detailed spatio-angular fields in DKI datasets present a special challenge for visualization. Traditional techniques that use glyphs are often inadequate for expressing subtle changes in the DKI fields. My talk will outline our approach that addresses the above challenge to reveal micro-structural properties of the brain.

About the speaker

Amitabh Varshney is the Director of the Institute for Advanced Computer Studies (UMIACS) and Professor of Computer Science at the University of Maryland at College Park. He received a B. Tech. in Computer Science from the Indian Institute of Technology, Delhi in 1989 and a M.S. and Ph.D. in Computer Science from the University of North Carolina at Chapel Hill in 1991 and 1994. During 1994 - 2000, he was an Assistant Professor in the Department of Computer Science at the State University of New York at Stony Brook. Varshney's research focus is on exploring the applications of graphics and visualization in engineering, science, and medicine. He has worked on the design and implementation of virtual walkthroughs of proposed structures, such as buildings, automobiles, and submarines. In the process he has developed new algorithms for automatically generating multiresolution object hierarchies, image-based rendering, parallel computation and simplification of radiosity meshes, and fine gesture recognition for virtual environments. His work on efficient and robust computation of smooth molecular surfaces is useful in the rational drug design process

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through the protein folding and docking problems. He is currently exploring applications in general-purpose high-performance parallel computing using clusters of CPUs and Graphics Processing Units (GPUs). He has also consulted and collaborated with the industry including NVIDIA, Honda, IBM, Daimler Chrysler, General Dynamics, and Reuters. He is the Director of the NVIDIA CUDA Center of Excellence at Maryland. Varshney received a NSF CAREER Award in 1995 and a Honda Research Initiation Award in 1997. He received the IEEE Visualization Technical Achievement Award in 2004. He is currently serving as the Chair of the IEEE Visualization and Graphics Technical Committee. He is a Fellow of IEEE.

See http://www.umiacs.umd.edu/people/varshney for more details.