Abstract:

RECENT ADVANCES IN MODELING, RENDERING, AND HARDWARE MAKE IT POSSIBLE TO GENERATE NEAR-PHOTOREALISTIC IMAGES OF MODERATELY COMPLEX SCENES AT INTERACTIVE RATES. ONE OF THE NEXT GRAND CHALLENGES IN COMPUTER GRAPHICS AND VISUALIZATION IS TO MODEL VIBRANT, DYNAMIC SCENES OF REAL-WORLD COMPLEXITY, SUCH AS URBAN SPACES. THE PROBLEM OF MODELING VIRTUAL CITYSCAPES OFFERS A DIVERSE SET OF OPPORTUNITIES FOR INNOVATIONS AND PROVIDES ENABLING TECHNOLOGIES OF SOCIETAL INTERESTS, INCLUDING ENERGY USE, TRANSPORTATION MECHANISMS, ECONOMIC SUSTAINABILITY, EDUCATION AND ENTERTAINMENT. SOME OF THE KEY RESEARCH ISSUES INCLUDE INTERACTIVE SIMULATION OF LARGE-SCALE CROWDS, REALISTIC MODELING OF COMPLEX TRAFFIC FLOWS, EFFICIENT MOTION SYNTHESIS OF PLAUSIBLE CHARACTER BEHAVIORS AND NATURAL PHENOMENA, AND REAL-TIME RENDERING USING MULTI-SENSORY DISPLAY. AT LEAST ONE TO TWO ORDERS OF MAGNITUDE PERFORMANCE IMPROVEMENT IN HARDWARE WILL BE NEEDED. NEW ALGORITHMS AND SOFTWARE SYSTEMS THAT CAN EXPLOIT SUCH COMPUTING POWER MUST BE DEVELOPED.

IN THIS TALK, I WILL PRESENT A FEW HIGHLIGHTS OF OUR RECENT EFFORTS ON THE DESIGN OF SCALABLE ALGORITHMS FOR BUILDING A VIRTUAL URBANSCAPE BY TAKING ADVANTAGES OF PARALLELISM AVAILABLE ON EMERGING COMMODITY HARDWARE, SUCH AS MANY-CORE PROCESSORS. I WILL DEMONSTRATE THE RESULTS ON SEVERAL INTERACTIVE APPLICATIONS, INCLUDING HETEROGENEOUS CROWD MODELING FOR VIRTUAL CITIES, DATA-DRIVEN TRAFFIC RECONSTRUCTION OF COMPLEX ROAD NETWORKS, AND REALISTIC SOUND RENDERING FOR ARCHITECTURAL AND URBAN ENVIRONMENTS. I WILL CONCLUDE BY DISCUSSING OUR EXPERIENCES AND SOME FUTURE RESEARCH DIRECTIONS.

Biography:

Ming C. Lin is currently Beverly W. Long Distinguished Professor of Computer Science at the University of North Carolina (UNC), Chapel Hill. She obtained her B.S., M.S., and Ph.D. in Electrical Engineering and Computer Science from the University of California, Berkeley. She received several honors and awards, including the NSF Young Faculty Career Award in 1995, Honda Research Initiation Award in 1997, UNC/IBM Junior Faculty Development Award in 1999, UNC Hettleman Award for Scholarly Achievements in 2003, Carolina Women's Center Faculty Scholar in 2008, UNC WOWS Scholar 2009-2011, and six best paper awards at international conferences. Her research interests include physically-based modeling, virtual environments, haptics, robotics, and geometric computing. She has (co-) authored more than 180 refereed publications in these areas and co-edited/authored three books. She has served on over numerous program committees of leading conferences and co-chaired dozens of international conferences and workshops. She is currently the Associate Editor-in-Chief of IEEE Transactions on Visualization and Computer Graphics and a member of 6 editorial boards and has served as a guest editor of several scientific journals and technical magazines. She also has served on several steering committees and advisory boards of international conferences, as well as technical advisory committees constituted by government organizations and industry. LIN@CS.UNC.EDU....HTTP://WWW.CS.UNC.EDU/~LIN.....HTTP://GAMMA.CS.UNC.EDU