

Reconstructing Reality: From Physical World to Virtual Environments

Ming C. Lin

University of Maryland at College Park

lin@cs.umd.edu

<http://www.cs.umd.edu/~lin>

With increasing availability of data in various forms from images, audio, video, 3D models, motion capture, simulation results, to satellite imagery, representative samples of the various phenomena constituting the world around us bring new opportunities and research challenges. Such availability of data has led to recent advances in data-driven modeling. However, most of the existing example-based synthesis methods offer empirical models and data reconstruction that may not provide an insightful understanding of the underlying process or may be limited to a subset of observations.

In this talk, I present recent advances that integrate classical model-based methods and statistical learning techniques to tackle challenging problems that have not been previously addressed. These include flow reconstruction for traffic visualization, learning heterogeneous crowd behaviors from video, simultaneous estimation of deformation and elasticity parameters from images and video, and example-based multimodal display for VR systems. These approaches offer new insights for understanding complex collective behaviors, developing better models for complex dynamical systems from captured data, delivering more effective medical diagnosis and treatment, as well as cyber-manufacturing of customized apparel. I conclude by discussing some possible future directions and challenges.

SHORT BIOGRAPHY: *Ming C. Lin is currently Distinguished University Professor and Elizabeth Stevinson Iribe Chair of Computer Science at the University of Maryland College Park and John R. & Louise S. Parker Distinguished Professor Emerita of Computer Science at the University of North Carolina (UNC), Chapel Hill. She was also an Honorary Visiting Chair Professor at Tsinghua University. 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, Beverly W. Long Distinguished Professorship 2007-2010, UNC WOWS Scholar 2009-2011, IEEE VGTC Virtual Reality Technical Achievement Award in 2010, and many best paper awards at international conferences. She is a Fellow of ACM, IEEE, and Eurographics and a member of ACM SIGGRAPH Academy.*

Her research interests include computational robotics, haptics, physically-based modeling, virtual reality, sound rendering, and geometric computing. She has (co-)authored more than 300 refereed publications in these areas and co-edited/authored four books. She has served on hundreds of program committees of leading conferences and co-chaired dozens of international conferences and workshops. She is currently a member of Computing Research Association-Women (CRA-W) Board of Directors, Chair of IEEE Computer Society (CS) Fellows Committee, Chair of IEEE CS Computer Pioneer Award, and Chair of ACM SIGGRAPH Outstanding Doctoral Dissertation Award. She is a former member of IEEE CS Board of Governors, a former Editor-in-Chief of IEEE Transactions on Visualization and Computer Graphics (2011-2014), a former Chair of IEEE CS Transactions Operations Committee, and a member of several editorial boards. She also has served on several steering committees and advisory boards of international conferences, as well as government and industrial technical advisory committees.

