Abstract:
The past decade has witnessed remarkable progress in image-based, data-driven vision and graphics. However, existing approaches often treat the images as pure 2D signals and not as a 2D projection of the physical 3D world. As a result, a lot of training examples are required to cover sufficiently diverse appearances and inevitably suffer from limited generalization capability. In this talk, I will present “inference-by-composition” approaches to overcome these limitations by modeling and interpreting visual signals in terms of physical surface, object, and scene. I will show how we can incorporate physically grounded constraints in a non-parametric optimization framework for (1) revealing the missing parts of an image due to removal of a foreground or background element, (2) recovering high spatial frequency details that are not resolvable in low-resolution observations, and (3) discovering multiple approximately linear structures in extremely noisy videos with an ecological application to bird migration monitoring at night. The resulting algorithms are simple and intuitive while achieving state-of-the-art performance without the need of training on an exhaustive set of visual examples. I will end my talk with a brief discussion of some key challenges and opportunities in visual learning with weak supervision.

Bio:
Jia-Bin Huang received the B.S. degree in Electronics Engineering from National Chiao-Tung University, Hsinchu, Taiwan. He is currently working toward the Ph.D. degree in the Department of Electrical and Computer Engineering at University of Illinois, Urbana-Champaign advised by Prof. Narendra Ahuja. His research interests include computer vision, computer graphics, and machine learning with a focus on visual analysis and synthesis with physically grounded constraints. His research received the best student paper award in IAPR International Conference on Pattern Recognition (ICPR) in 2012 for the work on computational modeling of visual saliency and the best paper award in the ACM Symposium on Eye Tracking Research & Applications (ETRA) in 2014 for work on learning-based eye gaze tracking. Huang is the recipient of the UIUC Graduate College Dissertation Completion Fellowship, Thomas and Margaret Huang Award for Graduate Research, Beckman Cognitive Science/Artificial Intelligence Award, Sundaram Seshu Fellowship, and the PURE Best Research Mentor Award. He is a student member of the IEEE, IEEE Computer Society, and ACM SIGGRAPH.

Monday, Feb. 15, 2016 @ 4:00 pm  McAdams Hall, Room 119

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