Joseph T. Kider Jr., Ph.D.

Assistant Professor at University of Central Flordia
Institute for Simulation and Training
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My current research focuses on the interdisciplinary digital design of sustainable architecture. I work on advanced theoretical algorithms and numeric simulations that derive a building's daylighting behavior, thermal performance, and material properties. I develop novel approaches for simulating, manipulating, and physically realizing sustainable designs in all phases of a building's lifecycle. This research directly impacts smart-building design, early-stage design, and retrofitting buildings. I also work on high dimensional light transport problems, such as complex illumination, material appearance, physically-based simulation, and spectral rendering, which facilitate a unique approach to provide both more accurate simulations and efficient algorithms for simulating sustainable architecture and smart buildings. I validate my approaches with custom built hardware which collects novel measurements.

Education

Ph.D. in Computer Science, University of Pennsylvania, Philadelphia, PA — 2012
Research Area: Computer Graphics
Advisor: Norman I. Badler
Dissertation: "*Simulation of 3D Model, Shape, and Appearance Aging by Physical, Chemical, Biological, Environmental, and weathering Effects*"

M.S. in Computer Science, University of Pennsylvania, Philadelphia, PA — 2005
Research Area: Computer Graphics
Advisor: Norman I. Badler

B.S. in Computer Science, The Catholic University of America, Washington, DC — 2003
Minors: Mathematics and Politics

Current Position

Assistant Professor, at University of Central Florida — 2016 - Present
Institute for Simulation and Training
I develop theoretical algorithms and numerical simulations for a physically-based building performance simulations, high-dimensional light transport algorthims, and all-weather sky model for daylighting and energy simulations. I prove the accuracy of my approaches with novel validation measurements with custom built hardware.

Employment History

Research Associate, at Cornell University 2016 - 2016
Program of Computer Graphics
Advisor: Donald P. Greenberg
I develop theoretical algorithms and numerical simulations for a physically-based all-weather sky model for daylighting and energy simulations. I prove the accuracy of my approaches with novel validation measurements with custom built hardware.

Postdoctoral Scholar, at Cornell University 2012 - 2015
Program of Computer Graphics
Advisor: Donald P. Greenberg
Developed numeric simulations for a physically-based all-weather sky model for daylighting and energy simulations and novel validation measurements.

Lecturer (Full-Time), University of Pennsylvania 2011 - 2012
Department of Computer and Information Science
Instructor for Physically-based Animation, GPU-Programming, and Senior Capstone Design

Associate Director, University of Pennsylvania 2009 - 2012
SIG Center for Computer Graphics
Department of Computer and Information Science
Managed five funded computer graphics research projects, summer intern program, and advised a variety of student research projects

Lecturer (Part-Time), University of Pennsylvania 2008 - 2011
Department of Computer and Information Science
Instructor for Physically-based Animation, GPU-Programming, and Senior Capstone Design

Internship (Software Development), Naval Research Laboratory 2002 - 2003
Host: Lawrence C. Schuette
Developed real-time mapping and RF propagation display software for the Navy.

Internship (Software Development), Naval Surface Warfare Center 2001 - 2002
Host: David J Marques
Developed and deployed software for "smart-ships".

Internship (Web Development), The Catholic University of America 1999 - 2002
Host: William Lantry
Developed and deployed software for Catholic University's website for both the front-end and back-end. Developed a 3D model and panoramic photos for a virtual tour.

Teaching Experience

Assistant Professor (University of Central Florida)
- IDS 6938 - Simulation Techniques (*coming soon...*) Spring 2017
- IDS 6938 - Building Performance Simulation Spring 2016

Research Associate (Cornell University)
- CS 4654 - Design for Virtual Reality (*co-taught with Don Greenberg*) Spring 2016

Lecturer (University of Pennsylvania)
- CIS 563 - Physically-based Animation Spring 2012
- CIS 497 - Senior Capstone Design - Digital Media Designn Fall 2011, Spring 2012
- CIS 565 - GPU Programming and Architecture Fall 2011

Lecturer, Part-time (University of Pennsylvania)
- CIS 563 - Physically-based Animation Spring 2011
- CIS 497 - Senior Capstone Design - Digital Media Designn Spring 2009, 2010, Fall 2010

• CIS 565 - GPU Programming and Architecture — Spring 2008, Summer 2009

Teaching Assistant (University of Pennsylvania)
• CIS 665 - GPU Programming and Architecture (Gary Katz) — Spring 2007
• CIS 462/562 - Computer Animation (Stephen Lane) — Fall 2005

Honors and Awards

• **Honorable Mention Paper Award**, SIGGRAPH / Eurographics Symposium on Computer Animation — 2011
• **Penn Prize for Excellence** in Graduate Student Teaching — 2010
• **Best Paper Award**, 10th International Symposium on Virtual Reality, Archaeology, and Cultural Heritage — 2009
• **Best Poster Award**, 1st GPU Technology Conference — 2009
• **Ashton Fellowship**, University of Pennsylvania — 2003 - 2006

Publications

Daniel Knowlton, **Joseph T. Kider Jr.,** and Donald P. Greenberg. "*A Physically-based Cloudy Sky Model*" ACM Transactions on Graphics (SIGGRAPH 2016). Submitted.

Karl Li, **Joseph T. Kider Jr.,**, Bruce Walter, Tony DeRose and Donald P. Greenberg. "*Temporally Coherent Path Reuse for Shot-based Rendering*" ACM Transactions on Graphics (TOG 2016). *In Progress*.

Joseph T. Kider Jr., Daniel Knowlton, Jeremy Newlin, Yining Karl Li, and Donald P. Greenberg. "*A Framework for the Experimental Comparison of Solar and Skydome Illumination*" ACM Transactions on Graphics (SIGGRAPH ASIA 2014). 33(6), 2014.

Mubbasir Kapadia, I-kao Chiang, Tiju Thomas, Norman I. Badler, **Joseph T. Kider Jr.** *Efficient Motion Retrieval in Large Motion Databases.* ACM SIGGRAPH Symposium on Interactive 3d Graphics and Games. 19-28, 2012.

Joseph T. Kider Jr., Kaitlin Pollock, Alla Safonova. "A Data-driven Appearance Model for Human Fatigue", Symposium for Computer Animation, 2011.

Joseph T. Kider Jr., Samantha Raja, Norman I. Badler, "*Fruit Senescence and Decay Simulation*", Computer Graphics Forum, 2011

Catherine Stocker, Ben Sunshine-Hill, John Drake, Ian Perera, **Joseph T. Kider Jr.,** Norman I. Badler. "*CRAM it! A Comparison of Virtual, Live-Action and Written Training Systems for Preparing Personnel to Work in Hazardous Environments*", IEEE International Conference on Virtual Reality, 2011

Daniel Markowitz, **Joseph T. Kider Jr.,** Alexander Shoulson, and Norman I. Badler. "*Intelligent Camera Control using Behavior Trees*", Proceedings of Motion in Games, 2011

Damian Slonneger, Matthew Croop, Jeremy Cytryn, **Joseph T. Kider Jr.,** Richard Rabbitz, Eric Halpern, Norman I. Badler. "*Human Model Reaching, Grasping, Looking and Sitting using Smart Objects*", International Symposium on Digital Human Modeling, 2011

Joseph T. Kider Jr., Mark Henderson, Maxim Likhachev, and Alla Safonova, "*High-dimensional Planning on the GPU*", IEEE International Conference on Robotics and Automation, 2010

Pengfei. Huang, Jinsheng Kang, **Joseph T. Kider Jr.,** Benjamin Sunshine-Hill, Jon McCaffrey, Desiree Rios, Norman Badler, "*Real-time Evacuation Simulation in Mine Interior Model of Smoke and Action*", Computer Animation and Social Agents, 2010

Joseph T. Kider Jr., Rebecca L. Fletcher, Nancy Yu, Renata Holod, Alan Chalmers, and Norman I. Badler. "*Recreating Early Islamic Glass Lamp Lighting*", International Symposium on Virtual Reality, Archaeology and Cultural Heritage. 2009

Gary Katz and **Joseph T. Kider Jr.** "*All-Pairs Shortest-Paths for Large Graphs on the GPU*", Graphics Hardware, 2008

Student Supervision

Master Students

- James Briggs [1] (Co-advised with Francois Guimbretiere) - *Advanced Design in Virtual Reality* 2016 - Present
- Yining Karl Li [1] (Co-advised with Donald Greenberg) - *Accelerating Shot-based Rendering using Temporal Acceleration* 2013 - Present
- Daniel Knowlton [1] (Co-advised with Donald Greenberg) - *Physically-based Cloudy Skies* 2013 - 2015
- John DeCorrato [1] (Co-advised with Donald Greenberg) - *Creating a Basis For Three Dimensional Sketching* 2013 - 2015
- Tiju Thomas [2] - *Efficient Motion Retrieval in Large Motion Databases* 2011 - 2012
- Igor Chiang [2] - *Efficient Motion Retrieval in Large Motion Databases* 2011 - 2012
- Qing Sun [2] - *Physically-based Thermal Refraction* 2011 - 2012
- TianTian Liu [2] - *Physically-based Thermal Refraction* 2011 - 2012
- Zakiuddin Shehzan Mohammed [2] - *Motion Capture* 2011 - 2012
- Raul Santos Matsui [2] - *Simulating Leaf Decay* 2011 - 2012
- Varun Talwar [2] - *CCD Inverse-Kinamatics on the GPU* 2011 - 2012
- Samantha Raja [2] - *Simulation of Fruit Decay* 2009 - 2011
- Jonathan McCaffrey [2] - *Interactive and Scalable Ray-Casting of Metaballs on the GPU* 2008 - 2011

Bachelor Students

- Kaitlin Pollock [2] - *A Data-driven Appearance Model for Human Fatigue* 2009 - 2012
- Adam Malley [2]- *Multi-modal Motion Capture* 2010 - 2012
- Daniel Knowlton [2]- *Interactive Eyes During Motion* 2010 - 2012
- Jeremy Cytryn [2]- *Interactive High Surface Tension Liquids* 2010 - 2011
- Terry Kaleas [2]- *Physically Based Phase Changing Materials* 2010 - 2011
- Marley Glib [2]- *Herd 'Em : An Interactive Multi-Agent Challenge Game* 2010 - 2011
- Kaikai Wang [2]- *Interactive Global Illumination of Indoor Scenes on the GPU* 2010 - 2011
- Corey Novich [2]- *Multi-modal Motion Capture* 2010 - 2011
- Nathan Zeichner [2]- *Fold it! - Interactive Origami Simulation* 2010 - 2012
- Lillian Chou [2]- *Stealth Agents* 2010 - 2011
- Damon Rocco [2]- *Virtual Building Blocks with Microsoft Kinect* 2010 - 2011
- John Drake [2]- *Evacuation Simulation Design and Validation* 2010 - 2011
- Ian Perra [2]- *A Cognitive Model for Converstational Agents* 2010 - 2011
- Daniel Markowitz [2]- *Intelligent Camera Control using Behavior Trees* 2010 - 2011
- Mike Lang [2]- *Human Simulation Test Bed* 2010 - 2011
- Prutsdom (Nop) Jiarathanakul [2]- *Robust Renderer with Global Illumination on WebGL* 2010 - 2011
- Carlin Yuen [2]- *Realistic Physically-Based Rain Simulation* 2010 - 2011
- Yiyi Zhou [2]- *Visualizing Motion Capture Data* 2008 - 2009
- Nancy Yu [2]- *Light from Temporally-Varying Irregular Illuminants* 2010 - 2011
- Rebecca Fletcher [2]- *Light from Temporally-Varying Irregular Illuminants* 2008 - 2010
- Mark Henderson [2]- *High-dimensional Planning on the GPU* 2008 - 2009
- Grace Fong [2]- *Phenotype-Based Figure Generation* 2007 - 2010
- Brittany Fields [2]- *Intelligent Sneaking Agents for Games* 2009 - 2010

- Emily Weihrich [2]- *Real-Time Hair Simulation for Low Dynamic Movements* 2009 - 2010
- Michelle Chen [2]- *Simulation of Fruit Decay* 2009 - 2010
- Paul Kanyuk [2]- *Simulating Trashing Environments* 2004 - 2005

Intern Students

- Jeremy Newlin [1,2]- *Simulating Trashing Environments* 2010, 2011, 2012
- Kelsey Hurly [2]- *Visualizing Multi-modal Motion Capture Data* 2010, 2011
- Himanshu Masand [2]- *Multi-modal Motion Capture* 2011

1 Cornell University

2 University of Pennsylvania

Professional Activities

- Regular reviewer for ACM SIGGRAPH, ACM SIGGRAPH ASIA, Eurographics, Symposium of Computer Animation, Journal of Graphics Techniques, and other major conferences and journals in the field of computer graphics.
- Advisor for University of Pennsylvania student SIGGRAPH Chapter

References

- **Donald P. Greenberg,** Professor, Cornell University, dpg5@cornell.edu
- **Norman I. Badler,** Professor, University of Pennsylvania, badler@seas.upenn.edu
- **Stephen Lane,** Professor of Practice, University of Pennsylvania, shlane@seas.upenn.edu
- **Lawrence Schuette,** Director, Office of Research, Office of Naval Research (ONR) larry.schuette@navy.mil
- **Kostas Daniilidis,** Professor, University of Pennsylvania, kostas@cis.upenn.edu
- **Amy Calhoun,** Director of Integrated Studies, University of Pennsylvania, cal1@seas.upenn.edu