

# Matthew Overby

Other contact info available upon request

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**Current Research:** Physics-based animation, Elastic deformation, collision response, numerical optimization

## EDUCATION

**Doctor of Philosophy, Computer Science**  
University of Minnesota Twin Cities

Expected 2020  
Advisor: Rahul Narain

**Master of Science, Computer Science**  
University of Minnesota Duluth

November 2014  
Advisor: Pete Willemsen

**Bachelor of Science, Computer Science**  
University of Minnesota Duluth

December 2011

## RESEARCH EXPERIENCE

- **Creative Intelligence Lab Intern** Summer 2018 & 2019  
Adobe Seattle, Washington, USA
  - ◇ Research techniques for collision detection and response for non-linear elastic deformation
- **R&D Software Engineering Intern** Summer 2017  
Digital Domain 3.0 Vancouver, British Columbia, CA
  - ◇ Research and develop methods for the simulation of physically-realistic muscle and skin dynamics using parallel optimization techniques
- **Research Computer Scientist** Fall 2015  
University of Utah, Dept. of Mechanical Engineering Salt Lake City, Utah, USA
  - ◇ Research and develop simulation models to better understand the impact of urbanization on the built environment, enabling the development more environment-friendly city infrastructure

## PUBLICATIONS

- Brown G.E., **Overby M.**, Forootaninia Z., Narain R. (2018). Accurate Dissipative Forces in Optimization Integrators. *ACM SIGGRAPH Asia*.  
www.mattoverby.net/#siggraphasia2018
- Li J., Daviet G., Narain R., Bertails-Descoubes F., **Overby M.**, Brown G.E., Boissieux L. (2018). An implicit frictional contact solver for adaptive cloth simulation. *ACM SIGGRAPH*.  
www.mattoverby.net/#siggraph2018
- **Overby M.**, Brown G.E., Li J., Narain R. (2017). ADMM  $\supseteq$  Projective Dynamics: Fast Simulation of Hyperelastic Models with Dynamic Constraints. *IEEE TVCG*.  
www.mattoverby.net/#tvcg2017
- Girard P., Nadeau D.F., Pardyjak E.R., **Overby M.**, Willemsen P., Stoll R., Bailey B.N., Parlange M.B. (2017). Evaluation of the QUIC-URB wind solver and QESRadiant radiation-transfer model using a dense array of urban meteorological observations. *Urban Climate*.  
www.mattoverby.net/#uc2017

- Narain R., **Overby M.**, Brown G.E. (2016) ADMM  $\supseteq$  projective dynamics: fast simulation of general constitutive models. *ACM SIGGRAPH/Eurographics SCA*.  
www.mattoverby.net/#sca2016
- **Overby M.**, Willemsen P., Bailey B.N., Halverson S., Pardyjak E.R. (2016). A rapid and scalable radiation transfer model for complex urban domains. *Urban Climate*.  
www.mattoverby.net/#uc2016
- Bailey B.N., **Overby M.**, Willemsen P., Pardyjak E.R., Mahaffee W.F., Stoll R. (2014). A scalable plant-resolving radiative transfer model based on optimized GPU ray tracing. *Agricultural Forest Meteorology*.  
www.mattoverby.net/#afm2014

## ORAL PRESENTATIONS

- GPU accelerated surface energy balance computations for urban environment simulation. AMS 2015, Symposium on High Performance Computing for Weather, Water, and Climate. Phoenix, AZ, January 2015.
- QUIC EnvSim: Radiative heat transfer in vegetative and urban environments with nvidia optix. GPU Technology Conference 2014. San Jose, CA, March 2014.
- Simulating radiative transport for vegetation in complex urban environments with green infrastructure. AMS 2014, Symposium on the Urban Environment. Atlanta, GA, February 2014. **Awarded Best Student Presentation**
- A highly scalable modeling framework based on gpu technology for simulating radiative transport in complex urban and plant canopies. ESA 2013, Sustainability: Urban Systems. Minneapolis, MN, August 2013.
- Modeling Vegetative Heat Transfer in Urban Environments with OptiX. GPU Technology Conference 2013. San Jose, CA, March 2013.

## COMPUTER SKILLS

Preferred Languages: C++, C, Python, Perl

APIs: OpenGL, GLFW, Eigen, OpenMP, CUDA

Applications & Tools: Unix/Linux, CMake, Git, SVN, LaTeX, MATLAB/Octave, Mathematica

## EXTRACURRICULAR ACTIVITIES

- SIGGRAPH Student Volunteer, 2017
- Subreviewer for ACM Symposium on Virtual Reality Software and Technology (VRST), 2015
- Selected to represent the Computer Science Department in UMD SCSE Dean interviews, 2014
- Academic Outreach:
  - ◊ Bulldog Science and Engineering Days, November 2013
  - ◊ Impact of Green Infrastructure on Urban Microclimate, June 2013
  - ◊ Engaging Elementary Students with Computer Science, May 2013
  - ◊ Impact of Urban Form through Experiments and Visualization, June 2012
- Member of the UMD ACM Club, 2009-2011