Matthew Overby

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Current Research: Elastic deformation, numerical optimization, collision response

EDUCATION

Doctor of Philosophy, Computer Science — Expected December 2020
University of Minnesota Twin Cities — Advisor: Rahul Narain

Master of Science, Computer Science — November 2014
University of Minnesota Duluth — Advisor: Pete Willemsen

Bachelor of Science, Computer Science — December 2011
University of Minnesota Duluth

RESEARCH EXPERIENCE

- **Creative Intelligence Lab Intern** — Summer 2018 & Summer 2019
  Adobe — Seattle, Washington, USA
  - ◇ Research new algorithms for robust collision detection/response and non-linear elastic deformation

- **R&D Software Engineering Intern** — Summer 2017
  Digital Domain 3.0 — Vancouver, British Columbia, CA
  - ◇ Research and develop animation tools for the simulation of physically-realistic muscle and skin deformation 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

- Bianchi C., **Overby M.**, Willemsen P., Smith A.D., Stoll R., Pardyjak E.R., (2019). Quantifying Effects of the Built Environment on Solar Irradiance Availability at Building Rooftops. *Journal of Building Performance Simulation*. www.mattoverby.net/#jbps2019
- 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, ABSTRACTS, AND POSTERS

- 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, Intel MKL, CUDA
Applications & Tools: Unix/Linux, CMake, Git, SVN, LaTeX, MATLAB/Octave, Mathematica

EXTRACURRICULAR ACTIVITIES

- Reviewer for ACM SIGGRAPH, 2019
- 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