


# MATTHEW OVERBY

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**Research Interests:** Geometry Optimization, Elastic Deformation, Collision Response

## EDUCATION

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

Expected Fall 2021  
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

## EXPERIENCE

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**z-emotion – Independent Contractor, Software Engineering**  
*Seoul, South Korea*

September 2020 – Present  
*z-emotion.com*

- Develop cloth simulation algorithms for interactive garment design

**Adobe – Creative Intelligence Lab Intern**  
*Seattle, Washington, USA*

Summer 2018 & Summer 2019  
*research.adobe.com*

- Research methods for geometry optimization and collision resolution

**Digital Domain – R&D Software Engineering Intern**  
*Vancouver, British Columbia, CA*

Summer 2017  
*digitaldomain.com*

- Research and develop animation tools for simulating muscle and skin

**University of Utah – Research Computer Scientist**  
*Salt Lake City, Utah, USA*

Fall 2015  
*mech.utah.edu/~pardyjak*

- Research and develop microclimate simulation algorithms with GPGPU

## PUBLICATIONS

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Carlo Bianchi, **Matthew Overby**, Peter Willemsen, Amanda D. Smith, Rob Stoll, Eric R. Pardyjak. (2019). Quantifying Effects of the Built Environment on Solar Irradiance Availability at Building Rooftops. *Journal of Building Performance Simulation*.

George E. Brown, **Matthew Overby**, Zahra Forootaninia, Rahul Narain. (2018). Accurate Dissipative Forces in Optimization Integrators. *ACM TOG (Proc. SIGGRAPH Asia)*.

Jie Li, Gilles Daviet, Rahul Narain, Florence Bertails-Descoubes, **Matthew Overby**, George E. Brown, and Laurence Boissieux. (2018). An Implicit Frictional Contact Solver for Adaptive Cloth Simulation. *ACM TOG (Proc. SIGGRAPH)*.

**Matthew Overby**, George E. Brown, Jie Li, Rahul Narain. (2017). ADMM  $\supseteq$  Projective Dynamics: Fast Simulation of Hyperelastic Models with Dynamic Constraints. *IEEE TVCG*.

Pascale Girard, Daniel F.Nadeau, Eric R.Pardyjak, **Matthew Overby**, Peter Willemsen, Rob Stoll, Brian N.Bailey, Marc B.Parlange. (2017). Evaluation of the QUIC-URB Wind Solver and QESRadiant Radiation-Transfer Model Using a Dense Array of Urban Meteorological Observations.. *Urban Climate*.

Rahul Narain, **Matthew Overby**, George E. Brown. (2016). ADMM  $\supseteq$  Fast Simulation of General Constitutive Models. *Proc. ACM SIGGRAPH/Eurographics SCA*.

**Matthew Overby**, Peter Willemsen, Brian N. Bailey, Scot Halverson, Eric R. Pardyjak. (2016). A Rapid and Scalable Radiation Transfer Model for Complex Urban Domains. *Urban Climate*.

**Matthew Overby.** (2014). A High Performance Framework for Coupled Urban Microclimate Models. *Master's Thesis - University of Minnesota Duluth.*

Brian N. Bailey, **Matthew Overby**, Peter Willemsen, Eric R. Pardyjak, Walter F. Mahaffee, Rob Stoll. (2014). A Scalable Plant-Resolving Radiative Transfer Model Based on Optimized GPU Ray Tracing. *Agricultural and Forest Meteorology.*

## TALKS, ABSTRACTS, AND POSTERS

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GPU Accelerated Surface Energy Balance Computations for Urban Environment Simulation. AMS 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. San Jose, CA. March 2014.

Simulating Radiative Transport for Vegetation in Complex Urban Environments with Green Infrastructure. AMS 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 Sustainability: Urban Systems. Minneapolis, MN. August 2013.

Modeling Vegetative Heat Transfer in Urban Environments with OptiX. GPU Technology Conference. San Jose, CA. March 2013.

## TECHNICAL SKILLS

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

**Libraries/Frameworks:** Eigen, GLSL, GPGPU-CUDA, Intel MKL & TBB, OpenGL, OpenMP

**Applications/Tools:** CMake, Git, LaTeX, Linux, Mathematica, MATLAB, MS Visual Studio, SVN

## ACTIVITIES

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Google Summer of Code – Blender Foundation, 2020

SIGGRAPH Student Volunteer, 2017

Reviewer:

- ACM SIGGRAPH, 2019
- ACM VRST, 2015

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