


# MATTHEW OVERBY

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**Research Interests:** Physics-Based Animation, Collision Resolution, Geometry Processing

## EDUCATION

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### Doctor of Philosophy in Computer Science

University of Minnesota

February 2022

Advisor: Rahul Narain

### Master of Science in Computer Science

University of Minnesota Duluth

November 2014

Advisor: Pete Willemsen

### Bachelor of Science in Computer Science, Minor in Mathematics

University of Minnesota Duluth

December 2011

## EXPERIENCE

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### Amazon – Applied Scientist

Seattle, Washington, USA (remote)

- Fashion innovation technology

March 2022 – Present

[amazon.science](https://amazon.science)

### Amazon – Applied Science Intern

Seattle, Washington, USA (remote)

- Fashion innovation technology

Summer 2021 & Fall 2021

[amazon.science](https://amazon.science)

### z-emotion – Independent Contractor, Software Engineering

Seoul, South Korea (remote)

- Develop cloth simulation algorithms for interactive garment design

September 2020 – May 2021

[z-emotion.com](https://z-emotion.com)

### Adobe – Creative Intelligence Lab Intern

Seattle, Washington, USA

- Research methods for geometry optimization and collision response

Summer 2018 & Summer 2019

[research.adobe.com](https://research.adobe.com)

### Digital Domain – R&D Software Engineering Intern

Vancouver, British Columbia, CA

- Research and develop animation tools for simulating muscle and skin

Summer 2017

[digitaldomain.com](https://digitaldomain.com)

### University of Utah – Research Computer Scientist

Salt Lake City, Utah, USA

- Research and develop microclimate simulation algorithms with GPGPU

Spring 2015

[mech.utah.edu/~pardyjak](https://mech.utah.edu/~pardyjak)

## PUBLICATIONS

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**Matthew Overby**, Danny Kaufman, Rahul Narain. (2021). Globally Injective Geometry Optimization with Non-Injective Steps. *Computer Graphics Forum (Proc. SGP)*.

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*.

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*.

## DISSERTATION AND THESIS

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Matthew Overby. (2022). Versatile Geometry Optimization with Hard Constraints. *Doctoral Dissertation - University of Minnesota*.

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

## 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

**Libraries/Frameworks:** Eigen, GPGPU (CUDA), Intel MKL & TBB, OpenGL, OpenMP

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

## ACTIVITIES

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Google Summer of Code – Blender Foundation, 2020

SIGGRAPH Student Volunteer, 2017