Matthew Overby

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

Education

Doctor of Philosophy in Computer Science — February 2022
University of Minnesota — *Advisor: Rahul Narain*
Dissertation: Versatile Geometry Optimization with Hard Constraints

Master of Science in Computer Science — November 2014
University of Minnesota Duluth — *Advisor: Pete Willemsen*
Thesis: A High Performance Framework for Coupled Urban Microclimate Models

Bachelor of Science in Computer Science, Minor in Mathematics — December 2011
University of Minnesota Duluth

Experience

Amazon Fashion – Applied Scientist — March 2022 – Present
Minneapolis, Minnesota, USA (remote) — *amazon.science*
- Research and develop scalable methods for 3D garment virtual try-on

Amazon Fashion – Applied Science Intern — Summer 2021 & Fall 2021
Minneapolis, Minnesota, USA (remote) — *amazon.science*
- Research and develop scalable methods for 3D garment virtual try-on

z-emotion – Independent Contractor, Software Engineering — September 2020 – May 2021
Seoul, South Korea (remote) — *z-emotion.com*
- Develop cloth simulation algorithms for interactive garment design

Abobe – Creative Intelligence Lab Intern — Summer 2018 & Summer 2019
Seattle, Washington, USA — *research.adobe.com*
- Research methods for geometry optimization and collision response

Digital Domain – R&D Software Engineering Intern — Summer 2017
Vancouver, British Columbia, CA — *digitaldomain.com*
- Research and develop animation tools for simulating muscle and skin

University of Utah – Research Computer Scientist — Spring 2015
Salt Lake City, Utah, USA — *mech.utah.edu/∼pardyjak*
- Research and develop microclimate simulation algorithms with GPGPU

Technical Skills

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

PUBLICATIONS

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*.

TALKS, ABSTRACTS, AND POSTERS

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.