shanescott

geometry, simulation, meshing, mathematics

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skills

technical communication
computational geometry
physical simulation
image processing
neural networks
optics

education

Ph.D. in Mathematics 2012-2018
Georgia Institute of Technology
thesis in surface geometry, minor in quantum computation

Dual B.S. in Physics and Mathematics 2008-2012
Kansas State University
thesis in wavelet analysis, GPA 4.0, year at University of Hyderabad, India

software

C++ VTK ECL CMake conan **Python** Tensorflow Keras Sage Pandas **Linux** Ubuntu Bash **JavaScript** **MATLAB** LaTeX

technical experience

Automating Design and Print Preparation for 3D Metal Manufacturing Aug 2019 - Present
Software Engineer at Divergent3D
primary architect for finite element geometry kernel used in automating design and part print preparation; led research on novel optimization schemes for part segmentation and packing; close collaboration to build tools directly meeting needs of our structural engineers, CAD designers, and additive manufacturers

Telematics Driver GPS Modeling June 2018 - Aug 2019
Statistical Modeler at LexisNexis Risk
physical models for GPS driver rating; led research on adversarial neural net approach to GPS anomaly detection; large data manipulation with high performance computing cluster in ECL & C++; projects in driver risk rating and AI driver recognition using GPS data from disparate device types

Surface Geometry and Topology 2013 - 2018
Graduate Student Researcher at Georgia Institute of Technology
researched reconstruction problems in symmetries of surfaces; algorithms in computing novel 3-manifold invariants using hyperbolic triangulation; Python implementations

Vascular Parametrizaiton for Bloodflow Simulation June - Aug 2017
Computation Intern at Lawrence Livermore National Lab
created novel geometry based computational load balancing for HARVEY, human blood flow simulation; researched algorithm for devising automated tubular parameterization of human vascular structure; C++ & VTK implementations

Inverse Problems in Medical Imaging June - Aug 2012
Visiting Student at University of Washington
studied partial differential equations for cancer modeling and Radon and X-ray tomography; implemented algorithms for reconstructing spatial densities from X-ray data

Wavelet Applications to Digital Imaging 2011 - 2012
Undergraduate Researcher at Kansas State University I-Center for Mathematics
research in wavelet analysis applications to low-loss streamable data compression of digital signals

Algorithmic Combinatorics on Words June - Aug 2011
Undergraduate Researcher at University of North Carolina at Greensboro
published novel research in pattern avoidance in strings

Attosecond Optics and Atomic Dynamics 2008 - 2010
Undergraduate Researcher at James R. Macdonald Lab, Kansas State University
developed electron dynamics simulation data for experiments in ultra high frequency optics; C implementations

peer-reviewed publications

Combinatorial models for surface and free group symmetries. PhD diss., Georgia Institute of Technology, 2018, hdl.handle.net/1853/60722.

Exact computation of the n-loop invariants of knots. Experimental Mathematics. 25. 2 (2016). Garoufalidis, Sabo, and Scott.

Computing the partial word avoidability indices of ternary patterns. Combinatorial Algorithms. IWOCA (2012). Lecture Notes in Computer Science, vol 7643. Springer, Berlin, Heidelberg. Blanchet-Sadri, Lohr, and Scott.

Computing the partial word avoidability indices of binary patterns. Journal of Discrete Mathematics 23 (2013). Blanchet-Sadri, Lohr, and Scott.

Delay control in attosecond pump-probe experiments. Optical Express 17.24 (2009). Chini, Mashiko, Wang, Chen, Yun, Scott, Gilbertson, and Chang.

conference presentations

Presenting with Inkscape and Sozi July 2016
Topology Students Workshop, School of Mathematics, Georgia Institute of Technology

Avoiding Patterns in Partial Words July 2012
23rd International Workshop on Discrete Algorithms, Tamil Nadu, India

Ternary Patterns in Partial Words April 2012
American Mathematical Society Spring Sectional Meeting, University of Kansas

teaching experience

Graduate Student Instructor 2012 - 2018
Georgia Institute of Technology
taught courses ranging from 20 to 120 students; managed teams of 2 to 5 teaching assistants; award winning instruction; subjects include calculus, differential equations, linear algebra, combinatorics, and algorithms

Georgia High School Mathematics Competition Organizer 2016 - 2017
Georgia Institute of Technology
coordinated annual statewide math competition of 400 students; managed team to design competition materials and activities; designed optical mark recognition automatic grading system

Teaching Assistant and Grader 2009 - 2012
Kansas State University
led algebra courses and assessed students; ran interactive computer lab for visualising complex algebra

achievements

Access Ally Award 2017
Georgia Institute of Technology Office of Disability Services
awarded for impact on hearing-impaired student success, accessibility, and advocacy

Outstanding Graduate Teaching Assistant 2016
Georgia Institute of Technology School of Mathematics
chosen by the department to represent school for superior instruction

School of Mathematics Graduate Representative 2016 - 2017
Georgia Institute of Technology
represented graduate student body on the faculty graduate committee and the graduate student council; founding member of the graduate student chapter of the American Mathematical Society

Eagle Scout and Community Service Award 2007
Boy Scouts of America and Survivors of the Dodge City Mexican Village
awarded for the design and erection of a historical marker for the Mexican Village in Dodge City, KS