Hasan H. Eruslu

Contact Information

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Education

Ph.D. in Applied Mathematics. University of Delaware, Newark, DE — June 2020
Area of Study: Numerical analysis and scientific computation

M.S. in Mathematics. Bogazici University, Istanbul, Turkey — June 2015
Thesis: *An optimal change of variables scheme for single scattering problems*

B.S. in Mathematics. Bogazici University, Istanbul, Turkey — June 2012

Summary

Code Development, Algorithm Design, Image Segmentation, Applied Mathematics, Numerical Analysis, High Performance Computation

Computer Skills

Proficient. Python, MATLAB, NumPy/SciPy, FEniCS/DOLFIN, Git/GitHub, LaTeX
Other. C++, OpenMP, MPI, Fortran, HTML, OpenGL, Bash

Relevant Coursework

Mathematics. Real, Complex and Functional Analysis; Nonlinear Water Waves; Elliptic and Evolutionary PDEs; Finite and Boundary Element Methods; Linear Algebra; Numerical Linear Algebra; Probability; Stochastic Processes; Graph Theory

Computer Science. Data Structures, Algorithm Design and Analysis; Object-Oriented Programming, Machine Learning

Work Experience

Research Assistant — September 2018 to present
University of Delaware, Department of Mathematical Sciences — Newark, DE
- Funded by NSF Computational Mathematics Program via Dr. Francisco Sayas.
- Developing robust computational tools to study the deformation and stress in solids.

Software Developer Intern — Summer 2018 & Summer 2019
Theiss Research, National Institute of Standards and Technology (NIST) — Gaithersburg, MD
- Developed an object-oriented Python library for 3D image segmentation problem.
- Resolved the boundary of a synthetic simple connected 3D object in given images with an accuracy corresponding in average to 50% of the object edge width.

Graduate Instructor/Teaching Assistant — December 2015 to 2018
University of Delaware, Department of Mathematical Sciences — Newark, DE
- Taught calculus for STEM majors for 13 hours a week during 5 week-semesters.
- Achieved above 95% rating of excellence in student evaluations.

Projects

Code Developer — 2015 to 2019
Team Pancho, University of Delaware — Newark, DE
- Target problems are in 3D settings including:
  - Behavior of viscoelastic materials under external forces in various conditions,
  - Visual effect of the stress on certain materials under pressure,
  - Interactions of a solid with an incoming acoustic wave.
- Producing vectorized, fast and parallelized algorithms with a team of 5-7 using MATLAB.
- Achieved at least 10^{-5} of relative accuracy in benchmark problems with high order polynomial approximation.

Publications

G. Dogan, and H. Eruslu. *An efficient shape optimization algorithm for surface segmentation in 3D images.* (In progress)

H. Eruslu, and F.-J. Sayas. *Polynomially bounded error estimates for Trapezoidal Rule Convolution Quadrature.* (In revision)

F. Ecevit, and H. Eruslu. *Efficient Galerkin schemes for high-frequency scattering problems based on frequency dependent changes of variables.* IMA Journal of Numerical Analysis, 2018.

T.S. Brown, S. Du, H. Eruslu, and F.-J. Sayas. *Analysis of models for viscoelastic wave propagation.* Applied Mathematics and Nonlinear Sciences, 2018.

F-J. Sayas, T.S. Brown, S. Du, and H. Eruslu. *Discrete waves in viscoelastic media.* R. Nochetto, S. Sauter, and C. Wieners, eds. *Space-time methods for time-dependent partial differential equations.* Mathematisches Forschungsinstitut Oberwolfach, pp. 58-60, 2017.

H. Eruslu, and F.-J. Sayas. *TRCQ for viscoelastic waves.* 10th Winter Research Symposium, UD. Dept. Math. Sciences. February 15, 2019. (Poster presentation)

Talks

G. Dogan, H. Eruslu, *Image segmentation problem and 3D simulations.* UD. Dept. Math. Sciences Graduate Student Seminar. Newark, Delaware. November 14, 2018.

E. Bergman, S. Du, H. Eruslu, *Panel: Process of oral candidacy examinations.* UD. Dept. Math. Sciences Graduate Student Seminar. Newark, Delaware. October 12, 2017.

H. Eruslu, *An HDG formulation for non-linear elasticity.* UD. Dept. Math. Sciences Graduate Student Seminar. Newark, Delaware. April 12, 2017.

S. Du, G. Hou, H. Eruslu, F.-J. Sayas, *Numerical simulation of viscoelastic waves. Part-I: The model and the discretization in space.* UD. Dept. Math. Sciences Summer Symposium. Newark, Delaware. August 2016.

Attended Workshops

Theory and Practice in Machine Learning and Computer Vision. Brown University, 2019.

OpenMP Workshop. By XSEDE and Pittsburg Supercomputing Center. Newark, DE, 2018.

MPI Workshop. By XSEDE and Pittsburg Supercomputing Center. Newark, DE, 2018.

Honors and Awards

University Dissertation Fellowship Award — 2019-2010

UD. Dept. Math. Sciences 2019 WRS Best Poster Award — February 2019

Excellence in Graduate Student Teaching Award — May 2018
University of Delaware — Newark, DE
- Annual award of recognition and $1,500 financial gift to at most two of more than 2000 graduate instructors/teaching assistants across the university.

GEMS (Groups Exploring Math. Sciences) Project Fund — Summer 2016
University of Delaware — Newark, DE
- Funded for the summer to work on viscoelastic wave simulations in a group of one undergraduate and two graduate students.

TUBITAK Undergraduate and Graduate Scholarship — 2006-2015

International Mathematical Olympiads (IMO), Silver Medal — 2006

National Mathematical Olympiads of Turkey, Gold Medal — 2006