

David Lenz

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EDUCATION:

University of California San Diego, La Jolla, CA

Ph.D. Mathematics with Specialization in Computational Science *expected*
Thesis: “Adaptive Space-Time Finite Element Methods in Four Dimensions” Jun 2020
Advisor: Randolph Bank

M.A. Applied Mathematics 2017

University of Notre Dame, Notre Dame, IN

B.S. Mathematics (*cum laude*) 2015

RESEARCH EXPERIENCE:

Argonne National Laboratory, Lemont, IL

Givens Associate, Mathematics and Computer Science Division

Investigated methods for efficient model fitting of scientific data sets. Used MATLAB to analyze the spectral characteristics of data sets and predict approximation errors under various fitting methods. 2019

San Diego Supercomputer Center, La Jolla, CA

Graduate Researcher, High-Performance Geocomputing Lab

Contributed to highly-scalable finite element solver for seismic wave equations. Re-wrote C++ tool for topographical surface modeling and increased efficiency by 40%. Studied methods for simulating acoustic-elastic dynamics in seismic solvers and set up automated testing pipelines for continuous delivery of software. 2017–19

NASA Glenn Research Center, Cleveland, OH

Intern, Space Communications and Navigation Directorate

Proposed and carried out research on the use of topological data analysis techniques in star-tracking algorithms. Quantified results with numerical experiments written in C++. 2016

RESEARCH INTERESTS:

Scalable Finite Element Methods; Unstructured 4D Meshing; Adaptive Mesh Refinement; High-Performance Computing; Isogeometric Analysis

INVITED TALKS:

“Mesh Refinement in 4D” (*upcoming*)

Minisymposium on Space-Time FEM/BEM: Theory and Applications, 26th International Domain Decomposition Conference, Hong Kong 2020

TEACHING:

University of California San Diego (<i>Instructor of Record</i>)	
Precalculus	Fall 2019
University of California San Diego (<i>Teaching Assistant</i>)	
Numerical Methods for Partial Differential Equations	Winter 2017, 18, 19
Introduction to Numerical Analysis: Approximation and Nonlinear Equations	Winter 2019
Introduction to Numerical Analysis: Linear Algebra	Winter 2017
Vector Calculus	Winter 2016, Spring 2016
Integral Calculus	Fall 2015
San Diego Miramar College (<i>Math Lab Tutor</i>)	2017–18

SOFTWARE:

EDGEcut: Automatic Topographical Surface Meshing (*with A. N. Breuer*)
 Documentation: http://usr.dial3343.org/en/master/chapters/tools/edge_cut.html

POSTERS:

Cui, Y., Breuer, A. N., **Lenz, D.** (2019, 08). *Continued Integration and Delivery for AWP-ODC-OS in the Public Cloud*. 2019 SCEC Annual Meeting.

Cui, Y., Breuer, A. N., Konwar, R., **Lenz, D.** (2018, 08). *Unified and Continuous Software Development for AWP-ODC-OS*. 2018 SCEC Annual Meeting.

Lenz, D., Tobin, J., Breuer, A. N., Heinecke, A., Yount, C., Cui, Y. (2017, 08). *Tuning AWP-ODC-OS for efficient, scalable performance on manycore architectures*. 2017 SCEC Annual Meeting.

PRESENTATIONS:

“Four-Dimensional Conforming Meshes for Finite Element Methods” CCoM Seminar, University of California San Diego, La Jolla, CA	Dec 2019
“Informed Model Fitting for Scientific Data Using the Discrete Legendre Transform” MCS Seminar, Argonne National Laboratory, Lemont, IL	Aug 2019
“Some Error Analysis of Spacetime Finite Element Methods” CCoM Seminar, University of California San Diego, La Jolla, CA	Feb 2019
“Foundations of Space-Time Finite Element Methods” CCoM Seminar, University of California San Diego, La Jolla, CA	May 2018
“A Comparison of Adaptive Refinement Schemes for Numerical PDEs” CCoM Seminar, University of California San Diego, La Jolla, CA	Feb 2017
“Applications of Topological Data Analysis to Star Tracking Algorithms” NASA SIP Colloquium, Glenn Research Center, Cleveland, OH	Aug 2016

SERVICE:

Academic Integrity Review Board Member, UCSD Academic Integrity Office	2016–19
Graduate Student Mentor, UCSD Department of Mathematics	2017–18

CERTIFICATIONS:

Leadership and Teamwork Certificate, UCSD Extension

2017

TECHNICAL SKILLS:

Programming:

C++ (proficient)

MATLAB (proficient)

Python (familiar)

Bash (familiar)

Software Development:

Git

CMake

GoCD

Numerical Libraries:

CGAL

PETSc

REFERENCES:

Contact information available upon request.

Dr. Randolph Bank (*advisor*)

Professor, Department of Mathematics

University of California San Diego

Dr. Thomas Peterka

Computer Scientist, Mathematics and Computer Science Division

Argonne National Laboratory

Dr. Yifeng Cui

Director, High-Performance GeoComputing Lab

San Diego Supercomputer Center

Dr. David Quarfoot

Professor, Departments of Mathematics and Physics

University of California San Diego