Shukai Du **Curriculum Vitae**

CONTACTS

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EDUCATION

University of Delaware 2020

- Ph.D candidate in Applied Math
  Advisor: Francisco-Javier Sayas
  Thesis: Generalized projection-based error analysis of hybridizable discontinuous Galerkin methods

Wuhan University

- M.S. in Computational Math 2015
- B.A. in Pure Math 2012

CURRENT INTERESTS

Hybridizable Discontinuous Galerkin (HDG) methods

- HDG projections and projection-based analysis
- HDG methods for elastic and electromagnetic waves
- Superconvergent HDG methods on polyhedral meshes

Viscoelastic wave propagation

- Time-domain and Laplace domain estimates
- Model coupling and fractional time derivative

PUBLICATIONS

Peer-reviewed articles

1. T.S. Brown, S. Du, H. Eruslu, and F.-J. Sayas. Analysis of models for viscoelastic wave propagation. *Applied Mathematics and Nonlinear Sciences* 3 (2018) 55-96.
   DOI: 10.21042/AMNS.2018.1.00006
2. S. Du, and F.-J. Sayas. New analytical tools for HDG in elasticity, with applications to elastodynamics. *Mathematics of Computation, in press.*
   DOI: 10.1090/mcom/3499

Books

1. S. Du, and F.-J. Sayas. An invitation to the theory of the Hybridizable Discontinuous Galerkin Method. *SpringerBriefs in Mathematics* (2019).
   DOI: 10.1007/978-3-030-27230-2

Submitted articles

1. S. Du, and F.-J. Sayas. A unified error analysis of HDG methods for the static Maxwell equations. *Submitted.* Arxiv:1910.01000
2. S. Du, and F.-J. Sayas. A note on devising HDG+ projections on polyhedral elements. *Submitted.*

PRESENTATIONS

Invited talks

1. New analysis techniques of HDG+ method
   SIAM sectional meeting, Iowa State U Oct 2019
2. Uniform-in-time optimal convergent HDG method for transient elastic waves with strong symmetric stress formulation
   WAVES2019, TU Wien Aug 2019
3. Hybridizable Discontinuous Galerkin schemes for elastic waves
   ICIAM2019, Valencia July 2019
4. HDG for transient elastic waves
   WONAPDE2019, U of Concepcion Jan 2019

Contributed talks

1. Projection-based analysis of HDG methods with reduced stabilization
   DelMar Num Day 2019, U of Maryland May 2019
2. Projection-based error analysis of HDG methods for transient elastic waves
   FEM Circus, U of Delaware Nov 2018
3. Devising a tailored projection for a new HDG method in linear elasticity
   FEM Circus, U of Tennessee Mar 2018
4. A new HDG projection and its applications
   Mid-Atlantic Numerical Analysis Day, Temple U Nov 2017

Poster presentation

1. Hybridizable Discontinuous Galerkin methods in transient elastodynamics
   FACM2018, New Jersey Institute of Technology Aug 2018
2. Building a computational code for 3D viscoelastic wave simulation
   Mid-Atlantic Numerical Analysis Day, Temple U Nov 2016

AWARDS AND HONORS

University Doctoral Fellowship Award at the University of Delaware	2019
ICIAM2019 travel grant	2019
Graduate Enrichment Fellowship at the University of Delaware	2018
GEMS project fund at the University of Delaware	Summer 2016
National Scholarship for Graduate Students of China	2013
People's Scholarship of Wuhan University	2011
Outstanding Student of Wuhan University	2009-2011

TEACHING EXPERIENCE

Teaching Assistant

- Review of Advanced Mathematical Problems (summer courses offered to incoming graduate students) 2018 Fall
- Analytic Geometry and Calculus C (Math243) 2016&2017 Fall
- Analytic Geometry and Calculus B (Math242) 2017 Spring
- Calculus I (Math221) 2018 Spring

International Teaching Assistant (ITA) training program

- Graduated with the highest category of scores (category I) Summer 2015

Graduate mentor

- GEMS summer research project Fall 2016

CODING PROJECTS

Hybridizable Discontinuous Galerkin (HDG) methods 2016 - current
(based on Team Pancho HDG3D library)

- Build Matlab codes of high order HDG methods on computing cluster for transient elastic/viscoelastic waves and Maxwell equations
- Write documentations with detailed implementation procedures for HDG methods for Maxwell equations

Finite Element Method (FEM) 2016
(based on Team Pancho FEM library)

- Build Matlab codes (codeveloped with Hasan Eruslu) of high order FEM methods on computing cluster for simulation of viscoelastic waves.

Multiscale modeling 2013 - 2015

- Implement algorithms to calculate Cauchy stress tensor based on micro-scale molecular dynamics information

COMPUTER SKILLS

Theory

Data Structures • Algorithm • Object Oriented Programming

Languages & Software

Matlab • Python • C • C++ • Fortran • openMPI • LISP • Linux Shell

ACTIVITIES

MSRI Summer School on Harmonic Analysis, Park City Jul 2018
Nonlocal School on Fractional Equations, Iowa State U Aug 2017
Finite Element Circus, Rutgers U Apr 2017
Summer School on Applied Mathematics in Beijing University Jul 2014
Second Pacific Rim Mathematical Association Congress Jun 2013
International Conference on Mathematical Modeling & Computation May 2013
Summer School on Statistical Learning and Inference for
Massive Data in Fudan University Jul 2012