

112 Ewing Hall
Department of Mathematical Sciences
University of Delaware

Phone: 302-966-9862
Email: shukaidu@udel.edu
Website: <https://shukaidu.github.io>

EDUCATION

University of Delaware

- **Ph.D in Applied Mathematics** *expected to graduate* Jun 2020
Advisor: Dr. Francisco-Javier Sayas
Thesis: Generalized projection-based error analysis of hybridizable discontinuous Galerkin methods
- M.S. in Applied Mathematics 2017

Wuhan University

- M.S. in Computational Mathematics 2015
- B.S. in Pure Mathematics 2012

RESEARCH INTERESTS

- Numerical analysis of partial differential equations
- Finite element and (hybridizable) discontinuous Galerkin methods
- Elastic/viscoelastic and electromagnetic waves
- Incompressible Navier-Stokes equations
- Inverse and ill-posed problems

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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://arxiv.org/abs/1910.01000)
2. **S. Du**, and F.-J. Sayas. A note on devising HDG+ projections on polyhedral elements. *Submitted*.
3. **S. Du**, and N. Du. A factorization of least-squares projection schemes for ill-posed problems. *Submitted*.

In preparation

1. **S. Du.** HDG methods for Stokes equation based on strong symmetric stress formulations. *In preparation.*

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 [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 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 |