ANNA LISCHKE

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EDUCATION

Brown University	Providence, RI
Ph.D., Applied Mathematics, Advisor: Johnny Guzmán, Ph.D.	Expected 2020
Master of Science, Applied Mathematics	2018
Iowa State University	Ames, IA
Master of Science, Applied Mathematics, Advisor: James Rossmanith, Ph.D.	2015
Washburn University	Topeka, KS
Bachelor of Science, Mathematics	2012
Summa Cum Laude, Mathematics & Statistics Department Honors	

RESEARCH EXPERIENCE

Brown University   Providence, RI
Ph.D. Thesis   *2015 - Present*

Finite Element Exterior Calculus

· Formulating C^1 and Stokes finite elements using the calculus of differential forms and constructing global de Rham complexes in arbitrary dimensions.

Numerical Methods for Fractional Differential Equations

· Developed spectral methods of quasi-optimal complexity and exponential convergence for nonlocal fractional differential equations [Lischke, Zayernouri, & Karniadakis, 2017].
· Constructed and analyzed finite difference methods with physically consistent reflecting boundary conditions for nonlocal diffusion problems [Lischke, Kelly, & Meerschaert, submitted 2018].
· Investigated and reviewed numerical methods, stochastic interpretations, and regularity properties for different fractional Laplacian definitions [Lischke, Pang, Gulian, et al., under review].

Iowa State University   Ames, IA
Masters Thesis   *2013 - 2014*

Asymptotic preserving space-time discontinuous Galerkin methods for a class of relaxation systems

Washburn University   Topeka, KS
Undergraduate Research, Advised by Brian Thomas, Ph.D.   *2010 - 2011*

Modeling the Distribution of Phytoplankton in Water

SKILLS

Languages and Software Development Experience

MATLAB, C++, Python, R, SAS, SPSS, CUDA, MPI

Jira, Confluence, Perforce

MathWorks   Natick, MA
Software Development Intern, Core Math Team   *Summer 2019*

Developed randomized algorithms for use in statistics and machine learning applications.

PUBLICATIONS

J. Guzmán, **A. Lischke**, and M. Neilan, "Exact sequences on Powell-Sabin splits." (2019). *Submitted*.

A. Lischke, M. Zayernouri, Z. Zhang, "Spectral and Spectral Element Methods". Chapter 2.2 in *Handbook of Fractional Calculus with Applications. Volume 3: Numerical Methods*, DeGruyter, 2019.

A. Lischke, J. F. Kelly, M. M. Meerschaert. "Reflecting boundary conditions for tempered fractional diffusion." (2018). *Submitted*.

A. Lischke, G. Pang, M. Gulian, F. Song, C. Glusa, X. Zheng, Z. Mao, W. Cai, M. M. Meerschaert, M. Ainsworth, G. E. Karniadakis. "What Is the Fractional Laplacian?" (2018). *Under review*.

A. Lischke, M. Zayernouri, and G. E. Karniadakis, "A Petrov-Galerkin spectral method of linear complexity for fractional multiterm ODEs on the half line." *SIAM J. on Sci. Comput.*, 39(3), 2017.

LEADERSHIP & COMMUNITY ENGAGEMENT ACTIVITIES

Fractional PDE research seminar at Brown University   Aug 2015 - Aug 2018
Chairperson

· Coordinated and presented research talks during a two-hour weekly seminar about recent advances in fractional PDEs.
· Managed a research project leading to a paper co-authored by eleven of the group members.

Association for Women in Mathematics Student Chapter   Aug 2017 - Aug 2018
Chapter President

Organized professional development and social events, a weekly reading group, educational talks, a regional conference, and informal mentoring events promoting underrepresented perspectives in mathematics and providing mentoring and learning experiences for students in STEM fields.

WINRS mathematics conference at Brown University   March 2017
Conference Organizer

· Planned an NSF-funded mathematics conference at Brown for New England-area universities.
· This conference won the national Association for Women in Mathematics award for Scientific Excellence.

Brown University SIAM Student Chapter   2016 - 2018
Executive Committee Member

Organized professional development and social events for students in STEM departments as a member of the student chapter executive committee.

HONORS & AWARDS

· Association for Women in Mathematics Award for Scientific Excellence   2017
· Diane Brandt Women in STEM Scholarship, Iowa State University   2012
· Summa Cum Laude, Washburn University   2012
· Mathematics & Statistics Department Honors, Washburn University   2012
· Laura Greene Scholarship for exceptional students in Mathematics, Washburn University   2010-2012
· Presidential Scholarship, Washburn University   2007-2012
· Phi Kappa Phi Honors Society   2011
· Young Artist Award, Washburn University Orchestra   2010
· American Pen Women Association Music Scholarship Recipient, Topeka, KS Chapter   2010
· Kappa Mu Epsilon Honors Society   2009
· Garvey Scholarship Exam, Top five score, Washburn University   2007

PRESENTATIONS

SIAM Conference on Computational Science and Engineering   Feb 2019

Boundary Conditions for Tempered Fractional Diffusion, in Theoretical and Computational Aspects in Nonlocal and Material Science Modeling, Spokane, WA

International Conference on Spectral and High Order Methods   July 2018

What is the fractional Laplacian? in MS41 Fractional Partial Differential Equations: Theory, Numerics, and Applications, London, UK

SIAM Annual Meeting   July 2017

Generalized Petrov-Galerkin schemes of linear complexity for distributed order initial value problems, in MS34 Fractional Partial Differential Equations: Modeling, Simulation, Application, and Analysis, Pittsburgh, PA

American Institute of Mathematical Sciences   July 2016

Efficient and tunably accurate spectral methods for fractional differential equations on the half line, in SS105 Recent Advances in Computational PDEs and their Applications, Orlando, FL

International Conference on Spectral and High Order Methods   June 2016

Efficient and tunably accurate Laguerre Petrov-Galerkin spectral methods for fractional differential equations on the half line, Rio de Janeiro, Brazil

SIAM Conference on Computational Science and Engineering   March 2015

Asymptotic-preserving space-time discontinuous Galerkin methods for a class of relaxation systems, Salt Lake City, UT

SIAM Annual Meeting   July 2014

Asymptotic-preserving space-time discontinuous Galerkin methods for a class of relaxation systems, Chicago, IL

Iowa State University   April 2014

Asymptotic-preserving semi-Lagrangian discontinuous Galerkin methods for a class of relaxation systems, Graduate Student Research Conference, Ames, IA

Institute for Computational and Experimental Research in Mathematics   June 2018

What is the fractional Laplacian? Workshop on "Fractional PDEs: Theory, Algorithms and Applications", Providence, RI

MANNA: Modeling, Analysis and Numerics for Nonlocal Applications   Dec 2017

What is the fractional Laplacian? Santa Fe, NM

Michigan State University   Oct 2016

A tunably-accurate spectral method with linear complexity for multi-term fractional differential equations on the half line, "A Workshop on Future Directions in Fractional Calculus Research and Applications", East Lansing, MI

MEETINGS ORGANIZED

- Co-organizer of "Fractional PDEs: Theory, Algorithms, and Applications", ICERM, Providence, RI · June 2018
- Co-organizer of "MANNA: Modeling, Analysis and Numerics for Nonlocal Applications", Santa Fe, NM · Dec 2017
- Co-organizer of "Women's Intellectual Network Research Symposium: Pan-New England Conference", Brown University, Providence, RI · March 2017

WORKSHOPS & SUMMER SCHOOLS ATTENDED

- Workshop on Fractional PDEs: Theory, Algorithms and Applications ICERM, Providence, RI · June 2018
- Workshop on Future Directions in Fractional Calculus Research and Applications Michigan State University, East Lansing, MI · Oct 2016
- Brown-ICERM-Kobe Summer Simulation School Brown University, Providence, RI and Kobe University, Kobe, Japan. · Aug 2016

STATISTICS & FINANCE EXPERIENCE

Valuation Actuarial Intern · Dec 2011 - Aug 2012
Security Benefit Life Insurance · *Topeka, KS*

Modeled annuity products for reserve calculations and compiled a presentation for state regulators.

Joint Program in Survey Methodology Junior Fellow · May 2011 - Aug 2011
National Center for Health Statistics · *Hyattsville, MD*

- Debugged SAS-based software used for federal public-facing vital statistics data sets.
- Validated statistical and interpretive content of federal infant mortality reports.

TEACHING

Experience

- Introduction to Real Analysis, Teaching Assistant, Iowa State University · Summer 2014
- Introduction to Real Analysis, Teaching Assistant, Iowa State University · Summer 2013
- Calculus II, Teaching Assistant, Iowa State University · Spring 2013
- Calculus I, Teaching Assistant, Iowa State University · Fall 2012

Pedagogical Training

- Sheridan Center Certificate I: Reflective Teaching, Brown University · Fall 2017
Introductory seminar which highlighted inclusive teaching practices, student engagement, and principles of learning design.

PROFESSIONAL ORGANIZATIONS

- American Mathematical Society · 2016 - Present
- Association for Women in Mathematics · 2015 - Present
- Society for Industrial and Applied Mathematics · 2013 - Present