Rebecca Durst

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EDUCATION

Ph.D., Applied Mathematics *Brown University, Providence, RI* May 2022

Thesis Adviser: Johnny Guzmán

Thesis: *Recent advances in splitting methods based on Robin-Robin coupling conditions*

Master of Science, Applied Mathematics *Brown University, Providence, RI* May 2019

Bachelor of Arts in Mathematics, with Honors *Williams College, Williamstown, MA* June 2017

Undergraduate Thesis Adviser: Steven Miller

Undergraduate Honors Thesis: *Benford's law beyond independence: copulas and detecting fraud*

ACADEMIC APPOINTMENTS

University of Pittsburgh | *Postdoctoral Associate, Department of Mathematics* September 2022–present

HONORS & ACCOLADES

Simon-Ostrach Fellowship | *Brown University* May 2021

NSF Graduate Research Fellow | *National Science Foundation* April 2019 – May 2022

Associate Member of Sigma Xi | *Elected by the Williams College Chapter* May 2017

Williams College Finnerty Fund | *Williams College* Summer 2016

PUBLICATIONS

[1] Erik Burman, Rebecca Durst, Miguel Fernández, and Johnny Guzmán. "Loosely coupled, non-iterative time-splitting scheme based on Robin–Robin coupling: Unified analysis for parabolic/parabolic and parabolic/hyperbolic problems". In: *Journal of Numerical Mathematics* 31.1 (2023), pp. 59–77.

[2] Erik Burman, Rebecca Durst, Miguel A Fernández, and Johnny Guzmán. "Fully discrete loosely coupled Robin-Robin scheme for incompressible fluid–structure interaction: stability and error analysis". In: *Numerische Mathematik* 151.4 (2022), pp. 807–840.

[3] Erik Burman, Rebecca Durst, and Johnny Guzmán. "Stability and error analysis of a splitting method using Robin–Robin coupling applied to a fluid–structure interaction problem". In: *Numerical Methods for Partial Differential Equations* 38.5 (2022), pp. 1396–1406.

[4] Michael J Person, Amanda S Bosh, Carlos A Zuluaga, Amanda A Sickafoose, Stephen E Levine, Jay M Pasachoff, Bryce A Babcock, Edward W Dunham, Ian S McLean, Jürgen Wolf, et al. "Haze in Pluto's atmosphere: Results from SOFIA and ground-based observations of the 2015 June 29 Pluto occultation". In: *Icarus* 356 (2021), p. 113572.

[5] Rebecca F Durst and Steven J Miller. "Benford's law beyond independence: tracking Benford behavior in copula models". In: *Involve, a Journal of Mathematics* 12.7 (2019), pp. 1193–1218.

[6] Sam Alterman, Jaeho Choi, Rebecca Durst, Sarah M Fleming, and William K Wootters. "The Boltzmann distribution and the quantum-classical correspondence". In: *Journal of Physics A: Mathematical and Theoretical* 51.34 (2018), p. 345301.

[7] Jay M Pasachoff, Bryce A Babcock, Rebecca F Durst, Christina H Seeger, Stephen E Levine, Amanda S Bosh, Michael J Person, Amanda A Sickafoose, Carlos A Zuluaga, Molly R Kosiarek, et al. "Pluto occultation on 2015 June 29 UTC with central flash and atmospheric spikes just before the New Horizons flyby". In: *Icarus* 296 (2017), pp. 305–314.

PREPRINTS

[1] Rebecca Durst and L. Ridgway Scott. *Chaotic dynamics of two-dimensional flows around a cylinder*. To appear as a featured article in Physics of Fluids. 2023. URL: https://arxiv.org/pdf/2311.07698.pdf.

[2] Erik Burman, Rebecca Durst, Miguel Angel Fernández, Johnny Guzmán, and Oscar Ruz. "Robin-Robin loose coupling for incompressible fluid-structure interaction: non-linear setting and nearly-optimal error analysis". In: (2023). URL: https://inria.hal.science/hal-04258861/file/paper.pdf.

PRESENTATIONS

[1] Rebecca Durst, Johnny Guzman, Erik Burman, and Miguel Fernandez. *Time-Splitting Methods Based on Robin Coupling Conditions*. SIAM Conference on Mathematical & Computational Issues in the Geosciences. Bergen, Norway, June 2023.

[2] Rebecca Durst, Johan Jansson, and L Ridgway Scott. *Modeling high Reynolds number flows with direct FEM simulation and adaptive Euler methods*. 2023 Joint Mathematics Meetings (JMM 2023). Jan. 2023.

[3] Rebecca Durst, Johnny Guzman, Erik Burman, and Miguel Fernandez. *Splitting methods for coupled problems based on Robin-Robin coupling conditions*. 2023 Joint Mathematics Meetings (JMM 2023). Jan. 2023.

[4] Rebecca Durst, Johnny Guzman, Erik Burman, and Miguel Fernandez. *Fully discrete loosely coupled Robin-Robin scheme for incompressible fluid- structure interaction: stability and error analysis*. 26th International Domain Decomposition Conference. The Chinese University of Hong Kong, Dec. 2020.

Additional Presentations:

1. Finite Element Circus – Fall 2023 (Notre Dame University)
2. Numerical Analysis Seminar, University of Maryland Department of Mathematics – March 2023 (invited by Ricardo Nochetto)
3. Finite Element Circus – Spring 2023 (Bridgewater State University)
4. Scientific Computing Seminar, University of Pittsburgh Department of Mathematics – October 2022
5. Finite Element Circus – Fall 2020 (Online)
6. Finite Element Circus – Fall 2021 (Pennsylvania State University)

ADDITIONAL PUBLISHED MATERIAL

[1] Rebecca Durst, Johan Jansson, and L. Ridgway Scott. *The Modern Scientific Paper: addressing reproducibility in simulated data through interactive computing (version 01)*. KTH-RDM. 2022.

RESEARCH EXPERIENCE

Postdoctoral Associate | *University of Pittsburgh, Pittsburgh PA* September 2022–present

Department postdoctoral position funded by the Math Research Center at the University of Pittsburgh.

Graduate Research Assistant | *Brown University, Providence, RI* June 2018 – May 2022

Adviser: Johnny Guzmán

Undergraduate Honors Thesis | *Williams College, Williamstown, MA* August 2016–May 2017

Adviser: Steven Miller

Conducted research in applied probability theory under the guidance of Professor Steven Miller

SMALL REU | *Williams College, Williamstown, MA* Summer 2016

Undergraduate mathematics research program

Conducted research in probability and combinatorics under the guidance of Professors Steven Miller and Eyvindur Palsson.

Summer Research Assistant | *Williams College, Williamstown, MA* Summer 2015

Department of Astronomy

Worked under the supervision of Professor Jay Pasachoff. Part of an MIT-Williams research team that traveled to New Zealand to observe the June 29th occultation of Pluto

Summer Research Assistant | *Williams College, Williamstown, MA* Summer 2014

Department of Physics

Conducted research projects with Professors Protik Majumder and William Wootters in experimental atomic physics and

theoretical quantum physics.

WORK, LEADERSHIP, AND OUTREACH

SIAM Faculty Adviser | *Department of Mathematics, University of Pittsburgh* September 2022–present

Currently serving as the faculty adviser to the SIAM chapter at the University of Pittsburgh. Responsible for funding requests and organizing the undergraduate math modeling competition (COMAP) entries.

Faculty-Graduate Liason | *Division of Applied Mathematics, Brown University* 2020–Spring 2022

Assisted in organizing budgets for graduate student groups and facilitating communication between graduate students and faculty.

President | *Brown University Chapter of The Associate for Women in Mathematics* Fall 2020–Spring 2022

Treasurer | *Brown University Chapter of The Associate for Women in Mathematics* Fall 2019–Spring 2020

Directed Reading Program Adviser | *Division of Applied Mathematics, Brown University* Fall 2018, Spring 2020

Led undergraduate students in semester-long independent reading projects in numerical methods and mathematical epidemiology.

Undergraduate Mentoring Program | *Division of Applied Mathematics, Brown University* Fall 2017– Spring 2021

Served as a mentor for undergraduate students in Applied Mathematics at Brown University. Emphasis on mentoring underrepresented students in STEM.

Vice President | *Williams College Student Chapter of the American Mathematical Society* Fall 2016–Spring 2017

Head Teaching Fellow | *Milham Panetarium, Williams College* June 2015–June 2017

In addition to regular teaching fellow duties, responsible for scheduling and staffing all presentations and training other teaching fellows.

Teaching Fellow | *Milham Panetarium, Williams College* June 2014–June 2015

Conducted regular planetarium shows for visiting groups in the Milham Planetarium housed in Hopkins Observatory.

TEACHING

Experience

Instructor | *Department of Mathematics, University of Pittsburgh* September 2022–present

Courses: Calculs 1 and 2, Introduction to numerical methods.

Teaching assistant GirlsGetMath@ICERM | *ICERM* Summer 2021 (online)

Instructor | *Division of Applied Mathematics, Brown University* Summer 2020

Courses: Applied Ordinary Differential Equations (Online)

Graduate Teaching Assistant | *Division of Applied Mathematics, Brown University* Fall 2018 – Spring 2019

Courses: Introduction to Computational Linear Algebra, Applied Ordinary Differential Equations

Pedagogical Training

Sheridan Center Course Design Seminar | *Sheridan Center for Teaching and Learning, Brown University* Spring 2020

Seminar focused on integrated course design principles to develop syllabi and course assessments based on effective learning goals for semester-long courses.

Sheridan Center Teaching Seminar | *Sheridan Center for Teaching and Learning, Brown University* Spring 2020

Certificate 1–Reflective Teaching. Course is focused on developing teaching strategies and skills based on how students learn.

OTHER SKILLS AND EXPERIENCE

Technical and Academia: |

- Significant experience with LaTeX, FEniCS, MatLab, and Mathematica. Some experience with C/C++ and Python.
- Assisted in running an Analysis review course for incoming graduate students in the Division of Applied Mathematics at Brown University in summer, 2018.
- Co-organized the Williams College Undergraduate Research Conference (with Steven Miller, Chi Huynh, and Alyssa

Epstein), Williams College, July 29, 2016.

Miscellaneous |

- Plays oboe and piano
- Proficient in Spanish