SOUGATA DHAR

CONTACT INFORMATION

Department of Mathematics
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EMPLOYMENT

- **Visiting Assistant Professor**, Department of Mathematics, University of Connecticut, Storrs, CT, August 2019–present.
- **Assistant Professor** (fixed-term), Department of Mathematics and Statistics, University of Maine, Orono, ME, August 2017–August 2019.

EDUCATION

Ph.D. in Mathematics, June 2017

- Dissertation: Lyapunov-type inequalities and applications to boundary value problems
- Supervisor: Qingkai Kong
- Department of Mathematical Sciences, Northern Illinois University, DeKalb, IL

M.S. in Mathematics, August 2011

- Thesis: Zero inflated exponential distribution and its variants
- Supervisor: Santanu Chakraborty
- Department of Mathematics and Statistics, University of Texas Rio Grande Valley, Edinburg, TX

B.E. in Electronics and communication engineering, May 2008

- Techno India, Saltlake, Kolkata, West Bengal, India

RESEARCH INTERESTS

1. Ordinary and Fractional Differential Equations
2. Nonlinear Difference Equations
3. Mathematical Physics

PUBLICATIONS

16. Existence of positive solutions of a Hammerstein integral equation using the layered compression-expansion fixed point theorem, (with J. W. Lyons and J. T. Neugebauer). *Submitted*.
15. Lyapunov-type Inequalities for Third Order Linear and Half-Linear Difference Equations, (with J. S. Kelly and Q. Kong). *Submitted*.
14. Existence of multiple anti-periodic solutions for a higher order nonlinear difference equation, (with L. Kong). *Submitted*.
13. Lyapunov-Type inequalities for a fractional boundary value problem with a fractional boundary condition, (with J. T. Neugebauer). *Accepted in Nonlinear Dyn. Syst. Theory*.

12. Fractional Lyapunov-type inequalities with mixed boundary conditions on univariate and multivariate domains, *J. Fract. Calc. Appl.*, **11**, no. 2 (2020), 148–159. (with Q. Kong)

11. A critical point approach to multiplicity results for a fractional boundary value problem, *Bull. Malays. Math. Sci. Soc.*, 2020, `https://doi.org/10.1007/s40840-020-00886-y`. (with L. Kong).

10. A non Green's function approach to fractional Lyapunov-type inequalities with applications to multivariate domains, *Diff. Eqn. Appl.*, **11**, no. 3 (2019), 409–425. (with J. S. Kelly).

9. An application of the layered compression-expansion fixed point theorem to a fractional boundary value problem, *PanAmer. Math. J.*, **29**, no. 3 (2019), 35-44, (with J. W. Lyons and J. T. Neugebauer).

8. Existence of solutions to a discrete fourth order periodic boundary value problem via variational method, *Diff. Eqn. Dyn. Sys.*, 2018 `https://doi.org/10.1007/s12591-018-0432-8`, (with L. Kong).

7. On linear and nonlinear fractional Hadamard boundary value problems, *Diff. Eqn. Appl.*, **10**, no. 3 (2018), 329–339.

6. Lyapunov-type inequalities for α-th order fractional differential equations with $2 < \alpha \leq 3$ and fractional boundary conditions, *Electron. J. Diff. Equ.*, **2017** (2017), no. 203, 1–15, (with Q. Kong).

5. Lyapunov-type inequalities for odd-order linear differential equations, *Electron. J. Diff. Equ.*, **2016** (2016), no. 243, 1–10, (with Q. Kong).

4. Fractional boundary value problems and Lyapunov-type inequalities with fractional integral boundary conditions, *Electron. J. Qual. Theory Differ. Equ.*, **2016**, no. 43, 1–16, (with Q. Kong and M. McCabe).

3. Lyapunov-type inequalities for third-order linear differential equations, *Math. Ineq. Appl.*, **19**, no. 1 (2016), 297–312, (with Q. Kong).

2. Lyapunov-type inequalities for higher order half-linear differential equations, *Appl. Math. Comput.*, **273** (2016), 114–124, (with Q. Kong).

1. Liapunov-type inequalities for third-order half-linear equations and applications to boundary value problems, *Nonlin. Anal.*, **110** (2014), 170–181, (with Q. Kong).

Conferences Organized

1. Special session on The Mathematics of Gravity and Light at the Joint Mathematics Meetings (JMM), Baltimore, MD, January 16-19, 2019.

Workshops Attended

1. *The Cahn-Hilliard Equations: Recent Advancements and Applications*, Burns, TN, May 20-24, 2019.

2. *Fractional PDEs: Theory, Algorithms and Applications*, The Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI, June 18-22, 2018.

3. American Mathematical Society's Mathematics Research Community (MRC) on The Mathematics of Gravity and Light, West Greenwich, RI, June 3-9, 2018.

4. *78th Midwest PDE Seminar* at Loyola University Chicago, Chicago, IL, October 15-16, 2016.

5. *AMS Fall Southeastern Sectional Meeting* at University of North Carolina at Greensboro, Greensboro, NC, November 8-9, 2014.

6. *Nonlinear Water Waves with Applications to Wave Current Interactions and Tsunamis*, NSF-CBMS Regional Conference in the Mathematical Sciences, at University of Texas Pan-American, Edinburg, TX, May 17-21, 2010.

Talks and Seminars

1. Mathematics & Statistics Seminar, The University of Tennessee at Chattanooga, Chattanooga, TN, January, 2020.

2. Mathematics & Statistics Seminar, Amherst College, Amherst, MA, February 2019.

3. The Joint Mathematics Meetings, Baltimore, MD, January, 2019.

4. AMS Spring Central Sectional Meeting, Ohio State University, Columbus, OH, March, 2018.

5. International Centre for Theoretical Sciences, Bengaluru, India, December, 2017.

6. Colloquium series of Department of Mathematics & Statistics, University of Maine, Orono, ME, October, 2017.

7. Applied Mathematics Seminar, Department of Applied and Computational Mathematics and Statistics, The University of Notre Dame , Notre Dame, IN, May, 2017.

8. SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May, 2017.

9. The Joint Mathematics Meetings, Atlanta, GA, January, 2017.

10. 36th Southeastern-Atlantic Regional Conference on Differential Equations, Florida Gulf Coast University, Fort Myers, FL, November, 2016.

11. The Joint Mathematics Meetings, Seattle, WA, January, 2016.

12. 35th Southeastern-Atlantic Regional Conference on Differential Equations, University of North Carolina at Greensboro, Greensboro, NC, October, 2015.

13. 13th Prairie Analysis Seminar, Kansas State University, Manhattan, KS, September, 2015.

14. Mississippi State Conference on Differential Equations and Computational Simulations, Mississippi State University, Starkville, MS, October, 2014.

15. 34th Southeastern-Atlantic Regional Conference on Differential Equations, The University of Memphis, Memphis, TN, October, 2014.

16. HESTEC Science Symposium, University of Texas- Pan American, Edinburg, TX, September, 2010.

17. Mathematics & Statistics Seminar, University of Texas Pan-American, Edinburg, TX, April, 2010.

Teaching Experience

Instructor of Record:

Department of Mathematics, University of Connecticut

- Differential Equations for Applications (2 Sections) — Fall 2020
- Calculus III (large lecture, 240+ students) — Fall 2020
- Calculus I — Summer 2020
- Partial Differential Equations (2 Sections) — Spring 2020
- Calculus III (large lecture, 250+ students) — Spring 2020
- Calculus I (large lecture, 340+ students) — Fall 2019
- College Algebra and Mathematical Modeling — Fall 2019

Department of Mathematics and Statistics, University of Maine

- Calculus I — Summer 2019
- Differential Equations with Linear Algebra — Spring 2019
- Calculus I (2 Sections) (large lectures, 70+ students in each) — Fall 2018
- Real Analysis II — Spring 2018
- Differential Equations with Linear Algebra — Spring 2018
- Calculus III (2 Sections) — Fall 2017

Department of Mathematics, Northern Illinois University

- Calculus I — Spring 2017
- Calculus III — Fall 2016
- Calculus II — Spring 2016
- Calculus III — Fall 2015
- Calculus II — Spring 2015
- Calculus I — Fall 2014
- Pre-calculus — Spring 2014
- Fundamentals of Mathematics II — Fall 2013
- Algebra for College Students — Spring 2013

Department of Mathematics and Statistics, University of Texas Rio Grande Valley

- Calculus I — Summer II 2011
- Pre-calculus — Summer I 2011
- College Algebra — Spring 2011
- Intermediate Algebra — Fall 2010
- College Algebra — Summer II 2010
- Intermediate Algebra — Summer I 2010

Honors and Awards

- *Outstanding Graduate Student Fellowship*, awarded by the Graduate School, Northern Illinois University, Spring 2016.
- *Outstanding Graduate Student Award*, awarded by the Mathematics Department, Northern Illinois University, Spring 2016.
- *Most Valuable Professor (MVP)*, awarded by the Athletics Department, Northern Illinois University, Fall 2015.
- *Certificate of Teaching Excellence*, awarded by the Mathematics Department, Northern Illinois University, Spring 2015.
- *Most Valuable Professor (MVP)*, awarded by the Athletics Department, Northern Illinois University, Fall 2014.
- Travel awards
  - *Graduate Student Travel Award for JMM*, American Mathematical Society, January 2017.
  - *Graduate Student Travel Award for JMM*, Northern Illinois University, January 2017.
  - *NSF Travel Award for Graduate Students*, Florida Gulf Coast University, November 2016.
  - *Graduate Student Travel Award for JMM*, Northern Illinois University, January 2016.
  - *NSF Travel Award for Graduate Students*, University of North Carolina Greensboro, October 2015.
  - *NSF Travel Award for Graduate Students*, Kansas State University, September 2015.
  - *AMS Fall Sectional Meeting*, University of North Carolina Greensboro, November 2014.
  - *Graduate Student Travel Award*, Northern Illinois University, November 2014.
  - *Graduate Student Travel Award*, Mississippi State University, October 2014.
  - *NSF Travel Award for Graduate Students*, Memphis University, October 2014.
- *Outstanding Student Research Award* in Mathematics at Hispanic Engineering Science and Technology (HESTEC) Science Symposium at the University of Texas Pan American, Fall 2010.

Scientific Research Experience

Intelligent Medical Objects, Northbrook, Illinois, USA

Research Internship in database management, May 2014-August 2014

- Project Topic: Grouping users based on selection history
- Advisor: Dr. Mike DeCaro

Referee/Reviewer

- Advances in Difference Equations
- Applied Mathematics and Computation
- Applied Mathematics Letters
- Differential Equations and Applications (3)
- FILOMAT (2)
- Mathematical Methods in the Applied Sciences
- Transactions of A. Razmadze Mathematical Institute (2)

Professional Services

- *Graduate Student Advisory Committee (GSAC)*, College of Liberal Arts and Sciences, Northern Illinois University, 2015–16.
- *Graduate Student Representative from GSAC on the University Council*, University Council and Faculty Senate, Northern Illinois University, 2015–16.
- *Graduate Colloquium Committee*, Department of Mathematics, Northern Illinois University, 2013–16.

Memberships

- Member of *American Mathematical Society* (AMS), since Fall 2011
- Member of *Society for Industrial and Applied Mathematics* (SIAM), since Fall 2011
- Member of the *Wieners Mathematical Society*, since Fall 2010