Eric Stachura | Curriculum Vitae

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Employment

Kennesaw State University — **Associate Professor**
Kennesaw, GA — *August 2024-present*

Kennesaw State University — **Assistant Professor**
Kennesaw, GA — *August 2018-July 2024*

Haverford College — **Visiting Assistant Professor**
Haverford, PA — *July 2016-June 2018*

Visiting/Administrative Positions

Basque Center for Applied Mathematics — **Visiting Fellow**
Bilbao, Spain — *January 2021-May 2021*

Immersive Visualization Environments Research Cluster — **Co-director**
Coles College of Business at KSU, Kennesaw — *August 2024-present*

Education

Temple University — **Philadelphia, PA**
Ph.D. in Mathematics — *July 2016*
Advisor: Cristian E. Gutiérrez

Temple University — **Philadelphia, PA**
Teaching in Higher Education Certificate — *May 2016*

University of Illinois at Chicago — **Chicago, IL**
B.S. in Mathematics — *May 2011*
Cum Laude and with honors. Minor: Physics.

Universidad Autónoma de Madrid — **Madrid, Spain**
Semester Abroad — *Spring 2013*
Also conducted research at Instituto de Ciencias Matemáticas (ICMAT).

Eidgenössiche Technische Hochschule (ETH) — **Zürich, Switzerland**
Semester Abroad — *Spring 2010*
Studied mathematics and physics while conducting High Energy Physics research.

Funding

Internal

KSU First Year Scholars program, *2024-2025*: KSU Office of Undergraduate Research

KSU Birla Carbon student mentor, *2023*: Birla Carbon, $3,400

KSU Summer Research Fellowship, *2020*: KSU Office of Research, $10,000

KSU Seed Grant, *2019-2020*: Mathematical Analysis of Optical Phenomena, $9,128

External

American-Scandinavian Foundation Fellowship, *2019-2020*: Mathematical Analysis of Nonlinear Maxwell Equations on rough surfaces, $5,000

Visiting Fellowship, *2021*: Basque Center for Applied Mathematics, $7,363

AMS-Simons Research Enhancement Grants for PUI Faculty, *2023-2026*: Mathematical Analysis of Liquid Crystal optics, $9,000

Army Research Office, *2024-2027*, grant W911NF-24-1-0040: Analysis of the bi-anisotropic Maxwell equations on domains with rough boundaries, $223,206

Publications

* denotes undergraduate student.

20. **E. Stachura**. *Mathematical methods in liquid crystal optics and lens design*. Springer Tracts in Modern Physics, 294, 2024.

19. **E. Stachura**, N. Wellander, and E. Cherkaev. Quantitative analysis of passive intermodulation and surface roughness. Studies in Applied Mathematics, 2024; 153:e12688. doi: 10.1111/sapm.12688

18. D. R. Adhikari and **E. Stachura**. *Eigenvalue problems for p-div-curl systems.* Journal of Mathematical Analysis and Applications, 526 (2), 127327, 2023 .

17. **E. Stachura**, *Acoustic Wave propagation in Anisotropic Media with applications to Piezoelectric materials*. Applicable Analysis, 101 (3), pp. 994-1010, 2022.

16. **E. Stachura** and N. Wellander. *Quantitative Trace Estimates for the Maxwell system in Lipschitz domains*. Mathematical Methods in the Applied Sciences, 44 (13), pp. 10635-10652, 2021.

15. **E. Stachura** and N. Hancock*. *Bound states and energy eigenvalues of a radial screened Coulomb potential*. Journal of Physics Communications, 5(6), 065004, 2021.

14. D. R. Adhikari, T. M. Asfaw, and **E. Stachura**. *A topological degree theory for perturbed $A_G(S+)$ operators and applications to nonlinear problem*s. Journal of Mathematical Analysis and Applications, 497 (2), 124912, 2021.

13. D. R. Adhikari and **E. Stachura**, *General p-curl systems and duality mappings on Sobolev spaces for Maxwell equations*. Electon. J. Differential Equations, Vol. 2020 (2020), No. 116, pp. 1-22.

12. C. Mayer* and **E. Stachura**. *Traveling wave solutions for a Cancer Stem Cell invasion model*. Discrete & Continuous Dynamical Systems - B, 26 (9), pp 5067–5093, 2021.

11. Á. Bényi, J. M. Martell, K. Moen, **E. Stachura**, and R. Torres. *Boundedness results for commutators with BMO functions via weighted estimates: a comprehensive approach*. Mathematische Annalen, 376 (1), 61–102, 2020.

10. **E. Stachura**. *Solving for 5G: How Math Modeling can improve modern communication systems*. Global Atlanta, June 2020, Article Link.

9. **E. Stachura**. Boundary Value problems for the Bi-anisotropic Maxwell system in Lipschitz Domains, in *URSI International Symposium on Electromagnetic Theory (EMTS)*, 2019, 4 pp.

8. **E. Stachura**. *Existence of Propagators for Time Dependent Coulomb-like Potentials*. Rocky Mountain Journal of Mathematics, 49 (7), 2347-2374, 2019.

7. C. E. Gutiérrez, L. Pallucchini, and **E. Stachura**. *General Refraction Problems with Phase Discontinuity on non flat Metasurfaces*. Journal of the Optical Society of America A, Vol. 34(7): 1160-1172, 2017.

6. **E. Stachura**. *Existence of weak solutions to Refraction Problems in Negative Refractive Index Materials*. Nonlinear Analysis, Vol. 157, 76-103, 2017.

5. **E. Stachura**. *The Time Dependent Maxwell System with Measurable Coefficients in Lipschitz Domains*. Journal of Mathematical Analysis and Applications, Vol. 452 (2), 941-956, 2017.

4. C. E. Gutiérrez and **E. Stachura**. *Metamaterial Lens Design*. Journal of the Optical Society of America A, Vol. 33(10), 2020-2026, 2016.

3. **E. Stachura**, *On Generalized Solutions to Some Problems in Electromagnetism and Geometric Optics*. Ph.D Thesis, 2016.

2. C. E. Gutiérrez, **E. Stachura**. *Uniform Refraction in Negative Refractive Index Materials*. Journal of the Optical Society of America A, Vol. 32 (11), pp. 2110-2122, 2015.

1. I. Mitrea, K. Ott, and **E. Stachura**. *Spectral Properties of the Reflection Operator in Two Dimensions*. Contemporary Mathematics, Vol. 581, pp. 199-215, 2012.

MSj denotes (peer reviewed) Mathematical Modeling scenario j.

(MS5) E. Stachura and T. Lozano (2022). 3-061-ChemEngApps-ModelingScenario. SIMIODE, QUBES Educational Resources. doi: 10.25334/61T9-4648

(MS4) E. Stachura. (2022). 9-010-TravelingWave-ModelingScenario. SIMIODE, QUBES Educational Resources. doi: 10.25334/JEKM-0J14

(MS3) E. Stachura. (2022). 9-005-InvasiveSpeciesModel-ModelingScenario. SIMIODE, QUBES Educational Resources.doi: 10.25334/ZPFB-YT32

(MS2) R. Krueger and E. Stachura. (2022). 6-024-DronePackageDelivery-ModelingScenario. SIMIODE, QUBES Educational Resources. doi: 10.25334/22SC-AQ03

(MS1) R. Krueger and E. Stachura (2019). 10-001-TilingHallway-ModelingScenario. SIMIODE, QUEBES Educational Resources. doi: 10.25334/2MZW-W214

Teaching experience

Basque Center for Applied Mathematics

Optimal Transport and Geometric Optics in complex media: 10 hour course, February 2021

Kennesaw State University

Differential Calculus (Math 1190): Fall 2018, Spring 2019, Fall 2021.

Ordinary Differential Equations (Math 2306): Fall 2020, Fall 2022, Spring 2023

Calculus IV (Math 3204): Spring 2022, Fall 2022

Partial Differential Equations (Math 4310): Fall 2021, Spring 2023

Intro to Calculus of Variations (Math 4490): Fall 2020, Spring 2023 (directed study)

Haverford College

Calculus: Dynamics and Integration: Fall 2016.

Advanced Topics in Applied Mathematics–PDE: Fall 2016.

Linear Algebra: Spring 2017.

Multivariable Calculus: Spring 2017, Fall 2017, Spring 2018.

Ordinary Differential Equations: Spring 2018.

Temple University

Precalculus: Fall 2013, Fall 2014, Fall 2015.

Mathematical Patterns: Summer 2014.

Integral Calculus: Summer 2015.

Undergraduate students supervised

Kennesaw State University

Elizabeth Iaryguine (Fall 2024): "Neumann problems for the fractal Laplacian"

Elizabeth Ehme (2022-2024): "Mathematical analysis of liquid crystal optics"

Thomas Muzzillo (2021): "Nearly absolute instruments"

Jessie Chen (2020): "Variational problems for the 2D Maxwell system"

Nick Hancock (2019-2020): "Bound states and other properties of a new class of screened Coulomb potentials"

Haverford College

Caleb Mayer (2018): Senior Thesis "Exploring the dynamics of a Cancer Cell model".

Claire Sargent (2018): Senior Thesis "A Mathematical Model for Diffusion of Innovations".

Caroline Steliotes (2018): Senior Thesis "Nonuniqueness for Calderon's Inverse Problem".

Amy Zamora (2018): Senior Thesis "A generalized PDE model for motor induced microtubule organization".

Andrew Hunter (2017): Senior Thesis "The Daubechies Wavelet".

Amanda Glavin (2017): Senior Thesis "Generalized Bass Diffusion Model for Discrete Data".

Awards

KSU Researcher of the year: 2023-2024

MAA Project NExT Fellow: 2019-2020

SIMIODE DeMarc Fellow: July 2019

SIMIODE MInDE Fellow: July 2018

Invited Talks

University of Minnesota Applied Mathematics Colloquium — **Minneapolis, MN**, *16 September 2024*

SIAM Materials Science — **Pittsburgh, PA**, *21 May 2024*

Applied Analysis and PDE Seminar at U. Athens (Greece) — **Virtual**, *17 May 2024*

NMS-ANMA Talk series — **Virtual**, *3 May 2024*

Georgia Southern Mathematics Colloquium — **Statesboro, GA**, *9 February 2024*

The Arctic Quasiperiodic Workshop 2023 — **Luleå, Sweden**, *5 June 2023*

Drexel University joint Mathematics-ECE Seminar — **Philadelphia, PA**, *1 March 2023*

Workshop on Applications of Geometric Methods of Functional Analysis — **Dallas, TX**, *5 May 2022*

Berry College Math Colloquium — **Mt. Berry, GA**, *2 November 2020*

Temple University Analysis Seminar — **Philadelphia, PA**, *20 March 2020*
, cancelled due to COVID-19

University of Utah Applied Math Seminar — **Salt Lake City, UT**, *2 March 2020*

University of West Georgia Applied Math Seminar — **Carrollton, GA**, *6 November 2019*

Lund University Electrical and Information Technology Department — **Lund, Sweden**, *18 June 2019*

Winthrop University Colloquium — **Rock Hill, SC**, *3 April 2019*

West Chester University Applied Math Seminar — **West Chester, PA**, *8 November 2017*

Hunter College of CUNY Department of Physics and Astronomy — **New York, NY**, *5 May 2017*

Drexel University PDE/Applied Math Seminar — **Philadelphia, PA**, *23 February 2017*

Center for the Computational Design of Functional Layered Materials — **Philadelphia, PA**, *9 December 2016*

Professional Activities

Reviewer: *Proceedings of the Royal Society A*, *Scientific Reviews*, *SN Partial Differential Equations and Applications*, *PLOS One*, *Optics Express*, *Optics Letters*, *Optics Continuum*, *Journal of*

Engineering Mathematics, *Mathematics and Mechanics of Solids*, *Analysis Mathematica, Journal of Applied Analysis, Communications in Applied Analysis, International Journal of Mathematical Education in Science and Technology*

Reviewer: *Mathematical Reviews, MAA Reviews, ZentralblattMath*

Organizer: SIAM Materials Science Mini-symposium "Advances in Electromagnetic scattering in complex media", May 2021

Co-organizer: Workshop on Methods in Nonlinear Analysis, Kennesaw State University, Nov. 2020

Co-organizer: MAA Special Session in Implementing Group Work: Demonstrations of Best Practices Joint Mathematics Meetings, Jan. 2020

Workshop leader: Philadelphia Area Math Teacher's Circle, March 2018

Organizer: Workshop *Philadelphia Area Density Functional Theory Day*, September 2017

Workshop Organizer: Philadelphia Science Festival, 2017, 2018

Special Program Grant Reviewer: Optical Society of America, 2017

Student Travel Grant reviewer: Optical Society of America, 2016

Co-organizer: AMS Special Session in Harmonic Analysis, Partial Differential Equations, and Geometric Measure Theory, Joint Mathematics Meetings, 2013