Narek Hovsepyan

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Employment

Post Doctoral Associate, Rutgers University - New Brunswick — 2024 -
Mentor: Prof. Michael Vogelius

Hill Assistant Professor, Rutgers University - New Brunswick — 2021 - 2024
Mentors: Profs. Michael Vogelius and Fioralba Cakoni

Education

Ph.D. in Mathematics, Temple University, Philadelphia, PA — 2015 - 2021
Advisor: Prof. Yury Grabovsky

M.Sc. in Mathematics (with honors), University of Bonn, Germany — 2012 - 2014
Advisor: Prof. Juan J. L. Velázquez

B.Sc. in Informatics and Applied Mathematics (with honors), — 2008 - 2012
Yerevan State University, Armenia

Research Interests

Applied mathematics and analysis of PDEs: mathematical aspects of materials science e.g., cloaking, metamaterials, and complex media; linear passive systems; inverse problems; (inverse) scattering theory; nonlinear optics

Awards and Honors

Nominee for Clay Research Fellow	2020
College of Science and Technology Outstanding Research Assistant Award	2020
Research Assistantship Award (supported by NSF DMS-1714287 grant)	2017-2020
Jay Novik Endowed Graduate Fellowship, Temple University	2019
DAAD Scholarship (German Academic Exchange)	2013-2014

Service and outreach

Referee: SIAM Journal on Mathematical Analysis, Differential and Integral Equations, Inverse Problems, Applied Numerical Mathematics

Co-organizer: Conference on Inverse Problems for Partial Differential Equations honoring David Colton, Rutgers University on May 20-22, 2024

Co-organizer: Applied and Computation Mathematics Seminar, Rutgers University, Spring 2023 - current

Co-organizer: The Undergraduate Mathematical Contest in Modeling (MCM), Temple University, Fall 2016

Publications and preprints

- On the optimality of broadband scattering estimates for a passive transformation optics cloak. In preparation.
- (with M. Vogelius) On the existence of positive nonlinear transmission eigenvalues in the second-harmonic generation process. In preparation.
- (with F. Cakoni, M. Lassas and M. Vogelius) On the lack of external response of nonlinear media in the second-harmonic generation process, submitted, 2024. arXiv:2401.00998
- On the distribution of Born transmission eigenvalues in the complex plane, *Asymptot. Anal.*, 136, No. 1, pp. 27-60, 2024.
- (with F. Cakoni and M. Vogelius) Far field broadband approximate cloaking for the Helmholtz equation with a Drude-Lorenz refractive index, *J. Math. Pures Appl.*, 182, pp. 285-318, 2024.
- On the optimal analytic continuation from discrete data. *Houst. J. Math.*, 48, No. 2, pp. 281 – 293, 2022.
- (with D. Harutyunyan) On the extreme rays of the cone of 3 times 3 quasiconvex quadratic forms: Extremal determinants vs extremal and polyconvex forms. *Arch. Ration. Mech. Anal.*, 244, pp. 1 - 25, 2022.
- (with Y. Grabovsky) On the feasibility of extrapolation of the complex electromagnetic permittivity function using Kramers-Kronig relations. *SIAM J. Math. Anal.*, 53, No. 6, pp. 6993 – 7023, 2021.
- (with Y. Grabovsky) On the commutation properties of finite convolution and differential operators II: sesquicommutation. *Results Math* 76, No. 3, Article 111, 2021.
- (with Y. Grabovsky) On the commutation properties of finite convolution and differential operators I: commutation. *Results Math* 76, No. 3, Article 112, 2021.
- (with Zh. Avetisyan and D. Harutyunyan) Rigidity of a thin domain depends on the curvature, size, and boundary conditions. *Appl. Math. Opt.*, 2021.
- (with Y. Grabovsky) Optimal error estimates for analytic continuation in the upper half-plane. *Commun. Pure Appl. Math*, 74, No. 1, pp. 140 - 171, 2021.
- (with Y. Grabovsky) Explicit power laws in analytic continuation problems via reproducing kernel Hilbert spaces. *Inverse Problems*, 36, No. 3, pp. 035001 - 035023, 2020
- (with J. J. L. Velázquez) Hopf Bifurcation in structural population models. *Math. Methods Appl. Sci.*, 39, No. 18, pp. 5258 - 5280, 2016.
- Quantification of Stability of Analytic Continuation with Applications to Electromagnetic Theory. *Temple University ProQuest Dissertations Publishing*, Aug 2021.

Research Visits

CUNY Advanced Science Research Center	Oct 2024
Institut Fourier, Université Grenoble-Alpes	Jun 1 - Jul 31, 2024
UC Santa Barbara	Feb 2021, Nov 2019, Dec 2018
Courant Institute, NYU	Jan 2018

Invited Talks

Guest Speaker, CUNY ASRC, Oct 11, 2024

Applied Mathematics and Scientific Computing Seminar, Temple University, Sep 18, 2024

Mathematical Physics Seminar, Institut Fourier, Université Grenoble-Alpes, Jun 24, 2024

Conference on Inverse Problems for PDEs honoring David Colton, Rutgers University, May 21, 2024

International Zoom Inverse Problems Seminar, UC Irvine, May 2, 2024

Inverse Problems Seminar, University of Washington, Apr 2, 2024

Colloquium, Louisiana State University, Feb 6, 2024

Hyperbolic & Dispersive PDE Seminar, Rutgers University, Feb 1, 2024

Applied and Computational Mathematics Seminar, Rutgers University, Jan 17, 2024

AMS Special Session on Advances in Analysis, PDE's and Related Applications, JMM, San Francisco, Jan 6, 2024

29th Nordic Congress of Mathematicians. Special Session on Inverse Problems, Aalborg, Denmark, Jul 3 - 7, 2023

13th AIMS Conference on Dynamical Systems, Differential Equations and Applications. Special Session on Harmonic Analysis and PDE, Wilmington, May 31 - Jun 4, 2023

PDE and Applied Mathematics Seminar, Drexel University, March 10, 2023

Applied and Computational Mathematics Seminar, Rutgers University, Feb 14, 2023

Inverse Problems Meeting (virtual), Jul 24, 2022

SIAM Conference on Mathematical Aspects of Materials Science (virtual), May 18, 2021

MAA Invited Paper Session on Harmonic Analysis and Applications to Complex Analysis and PDEs, JMM (virtual), Jan 6, 2021

AMS Fall Western Sectional Meeting, Special Session on Inverse Problems, (formerly at University of Utah, meeting virtually), Oct 24, 2020

AMS Sectional Meeting, Special Session on Inverse Problems, California State University, Fresno, May 3, 2020

AMS Special Session on Interactions of Inverse Problems, Computational Harmonic Analysis and Imaging, JMM, Denver, Jan 15, 2020

AMS Sectional Meeting, Special Session on Inverse Problems, UC Riverside, Nov 10, 2019

BIRS Workshop on Herglotz-Nevanlinna Theory Applied to Passive, Causal and Active Systems, Banff, Canada, Oct 8, 2019

Analysis Seminar, Temple University, Mar 11, 2019

Analysis Seminar, Temple University, Oct 29, 2018

Materials Working Group, Courant Institute, New York University, Apr 9, 2018

Global Analysis Seminar, Temple University, Oct 11, 2017

Graduate Summer Schools

MSRI Summer School: Séminaire de Mathématiques Supérieures. Microlocal Analysis: Theory and Applications (virtual), May 3 - Aug 13, 2021

PCMI (IAS) Summer School in Harmonic Analysis, Park City, UT, Jul 1 - 21, 2018

4th Chicago Summer School in Analysis, University of Chicago, IL, Jun 19 - 30, 2017

Teaching Experience

Rutgers University

Fall 2024	Math 423: Elementary Partial Differential Equations Math 252: Elementary Differential Equations
Spring 2024	Math 403: Introduction to Theory of Functions of a Complex Variable
Fall 2023	Math 251: Multivariable Calculus (Honors Sections) Math 252: Elementary Differential Equations
Spring 2023	Math 152: Calc. II for the Math. and Phys. Sciences (Honors Sections)
Fall 2022	Math 251: Multivariable Calculus (Honors Sections) Math 252: Elementary Differential Equations
Summer 2022	Math 152: Calc. II for the Math. and Phys. Sciences
Spring 2022	Math 152: Calc. II for the Math. and Phys. Sciences (Honors Sections) Math 311: Introduction to Real Analysis I
Fall 2021	Math 152: Calc. II for the Math. and Phys. Sciences

Temple University

Summer 2021	Methods in Applied Math (graduate level), Academic Intern/Seminar Leader
Fall 2020	Math 0702: Intermediate Algebra
Summer 2020	Real Analysis (graduate level), Academic Intern/Seminar Leader
Summer 2019	Methods in Applied Math (graduate level), Academic Intern/Seminar Leader
Summer 2018	Math 1042: Calculus 2
Summer 2017	Math 1041: Calculus 1
Spring 2017	Math 2101: Linear Algebra, Teaching Assistant
Fall 2016	Math 1041: Calculus 1
Summer 2016	Math 1041: Calculus 1
Spring 2016	Math 3031: Probability Theory 1, Teaching Assistant
Fall 2015	Biology 3312/5312: Biostatistics, Teaching Assistant

University of Bonn

Spring 2014	Scientific Computing I (graduate level), Recitation Instructor