Huy Quang Nguyen

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RESEARCH INTERESTS

Partial Differential Equations, Mathematical Fluid Mechanics, Harmonic Analysis.

APPOINTMENTS

August 2021–: Assistant Professor, Department of Mathematics, University of Maryland at College Park.

July 2018-August 2021 : Tamarkin Assistant Professor, Department of Mathematics, Brown University.

Sep 2016-June 2018: Postdoctoral Research Associate & Lecturer, Department of Mathematics and PACM, Princeton University. Mentor: Peter Constantin.

Sep 2012-Aug 2013: Teaching Assistant, Department of Mathematics and Computer Science, HCMC University of Science, Viet Nam.

EDUCATION

University Paris-Sud XI, France

Ph.D. in Mathematics, July 2016

- Dissertation Topic: High frequency analysis for water waves systems
- Advisor: Nicolas Burq
- Thesis Reviewers: David Lannes and Steve Shkoller.
- Thesis Defense Committee: Hajer Bahouri (President), Nicolas Burq, David Lannes, Jean-Claude Saut, and Claude Zuily.

University of Orléans, France & HCMC University of Science, Viet Nam

Master 2 in Applied Mathematics, July 2013

- Thesis Topic: Paradifferential calculus and applications to the Cauchy problem
- Advisor: Nicolas Burq
- Mention: très bien

HCMC University of Science, Viet Nam

B.S. in Mathemtics and Computer Science, Honors Program, September 2012

- Thesis Topic: Variational method for nonlinear elliptic problems
- Advisor: Duong Minh Duc
- Mention: high distinction; Valedictorian.

HONORS & AWARDS

- NSF Grant DMS-2205710 (2022-2025) *Link*.
- NSF Grant DMS-1907776 (2019-2022) *Link*, transferred to DMS- 2205734 *Link*.
- AMS Simons Travel Grant (2019-2021) (declined due to conflict with NSF grant).
- 2013-2016: Hadamard Mathematics LabEx Ph.D. fellowship, awarded by Fondation mathématique Jacques Hadamard.
- April-July 2013: Master Internship at University Paris-Sud XI, awarded by Fondation mathématique Jacques Hadamard.

- 2012: Valedictorian, HCMC University of Science.
- 2008-2012: Odon Vallet Scholarships for outstanding students.
- 2008-2012: Kumho Asiana-Vietnam Scholarships for outstanding students.

SUBMITTED PAPERS

1. *Proof of the transverse instability of Stokes waves*, with R. Creedon and W. Strauss.

2. *Slowly traveling gravity waves for Darcy flow: existence and stability of large waves*, with J. Brownfield.

3. *Large travelling capillary-gravity waves for Darcy flow.*

4. *Global well-posedness for the one-phase Muskat problem in 3D*, with H. Dong and F. Gancedo.

PUBLISHED/ACCEPTED PAPERS

1. *Traveling wave solutions to the one-phase Muskat problem: existence and stability*, with I. Tice. **Archive for Rational Mechanics and Analysis**, to appear.

2. *Coercivity of the Dirichlet-to-Neumann operator and applications to the Muskat problem*
Acta Mathematica Vietnamica, Special Issue in Honor of Duong Minh Duc, 48 (2023), 51–62.

3. *Global well-posedness for the one-phase Muskat problem*, with H. Dong, and F. Gancedo
Communications on Pure and Applied Mathematics, 2023.

4. *Proof of modulational instability of Stokes waves in deep water*, with W. Strauss
Communications on Pure and Applied Mathematics, 76 (2023), no. 5, 1035–1084.

5. *Well-posedness for SQG sharp fronts with unbounded curvature*, with F. Gancedo and N. Patel
Mathematical Models and Methods in Applied Sciences, Vol 32, No. 13, 2022.

6. *Remarks on the solution map for Yodovich solutions of the Euler equations*
Journal of Mathematical Fluid Mechanics, **24**, 44, 2022.

7. *Self-similar solutions for the Muskat problem*, with E Garca-Juarez, J Gomez-Serrano, B. Pausader
Advances in Mathematics, Vol. 399, 2022.

8. *Bounds on heat flux for Rayleigh-Bénard convection between Navier-slip fixed-temperature boundaries*, with T. Drivas and C. Nobili
Philosophical Transactions of the Royal Society A, Special Issue: Mathematical Problems in Physical Fluid Dynamics, Vol. 380, Iss. 2225, 2022.

9. *Global solutions for the Muskat problem in the scaling invariant Besov space $\dot{B}^1_{\infty,1}$*,
Advances in Mathematics, Vol. 394, 2022.

10. *The vanishing surface tension limit of the Muskat problem*, with P. FLynn
Communications in Mathematical Physics, 382, 1205–1241, 2021.

11. *On well-posedness of the Muskat problem with surface tension*,
Advances in Mathematics, Vol. 374, 2020.

12. *A paradifferential approach for well-posedness of the Muskat problem*, with B. Pausader
Archive for Rational Mechanics and Analysis, 237(1), 35–100, 2020.

13. *On global stability of optimal rearrangement maps*, with Toan T. Nguyen
    Archive for Rational Mechanics and Analysis, 238(2), 671–704, 2020.

14. *Compressible fluids and active potentials*, with P. Constantin, T. D. Drivas, and F. Pasqualotto
    Annales de l'Institut Henri Poincaré (C) Analyse Non Linéaire, 37(1), 145–180, 2020.

15. *Remarks on the emergence of weak Euler solutions in the vanishing viscosity limit*, with T. D. Drivas
    Journal of Nonlinear Science, 29(2), 709–721, 2019.

16. *Inviscid limit for SQG in bounded domains*, with P. Constantin and M. Ignatova
    SIAM Journal of Mathematical Analysis, 50(6), 6196–6207, 2018.

17. *Onsager's conjecture and anomalous dissipation on domains with boundary*, with T. D. Drivas
    SIAM Journal of Mathematical Analysis, 50(5), 4785–4811, 2018.

18. *On singularity formation in a Hele-Shaw model*, with P. Constantin, T. Elgindi, and V. Vicol
    Communications in Mathematical Physics, 363(1), 139–171, 2018.

19. *Local and global strong solutions for SQG in bounded domains*, with P. Constantin
    Physica D, Special Issue in Honor of Edriss Titi, Vol. 376-378 , 195–203, 2018.

20. *Global weak solutions for generalized SQG in bounded domains*,
    Analysis & PDE, 11(4), 1029–1047, 2018.

21. *Global weak solutions for SQG in bounded domains*, with P. Constantin
    Communications on Pure and Applied Mathematics, 71(11), 2323–2333, 2018.

22. *Sharp Strichartz estimates for water waves systems*,
    Transactions of the AMS, 370, 8797–8832, 2018.

23. *A sharp Cauchy theory for 2D gravity-capillary water waves*,
    Annales de l'Institut Henri Poincaré (C) Analyse Non Linéaire, 34(7), 1793–1836, 2017.

24. *A paradifferential reduction for the gravity-capillary waves system at low regularity and applications*, with T. de Poyferré
    Bulletin de la Société Mathématique de France 145(4), 643–710, 2017.

25. *Strichartz estimates and local existence for the gravity-capillary water waves with non-Lipschitz initial velocity*, with T. de Poyferré
    Journal of Differential Equations, 261(1), 396–438, 2016.

26. *A pseudo-local property of gravity water waves system*,
    SIAM Journal of Mathematical Analysis, 48(3) 1988–2027, 2016.

27. *Hadamard well-posedness of the gravity water waves system*,
    Journal of Hyperbolic Differential Equations, 13(4) 791–820, 2016.

UNDERGRADUATE PUBLICATIONS

1. H. Q. Nguyen, *Non uniformly elliptic equations with non-uniformly p-superlinear nonlinearities*,
   Differential and Integral Equations, 27(9) 977–1000, 2014.

2. *Non-uniformly asymptotically linear p-Laplacian problems*, with D. M. Duc
   Nonlinear Analysis, 92, 183–197, 2013.

MENTORING
- Undergraduate student John Brownfield (UMD).
- Graduate students Sepehr Mohammadkhani and Seyed Abdolhamid Banihashemi (UMD).

TEACHING EXPERIENCE
- Fall 2023: Graduate PDE I, UMD.
- Spring 2023: Graduate Real Analysis II, UMD.
- Fall 2022: Graduate Real Analysis I, UMD.
- Spring 2022: Advanced Calculus II, UMD.
- Fall 2021: Advanced Calculus I, UMD.
- Summer 2021: Analysis: functions of one variable, Brown University.
- Spring 2021: Graduate PDE, Brown University.
- Spring 2020: Math 0180 Intermediate Calculus (Calculus III), Brown University.
- Fall 2019: Math 1110 Ordinary Differential Equations, Brown University.
- Spring 2019: Math 0180 Intermediate Calculus (Calculus III), Brown University.
- Fall 2018: Math 1110 Ordinary Differential Equations, and Math 0100 Introductory Calculus II, Brown University.
- Spring 2018: MAT 322 Introduction to Differential Equations, Princeton University.
- Fall 2017: MAT 104 Calculus II, Princeton University.
- Spring 2013: Teaching Assistant for Real Analysis, HCMC University of Science.
- Fall 2012: Teaching Assistant for Analysis I: Functions of One Variable, HCMC University of Science.

CONFERENCE TALKS
- Workshop "Reflections on Mathematical Fluid Dynamics", University of Virginia; March 2023.
- AMS Spring Southeastern Sectional Meeting, Atlanta, GA; March 2023.
- Workshop on Fluids in Honor of David Ebin on his 80th birthday; Jan 2023.
- AMS Fall Eastern Sectional Meeting at University of Massachusetts-Amherst– Special Session "Topics in PDEs and Harmonic Analysis"; October 2022.
- IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena; April 2022.
- AMS Fall Eastern Sectional Meeting by Zoom–Special session on "Conservation laws and nonlinear wave equations"; October 2020.
- SIAM Conference on Analysis of PDE–Symposium " Recent Results in Incompressible Fluid Mechanics", La Quinta CA; December 2019.
- Workshop on recent developments in nonlinear waves, University of Illinois Chicago; November 2018.
- AMS Sectional Meeting at University of Arkansas–Special Session "Recent Advances in Mathematical Fluid Mechanics"; November 2018.
- AMS Sectional Meeting at University of Michigan–Special Session "Analytical and Numerical Aspects of Turbulent Transport"; October 2018.
- AMS Sectional Meeting at Vanderbilt University– Special Session "Evolution Equations and Applications"; April 2018.

- Joint Mathematics Meetings–AMS Special Session "Analysis of Nonlinear Partial Differential Equations and Applications", San Diego; January 2018.
- SIAM Conference on Analysis of PDE–Symposium "Mathematical Analysis in Incompressible Fluid Dynamics", Baltimore; December 2017.
- Princeton-Tokyo Fluid Mechanics Workshop, Princeton; November 2017.
- Summer Meeting Conference, University of Sciences, Ho Chi Minh city; August 2014.

SEMINAR &
COLLOQUIUM TALKS

- PDE Seminar, Georgia Tech; April 2023.
- RIT on Applied PDE; December 2022.
- PDE Seminar, Penn State University; October 2022.
- Virtual Analysis and PDE seminar, University of Wisconsin Madison, December 2021.
- Applied Mathematics Colloquium, University of Maryland at Baltimore, November 2021.
- Analysis Seminar, Johns Hopkins University, October 2021.
- RIT Seminar on Applied PDE, UMD; September 2021.
- Special Colloquium, Rutgers University; December 2020.
- Colloquium, University of Maryland at College Park; December 2020.
- Colloquium, Texas A&M; December 2020.
- Colloquium, North Carolina State University; December 2020.
- Analysis of Fluids and Related Topics Seminar, Princeton University; November 2020.
- Analysis Seminar, University of Oklahoma; November 2020.
- MI-MST Joint Analysis Seminar; July 2020.
- PDE Seminar via Zoom, ShanghaiTech University; June 2020.
- Online North East PDE and Analysis Seminar (ONEPAS); April 2020.
- PDE Geometric Analysis Seminar; University of Wisconsin; March 2020 (canceled due to pandemic).
- Analysis and PDE Seminar; University of Massachusetts Amherst; December 2019.
- PDE and Applied Math Seminar; University of California at Davis; November 2019.
- CAMS Colloquium, University of Southern California; November 2019.
- Partial Differential Equations Seminar, Vanderbilt University; March 2019.
- Differential Equations Seminar, University of Tennessee; February 2019.
- Analysis Seminar, Brown University; December 2018.
- Partial Differential Equations Seminar, Brown University; November 2018.
- Partial Differential Equations and Geometric Analysis Seminar, University of Wisconsin–Madison; March 2018.
- Partial Differential Equations Seminar, Brown University University; March 2018.
- Partial Differential Equations Seminar, Penn State University; February 2018.
- Analysis Seminar, UC San Diego; January 2018.

- Ergodic Theory & Statistical Mechanics Seminar, Princeton University; November 2017.
- Analysis Seminar, Courant Institute; November 2017.
- New Faculty Talks, Princeton; October 2017.
- Analysis of Fluids and Related Topics Seminar, Princeton University; October 2016.
- Graduate Student Seminar, Orsay; January 2016.
- Partial Differential Equations Seminar, Mathematics Research Institute of Rennes; October 2015.
- Numerical Analysis and Partial Differential Equations Seminar, University Paris-Sud 11; April 2015.

SERVICE

- Co-organizer of the summer school on Fluid Dynamics at the Brin Mathematics Center (UMD), July 2023.
- Serve on an NSF Panel.
- Serve on the Doctoral Candidacy Committee for Luis Carlos Suarez (2022), Ethan Dudley (2023).
- Co-organizer of the PDE-Applied Math Seminar at UMD, 2021–.
- Co-organizer of the RIT Seminar on Applied PDE at UMD, 2022–.
- Co-organizer of the PDE Seminar at Brown University, 2019-2021.
- Co-organizer of the Fluid and Related Topic Seminar at Princeton University, 2017-2018.
- Member of the organizing committee for the one-month program on "Multiscale Analysis and Methods for Quantum and Kinetic Problems" to be held at the Institute for Mathematical Sciences (Singapore) during 30 January –10 March 2023.
- Co-organizer of the special session on "Recent advances in fluids and related models" at the JMM meeting, 2022.
- Co-organizer of the symposium "Regularity, Singularity and Turbulence in Fluids" (3 parts) for the SIAM Conference on PDE 2019.
- Referee for Journal of the AMS, Journal of the EMS, Duke Mathematical Journal, Communications on Pure and Applied Mathematics, Archive for Rational Mechanics and Analysis, Communications in Mathematical Physics, Annals of PDE, SIAM Journal on Mathematical Analysis, Journal of Functional Analysis, Nonlinearity, Proceeding of the AMS, Journal of Differential Equations, Journal of Mathematical Analysis and Applications, Nonlinear Analysis, Nonlinear Analysis: Real World Applications, Rendiconti Lincei Matematica e Applicazioni, Water Waves.