TRUONG VU – CV

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RESEARCH INTERESTS

PDEs, Stochastic PDEs, Random Polynomials, Random matrices, Mathematical Physics, Probability

EDUCATION

- **Ph.D. in Applied Mathematics**, University of Illinois at Chicago (UIC) *2025 (Expected)*
- **M.A. in Mathematics**, Indiana University Bloomington (IUB) *2018*
- **M.S. in Mathematics**, Institute of Mathematics, Hanoi, Vietnam *2014*
- **B.A in Mathematics and Education**, Hanoi National University of Education, Vietnam *2009*

HONORS & AWARDS

- **Damber Singh Tomer and Meena Singh Tomer Endowed International Scholarship**, UIC *2023*
- **Hazel King Thompson Fellowship** for outstanding graduate students, IUB *Spring 2017*
- **Travel Award - Heidelberg Laureate Forum** *Sep. 2016*
  Selected for participation internationally to the Heidelberg Laureate Forum (HLF).
  All fares covered by the HLF foundation.
- **Vietnam Education Foundation Fellowship** (declined) *2016*

VISITING APPOINTMENTS

- **Department of Mathematics, Michigan State University**, Michigan, USA
  ○ Visiting Scholar *2024-2025*

PUBLICATIONS

Preprints

[13] K. Promislow, **T. Vu** and B. Wetton, *Patterns on Interfaces: Surface Diffusion and Incompressibility, 2025.*.

[12] A. Galligo, J. Najnudel, and **T. Vu**, *Dynamics of rotationally invariant polynomial root sets under iterated derivations, 2025*. [arXiv]

[11] J. Najnudel, E. Paquette, N. Simm, and **T. Vu,** *The Fourier coefficients of the holomorphic multiplicative chaos in the limit of large frequency, 2025.* [arXiv]

[10] **X.-T. Vu**, *Non-uniform dependence on initial data of solutions to logarithmically regularized 2D Euler equations*, preprint, 2024. [arXiv]

[9] G. Misiołek, and **X.-T. Vu**, *Regularity of solution maps of the generalized surface quasi-geostrophic equations*, preprint, 2024 . [Link to the talk]

[8] T. Tulabandhula, and **T. Vu,** *Multi-choice customer behavior contextual bandits dynamic recommendations marketing purchase probability,* preprint, 2024.

[7] **X.-T. Vu** and N. D. Yen, *Some types of sets which are not sequentially normally compact*, preprint, 2024. [pdf]

Published/Accepted in a Refereed Journal

[6] H. Jung, B. Langowski, A. Ortiz and **T. Vu**, *Expository article: Bounded orthogonal systems and the $\Lambda(p)$-set problem by Jean Bourgain*, [Expositiones Mathematicae, 2025.]

[5] André Galligo, Joseph Najnudel, **Truong Vu**, *Anti-concentration applied to roots of randomized derivatives of polynomials*, Electronic Journal of Probability, **29**: 1-20, 2024. [arXiv]

[4] Marcus Michelen and **Xuan-Truong Vu**, *Almost sure behavior of the zeros of iterated derivatives of random polynomials*, Electronic Communications in Probability, **29**: 1-10, 2024. [arXiv]

[3] Marcus Michelen and **Xuan-Truong Vu**, *Zeros of a growing number of derivatives of random polynomials with independent roots*, Proceedings of the American Mathematical Society, **152**: 2683-2696, 2024. [arXiv].

[2] Gerard Misiołek and **Xuan-Truong Vu**, *On continuity properties of solution maps of the generalized SQG family*, Vietnam Journal of Mathematics, **52**: 689-698, 2024. (For the special issue in honor of Carlos Kenig's 70th birthday.)

[1] Andrea Giorgini, Roger Temam and **Xuan-Truong Vu**, *The Navier-Stokes-Cahn-Hilliard equations for mildly compressible binary fluid mixtures*, Discrete and Continuous Dynamical Systems-B, **26**(1): 337-366, 2021.

Work in Progress

- V. Nguyen, A. Soffer and **X.-T. Vu**, *On the existence of self-similar solutions for the mass-critical nonlinear Schrödinger equations*.
- R. Temam and **X.-T. Vu**, *On a slightly compressible fluid-structure interaction problem with Navier boundary conditions*.
- M. K. Drake, V. Nguyen and **X.-T. Vu,** *Extension in Sobolev spaces*.
- **T. Vu**, *Hausdorff dimensions of Cantor sets in the unit circle*. [Preliminary version]
- J. Bochi and **T. Vu,** *On Halasz-Szekely mean (tentative title)*.
- *High-Dimensional Sparse Linear Contextual Bandits with Heavy-tailed Rewards*.

Lecture Notes

[L1] **X.-T. Vu**, Weyl's theorems on uniform distribution and Kronecker's theorem (in Vietnamese). In *Some Basic Theorems in Analytic Number Theory*, Lecture Notes edited by Prof. Ngo Bao Chau, pp. 67–76, Vietnam Institute for Advanced Study in Mathematics, 2012.

[L2] **X.-T. Vu** Minkowski's theorem on lattice points in convex sets (in Vietnamese). In *Some Basic Theorems in Analytic Number Theory*, Lecture Notes edited by Prof. Ngo Bao Chau, pp. 77–85, Vietnam Institute for Advanced Study in Mathematics, 2012.

EXPERIENCE IN QUANTUM COMPUTING AND STATISTICS

[1] *Grover-Based Quantum 4x4 Sudoku Solver.* [Link]

[2] *Oracle for Shor's algorithm.* [Link]

[3] *Kitaev's toric code under random Pauli error.* [Link]

[4] *An alternative way of tuning parameters for Ridge, LASSO, and LARS to improve their performance on the prostate cancer data.*

TEACHING EXPERIENCES

Assisted for the following courses. Duties include grading, leading discussion sessions, keeping office hours.

University of Illinois at Chicago

- *MCS 521: Combinatorial Optimization* — *Fall 2023*
- *MCS 425: Codes and Cryptography* — *Falls 2022, 2023*
- *STAT 382: Statistical Methods and Computing* — *Fall 2022*
- *MATH 533: Real Analysis* — *Fall 2022*
- *MCS 320: Introduction to Symbolic Computation* — *Spring 2022, Spring 2025*

- *MCS 471: Numerical Analysis* — *Fall 2021, Summer 2022*
- *CS 401: Computer Algorithms I* — *Fall 2021*
- *MATH 180: Calculus I* — *Spring 2021*
- *MCS 275: Programming Tools and File Management* — *Fall 2020*
- *MATH 220: Introduction to Differential Equations* — *Summer 2020*
- *MATH 481: Applied Partial Differential Equations* — Spring 2020
- *MATH 310: Applied Linear Algebra* — *Fall 2019, Spring 2020, Spring 2025*

Indiana University Bloomington

- *MATH-M 371 Elementary Computational Methods* — *Spring 2018*
- *MATH-M 442: Partial Differential Equations II* — *Spring 2018*
- *MATH-M 447: Mathematical Models* — *Fall 2017*
- *MATH-M 441: Partial Differential Equations I* — *Fall 2017*
- *MATH-M 343: Differential Equations* — *Fall 2016*

University of Science and Technology of Hanoi

- *Analysis and Differential Equations* — *Falls 2014, 2015*

University of Engineering and Technology, Vietnam National University

- *Calculus I, II* — *2014- 2016*
- *Linear Algebra* — *2014- 2016*

SELECTED TALKS & PRESENTATIONS

- *Regularity of solution maps of the generalized surface quasi-geostrophic equations* — *May 16-18, 2025*
  Nonlinear Constraints: A Catalyst for Creativity in Analysis and its Applications, AWM Research Symposium 2025
- *Some results about behavior of the zeros of iterated derivatives of random polynomials* — *Jan 07-10, 2025*
  AMS Special Session on Spectral Theory of Ergodic Operators and Related Models, JMM 2025
- *Non-Uniform Dependence on Initial Data of Solutions to inviscid Models Generalizing the Two-dimensional Euler Equations*, Spring Central Sectional Meeting — *Mar. 26-27, 2022*
- International Workshop “Variational Analysis and Application" — *Aug. 28 - Sep. 05, 2015*
  Erice, Sicily, Italy

CONFERENCES & WORKSHOPS ATTENDED

- SLMATH Summer Graduate Schools on *Concentration Inequalities and Localization Techniques in High Dimensional Probability and Geometry* — *July 3-14, 2023*
- Summer Schools on *random matrix theory and applications*, Ohio State University — *May 22-26, 2023*
- Cornell Probability Summer School, Cornell University — *July 24-August 06, 2022*
- UT graduate school in Groups and Dynamics, UT Austin — *July 17-22, 2022*
- Long-term invited participant at HIM, Bonn, Germany — *Spring 2022*
  Program: *Interactions between Geometric Measure Theory, Singular Integrals, and PDEs*
  (Unfortunately, I could participate online only due to my visa issue)
- Riviere-Fabes Symposium on Analysis and PDE, University of Minnesota — *2019, 2022*
- Midwestern Workshop on Asymptotic Analysis, Indiana University Bloomington — *Oct. 5-7, 2018*
- The Fourth Chicago Summer School In Analysis, University of Chicago — *June 19-30, 2017*
- Workshop: Analysis in Lyon, Université Claude-Bernard Lyon 1, France — *Oct. 26-30, 2015*

SERVICE

- Introduce kids to mathematics through MSU Math Outreach programs, Lansing, Michigan *2024*
- Helping students at Math & Science Learning Center, UIC, Chicago *2019, 2020, 2021, 2022*
- Buiding complex geometric shapes for young children, ScienceFest, Bloomington, Indiana *2016-2017*
- Delivering lectures at a summer school, Vietnam Institute for Advanced Study in Mathematics *2012*
- Summer mentoring for Hau Hoang, a Vietnamese student attending at St. John's College *2011*

TECHNICAL SKILLS

Mathematica ♦ MATLAB ♦ Python ♦ Julia ♦ LaTeX ♦ **R**