Tung T. Nguyen

CONTACT
INFORMATION

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RESEARCH
INTERESTS

Algebraic and computational number theory, non-commutative algebras and their applications to spectral graph theory, non-linear dynamics, and Galois modules.

EMPLOYMENT

Postdoctoral Associate in Mathematics, Western University   2021-

EDUCATION

Doctor of Philosophy in Mathematics, The University of Chicago   December 2020

- Advisor: Professor Kazuya Kato

- Thesis: Special values of L-functions over global fields

Bachelor of Science in Mathematics, Vietnam National University   2009-2014

- Senior thesis advisor: Professor Ralph Greenberg

- Senior thesis: On the norm of the fundamental units in real quadratic number fields.

PUBLICATIONS

1. L. Muller, J. Minac, **Tung T. Nguyen**, *Algebraic approach to the Kuramoto model*. Physical Review E vol. 104, 2021.

2. **Tung T. Nguyen**, *Heights and Tamagawa numbers of motives*. Journal of Pure and Applied Algebra, 226(5), 2021.

3. Roberto Budzinski, **Tung T. Nguyen**, Gabriel B. Benigno, Jacqueline Doan, Jan Minac, Terrence J. Sejnowski, Lyle Muller, *A simple geometry unites synchrony, chimeras, and waves in nonlinear oscillator networks*. Chaos: An Interdisciplinary Journal of Nonlinear Science, 32(3), 031104, 2022.

4. Jacqueline Doan, Jan Minac, Lyle Muller, **Tung T. Nguyen**, Federico W. Pasini, *Join of circulant matrices*, Linear Algebra and its Applications, 650, pp.190-209.

5. Jan Minac, Duy Tan Nguyen, **Tung T. Nguyen**, *Fekete polynomials, quadratic residues, and arithmetic,* Journal of Number Theory, 242, pp.532-575.

6. Jan Minac, Duy Tan Nguyen, **Tung T. Nguyen**, *Further insights into the mysteries of the values of zeta functions at integers*, Mathematica Slovaca, 2022.

7. Roberto Budzinski, Jacqueline Doan, Jan Minac, Lyle Muller, **Tung T. Nguyen**, Federico Pasini, *Equilibria in Kuramoto oscillator networks: An algebraic approach*, SIAM Journal on Applied Dynamical Systems, 2022.

8. Lauren Heller, Ján Mináč, **Tung T. Nguyen**, Andrew Schultz, Duy Tan Nguyen, *Galois module structure of some elementary p-abelian extensions*, Israel Journal of Mathematics, 2023.

9. Roberto C. Budzinski, **Tung T. Nguyen**, Gabriel B. Benigno, Jacqueline Doan, Jan Minac, Terrence J. Sejnowski, and Lyle E. Muller, *Analytical prediction of specific spatiotemporal patterns in nonlinear oscillator networks with distance-dependent time delays*, Physical Review Research, 5(1), p.013159.

10. **Tung T. Nguyen**, Roberto C. Budzinski, Federico W. Pasini, Robin Delabays, Ján Patera, and Lyle E. Muller, Broadcasting solutions on multilayer networks of phase oscillators, Chaos, Solitons & Fractals 168 (2023): 113166.

11. Sunil Chebolu, Jon Merzel, Jan Minac, Lyle Muller, Federico Pasini, **Tung T. Nguyen**, Duy Tan Nguyen, *On the joins of group rings*, Journal of Pure and Applied Algebra 227, no. 9 (2023): 107377.

12. Frank Chemotti, Jan Minac, **Tung T. Nguyen**, Andrew Schultz, John Swallow, Nguyen Duy Tan, *Quaternion algebras and square power classes over biquadratic extensions*, Israel Journal of Mathematics, 2023.

PREPRINTS

- Jan Minac, Duy Tan Nguyen, **Tung T. Nguyen**, *On the arithmetic of generalized Fekete polynomials*. Submitted, 2022. Available at https://arxiv.org/abs/2206.11778.

- Jacqueline Doan, Jan Minac, Lyle Muller, **Tung T. Nguyen**, Federico W. Pasini, Join of normal matrices with constant row sums (submitted). Available at https://arxiv.org/abs/2207.04181

- Korey Brownstein, **Tung T. Nguyen**, Utilization of a natural language processing-based approach to determine the composition of artifact residues (submitted). Github repository for this project https://github.com/tungprime/NLP_and_composition_of_artifact_residues

- Lyle Muller, Jan Minac, **Tung T. Nguyen**, Duy Tan Nguyen, On the Paley graph of a quadratic character (submitted), 2022. Available at https://arxiv.org/abs/2212.02005

TEACHING EXPERIENCES

University of Chicago

- 2020-2021: MATH 15200 (Advanced Calculus II, via Zoom).

- 2019-2020: MATH 15100-15200 (Advanced Calculus I, II).

- Summer 2019: Introduction to Mathematics via the Proofs-based method (CAAP summer program at UChicago).

- 2018-2019: MATH 15200-15300 (Advanced Calculus II, III).

- 2017-2018: 13100-13200-13300 (Elementary functions and calculus I, II, III).

- 2016-2017: 13100-13200-13300 (Elementary functions and calculus I, II, III).

- 2015-2016: College Fellow for IBL Honors Calculus.

Vietnam National University

- 2023: Introduction to computational number theory and Sagemath (invited course, summer 2023.)

- 2014: Introduction to Statistics.

- 2013: Teaching Assistant for the course "Introduction to Galois theory".

RESEARCH STUDENTS

- Co-supervised Lewis Glabush toward his senior thesis (with Prof. Jan Minac and Prof. Lyle Muller).

  - Topic: Special Families of Generalized Paley Graphs and the Riemann Hypothesis for Graphs.

- Co-supervised four students in the Fields Undergraduate Summer Research Program 2021 (with Prof. Jan Minac and Prof. Lyle Muller).

  - Students: Anna Krokhine, Chun Hei Lam, Ton Meesena, William I Jones.

- Project: Spectrum of almost complete digraphs.

- Mentored 3 projects for the Directed Reading Program at The University of Chicago.

  - Michael Cronin: Modular arithmetic (Spring 2016).
  - Benjamin Andrew: Elementary number theory (Fall 2017).
  - Xingyu Wang: p-adic numbers and applications (Spring 2018).

- Mentored 3 REU projects at UChicago (Summer 2016).

  - Hung Ho: Gaussian integers.
  - Christopher Wilson: A brief introduction to ZFC.
  - Mantas Mazeika: The singular value decomposition and low-rank approximation.

- Co-supervised the Ph.D. student Priya B. Chain toward her thesis (with Prof. Jan Minac and Prof. Lyle Muller).

  - Project: Broadcasting solutions on multiplex systems of oscillator networks.

PEDAGOGY DEVELOPMENT AND COURSEWORK

Course Design and College Teaching (CCTE 50000). The main goals of this course are.

- Design an inclusive and well-conceived course based on meaningful learning objectives and constructed with teaching methods and assessments aligned with those objectives.

- Articulate a meaningful student-centered approach to teaching.

PROFESSIONAL SERVICES

- Organized a virtual math conference to celebrate the 85th birthday of Professor Moshe Rosenfeld, March 2023.

- Co-organizer and lecturer for the Western-Fields School in Networks and Neuroscience, September 2022.

- Co-organized the PolyMath REU program (with Dr. Thang Pham, Dr. Tuan Tran, and Dr. Tu Nguyen), August 2022-present.

- Co-organized the Algebra Seminar at Western University (with Prof. Jan Minac), 2021.

- Co-organized the following learning groups at UChicago: etale cohomology (Fall 2015) and p-adic Hodge theory (Winter and Spring 2017).

REFEREE SERVICES

- Revista Matematica Iberoamericana.

- Tatra Mountains Mathematical Publications.

- AMS Mathematical Reviews.

RESEARCH PRESENTATIONS

- Virtual Brazilian Number Theory Seminar, June 2023 (upcoming).

- International Workshop on Matrix Analysis and Its Applications, Quynhon, July 2023 (upcoming).

- Pan Asian Number Theory conference, Harbin China, August 2023 (upcoming).

- Research Seminar, University of Arkansas at Little Rock, March 2023.

- Contributed Talk, Special Session Rethinking Number Theory, AMS Joint Meeting, Boston, January 2023.

- Korea-Taiwan-Vietnam joint seminar in Combinatorics and Analysis, November 2022.

- 2nd International workshop on matrix analysis and applications, October 2022.

- Fields Number Theory Seminar, Fields Institute, October 2022.

- 34th Midwestern Conference on Combinatorics and Combinatorial Computing, Illinois State University, October 2022.

- ISU Algebra Seminar, Illinois State University, September 2022.

- Connecticut Number Theory 2022 Conference, June 2022.

- Zassenhaus Groups and Friends Conference, Binghamton University, May 2022.

- 2022 Southern Regional Number Theory Conference, Louisiana State University, March 2022.

- New Developments in Number Theory, February 2022.

- UIC Number Theory Seminar, February 2022.

- Northwestern Number Theory Seminar, December 2021.

- The Algebra and Number Theory Seminar, Texas Tech University, November 2021.

- Algebra Seminar, Binghamton University, November 2021.

- AMS Fall Western Sectional Meeting, October 2021.

- Undergraduate colloquium, Illinois State University, October 2021.

- First SIBAU-NU Workshop on Matrix Analysis and Linear Algebra, October 2021.

- Mathematics and Statistics Colloquium, Loyola University, October 2021.

- Invited talk at Williams SMALL REU 2021, join of circulant graphs. Also had an open discussion about my experiences in mathematics and shared some personal advice for undergraduate students.

- Young Researchers in Algebraic Number Theory, August 2021.

- Hanoi, Chicago, Boston and Western: A panoramic view of absolute Galois groups (joint talk with Jan Minac), joint seminar between
    - Mini-workshop on Algebra and homogeneous spaces
    - Online seminar on quadratic forms, linear algebraic groups, and beyond

- Fekete polynomials, quadratic residues, and arithmetic, GTA Philadelphia 2021, Temple University, May 2021.

- Heights and Tamagawa numbers of motives, Algebra Seminar, Western University, February 2021.

- Hurwitz zeta functions, What is ... a seminar? February 2021.

- Special values of the Riemann zeta function at negative integers, The Trojan Math Seminar, Troy University, December 2020.

- Heights and Tamagawa numbers of motives, HUJI-BGU Number Theory Seminar, December 2020.

- Heights and Tamagawa numbers of mixed motives, Interactions between Representation Theory and Algebraic Geometry, Chicago 2017 (poster session).

AWARDS AND SCHOLARSHIPS	• PI4-IMA fellowship, 2020, UIUC.
	• AMS Graduate Travel Grant to Joint Mathematics Meetings 2020.
	• National Program for the Development of Mathematics scholarship, 2014.
	• Honda Young Engineers and Scientists award for top 10 Vietnamese students in STEM fields, 2013.
COMPUTER SKILLS	• Python • Machine learning • Probabilistic programming with PyMC3 • Matlab