Tung T. Nguyen

CONTACT INFORMATION

Department of Mathematics
The University of Western Ontario
London, ON Canada, N6A 5B7

Mobile: 312-478-7812
E-mail: nguyenthotung@gmail.com
Website: https://tungprime.github.io/

RESEARCH INTERESTS

Algebraic and computational number theory, representation theory of finite groups, spectral graph theory, non-linear dynamics, and computational neuroscience.

EMPLOYMENT

Postdoctoral Associate in Mathematics, Western University and OnePick Inc 2021-

- Mentors: Professor Jan Minac and Professor Lyle Muller

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

Master of Science in Mathematics, The University of Chicago June 2016

- Advisor: Professor Kazuya Kato
- Topic proposal: p-adic L-functions of elliptic curves with complex multiplication

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.

AWARDS AND SCHOLARSHIPS

- PI4-IMA fellowship, 2020, UIUC.
- National Program for the Development of Mathematics scholarship, 2014.
- Honda Young Engineers and Scientists award for top 10 Vietnamese students in STEM fields, 2013.

TEACHING EXPERIENCES

University of Chicago

- 2015-2016: College Fellow for IBL Honors Calculus.
- 2016-2017: 13100-13200-13300 (Elementary functions and calculus).
- 2017-2018: 13100-13200-13300 (Elementary functions and calculus).
- 2018-2019: MATH 15200-15300 (Elementary functions and calculus).
- Summer 2019: CAAP summer program at UChicago.
- 2019-2020: MATH 15100-15200 (Elementary functions and calculus).
- 2020-2021: MATH 15200 (Elementary functions and calculus, via Zoom).

Vietnam National University

- 2013: TA for a course in Galois theory (Professor Le Minh Ha.)
- 2014: Introduction to Statistics (Vietnam National University)

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, 2022.
5. Jan Minac, Duy Tan Nguyen, **Tung T. Nguyen**, *Fekete polynomials, quadratic residues, and arithmetic,* Journal of Number Theory, 2022.

PREPRINTS

- 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*. Submitted, 2022.
- Roberto Budzinski, Jacqueline Doan, Jan Minac, Lyle Muller, **Tung T. Nguyen**, Federico Pasini, *Equilibria in Kuramoto oscillator networks: An algebraic approach* (under revision for SIAM Journal on Applied Dynamical Systems), 2022. Available at https://arxiv.org/abs/2111.02568
- Frank Chemotti, Jan Minac, **Tung T. Nguyen**, Andrew Schultz, John Swallow, Nguyen Duy Tan, *Quaternion algebras and square power classes over biquadratic extensions* (under revision for Israel Journal of Mathematics), 2022. Available at https://arxiv.org/abs/2112.06688
- Jan Minac, Duy Tan Nguyen, **Tung T. Nguyen**, *Further insights into the mysteries of the values of zeta functions at integers*. Submitted, 2022. Available at https://arxiv.org/abs/2108.08171
- 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.
- Lauren Heller, Ján Mináč, **Tung T. Nguyen**, Andrew Schultz, Duy Tan Nguyen, *Galois module structure of some elementary p-abelian extensions*. Submitted, 2022. Available at https://arxiv.org/abs/2203.02604.
- Sunil Chebolu, Jon Merzel, Jan Minac, Lyle Muller, Federico Pasini, **Tung T. Nguyen**, Duy Tan Nguyen, *On the joins of group rings*, Submitted 2022. Available at https://arxiv.org/abs/2208.07413.
- 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
- **Tung T. Nguyen**, Roberto C. Budzinski, Federico W. Pasini, Robin Delabays, Ján Mináč, and Lyle E. Muller, Broadcasting solutions on multilayer networks of phase oscillators (manuscript available)

SERVICES AND MENTORING

- Co-organize a PolyMath REU (with Dr. Thang Pham , Dr. Tuan Tran , and Dr. Tu Nguyen). Website: https://vietnampolymathreu.wixsite.com/forvietnamesestudent
- Co-supervised an undergraduate student, Lewis Glabush, toward his senior thesis (with Prof. Jan Minac and Prof. Lyle Muller).
- Co-organizer of the Algebra Seminar at Western University (with Prof. Jan Minac).
- 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.
- Completing a paper on spectral graph theory and matrix algebra.

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- Co-organizer and speaker for the following learning groups at UChicago: etale cohomology (Fall 2015) and p-adic Hodge theory (Winter and Spring 2017).
- Mentored 3 projects for the Directed Reading Program (Spring 2016 and Fall 2017, Spring 2019).
  - Michael Cronin: Modular arithmeitcs.
  - Benjamin Andrew: Elementary number theory.
  - Xingyu Wang: p-adic numbers and applications.
- Mentored three 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.

TALKS, COLLOQUIA AND SEMINARS

- Connecticut Number Theory 2022 Conference, June 2022.
- Zassenhaus Groups and Friends Conference, Binghamton University, May 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).

RELEVANT COURSEWORK

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

- Reflect critically on and improve their teaching practice.
- Design an inclusive and well-conceived course based in meaningful learning objectives and conctructed with teaching methods and assessments aligned with those objectives.
- Articulate a meaningful student-centered approach to teaching.

COMPUTER SKILLS

• Python • Machine learning • Probabilistic programming with PyMC3 • Matlab

REFERENCES

Prof. Kazuya Kato
Department of Mathematics
The University of Chicago
kkato@math.uchicago.edu

Prof. Jan Minac
Department of Mathematics
The University of Western Ontario
minac@uwo.ca

Prof. Lyle Muller
Department of Mathematics
The University of Western Ontario
lmuller2@uwo.ca

Dr. John Boller (teaching)
Department of Mathematics
The University of Chicago
boller@math.uchicago.edu

Prof. Sunil Chebolu
Department of Mathematics
Illinois State University
schebol@ilstu.edu