

# PAK-HIN LEE

## CURRICULUM VITAE

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### CONTACT AND PERSONAL INFORMATION

- **Mailing Address:**  
Department of Mathematics, Columbia University  
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- **Office:** 408 Mathematics
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- **Website:** <http://www.math.columbia.edu/~phlee/>
- **Citizenship:** Hong Kong

### RESEARCH INTERESTS

- Number theory and related areas of automorphic forms and arithmetic geometry

### EDUCATION

- **Columbia University** (New York City, NY) 09/2012 – present
  - ◆ Candidate for Ph.D. in Mathematics, 2019 (expected)
  - ◆ M.Phil. in Mathematics, 2016
  - ◆ M.A. in Mathematics, 2014
  - ◆ Thesis Advisor: Eric Urban
- **Stanford University** (Stanford, CA) 09/2008 – 06/2012
  - ◆ B.S. in Mathematics, with Departmental Honors and University Distinction, 2012

### AWARDS AND HONORS

- Dean's Fellow, Graduate School of Arts and Sciences, Columbia University 2012 – present
- J. E. Wallace Sterling Award for Scholastic Achievement, Stanford University 2012
  - ◆ Top 25 graduating seniors in the School of Humanities and Sciences
- Honorable Mention, The 71st William Lowell Putnam Mathematical Competition 2010
- Nominee, Boothe Prize for Excellence in Writing, Stanford University 2009
- Sir Edward Youde Memorial Scholarship for Overseas Studies 2008 – 2011
- Silver Medal, The 48th International Mathematical Olympiad (IMO) 2007
- HKSAR Government Scholarship 2007

### PUBLICATIONS

- *Parity of the partition function and traces of singular moduli*, with A. Zamorzaev  
International Journal of Number Theory, Vol. 8, No. 2 (2012), P.395 – 409

### RESEARCH TALKS GIVEN

- *Parity of the partition function and traces of singular moduli* 12/2010  
Analytic Number Theory Seminar, Stanford University

## EXPOSITORY TALKS GIVEN

### • Graduate Learning Seminars and Topics Courses at Columbia University

- ◆ *Lambda-adic modular forms and Lambda-adic Galois representations* [4 lectures] 09/2017 – 10/2017  
Graduate student seminar on Hida theory
- ◆ *The Ax–Sen–Tate theorem and Hodge–Tate representations* [2 lectures] 05/2017  
Graduate student seminar on the Mordell conjecture
- ◆ *Overview of the Langlands conjectures* [3 lectures] 01/2017 – 03/2017  
Graduate student seminar on the Langlands program
- ◆ *A smooth linear partial differential equation without solutions* 12/2016  
Graduate student seminar on geometric analysis
- ◆ *Proof of Perrin-Riou’s main theorem on  $p$ -adic Euler–Iwasawa systems* 12/2016  
Research seminar on Euler systems
- ◆ *The Riemann–Roch theorem for number fields* 04/2016  
Graduate student seminar on algebraic number theory
- ◆  *$p$ -adic Galois representations and differential equations (after L. Berger)* [3 lectures] 02/2016  
Research seminar on  $(\phi, \Gamma)$ -modules
- ◆ *Overconvergent modular symbols and Stevens’ classicality theorem* 10/2015  
Graduate student seminar on  $p$ -adic  $L$ -functions
- ◆ *On a rigidity result of Chai on Hecke-invariant subvarieties* [2 lectures] 04/2015  
Topics course on non-vanishing results of special values of  $L$ -functions
- ◆ *Compact operators on  $p$ -adic Banach spaces* 03/2014  
Research seminar on  $p$ -adic families of automorphic forms
- ◆ *Local Howe duality* 10/2013  
Graduate student seminar on theta correspondence
- ◆ *Spectral sequences* 02/2013  
Topics course on the cohomology of arithmetic groups

### • Undergraduate Seminars at Columbia University

- ◆ *From cutting squares to combinatorics and 2-adics* 04/2018  
Undergraduate Mathematics Seminar
- ◆ *Rational elliptic curves have no 11-torsion* 04/2016  
Undergraduate Mathematics Seminar
- ◆ *Why is the Ramanujan constant almost an integer?* 10/2014  
Undergraduate Mathematics Seminar
- ◆ *Dirichlet’s theorem on primes in arithmetic progressions* 11/2012  
Undergraduate Mathematics Seminar

## CONFERENCES AND WORKSHOPS ATTENDED

- Arizona Winter School 2018: Iwasawa Theory 03/2018  
University of Arizona (Tucson, AZ, United States)
- Recent Developments on the Arithmetic of Special Values of  $L$ -functions 12/2017  
Bernoulli Center, École Polytechnique Fédérale de Lausanne (Lausanne, Switzerland)
- Workshop on Motives, Galois Representations and Cohomology Around the Langlands Program 11/2017  
Institute for Advanced Study (Princeton, NJ, United States)

- Iwasawa 2017 07/2017  
University of Tokyo (Tokyo, Japan)
- Graduate courses:  $p$ -adic methods for Galois representations and modular forms 01/2017 – 02/2017  
Barcelona Graduate School of Mathematics (Barcelona, Spain)
- $p$ -adic Methods in Number Theory 05/2015  
University of California, Berkeley (Berkeley, CA, United States)
- Automorphic forms, Shimura varieties, Galois representations and  $L$ -functions 12/2014  
Mathematical Sciences Research Institute (Berkeley, CA, United States)
- Introductory Workshop: New Geometric Methods in Number Theory and Automorphic Forms 08/2014  
Mathematical Sciences Research Institute (Berkeley, CA, United States)
- Spring School on Classical and  $p$ -adic Hodge Theories 05/2014  
Centre Henri Lebesgue (Rennes, France)
- Recent Advances in Hodge Theory: Period Domains, Algebraic Cycles, and Arithmetic 06/2013  
Pacific Institute for the Mathematical Sciences (Vancouver, BC, Canada)
- $p$ -adic Modular Forms,  $L$ -functions, and Galois Representations 05/2013  
University of California, Los Angeles (Los Angeles, CA, United States)
- Algebraic Geometry Northeastern Series Spring 2013 04/2013  
Yale University (New Haven, CT, United States)
- Arizona Winter School 2013: Modular Forms and Modular Curves 03/2013  
University of Arizona (Tucson, AZ, United States)

## TEACHING AND RELATED EXPERIENCE

- **Instructor, Department of Mathematics, Columbia University**
  - ◆ MATH UN1102: Calculus II (scheduled) 01/2019 – 05/2019
  - ◆ MATH S1202: Calculus IV 07/2018 – 08/2018
  - ◆ MATH UN1102: Calculus II 01/2018 – 05/2018
  - ◆ MATH S1202: Calculus IV 05/2017 – 06/2017
  - ◆ MATH S1202: Calculus IV 07/2016 – 08/2016
  - ◆ MATH S1202: Calculus IV 07/2015 – 08/2015
- **Teaching Assistant, Department of Mathematics, Columbia University**
  - ◆ MATH GR6261: Commutative Algebra (Graduate-level) (Instructor: Eric Urban) 09/2018 – 12/2018
  - ◆ MATH UN1101: Calculus I (Instructor: Alisa Knizel) 09/2018 – 12/2018
  - ◆ Department Assistant for Summer Session 05/2018 – 06/2018
  - ◆ MATH GR6343: Lie Groups and Representations (Graduate-level) (Instructor: Eric Urban) 09/2017 – 12/2017
  - ◆ MATH GR6657: Class Field Theory (Graduate-level) (Instructor: Chao Li) 01/2017 – 05/2017
  - ◆ MATH GU4043: Algebraic Number Theory (Instructor: Chao Li) 09/2016 – 12/2016
  - ◆ MATH G4657: Class Field Theory (Graduate-level) (Instructor: Wei Zhang) 01/2016 – 05/2016
  - ◆ MATH V1202: Calculus IV (Instructor: Bogwang Jeon) 09/2015 – 12/2015
  - ◆ Summer Undergraduate Research: Arithmetic Properties of Hurwitz Numbers (Project Leader: David Hansen) 06/2015 – 08/2015
  - ◆ MATH V2010: Linear Algebra (Instructor: Gabriele di Cerbo) 01/2015 – 05/2015
  - ◆ MATH V3025: Making, Breaking Codes (Instructor: Dorian Goldfeld) 09/2014 – 12/2014

- ◆ MATH S1201: Calculus III (Instructor: Philip Engel) 05/2014 – 07/2014
- ◆ MATH V1101: Calculus I (Instructor: Anand Deopurkar) 01/2014 – 05/2014
- ◆ MATH V1202: Calculus IV (Instructor: Michael Woodbury) 09/2013 – 12/2013
- **Stanford University Mathematics Camp (SUMaC)**
  - ◆ Residential Counselor and Teaching Assistant for Program II (Algebraic Topology) 07/2014 – 08/2014
  - ◆ Residential Counselor and Teaching Assistant for Program II (Algebraic Topology) 07/2013 – 08/2013
  - ◆ Residential Counselor and Teaching Assistant for Program II (Algebraic Topology) 07/2012 – 08/2012
- **Stanford – Math League Tournament**
  - ◆ Residential Counselor for the Third Annual Tournament 08/2014
- **Course Grader, Department of Mathematics, Stanford University**
  - ◆ Graded homework for courses on Real Analysis, Algebraic Number Theory, Calculus on Manifolds, and Functional Analysis. 09/2009 – 06/2012

## SYNERGISTIC ACTIVITIES

- **Seminar organization**
  - ◆ Organized four graduate learning seminars on advanced topics in number theory. 09/2016 – 05/2018
- **Assistance with undergraduate research**
  - ◆ Assisted an REU group of four undergraduate students led by David Hansen, on the arithmetic properties of Hurwitz numbers. 06/2015 – 08/2015
- **Compilation of lecture notes**
  - ◆ Live-TeX and compile lecture notes for numerous topics courses and seminars, which are shared publicly on my website. 01/2013 – present

## EXTRA-CURRICULAR ACTIVITIES

- **Microsoft College Puzzle Challenge**
  - ◆ Member of runner-up team at Columbia University 04/2016
  - ◆ Member of winning team at Columbia University 04/2015
  - ◆ Member of runner-up team at Columbia University 04/2014
  - ◆ Member of winning team at Columbia University 04/2013
- **ACBL North American Collegiate Bridge Team Championship**
  - ◆ Member of runner-up team representing Stanford University 07/2012

## COMPUTER SKILLS

- C++, Java, LaTeX, Mathematica, Pascal

## LANGUAGES

- English (fluent), Cantonese Chinese (native), Mandarin Chinese (professional)