

# Heesung Yang

Phone: (902) 494-2572

Fax: (902) 494-5130

E-mail: [hsyang@dal.ca](mailto:hsyang@dal.ca)

Website: <https://www.heesungyang.com>

Citizenship: United States

Department of Mathematics and Statistics

Dalhousie University

6316 Coburg Road, PO BOX 15000

Halifax, NS, Canada

B3H 4R2

---

**Research Interests** NUMBER THEORY: elementary number theory, analytic number theory, combinatorial number theory, transcendental number theory.

**Education** DALHOUSIE UNIVERSITY, Halifax, Nova Scotia, Canada 2018 –  
Doctor of Philosophy (in progress; advanced to PhD candidacy)  
Adviser: Karl Dilcher

UNIVERSITY OF WATERLOO, Waterloo, Ontario, Canada 2014 – 2017  
Master of Mathematics  
Research paper title: *On the approximation of real numbers with algebraic integers of low degree*  
Adviser: Cameron L. Stewart

UNIVERSITY OF WASHINGTON, Seattle, WA, USA 2013 – 2014  
Non-degree studies

UNIVERSITY OF CALIFORNIA, LOS ANGELES, Los Angeles, CA, USA 2012 – 2013  
Non-degree studies

DARTMOUTH COLLEGE, Hanover, NH, USA 2008 – 2012  
Bachelor of Arts (cum laude), Mathematics with High Honours, June 2012  
Thesis title: *Unitary untouchable numbers*  
Adviser: Carl Pomerance

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS, Budapest, Hungary  
Budapest Semesters in Mathematics (a semester-long intensive transfer program).

- Participated in Fall 2011 (September 2011 – December 2011)
- Completed the program with High Honours (awarded to students whose average grade was an A)
- Courses taken: Analytic Number Theory, Complex Analysis, Topics in Geometry, Mathematical Physics

**Academic Experience** NOVA SCOTIA MATH CIRCLES, DALHOUSIE UNIVERSITY, Halifax, NS, Canada  
*Regular Presenter and Content Developer* September 2019 – August 2022  
I visited local elementary, middle, or high schools to give math presentations and run interactive activities. I also participated in week-long trips (twice a year) to a school in Cape Breton and/or to a school in the Tri-County/Yarmouth. Finally, I participated in Dalhousie Discovery days and open house as part of the Math Circles. Furthermore, I involved in developing the following new presentations for the Math Circles: The Candy Game and Pascal's Triangle.

DALHOUSIE UNIVERSITY, Halifax, NS, Canada

*Teaching Assistant*

September 2018 –

I answered questions at the University's learning centre (Courses covered: calculus [MATH 1000, MATH 1010, MATH 1215], linear algebra [MATH 1030, MATH 2040], and discrete mathematics [MATH 2112]), led tutorial sections, and/or marked assignments (listed below). F, W, and S denote Fall, Winter, and Summer respectively.

- MATH 1010: Differential & Integral Calculus II (two sections) W21
- MATH 3031: Abstract Algebra I F20
- MATH 2040: Linear Algebra (second year) S20
- MATH 4116: Cryptography (marking) W20
- MATH 1290: Engineering Mathematics II (one section) W20
- MATH 1000: Differential & Integral Calculus I (two sections) F19
- MATH 1215: Calculus for Life Sciences (two sections) F18
- Learning centre F18 onwards

UNIVERSITY OF WATERLOO, Waterloo, ON, Canada

*Teaching Assistant*

September 2014 – August 2017

I performed various duties as a TA for the following courses. Duties included, but not limited to, answering assignment questions at the University's tutorial centre, leading tutorial sessions, holding office hours, and assisting in marking exams. F, W, and S denote Fall, Winter, and Spring/Summer respectively.

- PMATH 441/641: Algebraic Number Theory S16, W17
- MATH 215: Linear Algebra for ECE Students W16
- MATH 647: Foundations of Calculus I (online course) W16
- PMATH 745: Representation Theory of Finite Groups F15
- MATH 137: Calculus 1 for Honours Mathematics F15
- PMATH 347: Groups and Rings S15
- PMATH 340: Elementary Number Theory W15, F16, S17
- MATH 138: Calculus 2 for Honours Mathematics W15
- MATH 135: Algebra for Honours Mathematics F14, F16
- MATH 114: Linear Algebra for Sciences F14

UNIVERSITY OF CALIFORNIA, LOS ANGELES, Los Angeles, CA, USA

*Teaching Assistant*

September 2012 – June 2013

Led the discussion sections and marked the exams for the following courses:

- Math 61: Introduction to Discrete Structures (two sections) S13
- Math 32A: Calculus of Several Variables (two sections) S13
- Math 33A: Linear Algebra and Applications (two sections) W13
- Math 31B: Integration and Infinite Series (two sections) W13
- Math 31B: Integration and Infinite Series (four sections) F12

KANSAS STATE UNIVERSITY, Manhattan, KS, USA

*Undergraduate Researcher*

June 2011 – July 2011

- Invited to participate in the REU organized by Kansas State University.
- My project was on number theory. My research question was finding the lower bound on the number of variables that systems of forms over a  $C_i$  field must have in order for them to have a linear space of simultaneous zeroes.
- Mentors: Craig V. Spencer (primary), Todd Cochrane (secondary)
- Supported by the NSF REU Grant DMS-1004336.

DARTMOUTH COLLEGE, Hanover, NH, USA

*Grader*

Fall 2009, Winter 2010, Fall 2010

Marked weekly homework sets for the following courses:

- Math 25: Number Theory F10
- Math 14: Calculus of Vector-Valued Functions (Honours Version) W10
- Math 13: Calculus of Vector-Valued Functions W10
- Math 12: Calculus Plus F09

Math 12 is the honours version of Math 11, a multivariable calculus course designed especially for first-year students who completed AP Calculus BC before attending Dartmouth.

## Publications

- [1] H.-S. YANG, *On the approximation of real numbers with algebraic integers of low degree*, MMath research paper, University of Waterloo, Waterloo, Ontario, Canada, 2015.
- [2] C. Pomerance and H.-S. YANG, *Variant of a theorem of Erdős on the sum-of-proper-divisors function*, Math. Comp. **83** (2014), 1903-1913.
- [3] T. Cochrane, C. V. Spencer, and H.-S. YANG, *Rational linear spaces on hypersurfaces over quasi-algebraically closed fields*, Rocky Mountain J. Math. **44** (2014), no. 6, 1805-1816.
- [4] H.-S. YANG, *Unitary untouchable numbers*, Undergraduate honours thesis, Dartmouth College, Hanover, NH, 2012.

## Invited Talks

- Variant of a theorem of Erdős on the sum-of-proper-divisors function*, AMS Special Session on Covering of the Integers, Joint Mathematics Meetings 2013, 11 January 2013.
- Rational linear spaces on hypersurfaces over quasi-algebraically closed fields*, AMS Special Session on Arithmetic Geometry, Joint Mathematics Meetings 2012, 4 January 2012.

## Contributed Talks

- Variant of a theorem of Erdős on the sum-of-proper-divisors function*, Dalhousie University Number Theory Seminar, 25 November 2019.
- Quadratic sieve factoring algorithm*, PMATH 940: Computational algebraic number theory final seminar, University of Waterloo, 5 April 2016.
- Irrationality measures for some automatic real numbers*, PMATH 940: Heights and arithmetic final seminar, University of Waterloo, 30 November 2015.
- On  $p$ -adic Waring's problem*, PMATH 940:  $p$ -adic Analysis final seminar, University of Waterloo, 1 December 2014.
- Variant of a theorem of Erdős on the sum-of-proper-divisors function*, West Coast Number Theory 2012, 18 December 2012.
- Unitary untouchable numbers*, Young Mathematicians Conference 2012, 27 July 2012.
- Unitary untouchable numbers*, Canadian Number Theory Association Meeting XII, 17 June 2012.
- Rational linear spaces on hypersurfaces over quasi-algebraically closed fields*, Young Mathematicians Conference 2011, 19 August 2011.

**Conferences Attended**

1. 2022 CMS Summer Meetings, St. John's, NL, Canada (2022)
2. West Coast Number Theory 2021 (online, 2021)
3. LGBTQ+ Math Day (online, 2021)
4. Analytic and Combinatorial Number Theory: The Legacy of Ramanujan (a conference in honour of Bruce C. Berndt's 80th birthday), Urbana, IL, USA (2019)
5. Canadian Number Theory Association (CNTA) XIV, Calgary, AB, Canada (2016)
6. Arithmetic 2015: Silvermania (in honour of Joseph H. Silverman), Providence, RI, USA (2015)
7. Elementary, analytic, and algorithmic number theory: Research inspired by the mathematics of Carl Pomerance (in honour of Carl Pomerance's 70th birthday), University of Georgia, Athens, GA, USA (2015)
8. Joint Mathematics Meetings, San Diego, CA, USA (2013)
9. West Coast Number Theory 2012, Pacific Grove, CA, USA (2012)
10. Canadian Number Theory Association (CNTA) XII, Lethbridge, AB, Canada (2012)
11. Joint Mathematics Meetings, Boston, MA, USA (2012)
12. Young Mathematicians Conference, Ohio State University, Columbus, OH, USA (2011, 2012)

**Honours and Awards**

DALHOUSIE UNIVERSITY RESEARCH GRANT, Dalhousie University, Fall 2018 –  
FACULTY OF GRADUATE STUDIES DEPARTMENTAL SCHOLARSHIP, Dalhousie University, Fall 2018 –  
UNIVERSITY OF WATERLOO GRADUATE SCHOLARSHIP, University of Waterloo, Spring 2015, Spring 2016.  
INTERNATIONAL DOCTORAL STUDENT AWARD, University of Waterloo, Fall 2015 – Spring 2017.  
INTERNATIONAL MASTERS STUDENT AWARD, University of Waterloo, Fall 2014 – Spring 2015.  
MATHEMATICS GRADUATE EXPERIENCE AWARD, University of Waterloo, Fall 2014 –  
MATHEMATICS FACULTY GRADUATE AWARD, University of Waterloo, Fall 2014 –  
PURE MATHEMATICS DEPARTMENTAL AWARD, University of Waterloo, Fall 2014 – Winter 2015, Winter 2016.  
GAZZANIGA FAMILY SCIENCE AWARD, Dartmouth College, June 2012.  
This award is given to an undergraduate in the sciences departments who demonstrated an outstanding research record. I was nominated by the College's mathematics department and was chosen as a winner by the chairs of the sciences departments, for the best undergraduate thesis in the sciences departments.

**Other Math Activities**

PRESIDENT, Dartmouth Mathematical Society

- Member since September 2008; President during the 2009–2010 academic year.
- Planned extracurricular mathematical activities, such as weekly (every two weeks in Winter and Spring quarters) talks on a topic chosen by an invited faculty member or graduate student.

**University  
Service**

UNDERGRADUATE MEMBER, Dartmouth College Council on Computing

- Term: September 2010 – June 2011
- I was one of the two undergraduates chosen by the Membership and Internal Affairs Committee of the Student Assembly to sit on the Council on Computing to represent the interests of the student body.

MEMBER, Student Advisory Group for the Blitz-2-Blitz Transition

- Period of involvement: September 2010 – June 2011
- Dartmouth College decided to migrate to the new Blitz system by the Microsoft Online Services to replace the old BlitzMail system. A group of volunteers advised the Computing Service officials in charge of the migration process so that the process went as smoothly as possible.

**Other Work  
Experience**

STUDENT CONSULTANT, Dartmouth College Computing Help Desk (January 2011 – June 2011, January 2012 – June 2012)

**Professional  
Memberships**

Canadian Mathematical Society, American Mathematical Society, Mathematical Association of America

**Computer Skills**

Programming languages: Java (basic), Mathematica (basic), Sage (basic).  
Applications: L<sup>A</sup>T<sub>E</sub>X, LibreOffice.

## References

Karl Dilcher  
Department of Mathematics and Statistics  
Dalhousie University  
6316 Coburg Road  
Halifax, NS, Canada  
B3H 4R2  
dilcher@mathstat.dal.ca

Cameron L. Stewart  
Department of Pure Mathematics  
University of Waterloo  
200 University Avenue West  
Waterloo, ON, Canada  
N2L 3G1  
cstewart@uwaterloo.ca

Kevin G. Hare  
Department of Pure Mathematics  
University of Waterloo  
200 University Avenue West  
Waterloo, ON, Canada  
N2L 3G1  
kghare@uwaterloo.ca

Jason P. Bell  
Department of Pure Mathematics  
University of Waterloo  
200 University Avenue West  
Waterloo, ON, Canada  
N2L 3G1  
jpbell@uwaterloo.ca

Carl Pomerance  
Department of Mathematics  
Dartmouth College  
6188 Kemeny Hall  
Hanover, NH, United States  
03755  
carlp@math.dartmouth.edu