Jed Yang

Curriculum Vitae

August 13, 2024

Contact Information

Department of Mathematics and Computer Science
Bethel University
3900 Bethel Dr.
St. Paul, MN 55112, USA
Website: `https://www.mathcs.bethel.edu/yang`
Email: `jed-yang@bethel.edu`
Phone: (651) 638-6405

Education

2008–2013 **University of California, Los Angeles**, CA, USA
Ph.D., Mathematics, June 2013
Advisor: Igor Pak
Dissertation: "*Computational Complexity and Decidability of Tileability*"
Master of Arts, Mathematics, March 2010

2004–2008 **California Institute of Technology**, Pasadena, CA, USA
Bachelor of Science with Honor, Mathematics, June 2008
Class rank 2/207. GPA 4.09

Employment

Bethel University, St. Paul, MN, USA
2023– Associate Professor of Mathematics and Computer Science
2018–2023 Assistant Professor of Mathematics and Computer Science

Carleton College, Northfield, MN, USA
2021–2023 Summer Computer Science Instructor, Summer Liberal Arts Institute [x3]
2016–2018 Visiting Assistant Professor of Computer Science

University of Minnesota, Minneapolis, MN, USA
2013–2016 Postdoctoral Associate

University of California, Los Angeles
2013 Lecturer
2009–2012 Teaching Assistant

California Institute of Technology, Pasadena, CA, USA
2005–2008 Web Developer

Research Interests

Tilings, computational complexity, decidability, aperiodicity, discrete geometry, polytopes, graph theory, colorings, hypergraphs, combinatorics

Teaching Experience

Bethel University

August 2018–

COS 100	Introduction to programming
COS 216	Algorithms and advanced data structures
COS 371	Organization of programming languages
COS 490/MAT 425	Computability and complexity
MAT 101M	Mathematics for the 21st century
MAT 125	Calculus 2
MAT 223	Multivariable calculus
MAT 241	Discrete mathematics

Carleton College

September 2016–June 2018, July 2021, July 2022, July 2023

CS 099	Game development (Summer Liberal Arts Institute)
CS 111	Introduction to computer science
CS 201	Data structures
CS 202	Mathematics of computer science
CS 251	Programming languages: design and implementation
CS 254	Computability and complexity

University of Minnesota

September 2013–May 2016

Math 1271	Calculus (lecturer and course chair, supervised 4 other instructors and 11 TAs)
Math 4707	Introduction to combinatorics and graph theory
Math 4990	Discrete geometry (UMTYMP Advanced topics)
Math 5707	Graph theory

University of California, Los Angeles

Instructor	June 2013–August 2013
Math 131A	Analysis
Teaching Assistant	September 2009–September 2012
Math 31A	Differential and integral calculus
Math 32A	Multivariate differential calculus
Math 32B	Multivariate integral calculus

Undergraduate Mentoring

2021	Alex Harker, independent research advisor
2018	Will Knospe, Will Schwarzer, and David White, Carleton summer research, mentor
2018	Nick Spinale, Carleton independent research, mentor
2017	Zephyr Lucas, Anna Meyer, and Walt O'Connor, Carleton summer research, mentor
2015	Jake Donaldson, UMN senior project, mentor
2014	UMN Combinatorics Research Experiences for Undergraduates (REU), co-mentor

Fellowships and Awards

2010–2013 NSF Graduate Research Fellowship, National Science Foundation, USA
2008–2010 Chancellor's Fellowship, UCLA, Los Angeles, CA, USA
2008 Scott Russell Johnson Prize for Graduating Senior, Caltech, Pasadena, CA, USA
2007 Eric Temple Bell Undergraduate Mathematics Research Prize, Caltech
2007 Herbert J. Ryser Scholarship (for general mathematical excellence), Caltech
2007 Rosalind W. Alcott Merit Scholarship, Caltech
2006, 2007 Carnation Scholarship, Caltech

Publications and Preprints

12. (*with I. Pak*) Tiling with puzzle pieces is hard, in preparation.
11. Some NP-complete edge packing and partitioning problems in planar graphs, *Communications on Number Theory and Combinatorial Theory* **3** (2022), Article 2.
`https://www.mathcs.bethel.edu/yang/papers/spantree.pdf`
10. (*with P. Pylyavskyy*) Puzzles in K-homology of Grassmannians, *Pacific J. Math.* **303** (2019), 703–727.
`https://www.mathcs.bethel.edu/yang/papers/ktiles.pdf`
9. (*with N. M. Tran*) Antibiotics time machines are hard to build, *Notices Amer. Math. Soc.* **64** (2017), 1136–1140.
`https://www.mathcs.bethel.edu/yang/papers/timemachine.pdf`
8. (*with D. Davis, V. Dods, C. Traub*) Geodesics on the regular tetrahedron and the cube, *Discrete Math.* **340** (2017), 3183–3196.
`https://www.mathcs.bethel.edu/yang/papers/geodesics.pdf`
7. (*with G.-Y. Pan, J.-Y. Jou, B.-C. Lai*) Scalable global power management policy based on combinatorial optimization for multiprocessors, *ACM Transactions on Embedded Computing Systems* **14** (2015), Article 70, 24pp.
`https://www.mathcs.bethel.edu/yang/papers/power.pdf`
6. Rectangular tileability and complementary tileability are undecidable, *European J. Combin.* **41** (2014), 20–34.
`https://www.mathcs.bethel.edu/yang/papers/decide.pdf`
5. Computational complexity and decidability of tileability, PhD dissertation (2013).
`https://www.mathcs.bethel.edu/yang/papers/yang-thesis.pdf`
4. (*with I. Pak*) The complexity of generalized domino tilings, *Electron. J. Combin.* **20** (2013), P12, 23pp.
`https://www.mathcs.bethel.edu/yang/papers/domino.pdf`
3. (*with I. Pak*) Tiling simply connected regions with rectangles, *J. Combin. Theory Ser. A* **120** (2013), 1804–1816.
`https://www.mathcs.bethel.edu/yang/papers/rect.pdf`
2. Vertex-pancyclicity of hypertournaments, *J. Graph Theory* **63** (2010), 338–348.
`https://www.mathcs.bethel.edu/yang/papers/pancyclic.pdf`

1. On coloring claw-free graphs, manuscript (2007).
   `https://www.mathcs.bethel.edu/yang/papers/clawfree.pdf`

Talks

2024

Apr **MAA North Central Section**, Minneapolis, MN
"*Simple framework for students teaching each other proof strategies*"

2021

Oct **MAA North Central Section**, Virtual Meeting
"*Triangles, rhombi, and hexagons can count*"

2018

Mar **Bethel University**, St. Paul, MN
"*Complexity of simple tiles*"

Feb Computer Science Colloquium, **Carleton College**, Northfield, MN
"*Computer-assisted proof system for tilings*"

2017

Feb Computer Science Colloquium, **Carleton College**, Northfield, MN
"*Counting triangular puzzle tilings*"

2016

Oct **MAA North Central Section**, Minneapolis, MN
"*Tiling with puzzle pieces is hard*"

May Combinatorics and Algebraic Geometry Seminar, **U. of Pennsylvania**, Philadelphia, PA
"*Complexity of tiling using triangles*"

Apr **MAA North Central Section**, St. Paul, MN
"*Undecidable problems in tilings*"

Computer Science Colloquium, **Carleton College**, Northfield, MN
"*Tiling with simple tiles is hard*"

2015

Nov Combinatorics Seminar, **Caltech**, Pasadena, CA
"*Hard tiling problems on lattices*"

Discrete Math Seminar, **Rutgers University**, New Brunswick, NJ
"*Tiling with triangles is hard*"

Oct **MAA North Central Section**, Bemidji, MN
"*Tiling with simple tiles can be hard*"

Sep Algebra-Geometry-Combinatorics Seminar, **San Francisco State University**, CA
"*Hard tiling problems*"

2014

NOV Combinatorics Seminar, **UCLA**, Los Angeles, CA
"*Hard tiling problems with triangles and rhombi*"

Geometric and Enumerative Combinatorics Workshop, **IMA**, Minneapolis, MN
"*Hard tiling problems with triangles and rhombi*"

SEP **AMS Special Session on Algebraic Combinatorics**, Eau Claire, WI
"*Tiling by triangles and rhombi is hard*"

2013

DEC Applied Math Colloquium, **National Chiao Tung University**, Hsinchu, Taiwan
"*Complexity of tiling with rectangles*"

Applied Math Seminar, **National Dong Hwa University**, Hualien, Taiwan
"*Complexity of tiling by rectangles*"

NOV Student Combinatorics Seminar, **University of Minnesota**, Minneapolis, MN
"*Klarner systems and easy tiling problems*"

SEP Combinatorics Seminar, **University of Minnesota**, Minneapolis, MN
"*Computational complexity and decidability of tiling problems*"

JUN Combinatorics Seminar, **UCLA**, Los Angeles, CA
"*Computational complexity and decidability of tileability*"

MAY Graduate Seminar, **UCLA**, Los Angeles, CA
"*Counting domino tilings of Aztec diamonds*"

APR **Graduate Student Combinatorics Conference**, Minneapolis, MN
"*Undecidability of tileability*"

JAN **Joint Math Meetings**, San Diego, CA
AMS Special Session on Discrete Geometry and Algebraic Combinatorics
"*Hard tiling problems with simple tiles*"

AMS Special Session on Discrete and Computational Geometry
"*Undecidable tiling problems*"

2012

NOV Discrete Math Seminar, **Rutgers University**, New Brunswick, NJ
"*Tiling simply connected regions using rectangles*"

Combinatorics Seminar, **Massachusetts Institute of Technology**, Cambridge, MA
"*Hard tiling problems with rectangles*"

Combinatorics and Probability Seminar, **University of Pennsylvania**, Philadelphia, PA
"*Complexity of tiling using rectangles*"

NOV Combinatorics Seminar, **Georgia Institute of Technology**, Atlanta, GA
"*Tiling simply connected regions by rectangles*"

Oct Algebra and Combinatorics Seminar, **Texas A&M University**, College Station, TX
"*Hard tiling problems with rectangular tiles*"

Combinatorics Seminar, **University of Michigan**, Ann Arbor, MI
"*Tiling simply connected regions with rectangles*"

Mar Graduate Seminar, **UCLA**, Los Angeles, CA
"*Brick walls and easy tiling problems*"

Feb Combinatorics Seminar, **Caltech**, Pasadena, CA
"*Hard tiling problems in simply connected regions*"

2011

Apr Combinatorics Seminar, **UCLA**, Los Angeles, CA
"*On hard tiling problems*"

Graduate Seminar, **UCLA**, Los Angeles, CA
"*Magic carpets and hard tiling problems*"

Service

University committees

Advising Committee [x2]
Committee for Academic Affairs (CAA)
Student Success Committee (SSC)
Faculty Policy Review Committee (FPRC) [x2]
Professional Advancement Committee (PAC)
Math Curriculum Subcommittee (chair) [x2]
Computer Science Curriculum Subcommittee (chair) [x2]
Calculus Subcommittee (chair)

Leadership

2024 Chair, Department of Mathematics and Computer Science (sabbatical replacement)
2023– Treasurer, Mathematical Association of America (MAA) North Central Section (NCS)

Organizational activities

2022, 2023 MAA NCS Heuer Team Math Competition, co-organizer [x2]
2020 CS Group Advising, organizer
2014–2015 University of Minnesota Combinatorics Seminar, co-organizer
2012–2013 UCLA Graduate Seminar, organizer
2013 UCLA Prospective Graduate Student Open House, student co-organizer

Journals refereed

American Mathematical Monthly
Discrete Mathematics
Discrete & Computational Geometry
European Journal of Combinatorics

Graphs and Combinatorics
Journal of Combinatorics
Journal of Graph Theory
SIAM Journal on Discrete Mathematics (SIDMA)
Seminaire Lotharingien de Combinatoire

Conferences refereed

ACM-SIAM Symposium on Discrete Algorithms (SODA)

Outreach

2012	Los Angeles Math Circle, guest lecture
2009–2012	Gertz–Ressler High School, guest lectures and volunteer tutoring
2008–2012	California Academy of Mathematics and Science, guest lectures and tutoring