# Wai-Kit Lam


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**Research Interests** Probability theory.

**Education**

**Indiana University, Bloomington**

Ph.D. in Mathematics, 2013 - 2018

Advisor: Michael Damron
Dissertation Topic: Topics in critical and first-passage percolation

**The Chinese University of Hong Kong**

M.Phil. in Mathematics, 2011 - 2013

Advisor: De-Jun Feng
Dissertation Topic: Arithmetic properties of certain sets of fractional dimension

B.Sc. in Mathematics, 2008 - 2011

**Employment**

**University of Minnesota**

Dunham Jackson Assistant Professor, 2018 - 2021

**Publications/ Preprints**

(With M. Damron, C. Janjigian and X. Shen) Tail bounds for the averaged empirical distribution on a geodesic in first-passage percolation. *arXiv: 2010.08072*

(With W.-K. Chen) Universality of approximate message passing algorithms. *arXiv: 2003.10431*

(With M. Damron and J. Hanson) Universality of the time constant for 2D critical first-passage percolation. *arXiv: 1904.12009*

(With W.-K. Chen) Order of fluctuations of the free energy in the SK model at critical temperature. *ALEA Lat. Am. J. Probab. Math. Stat.* Volume XVI (2019), 809–816.

(With M. Damron and J. Hanson) The size of the boundary in first-passage percolation. *Ann. Appl. Probab.* Volume 28, Number 5 (2018), 3184–3214.

(With M. Damron and X. Wang) Asymptotics for 2D critical first passage percolation. *Ann. Probab.* Volume 45, Number 5 (2017), 2941–2970.

**Forthcoming preprints**

(With M. Damron, J. Hanson and D. Harper) Exceptional times in 2D critical first-passage percolation.

(With P. Nolin) Near-critical avalanches in 2D frozen percolation and forest fires.

(With A. Sen) Maximum weight matching on locally tree-like graphs.

**Talks/ Presentations**

Random complex systems: examples and applications
Special Colloquium, Academia Sinica (Dec. 2020)

National Taiwan University (Nov. 2020)

Near-critical avalanches in 2D frozen percolation and forest fires

Weierstrass Institute for Applied Analysis and Stochastics (Oct. 2020)
Probability and Related Fields Seminar, Indiana University (Feb. 2020)
Probability Seminar, University of Minnesota (Jan. 2020)

Tail bounds for the averaged empirical distribution on a geodesic in first-passage percolation

Northwestern University-University of Minnesota Joint Probability Seminar (Sep. 2020)

The travel time to infinity in percolation

Bernoulli-IMS One World Symposium 2020 (Aug. 2020)
(Poster presentation) Interacting Particle Systems, Statistical Mechanics, and Related Topics, UCLA (Mar. 2019)
Probability Seminar, University of Minnesota (Sep. 2018)

Universality of the time constant in 2D critical first-passage percolation

AMS Sectional Meeting, Binghamton University (Oct. 2019)
Stochastic Processes and their Applications 2019, Northwestern University (July 2019)

Limit shapes in first-passage percolation

Functional Analysis Seminar, University of Pittsburgh (Oct. 2018)

The size of the boundary in first-passage percolation

Probability Seminar, University of Illinois at Urbana–Champaign (Mar. 2018)

The size of the boundary in the Eden model

Seminar, The Chinese University of Hong Kong (May 2017)
AMS Joint Math Meetings, Atlanta (Jan. 2017)

Asymptotics for 2D first-passage percolation

AMS Joint Math Meetings, Atlanta (Jan. 2017)
Probability and Related Fields Seminar, Indiana University (Oct. 2016)
Seminar, The Chinese University of Hong Kong (July 2016)

Arithmetic properties of certain sets of fractional dimension

Seminar, The Chinese University of Hong Kong (Nov. 2012)

## Expository talks

Several talks on first-passage percolation
Probability/mathematical physics learning seminar, University of Minnesota (Spring 2019)

Several talks on random matrix theory
Graduate student seminar: Random matrix theory, Indiana University (Spring 2018)

Fourier decay of measures
Graduate student analysis seminar, Indiana University (Nov. 2015)

Commutative Banach algebras
Student seminar, The Chinese University of Hong Kong (July 2015)

Arithmetic progressions in sets of fractional dimension
Seminar, The Chinese University of Hong Kong (Mar. 2012)

## Conferences/ Workshops Participation

42nd Midwest Probability Colloquium, Northwestern University (Oct. 2020)
Bernoulli-IMS One World Symposium 2020 (Aug. 2020)
AMS Joint Math Meetings, Denver (Jan. 2020)
AMS Sectional Meeting, Binghamton University (Oct. 2019)

41st Midwest Probability Colloquium, Northwestern University (Oct. 2019)
Stochastic Processes and their Applications 2019, Northwestern University (July 2019)
Mathematics Research Communities: Stochastic Spatial Models, Whispering Pines (June 2019)
2019 Spring Probability Workshop, Academia Sinica (May 2019)
Interacting Particle Systems, Statistical Mechanics, and Related Topics, UCLA (Mar. 2019)
Spin Glasses and Related Topics, BIRS (Oct. 2018)
Workshop on Fractal Geometry and Related Topics, CUHK (May 2018)
Wabash Modern Analysis Seminar, Wabash College (Feb. 2018)
AMS Sectional Meeting, Indiana University (Apr. 2017)
AMS Joint Math Meetings, Atlanta (Jan. 2017)
School and Workshop on Random Interacting Systems, University of Bath (June 2016)
Midwest Workshop on Asymptotic Analysis, Indiana University (Oct. 2015)
AMS Sectional Meeting, Michigan State University (Mar. 2015)
International Conference on Advances on Fractals and Related Topics, CUHK (Dec. 2012)
Workshop on Fractals and Related Fields, CUHK (Feb. 2012)
Kyoto University/CUHK Joint Workshop on Analysis and Geometry of Fractals and Metric Measure Spaces, CUHK (Mar. 2010)

## Teaching Experience

At UMN:

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| Spring | 2021 | Instructor, MATH 5652 Introduction to Stochastic Processes. |
| Fall | 2020 | Instructor, MATH 5651 Basic Theory of Probability and Statistics (two sections). |
| Spring | 2020 | Instructor, MATH 5652 Introduction to Stochastic Processes. |
| Fall | 2019 | Instructor, MATH 5652 Introduction to Stochastic Processes (two sections). |
| Spring | 2019 | Instructor, MATH 5651 Basic Theory of Probability and Statistics. |
| Fall | 2018 | Instructor, MATH 5651 Basic Theory of Probability and Statistics (two sections). |

At IU:

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| Fall | 2017 | Instructor, MATH-D116 Introduction to Finite Mathematics. |
| Fall | 2016 | Instructor, MATH-M018 Basic Algebra for Finite Mathematics (two sections). |
| Fall | 2014 | Recitation instructor, MATH-M211 Calculus I (two sections). |
| Spring | 2014 | Recitation instructor, MATH-M212 Calculus II. |

At CUHK:

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| Spring | 2013 | Teaching assistant, MATH2220 Mathematics Laboratory II. |
| Fall | 2012 | Teaching assistant, MATH2050 Mathematical Analysis I. |
| Spring | 2012 | Teaching assistant, MATH2220 Mathematics Laboratory II. |
| Fall | 2011 | Teaching assistant, MATH2050 Elementary Analysis I. |

EPYMT (Enrichment Programme for Young Mathematics Talents):

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| Summer | 2012 | Teaching assistant, Understanding Non-Euclidean Geometry. |
| Summer | 2011 | Teaching assistant, Understanding Non-Euclidean Geometry. |
| Summer | 2009 | Teaching assistant, Number Theory and Cryptography. |

## Mentoring

Undergraduate senior project:
Lu Zhang (Spring 2019), Xiaoyi Duan (Fall 2019), Lukuan Wang, Wanchen Zhang (Spring 2020), Brandon Kolstoe, Feng Su (Spring 2021)
Directed Reading Program:
Beixi Lei (Fall 2015)

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| Editorial service | Refereed articles for Annales de l'Institut Henri Poincaré, Electronic Communications in Probability, Journal of Statistical Physics, and some conference proceedings.<br><br>Reviewed articles for Mathscinet. |

| Honors and Awards | | |
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| | 2019–2020 | Thank A Teacher Award (twice) |
| | 2016–2017 | College of Arts and Sciences Travel Award |
| | 2014–2015 | William B. Wilcox Mathematics Award |
| | 2013–2014 | College of Arts and Sciences Top Up Award |
| | | James P. Williams Memorial Award |
| | | AMS Graduate Student Travel Grant |
| | 2010–2011 | Dean's List-Merit, New Asia College |
| | | Dean's List, Faculty of Science |
| | 2009–2010 | Ng Kung Fu Educational Fund Scholarships in Mathematics |
| | 2008–2009 | Dean's List-Merit, New Asia College |
| | | Dr Daisy Li Mathematics Award |
| | | Mathematics Scholarship |

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| Service | Co-organizer, Probability seminar (Fall 2018 –)<br>Organizer, Graduate student seminar: Random matrix theory (Spring 2018)<br>Student helper and organizer, Directed Reading Program (Spring 2016)<br>Student helper, Science Fest (Oct. 2015) |
| Languages | Cantonese (native), English (fluent), German (reading proficiency), Japanese (fluent), Mandarin (fluent) |
| Citizenship | Hong Kong citizen |
| Nationality | British national (overseas) |