# Yevgeniy Kovchegov

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## EDUCATION

- *Ph.D. in mathematics*, Stanford University, California, June 2002 Advisor: A. Dembo

- *M.S. in mathematics*, Stanford University, California, September 2000

- *B.A. in mathematics, with honors*, New York University, New York, May 1997

## EMPLOYMENT

- PROFESSOR
  Department of Mathematics, Oregon State University
  September 2017 - Present

- ASSOCIATE PROFESSOR
  Department of Mathematics, Oregon State University
  September 2011 - September 2017

- ASSISTANT PROFESSOR
  Department of Mathematics, Oregon State University
  September 2005 - September 2011

- VIGRE ASSISTANT PROFESSOR
  Department of Mathematics, University of California, Los Angeles
  August 2002 - June 2005

- RESEARCH ASSISTANT / TEACHING ASSISTANT
  Department of Mathematics, Stanford University, California
  August 1997 - June 2002

## VISITING APPOINTMENTS

- VISITING FULL PROFESSOR
  IME, University of São Paulo, São Paulo, SP, Brazil
  December 2018 - June 2019

- VISITING ASSOCIATE PROFESSOR
  IME, University of São Paulo, São Paulo, SP, Brazil
  January 2017 - March 2017

# PUBLICATIONS

## Books

B1. **Yevgeniy Kovchegov** and Peter T. Otto, *Path Coupling and Aggregate Path Coupling*, SpringerBriefs in Probability and Mathematical Statistics, Springer, 2018, ISBN 978-3-319-77018-5. doi:10.1007/978-3-319-77019-2

## Surveys

R2. **Yevgeniy Kovchegov**, Ilya Zaliapin, and Efi Foufoula-Georgiou, *Random Self-Similar Trees with Applications to Geophysics*, Surveys in Geophysics, Vol. **43**, (2022) 353-421; doi:10.1007/s10712-021-09682-0

R1. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Random Self-Similar Trees: A mathematical theory of Horton laws*, Probability Surveys, Vol. **17** (2020), 1-213; doi:10.1214/19-PS331

## Refereed journal publications

J39. **Yevgeniy Kovchegov**, Alex Negrón, Clarice Pertel, and Christopher Wang, *Extensions of true skewness for unimodal distributions*, to appear in Mathematical Methods of Statistics (2024) arXiv:2209.11139

J38. **Yevgeniy Kovchegov** and Peter T. Otto, *Multidimensional Lambert-Euler inversion and vector-multiplicative coalescent processes*, Journal of Statistical Physics, Vol. **190**, Article 188 (2023) doi:10.1007/s10955-023-03188-2

J37. **Yevgeniy Kovchegov**, Guochen Xu, and Ilya Zaliapin, *Invariant Galton-Watson trees: metric properties and attraction with respect to generalized dynamical pruning*, Advances in Applied Probability, Vol. **55**, Issue 2, (2023) 643-671; doi:10.1017/apr.2022.39

J36. Evgenia Chunikhina, Paul Logan, **Yevgeniy Kovchegov**, Anatoly Yambartsev, Debashis Mondal, and Andrey Morgun, *The C-SHIFT algorithm for normalizing covariances*, IEEE/ACM Transactions on Computational Biology and Bioinformatics, Vol. **20**, Issue 1, (2023) 720-730; doi:10.1109/TCBB.2022.3151840

J35. **Yevgeniy Kovchegov**, Ilya Zaliapin, and Yehuda Ben-Zion, *Invariant Galton-Watson branching process for earthquake occurrence*, Geophysical Journal International, Vol. **231**, Issue 1, (2022) 567-583; doi:10.1093/gji/ggac204

J34. **Yevgeniy Kovchegov**, *A new life of Pearson's skewness*, Journal of Theoretical Probability, Vol. **35**, Issue 4, (2022) 2896-2915; doi:10.1007/s10959-021-01149-7

J33. (Same as R2.) **Yevgeniy Kovchegov**, Ilya Zaliapin, and Efi Foufoula-Georgiou, *Random Self-Similar Trees with Applications to Geophysics*, Surveys in Geophysics, Vol. **43**, (2022) 353-421; doi:10.1007/s10712-021-09682-0

J32. **Yevgeniy Kovchegov**, Ilya Zaliapin, and Efi Foufoula-Georgiou, *Critical Tokunaga model for river networks*, Physical Review E, Vol. **105**, 014301 (2022); doi:10.1103/PhysRevE.105.014301

J31. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Invariance and attraction properties of Galton-Watson trees*, Bernoulli, Vol. **27**(3), (2021) 1789-1823; doi:10.3150/20-BEJ1292

J30. **Yevgeniy Kovchegov**, Peter T. Otto, and Anatoly Yambartsev, *Cross-multiplicative coalescent processes and applications*, ALEA: Latin American Journal of Probability and Mathematical Statistics, Vol. **18** (2021), 81-106; doi:10.30757/ALEA.v18-05

J29. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Dynamical pruning of rooted trees with applications to 1D ballistic annihilation*, Journal of Statistical Physics, Volume **181**, Issue 2 (2020), 618-672; doi:10.1007/s10955-020-02593-1

J28. (Same as R1.) **Yevgeniy Kovchegov** and Ilya Zaliapin, *Random Self-Similar Trees: A mathematical theory of Horton laws*, Probability Surveys, Vol. **17** (2020), 1-213; doi:10.1214/19-PS331

J27. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Random self-similar trees and a hierarchical branching process*, Stochastic Processes and Their Applications, Volume **129**, Issue 7 (2019), 2528-2560; doi:10.1016/j.spa.2018.07.015

J26. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Tokunaga self-similarity arises naturally from time invariance*, Chaos **28**, 041102 (2018); doi:10.1063/1.5029937

J25. José C. Hernández, **Yevgeniy Kovchegov**, and Peter T. Otto, *The aggregate path coupling method for the Potts model on bipartite graph*, Journal of Mathematical Physics, Volume **58**, Issue 2, 023303 (2017); doi:10.1063/1.4976502

J24. Jenia Rousseva and **Yevgeniy Kovchegov**, *On alternating quantum walks*, Physica A: Statistical Mechanics and its Applications, Volume **470** (2017), 309-320; doi:10.1016/j.physa.2016.11.138

J23. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Horton self-similarity of Kingman's coalescent tree*, Annales de l'Institut Henri Poincaré - Probabilités et Statistiques, Vol. **53**, No. 3 (2017), 1069-1107; doi:10.1214/16-AIHP748

J22. Anatoly Yambartsev, Michael Perlin, **Yevgeniy Kovchegov**, Natalia Shulzhenko, Karina L. Mine, Xiaoxi Dong, Andrey Morgun, *Unexpected links reflect the noise in networks*, Biology Direct **11**, 52 (2016); doi:10.1186/s13062-016-0155-0

J21. **Yevgeniy Kovchegov** and Ilya Zaliapin, *Horton law in self-similar trees*, Fractals, Vol. **24**, No. 2 (2016) 1650017 (10 pages); doi:10.1142/S0218348X16500171

J20. Kyle Bradford, **Yevgeniy Kovchegov**, and Thinh Nguyen, *Stable adiabatic theorems for Markov chains*, Stochastics, Volume **88**, Issue 4 (2016), 567-585; doi:10.1080/17442508.2015.1102267

J19. **Yevgeniy Kovchegov** and Peter T. Otto, *Rapid mixing of Glauber dynamics of Gibbs ensembles via aggregate path coupling and large deviations methods*, Journal of Statistical Physics, Volume **161**, Issue 3 (2015), 553-576; doi:10.1007/s10955-015-1345-3

J18. **Yevgeniy Kovchegov** and Nese Yildiz, *Orthogonal polynomials for semiparametric instrumental variables model*, ESAIM: Probability and Statistics, Volume **19**, (2015), 293-306; doi:10.1051/ps/2014025

J17. **Yevgeniy Kovchegov** and Nicholas Michalowski, *A class of Markov chains with no spectral gap*, Proceedings of the American Mathematical Society, Volume **141**, Number 12 (2013), 4317-4326; doi:10.1090/S0002-9939-2013-11697-7

J16. Max Brugger, Kyle Bradford, Samina Ehsan, Bechir Hamdaoui, **Yevgeniy Kovchegov**, *Analytic bounds on data loss rates in mostly-covered mobile DTNs*, IEEE Transactions on Wireless Communications, Volume **12**, Number 7 (2013), 3121-3129; doi:10.1109/TWC.2013.060313.111597

J15. Kien Nguyen, Thinh Nguyen, **Yevgeniy Kovchegov**, and Viet Le, *Distributed Data Replenishment*, IEEE Transactions on Parallel and Distributed Systems, Volume **24**, Number 2 (2013), 275-287; doi:10.1109/TPDS.2012.115

J14. Samina Ehsan, Kyle Bradford, Max Brugger, Bechir Hamdaoui, **Yevgeniy Kovchegov**, Douglas Johnson, and Mounir Louhaichi, *Design and analysis of delay-tolerant sensor networks for monitoring and tracking free-roaming Aanimals*, IEEE Transactions on Wireless Communication, Volume **11**, Issue 3 (2012), 1220-1227; doi:10.1109/TWC.2012.012412.111405

J13. Ilya Zaliapin and **Yevgeniy Kovchegov**, *Tokunaga and Horton self-similarity for level set trees of Markov chains*, Chaos, Solitons & Fractals, Volume **45**, Issue 3 (2012), 358-372; doi:10.1016/j.chaos.2011.11.006

J12. Zlatko Dimcovic, Daniel Rockwell, Ian Milligan, Robert Burton, Thinh Nguyen, and **Yevgeniy Kovchegov**, *Framework for discrete-time quantum walks and a symmetric walk on a binary tree*, Physical Review A **84**, 032311 (2011), 12 pages; doi:10.1103/PhysRevA.84.032311

J11. **Yevgeniy Kovchegov**, Peter T. Otto, and Mathew Titus, *Mixing times for the mean-field Blume-Capel model via aggregate path coupling*, Journal of Statistical Physics, Volume **144**, Issue 5 (2011), pp. 1009-1027; doi:10.1007/s10955-011-0286-8

J10. Kyle Bradford and **Yevgeniy Kovchegov**, *Adiabatic theorems for Markov chains and applications*, Journal of Statistical Physics, Volume **143**, Issue 5 (2011), 955-969; doi:10.1007/s10955-011-0219-6

J9. **Yevgeniy Kovchegov**, *Orthogonality and probability: mixing times*, Electronic Communications in Probability, Vol. **15** (2010), 59-67; doi:10.1214/ECP.v15-1525

J8. **Yevgeniy Kovchegov**, *A note on adiabatic theorem for Markov chains*, Statistics & Probability Letters, **80** (2010), 186-190; doi:10.1016/j.spl.2009.10.005

J7. **Yevgeniy Kovchegov**, Nick Meredith, and Eyal Nir, *Occupation times and Bessel densities*, Statistics & Probability Letters, **80** (2010), 104-110; doi:10.1016/j.spl.2009.09.018

J6. **Yevgeniy Kovchegov**, *Orthogonality and probability: beyond nearest neighbor transitions*, Electronic Communications in Probability, Vol. **14**, (2009), 90-103; doi:10.1214/ECP.v14-1447

J5. **Yevgeniy Kovchegov**, *Multi-particle processes with reinforcements*, Journal of Theoretical Probability, **21** (2008), 437-448; doi:10.1007/s10959-007-0141-7

J4. Eyal Nir, Xavier Michalet, Kambiz Hamadani, Ted A. Laurence, Daniel Neuhauser, **Yevgeniy Kovchegov**, and Shimon Weiss, *Shot-noise limited single-molecule FRET histogram: comparison between theory and experiments*, Journal of Physical Chemistry B, Vol. 110, N. 44 (2006), 22103-22124; doi:10.1021/jp063483n

J3. **Yevgeniy Kovchegov**, *Exclusion processes with multiple interactions*, Stochastic Processes and Their Applications, Vol. **115** (2005), 1233-1256; doi:10.1016/j.spa.2005.03.003

J2. **Yevgeniy Kovchegov**, *Brownian bridge asymptotics for the subcritical Bernoulli bond percolation*, Markov Processes and Related Fields, Vol. **10**, N. 2 (2004), 327-344

J1. **Yevgeniy Kovchegov** and Scott Sheffield, *Linear speed large deviations for percolation clusters*, Electronic Communications in Probability, Vol. **8** (2003), 179-183; doi:10.1214/ECP.v8-1098

Refereed conference proceedings

C6. Leena Zacharias, Thinh Nguyen, **Yevgeniy Kovchegov**, and Kyle Bradford, *Analysis of Adaptive Queueing Policies via Adiabatic Approach*, the Proceedings of the 2013 International Conference on Computing, Networking and Communications(ICNC), (2013), 1053-1057; doi:10.1109/ICCNC.2013.6504237

C5. Max Brugger, Kyle Bradford, Samina Ehsan, Bechir Hamdaoui, **Yevgeniy Kovchegov**, *Upper Bounds on Expected Hitting Times in Mostly-Covered Delay-Tolerant Networks*, the Proceedings of IEEE International Conference on Communications (IEEE ICC 2012), June 2012, 4995-4999; doi:10.1109/ICC.2012.6363751

C4. Samina Ehsan, Max Brugger, Kyle Bradford, Bechir Hamdaoui, **Yevgeniy Kovchegov**, *Sufficient Node Density Conditions on Delay-Tolerant Sensor Networks for Wildlife Tracking and Monitoring*, the Proceedings of IEEE GLOBECOM 2011, December 2011; doi:0.1109/GLOCOM.2011.6134558

C3. Kien Nguyen, Thinh Nguyen, **Yevgeniy Kovchegov**, and Viet Le, *P2P Distributed Data Replenishment*, the Proceedings of the 20th IEEE International Conference on Computer Communications and Networks (ICCCN), (2011); doi:10.1109/ICCCN.2011.6005811

C2. Kyle Bradford, Max Brugger, Samina Ehsan, Bechir Hamdaoui, **Yevgeniy Kovchegov**, *Data Loss Modeling and Analysis in Partially-Covered Delay-Tolerant Networks*, the Proceedings of the 20th IEEE International Conference on Computer Communications and Networks (ICCCN), (2011); doi:10.1109/ICCCN.2011.6005924

C1. Kien Nguyen, Thinh Nguyen, and **Yevgeniy Kovchegov**, *A P2P video delivery network (P2P-VDN)*, the Proceedings of the 18th IEEE International Conference on Computer Communications and Networks (ICCCN), (2009); doi:10.1109/ICCCN.2009.5235364

TECHNICAL REPORTS

T6. Bruno Barbosa, Wasamon Jantai, **Yevgeniy Kovchegov**, and Guochen Xu, *Proving Newman's CLT via Stein's method*, Technical Report, Oregon State University (2021) Deposited on ScholarsArchive@OSU

T5. **Yevgeniy Kovchegov** and Nese Yildiz, *Identification via completeness for discrete covariates and orthogonal polynomials*, Technical Report, Oregon State University (2011) Deposited on ScholarsArchive@OSU

T4. Robert M. Burton and **Yevgeniy Kovchegov**, *Mixing times via super-fast coupling*, Technical Report, Oregon State University (2011) Deposited on ScholarsArchive@OSU

T3. Zlatko Dimcovic and **Yevgeniy Kovchegov**, *Quantum interchange walk as a unifying approach*, Technical Report, Oregon State University (2010) Deposited on ScholarsArchive@OSU

T2. Robert M. Burton and **Yevgeniy Kovchegov** and Thinh Nguyen, *Quantum random walk via classical random walk with internal states*, Technical Report, Oregon State University (2010) Deposited on ScholarsArchive@OSU

T1. **Yevgeniy Kovchegov**, *Russo's formula for Lorentz lattice gas model*, Technical Report, Oregon State University (2010) Deposited on ScholarsArchive@OSU

THESIS

TH. **Yevgeniy Kovchegov**, *Brownian bridge, percolation and related processes*, Ph.D. Thesis, Stanford University (2002)

# SERVICE TO THE PROFESSION

- EDITORIAL BOARD

    - Associate Editor for *Stochastics and Dynamics* (Spring 2018 - Present)
    - Associate Editor for *Rocky Mountain Journal of Mathematics* (Summer 2019 - Present)


- REFEREE/REVIEWER

    American Mathematical Monthly; AMS MathSciNet Mathematical Reviews; Annals of Applied Probability; Annals of Probability; Econometrics; Electronic Communications in Probability; Electronic Journal of Probability; Entropy; Journal of Geophysical Research: Solid Earth; Journal of Statistical Physics; Journal of Theoretical Probability; NSF Probability Panel; Rocky Mountain Journal of Mathematics; Sankhya A; SIAM Journal on Discrete Mathematics; SIAM Journal on Mathematical Analysis; Stochastic Environmental Research and Risk Assessment; Stochastic Processes and Their Applications; Acta Physica Polonica A; Cengage Learning (book publisher); Pearson (book publisher)


- CONFERENCES ORGANIZED

    - <u>Fall 2006 - Fall 2022</u> Member of the scientific committee for the Pacific Northwest Probability Seminar, an annual scientific conference organized by Oregon State University, University of British Columbia, University of Oregon, University of Washington, and Microsoft Research (until 2018).

    - <u>Fall 2021</u> Co-organizer of *Frontier Probability Days (FPD) 2021*. The purpose of this conference is to bring together leading regional and national researchers in probability theory and its applications, along with graduate students and others, to foster interactions and stimulate research activity. The organizing committee was spread among three universities in the Intermountain West region: Oregon State University; University of Arizona; University of Nevada, Las Vegas; University of Utah.

    - <u>Spring 2018</u> Co-organizer of a research workshop on *Random Trees: Structure, Self-similarity, and Dynamics* that took place from April 23-27, 2018, at the Centro de Investigación en Matemáticas (CIMAT), Guanajuato, México.

    - <u>Spring 2018</u> Co-organizer of *Frontier Probability Days (FPD) 2018*. The purpose of this conference is to bring together leading regional and national researchers in probability theory and its applications, along with graduate students and others, to foster interactions and stimulate research activity. The organizing committee

was spread among three universities in the Intermountain West region: Oregon State University, University of Arizona, and University of Utah.

- <u>Fall 2013</u> Co-Chair for *Statistics 2013 Oregon* event, marking 2013 as the International Year of Statistics. The International Year of Statistics was recognized in a resolution approved by both houses of the United States Congress. The goal of *Statistics 2013 Oregon* was to increase public awareness of the impact of probability and statistics on the society, and to engage Oregon students and professionals. *Statistics 2013 Oregon* was a collaborative effort of faculty members specializing in probability and statistics from the seven Oregon schools including Lewis & Clark College, Oregon Health Sciences University, Oregon State University, Portland State University, Reed College, University of Oregon, and Willamette University. The event was endorsed by the Bernoulli Society, the National Council of Teachers of Mathematics, and the International Year of Statistics (Statistics2013) campaign.

## FUNDING

FUNDED GRANT PROPOSALS:

- February 1, 2022 - April 30, 2023   **The Southern California Earthquake Center (SCEC) Award #22090** "Stochastic Branching Process Modeling of Earthquake Occurrence" Ilya Zaliapin (PI at UNR), **Yevgeniy Kovchegov (PI at OSU)**, and Yehuda Ben-Zion (PI at USC)
  Amount: $30,019 ($14,981 for Oregon State University)

- March 1, 2020 - February 28, 2022   **NSF DMS-1947572** "Frontier Probability Days Conference" Le Chen (PI), Sunder Sethuraman (Co-PI), Firas Rassoul-Agha (Co-PI), **Yevgeniy Kovchegov (Co-PI)**, and Thomas Alberts (Co-PI)
  Amount: $32,000

- March 1, 2018 - February 28, 2019   **NSF DMS-1802828** "Frontier Probability Days Conference" **Yevgeniy Kovchegov (PI)**, Thomas Alberts (Co-PI), Firas Rassoul-Agha (Co-PI), Sunder Sethuraman (Co-PI), and Davar Khoshnevisan (Co-PI)
  Amount: $25,000

- August 15, 2014 - December 31, 2018   **NSF DMS-1412557** "Unexpected Correlations in Biological Networks" **Yevgeniy Kovchegov (PI)** and Andrey Morgun (Co-PI)
  Amount: $184,702

- September 1, 2013 - August 31, 2014   **Simons Foundation / Collaboration Grants for Mathematicians** "Collaboration in Stochastics" (Award Number: 284262) **Yevgeniy Kovchegov (PI)**
  Amount: $35,000 This grant was used for one year out of five. The remaining funds were returned to the funding agency.

- April 2009 - June 2009    **OSU/FRT** "Orthogonality and Probability" **Yevgeniy Kovchegov (PI)**
  Amount: $6,000

Funded Travel Support:

- Winter-Spring 2019    **Foundation for Research Support of the State of São Paulo (FAPESP), Brazil.** Travel grant. "Hydrodynamic limits of coalescent processes and minimal spanning trees with applications in mathematical biology" (Award 2018/07826-5) Anatoly Yambartsev (Principal researcher) and **Yevgeniy Kovchegov (Visiting Researcher)**
  Amount: R$71,415 (at that time, ≈$18,953)

- Winter 2017    **Foundation for Research Support of the State of São Paulo (FAPESP), Brazil.** Travel grant. "Extending the theory of weak convergence for coalescence processes" (Award 2016/19286-0) Anatoly Yambartsev (Principal researcher) and **Yevgeniy Kovchegov (Visiting Researcher)**
  Amount: R$25,024 (at that time, ≈$7,816)

- June 2014    Travel support for attending 30th IUGG Mathematical Geophysics Organizing Committee, Merida, Yucatan, Mexico, June 2-6, 2014.
  Amount: $1,000

- August 2013    **AMS/NSF-DMS** Travel support for attending the Mathematical Congress of the Americas in Guanjuato, Mexico in August 2013.
  Amount: $1,600

Funded Student Research:

- Fall/Winter/Spring 2011-12    **OSU/URISC** Christopher Jones "Quantum Walks and Quantum Algorithms" (Faculty Project Advisor: **Yevgeniy Kovchegov**)
  Amount: $1,800

- Winter/Spring 2007    **OSU/URISC** Nick Meredith "Occupation Times and Learning Models" (Faculty Project Advisor: **Yevgeniy Kovchegov**)
  Amount: $1,200

# STUDENTS AND POSTDOCTORAL TRAINEES

- ### Postdocs mentored

  Patrik V. Nabelek, Sept. 2020 - June 2022

  José J. C. Hernández, Dec. 2015 - April 2016

  Nicholas Michalowski, Sept. 2010 - June 2012 (co-mentored)

- ### Ph.D. students supervised

  Guochen Xu - Ph.D. in mathematics, degree awarded in Winter 2023
  Thesis: *"On Invariant Galton-Watson Trees with Exponential Edge Lengths"*

  Wasamon Jantai - Ph.D. in mathematics, degree awarded in Summer 2021
  Thesis: *"Proving limit theorems for associated random variables via Stein's method"*

  Bruno Barbosa - Ph.D. in mathematics, degree awarded in Fall 2020
  Thesis: *"Aggregate path coupling for the generalized Curie-Weiss model"*

  Paul Logan - Ph.D. in statistics, degree awarded in Winter 2020 (co-advised)
  Thesis: *"C-SHIFT, quantile theory, and assessing monotonicity"*

  Kyle Bradford - Ph.D. in mathematics, degree awarded in Spring 2013
  Thesis: *"Adiabatic and stable adiabatic times"*

  Zlatko Dimcovic - Ph.D. in physics, degree awarded in Spring 2012
  Thesis: *"Discrete-time quantum walks via interchange framework and memory in quantum evolution"*

- ### M.S. students supervised

  Lars D. Gunderson - M.S. in mathematics, degree awarded in Spring 2023

  Guochen Xu - M.S. in mathematics, degree awarded in Spring 2021

  Rodrigo Duran - M.S. in mathematics, degree awarded in Winter 2013

  Jonathan Hunt - M.S. in mathematics, degree awarded in Winter 2012

  Kyle Bradford - M.S. in mathematics, degree awarded in Fall 2010

  Matthew Eves - M.S. in mathematics, degree awarded in Fall 2007

- ### Local graduate co-advisor

  Dallas Foster - Ph.D. in mathematics, degree awarded in Spring 2021

  Johannes Krotz - M.S. in mathematics degree awarded in Spring 2021

- HONORS STUDENTS SUPERVISED

  Nick Meredith - Honors B.S. in mathematics, graduated in Spring 2007

- UNDERGRADUATE RESEARCH PROJECTS SUPERVISED

  C. Wang (Columbia University) - REU, Summer 2021

  C. Pertel (Cornell University) - REU, Summer 2021

  A. Negrón (llinois Inst. of Tech.) - REU, Summer 2021

  J. Johnson (Oregon State University) - REU, Summer 2017

  C. Campregher (California State University, Long Beach) - REU, Summer 2017

  A.-S. Hirst (California State University, Dominguez Hills) - REU, Summer 2016

  R. Linder (University of Maryland, Baltimore County) - REU, Summer 2016

  J. Rousseva (Eastern Washington University) - REU, Summer 2015

  A. Asay (Oregon State University) - REU, Summer 2015

  G. Grindstaff (Pomona College) - REU, Summer 2013

  K. Wilson (University of Oregon) - REU, Summer 2013

  L. Veith (University of Washington) - REU, Summer 2012

  K. Schwenkler (Hampshire College) - REU, Summer 2012

  A. Deibel (Arizona State University) - REU, Summer 2012

  C. Jones (Oregon State University) - URISC project, Fall/Winter/Spring 2011-12

  B. Cornelis (University of British Columbia) - REU, Summer 2011

  S. Sherpa (MIT) - REU, Summer 2011

  D. Shigeta (University of Portland) - REU, Summer 2010

  J. Thompson (University of Cambridge, UK) - REU, Summer 2010

  E. Azorr (Oregon State University) - REU, Summer 2009

  S. Ghitelman (Oberlin College) - REU, Summer 2009

  R. Morrison (Williams College) - REU, Summer 2009

  G. Rice (Oregon State University) - REU, Summer 2009

  B. Coate (The College of Idaho) - REU, Summer 2008

  E. DeYoung (University of Chicago) - REU, Summer 2008

  J. Drinane (Winona State U.) - REU, Summer 2008

  J. Hanselman (MIT) - REU, Summer 2008

  N. Meredith (Oregon State University) - URISC project, Winter/Spring 2007

  T. Gao (UCLA) - VIGRE Research Experience, UCLA, Summers 2003 and 2004

- **Served on defense committee**

  1. Renee Nolan (M.S. degree, Mathematics)
  2. John Henry (Ph.D. in Statistics, Mathematics, minor professor)
  3. Benjamin Morin (M.S. degree, Mathematics)
  4. Noppadon Wichitsongkram (M.S. and Ph.D. degrees, Mathematics)
  5. Leena Zacharias (M.S. degree, EECS)
  6. Daniel Rockwell (Ph.D. degree, Mathematics)
  7. Torrey Johnson (Ph.D. degree, Mathematics)
  8. Zachary Gelbaum (Ph.D. degree, Mathematics)
  9. Mathew Titus (M.S. degree, Mathematics)
  10. Daniel Lebowitz (M.S. degree, Mathematics)
  11. Pingan Zhu (M.S. degree, Mathematics)
  12. Victor Nava (M.S. degree, Mathematics)
  13. Christopher Owens (M.S. degree, Mathematics)
  14. Joshua Kincaid (Ph.D. degree, Physics)
  15. Alex Root (M.S. degree, Mathematics)
  16. Huanqun Jiang (Ph.D. degree, Mathematics)
  17. Ricardo Reyes Grimaldo (M.S. degree, Mathematics)
  18. Micah Losee (M.S. degree, Mathematics)
  19. Lucas Perryman-Deskins (Ph.D. degree, Mathematics)

- **Served as Graduate Council Representative (GCR)**

  1. Balaji Lakshminarayanan (M.S. degree, EECS)
  2. Thuan Duong-Ba (Ph.D. degree, EECS)
  3. Mohammad Javad Norooz Oliaee (M.S. degree, EECS)
  4. Majid Adeli (Ph.D. degree, EECS)
  5. Fanghui Ren (M.S. degree, EECS)
  6. Benjamin Hershberg (Ph.D. degree, EECS)
  7. Sachin Rao (M.S. degree, EECS)
  8. Megha Maiya (Ph.D. degree, EECS)
  9. Atipol Asavametha (M.S. degree, EECS)
  10. Gaole Jin (M.S. degree, EECS)
  11. Sumit A. Talwalkar (Ph.D. degree, EECS)

12. Duong Nguyen-Huu (M.S. degree, EECS)

13. Thai Duong (M.S. degree, EECS)

14. Wei Li (M.S. degree, EECS)

15. Lixia Zhou (Ph.D. degree, Chemistry)

16. Liang Wang (M.S. degree, Chemistry)

17. Rasha Mohammad Obeidat (Ph.D. degree, EECS)

18. Zhengxian Lin (Ph.D. degree, EECS)

19. Ian McQuoid (Ph.D. degree, CS)

20. Noah Silva de Leonardi (Ph.D. degree, Integrative Biology)

21. Hanyu Wang (Ph.D. degree, EECS)

## UNIVERSITY SERVICE

- UNIVERSITY COMMITTEE SERVICE: Ecosystem Informatics IGERT executive committee

- DEPARTMENTAL COMMITTEE SERVICE:

  - qualifying exams committee (Fall 2011 - Summer 2018, Fall 2020 - Spring 2021; CHAIR: Fall 2021- present)

  - ad-hoc qualifying exams committee (Fall 2023 - present)

  - departmental newsletter committee (Fall 2022 - present)

  - tenure-track search committee in Probability with Applications in Data Science (CHAIR: Summer 2021 - Winter 2022)

  - tenure-track search committee in Topology - Topological Data Analysis (Summer 2021 - Winter 2022)

  - postdoc search committee (Winter 2020 - Spring 2020)

  - tenure-track search committee (Summer 2019 - Spring 2020)

  - undergraduate advising committee (Fall 2015 - Summer 2018, Fall 2019 - Summer 2020)

  - actuarial science committee (CHAIR: Fall 2015 - Summer 2018)

  - mathematics colloquium (CO-CHAIR: Spring 2018, CO-CHAIR: Fall 2020 - Spring 2021; CHAIR: Fall 2021-Winter 2022)

  - ad-hoc committee on hiring (Fall 2017)

  - ad-hoc committee on remaking MTH 306 (2016 - 2017)

  - co-organizer of Milne Lecture (Spring 2017)

- three year review committee: David Koslicki (Spring 2016)
- visiting assistant professor hiring committee (Spring 2016)
- graduate committee (Fall 2011 - Spring 2015)
- qualifying exam task force (Fall 2013)

Before Fall 2011: undergraduate advising committee, language exam, computer committee

- <u>Fall 2005 - Winter 2020</u> Organized weekly probability seminar in the Department of Mathematics at Oregon State University.

- <u>Spring 2009 - Fall 2012</u> Organizer of a research and exploration group on quantum information and computation at Oregon State University that brought together faculty and students from Department of Mathematics, Department of Physics and the School of EECS.

- Volunteered at the Mathematics and Statistics Learning Center (MSLC) in Fall 2013, Winter 2014.

## PROFESSIONAL MEETINGS, SYMPOSIA, AND CONFERENCES

119. November 2023 *Multidimensional Lambert-Euler inversion and vector-multiplicative coalescent processes*, Probability and Data Science Seminar, Oregon State University **(invited speaker)**

118. October 2022 The Twenty-second Northwest Probability Seminar (annual conference), University of Washington, Seattle **(organizer)**

117. June 2022 *Critical Tokunaga model for river networks*, 33rd IUGG Conference on Mathematical Geophysics, Seoul National University, Seoul, Republic of Korea **(invited speaker)**

116. April 2022 *Multidimensional Lambert-Euler inversion and vector-multiplicative coalescent processes*, Probability Seminar, Indiana University, Bloomington, IN **(invited speaker)**

115. December 2021    Frontier Probability Days 2021, University of Nevada, Las Vegas **(organizer)**

114. November 2021 *A generalization of Abel's binomial theorem*, Mathematics Colloquium, Pacific University, Forest Grove, Oregon **(invited speaker)**

113. November 2021 *A new life of Pearson's skewness*, Nevada Statistics Seminar, University of Nevada, Reno **(invited speaker)**

112. March 2021 *Invariant Galton-Watson measures*, Seminário de Probabilidade e Processos Estocásticos, University of São Paulo, São Paulo, Brazil (**invited speaker**)

111. March 2021 *Invariant Galton-Watson trees*, 2021 Coast Combinatorics Conference, hosted by the University of Victoria (**invited speaker**)

110. February 2021 *Invariant Galton-Watson measures*, Mathematical Physics and Probability Seminar at University of Arizona and Stochastics Seminar at University of Utah (**invited speaker**)

109. November 2020 *A new life of Pearson's skewness*, Mathematics Colloquium, Oregon State University (**invited speaker**)

108. October 2020 *Quantum Walks: What's Missing?*, Portland Quantum Computing Meetup (**invited speaker**)

107. August 2020 *Critical Tokunaga branching processes*, section on Random Discrete Structures, Bernoulli-IMS One World Symposium 2020 (**presenter**)

106. October 2019 The Twenty-first Northwest Probability Seminar (annual conference), University of Washington, Seattle (**organizer**)

105. April 2019 *Random self-similar trees: dynamical pruning and its applications*, Seminário de Probabilidade e Processos Estocásticos, University of São Paulo, São Paulo, Brazil (**invited speaker**)

104. December 2018 *An Introduction to Stein's Method*, 2º Encontro da pós-graduação em estatística do IME-USP (a conference), Instituto de Matemática e Estatística (IME) da University of São Paulo, São Paulo, Brazil (**invited speaker**)

103. October 2018 The Twentieth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA (**organizer**)

102. September 2018 *Cross-multiplicative coalescence and minimal spanning trees of irregular graphs*, Mathematical Physics and Probability Seminar, University of Arizona (**invited speaker**)

101. June 2018 *Random self-similar trees and applications in geosciences*, 32nd IUGG Conference on Mathematical Geophysics, Nizhny Novgorod, Russia (**invited speaker**)

100. May 2018 *Tokunaga self-similarity arises naturally from time invariance*, Probability Seminar, Oregon State University (**presenter**)

99. April 2018  *Random Trees and Their Applications: Metric Trees*, presented at the workshop on Random trees: Structure, Self-similarity, and Dynamics (April 23-27, 2018) in CIMAT, Guanajuato, Mexico (**invited speaker / organizer**)

98. March 2018  Frontier Probability Days 2018, Oregon State University, Corvallis, Oregon (**organizer**)

97. February 2018 *Random self-similar trees: dynamical pruning and its applications to inviscid Burgers equations*, Mathematical Physics and Probability Seminar, University of Arizona (**invited speaker**)

96. November 2017 *Random self-similar trees: dynamical pruning and its applications to inviscid Burgers equations*, The Nineteenth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA (**invited speaker / organizer**)

95. October 2017 *Random self-similar trees: dynamical pruning and its applications to inviscid Burgers equations*, Probability Seminar, Oregon State University (**presenter**)

94. July 2017 *Random Self-Similar Trees: Dynamical Pruning, Invariance, and Criticality*, presented at the 39th Conference on Stochastic Processes and their Applications (SPA2017) contributed session on random self-similar trees and their applications (July 24-28, 2017) in Moscow, Russia (**presenter / contributed session organizer**)

93. April 2017 *Coalescence and minimal spanning trees of irregular graphs*, Probability Seminar, Oregon State University (**presenter**)

92. March 2017 *Path Coupling and Aggregate Path Coupling*, Applied Mathematics Colloquium, University of São Paulo, São Paulo, Brazil (**invited speaker**)

91. March 2017 *Self-similar random trees (a two lecture mini course)*, IME, University of São Paulo, São Paulo, Brazil (**invited speaker**)

90. February 2017 *Coalescence and Minimal Spanning Trees*, Seminário de Teoria da Computação, Combinatória e Otimização, University of São Paulo, São Paulo, Brazil (**invited speaker**)

89. November 2016 *Stationary distribution for Moran process*, Mathematical Biology Seminar, Oregon State University (**presenter**)

88. November 2016 *New Perspectives in Discrete Probability and Its Applications*, Mathematics Colloquium, Oregon State University (**presenter**)

87. November 2016 The Eighteenth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA (**organizer**)

86. October 2016 *On tree-pruning and prune-invariances in random binary rooted trees*, Probability Seminar, University of California, Berkeley (**invited speaker**)

85. June 2016 *Hierarchical branching processes*, 31st IUGG Conference on Mathematical Geophysics, Paris, France (**invited speaker**)

84. June 2016 *Tree self-similarity based on Horton ordering and Tokunaga indexing*, Conference on "Random Trees and Maps: Probabilistic and Combinatorial Aspects", Centre International de Rencontres Mathématiques (CIRM), Marseille, France (**invited speaker**)

83. May 2016 *Horton-Strahler ordering and Tokunaga indexing in stochastic processes*, Probability Seminar, Oregon State University (**presenter**)

82. April 2016 *Path Coupling and Aggregate Path Coupling*, Mathematical Physics and Probability Seminar, University of Arizona (**invited speaker**)

81. April 2016 *Hierarchical Branching Processes*, Special Session on Topics in Probability, AMS Western Sectional Meeting, University of Utah (**presenter**)

80. March 2016 *Path Coupling and Aggregate Path Coupling*, Probability Seminar, Stanford University, California (**invited speaker**)

79. February 2016 *Path Coupling and Aggregate Path Coupling*, Probability Seminar, University of Washington, Seattle (**invited speaker**)

78. October 2015 The Seventeenth Northwest Probability Seminar (annual conference), University of Washington, Seattle (**organizer**)

77. October 2015 *Path Coupling and Aggregate Path Coupling*, Probability Seminar, Oregon State University (**presenter**)

76. September 2015 *Path Coupling and Aggregate Path Coupling*, Probability Seminar, University of São Paulo, São Paulo, Brazil (**invited speaker**)

75. September 2015 *Horton self-similarity of Kingman's coalescent*, New Interactions of Combinatorics and Probability, ICMC, University of São Paulo, São Carlos, Brazil, August 24 – September 4, 2015 (**invited speaker**)

74. October 2014 The Sixteenth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA (**organizer**)

73. June 2014 *Horton self-similarity of coalescent trees* (with Ilya Zaliapin), 30th IUGG Conference on Mathematical Geophysics, Merida, Yucatan, Mexico, June 2-6, 2014 (**poster presenter**)

72. March 2014 *Horton Self-similarity of Kingman's Coalescent*, Mathematics Colloquium, New Mexico State University (**invited speaker**)

71. February 2014 *Noise in gene regulatory networks, FKG and Holley inequalities*, Mathematical Biology Seminar, Oregon State University (**presenter**)

70. November 2013 *On Markov Chain Monte Carlo*, Probability Seminar, Oregon State University (**presenter**)

69. October 2013 The Fifteenth Northwest Probability Seminar at University of Washington (1st day) and Microsoft Research, Redmond, WA (2nd day) (**organizer**)

68. October 2013 *Statistics 2013 Oregon* event, marking 2013 as the International Year of Statistics. Public Lecture and Reception, Hoffman Hall at Portland State University, Oregon (**organizer**)

67. August 2013 *Horton self-similarity and coalescent trees*, Special Session on Graph and Network Analysis in the Geosciences, Mathematical Congress of the Americas 2013 in Guanajuato, Mexico **(invited speaker)**

66. May 2013 *Proportion of Unexpected Correlations (PUC) as a measure of error in regulatory network* (presented jointly with A. Morgun), Mathematical Biology Seminar, Oregon State University **(presenter)**

65. February 2013 *Horton self-similarity of Kingman's coalescent tree*, Probability Seminar, Oregon State University **(presenter)**

64. October 2012 The Fourteenth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA **(organizer)**

63. April 2012 *Application of aggregate path coupling and large deviations to mixing times of statistical mechanical models*, Probability Seminar, Oregon State University **(presenter)**

62. April 2012 *Application of aggregate path coupling and large deviations to mixing times of statistical mechanical models*, Probability Seminar, UCLA **(invited speaker)**

61. February 2012 *Identification via completeness for discrete covariates and orthogonal polynomials*, Probability Seminar, Oregon State University **(presenter)**

60. October 2011 The Thirteenth Northwest Probability Seminar (annual conference), University of Washington, Seattle **(organizer)**

59. May 2011 *Phase estimation in quantum computing*, Probability Seminar, Oregon State University **(presenter)**

58. March 2011 *Introduction to Quantum Computation*, Mathematics Colloquium, Willamette University **(invited speaker)**

57. February 2011 *Path coupling method*, Probability Seminar, Oregon State University **(presenter)**

56. November 2010 *Convergence to stationary state*, Mathematics Colloquium, Oregon State University **(presenter)**

55. November 2010 *Tokunaga self-similarity for time series*, Probability Seminar, Oregon State University **(presenter)**

54. October 2010 *Introduction to free probability*, Probability Seminar, Oregon State University **(presenter)**

53. October 2010 The Twelfth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA **(organizer)**

52. September 2010 *On Markov Chain Monte Carlo (MCMC) and Mixing Rates*, Mathematics and Statistics Colloquium, University of Nevada, Reno **(invited speaker)**

51. July 2010 *Orthogonal polynomials and mixing rates*, Conference on Orthogonal Polynomials in Probability Theory, July 6-10, 2010, Texas A & M University, College Station **(invited speaker)**

50. January 2010 *Orthogonality and probability: mixing times*, Probability Seminar, University of Oregon **(invited speaker)**

49. January 2010 *Discrete and continuous quantum walks*, Probability Seminar, Oregon State University **(presenter)**

48. October 2009 *On Markov Chain Monte Carlo and mixing rates*, Solid State Physics Seminar, Department of Physics, Oregon State University **(invited speaker)**

47. October 2009 The Eleventh Northwest Probability Seminar (annual conference), University of Washington, Seattle **(organizer)**

46. October 2009 *On MCMC and Mixing Rates*, Mathematics Colloquium, Willamette University **(invited speaker)**

45. October 2009 *Intro to quantum probability and quantum computing* (a series of three talks), Probability Seminar, Oregon State University **(presenter)**

44. April 2009 *Mixing times via orthogonal polynomials*, Probability Seminar, Oregon State University **(presenter)**

43. March 2009 *On orthogonality in probability*, Frontier Probability Days 2009, Salt Lake City, Utah **(presenter)**

42. March 2009 *Orthogonality and Probability, Part IV: Riemann-Hilbert problems, applications*, Probability Seminar, Oregon State University **(presenter)**

41. February 2009 *Orthogonality and Probability*, Probability Seminar, Stanford University, California **(invited speaker)**

40. January 2009 *A note on adiabatic theorem for Markov chains and adiabatic quantum computation*, Probability Seminar, Oregon State University **(presenter)**

39. November 2008 *Orthogonality and Probability, Part III: Beyond nearest neighbor transitions*, Probability Seminar, Oregon State University **(presenter)**

38. November 2008 The Tenth Northwest Probability Seminar (annual conference), Microsoft Research, Redmond, WA **(organizer)**

37. October 2008 *Orthogonality and Probability, Part II*, Probability Seminar, Oregon State University **(presenter)**

36. October 2008 *Orthogonality and Probability*, Probability Seminar, Oregon State University **(presenter)**

35. January 2008 *Perfect coupling and tunneling to the future*, Probability Seminar, Oregon State University **(presenter)**

34. January 2008 *Tunneling to the future and perfect coupling*, Workshop on Random Walks, Particle Systems and Random media - Santiago, Chile **(invited speaker)**

33. October 2007 The Ninth Northwest Probability Seminar (annual conference), University of Washington, Seattle **(organizer)**

32. October 2007 *Occupation times and modified Bessel functions*, Probability Seminar, Oregon State University **(presenter)**

31. August 2007 *Superfast Coupling and Rapid Mixing*, The 32nd Conference on Stochastic Processes and their Applications, University of Illinois at Urbana-Champaign **(presenter)**

30. May 2007 *Markov Chain Monte Carlo simulations and their mixing rates*, Mathematics Colloquium, Oregon State University **(invited speaker)**

29. March 2007 *Mixing times via super-fast coupling*, Stochastics Seminar, University of Utah **(invited speaker)**

28. March 2007 *Mixing times via super-fast coupling*, Dynamics Seminar, University of Victoria, Canada **(invited speaker)**

27. February 2007 *On Stein-Chen coupling*, Probability Seminar, Oregon State University **(presenter)**

26. October 2006 *Mixing times via super-fast coupling*, Probability Seminar, University of Oregon **(invited speaker)**

25. October 2006 The Eighth Northwest Probability Seminar (annual conference), University of Washington, Seattle **(organizer)**

24. October 2006 *Mixing times via super-fast coupling*, Probability Seminar, Oregon State University **(presenter)**

23. October 2006 *Mixing times via coupling method*, Probability Seminar, Oregon State University **(presenter)**

22. January 2006 *Critical percolation and Lorentz lattice gas model: an expository talk*, Probability Seminar, Oregon State University **(presenter)**

21. January 2006 *Subcritical percolation: cluster expansion and Brownian bridge asymptotics*, Probability Seminar, Oregon State University **(presenter)**

20. November 2005 *On Mixing Times II*, Probability Seminar, Oregon State University **(presenter)**

19. October 2005 *Generalized symmetric exclusion processes*, The Seventh Northwest Probability Seminar, University of Washington, Seattle **(invited speaker)**

18. October 2005 *On Mixing Times I*, Probability Seminar, Oregon State University **(presenter)**

17. April 2005 *Multi-particle edge-reinforced processes*, Colloquium, Oregon State University **(invited speaker)**

16. February 2005 *Multi-particle edge-reinforced processes*, Probability Seminar, University of Minnesota **(invited speaker)**

15. January 2005 *Multi-particle processes with reinforcements*, Probability Seminar, University of Pennsylvania **(invited speaker)**

14. January 2005 *Multi-particle edge-reinforced processes*, Probability Seminar, University of Rochester **(invited speaker)**

13. January 2005 *Edge-reinforced processes*, Probability Seminar, University of California, Berkeley **(invited speaker)**

12. November 2004 *Multi-particle edge-reinforced processes*, Probability Seminar, Stanford University, California **(invited speaker)**

11. October 2004 *Multi-particle processes with reinforcements*, Probability Seminar, University of California, Los Angeles **(presenter)**

10. April 2004 *Exclusion processes with multiple interactions*, Probability Seminar, Stanford University, California **(invited speaker)**

9. March 2004 *Exclusion processes with multiple interactions*, Probability Seminar, University of California, Los Angeles **(presenter)**

8. May 2003 *Brownian bridge in percolation and self-avoiding walks models*, Probability Seminar, University of California, Los Angeles **(presenter)**

7. May 2003 *Finding Brownian bridge in percolation and self-avoiding walk models*, Probability Seminar, University of California, Irvine **(invited speaker)**

6. April 2003 *Finding Brownian bridge in percolation and self-avoiding walk models*, Probability Seminar, University of Southern California, Los Angeles **(invited speaker)**

5. October 2002 *Recurrence phenomenon in Lorentz lattice gas model*, Probability Seminar, University of California, Los Angeles **(presenter)**

4. February 2002 *Brownian bridge in percolation and related processes*, Probability Seminar, University of Washington, Seattle **(invited speaker)**

3. January 2002 *Brownian bridge in percolation and related processes*, Probability Seminar, University of British Columbia, Canada **(invited speaker)**

2. October 2001 *Brownian bridge asymptotics in percolation*, Probability Seminar, Stanford University, California **(presenter)**

1. August 1996 *Measures on the Sierpinski gasket*, MAA National Student Conference, University of Washington, Seattle **(presenter)**

# COURSES TAUGHT AT OREGON STATE UNIVERSITY

ADVANCED GRADUATE COURSES TAUGHT AT OREGON STATE UNIVERSITY:

**MTH 669 Special Topics in Stochastic Processes.** This advanced graduate course covers different topics in different years. Taught it in Fall 2006 (**Stochastic Processes**), Winter 2007 (**Statistical Mechanics**), Spring 2011 (**Large Deviations**), Fall 2012 (**Random Matrices**).

**MTH 665 Probability Theory II.** This advanced graduate course covers Markov chains, martingales and stopping times, time reversibility, recurrence, ergodicity, mixing times, coupling method, continuous-time Markov chain on a discrete state space, brownian motion, introduction to Ito's calculus. Prepared slides and other materials. The slides can be found at http://math.oregonstate.edu/∼kovchegy/math665spring2020/
Taught it in Spring 2009, Spring 2013, Spring 2020.

**MTH 664 Probability Theory I.** This advanced graduate course covers general theory of probability measures and random variables, Radon-Nikodym derivatives, conditional expectations, modes of convergence, probabilistic inequalities, laws of large numbers, Fourier transform, Plancherel's Theorem, characteristic functions, central limit theorem, martingales and stopping times. Prepared slides and other materials. The slides can be found at http://math.oregonstate.edu/∼kovchegy/math664fall2021/
Taught it in Winter 2009, Winter 2013, Winter 2020, Fall 2021.

**MTH 612 Complex Analysis II.** This graduate course covers advanced topics in complex analysis. Taught it in Fall 2007.

**MTH 611 Complex Analysis I.** This graduate course covers basic theory of analytic functions of a complex variable, including Cauchy's theorem, residue theorem, analytic continuation, conformal mappings, entire, and meromorphic functions.
Taught it in Spring 2007, Spring 2013.

**MTH 599 Ecosystem Informatics.** This experimental collaborative class concentrated on mathematical models in ecology. Co-instructed it in Fall 2005, Winter 2006, Spring 2006, Fall 2006, Winter 2007, Fall 2007, Winter 2008, Fall 2008, Winter 2009.

COURSES CROSS-LISTED AS GRADUATE AND UNDERGRADUATE:

**MTH 483/583 Complex Variables.** This cross-listed undergraduate/graduate course covers introductory complex differential and integral calculus including Cuachy's theorem, Cuachy's formula, the residue calculus, power series and Laurent series, harmonic functions, conformal mapping, and applications.
Taught it in Spring 2015.

**MTH 467/567 Actuarial Mathematics.** This cross-listed undergraduate/graduate course covers risk theory and foundations of actuarial science using stochastic models. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math567spring2018/
Taught it in Spring 2017, Spring 2018, Winter 2023

**MTH 465/565 Probability III.** This cross-listed undergraduate/graduate course covers discrete-time Markov chains, recurrent and transient states, reversible Markov chains, martingales, stopping times, Optional Stopping Theorem, probability harmonic functions, first passage probability, Markov Chain Monte Carlo, mixing times, continuous-time Markov chains, ergodicity, Poisson processes, continuous-time birth-and-death chains, queueing processes. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math565spring2021/
Taught it in Spring 2006, Spring 2010, Spring 2014, Spring 2021,

**MTH 464/564 Probability II.** This cross-listed undergraduate/graduate course covers transformations of random variables, joint probability distributions, covariance and correlation, conditional expectation, conditional variance, sums of independent random variables, moment generating functions, characteristic functions, the central limit theorem and other weak limit theorems. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math564winter2021/
Taught it in Winter 2006, Winter 2010, Winter 2014, Winter 2021.

**MTH 463/563 Probability I.** This cross-listed undergraduate/graduate course covers introduction to probability theory. Topics covered include the axioms of probability, probability spaces and models, independence, random variables, probability distributions, expectation, variance, probabilistic inequalities, the law of large numbers, and the binomial central limit theorem. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math563fall2020/
Taught it in Fall 2005, Fall 2009, Fall 2013, Fall 2020, Fall 2022.

**MTH 428/528 Stochastic Elements in Mathematical Biology.** This cross-listed undergraduate/graduate course covers discrete time and continuous time Markov chains, mathematical models of genetic drift, Wright-Fisher model, Moran process (aka 'Moran model') as a model of finite populations, branching processes and their applications in genealogy, birth-and-death processes, Yule preferential attachment process and its application in bacteria population growth, coalescent processes and their applications in population genetics. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math528winter2022/
This course was originally developed by Prof. Kovchegov who taught it in Spring 2016, Spring 2017, Spring 2018, Spring 2020, Spring 2021, Winter 2022.

**MTH 427/527 Introduction to Mathematical Biology.** This cross-listed undergraduate/graduate course covers modeling and mathematical analysis of biological processes using first principles at scales ranging from the molecular to the population level. Deterministic

models are studied in both discrete and continuous time and analyzed using linearization principles, linear and nonlinear stability techniques, phase plane methods, and methods from partial differential equations. Prepared slides and other materials. The slides can be found at http://math.oregonstate.edu/∼kovchegy/math527kov/
Taught it in Fall 2023.


Upper division undergraduate courses taught at Oregon State University:

**MTH 361 Introduction to Probability.** This undergraduate course covers probability problem solving using concepts developed in calculus. Topics include probability models, discrete and continuous random variables, expectation and variance, the law of large numbers, and the central limit theorem. Prepared slides and other materials. The slides can be found at http://math.oregonstate.edu/∼kovchegy/math361summer2021/
Taught it in Spring 2010, Spring 2011, Spring 2012, Summer 2016, Summer 2017, Summer 2020, Summer 2021, Summer 2022 (via Ecampus online platform), Summer 2023 (via Ecampus online platform).

**MTH 355 Discrete Mathematics.** This undergraduate course covers proof analysis and development in the context of discrete mathematics for math majors transitioning to upper-division course work. Topics include elementary logic and set theory, quantifiers, basic counting principles, elementary combinatorics, equivalence relations, the binomial theorem, mathematical induction, recurrence relations, generating functions, and introductory graph theory. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math355winter2020/
Taught it in Winter 2020.

**MTH 343 Introduction to Modern Algebra.** This undergraduate course covers introduction to algebraic abstraction with an emphasis on structures and logical communication by way of proofs. Material includes an introduction to groups, rings and fields. Emphasis is on symmetry groups, the integers as a ring, and polynomial rings; selected applications. Taught it in Fall 2016.

**MTH 342 Linear Algebra II.** This undergraduate course covers abstract (real or complex) vector spaces, linear transformations, inner product spaces, orthogonality, eigenspaces and diagonalization, spectral theorems, singular value decomposition. Taught it in Winter 2010, Spring 2014, Winter 2015.

**MTH 341 Linear Algebra I.** This undergraduate course covers matrix algebra, determinants, systems of linear equations, subspaces, linear transformations, eigenvalues, eigenvectors and eigenspaces, diagonalization. Prepared slides and other materials. The slides can be found at http://math.oregonstate.edu/∼kovchegy/math341fall2017/
Taught it in Fall 2010, Summer 2015, Fall 2017, Fall 2023.

**MTH 323 Mathematical Modeling.** This undergraduate course covers a variety of mathematical modeling techniques. Students learn to formulate models in response to practical

problems drawn from ecology, environmental sciences, engineering or other fields. Taught it in Summer 2018, Fall 2019.

**MTH 312 Advanced Calculus II.** This undergraduate course covers sequences and series of functions, pointwise and uniform convergence, Taylor series, Riemann integration, the fundamental theorem of calculus, improper integrals. Prepared slides and other materials. The slides can be found at http://math.oregonstate.edu/∼kovchegy/math312winter2023/ Taught it in Winter 2011, Spring 2016, Winter 2023.

**MTH 311 Advanced Calculus I.** This undergraduate course covers rigorous development of calculus, axiomatic properties of $\mathbb{R}$, topology of the real line, convergence of sequences and series of real numbers, functions, limits of functions, basic properties of continuity and derivatives. Taught it in Fall 2010, Winter 2016.

LOWER DIVISION UNDERGRADUATE COURSES TAUGHT AT OREGON STATE UNIVERSITY:

**MTH 306 Matrix and Power Series Methods.** This course was later partitioned into **MTH 264 Introduction to Matrix Algebra** and **MTH 265 Introduction to Series**. This undergraduate course covers introduction to matrix algebra, determinants, systematic solution to linear systems, and eigenvalue problems, convergence and divergence of series with emphasis on power series, Taylor series expansions, convergence tests for power series, and error estimates for truncated series used in practical approximations. Prepared slides and other materials. The slides can be found at
http://math.oregonstate.edu/∼kovchegy/math306fall2017/
Taught it in Spring 2006, Summer 2006, Summer 2009, Winter 2011, Summer 2011, Fall 2011, Winter 2012 (honors), Summer 2012, Summer 2013 (two sections), Winter 2014 (honors), Summer 2014 (two sections), Fall 2014, Summer 2015, Fall 2017.

**MTH 256 Applied Differential Equations.** This undergraduate course covers first order linear and nonlinear equations, second order linear equations, applications to electric circuits and mechanical oscillators, introduction to the Laplace transform and higher order equations, solution methods and applications appropriate for science and engineering. Taught it in Summer 2006, Summer 2023 (via Ecampus online platform).

**MTH 254 Vector Calculus I.** This undergraduate course covers vectors, vector functions, curves in two and three dimensions, surfaces, partial derivatives, gradients, directional derivatives, multiple integrals in rectangular, polar, cylindrical, and spherical coordinates, physical and geometric applications. Taught it in Spring 2008 (two sections), Winter 2016 (honors).

**MTH 252 Integral Calculus.** This undergraduate course covers definite integrals, integral tables, basic techniques of integration, calculus of logarithmic and exponential functions, polar coordinates, applications (areas, volume, force, work), growth and decay problems. Taught it in Fall 2012 (honors).

**MTH 251 Differential Calculus.** This undergraduate course covers differential calculus for engineers and scientists including rates of change (the derivative, velocity, and acceleration), maximum-minimum problems, the algebraic rules of differential calculus and derivatives of polynomial, rational, and trigonometric functions. Also covers antiderivatives and simple motion problems. Taught it in Fall 2016 (honors).

The course sequence consisting of **MTH 231 Elements of Discrete Mathematics I** and **MTH 232 Elements of Discrete Mathematics II** was merged to become **MTH 231 Elements of Discrete Mathematics**. This undergraduate course covers elementary logic and set theory, functions, direct proof techniques, contradiction and contraposition, mathematical induction and recursion, elementary combinatorics, basic graph theory, minimal spanning trees. Taught *MTH 231 Elements of Discrete Mathematics I* in Summer 2010 (via Ecampus online platform), Fall 2010 (via Ecampus online platform), Spring 2011 (via Ecampus online platform), Fall 2011 (via Ecampus online platform), Spring 2012 (via Ecampus online platform). Taught *MTH 232 Elements of Discrete Mathematics II* in Winter 2008, Winter 2009, Winter 2010 (via Ecampus online platform), Summer 2010 (via Ecampus online platform), Winter 2011 (via Ecampus online platform), Summer 2011 (via Ecampus online platform), Fall 2011, Winter 2012 (via Ecampus online platform), Summer 2012 (via Ecampus online platform). Taught *MTH 231 Elements of Discrete Mathematics* in Fall 2014, Fall 2015.

# TABLE OF CLASSES TAUGHT AT OREGON STATE UNIVERSITY

| Credit Courses | | | |
|---|---|---|---|
| Term: | Course number: | Course Title: | Enrollment: |
| Fall 2005 | MTH 463/563 | Probability I | 32 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 9 |
| Winter 2006 | MTH 464/564 | Probability II | 16 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 8 |
| Spring 2006 | MTH 465/565 | Probability III | 14 |
| | MTH 306 | Matrix and Power Series Methods | 109 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 6 |
| Summer 2006 | MTH 256 | Applied Differential Equations | 16 |
| | MTH 306 | Matrix and Power Series Methods | 16 |
| Fall 2006 | MTH 669 | Topics in Stochastic Processes I | 9 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 6 |
| Winter 2007 | MTH 669 | Topics in Stochastic Processes II | 5 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 6 |
| Spring 2007 | MTH 611 | Complex Analysis I | 22 |
| Fall 2007 | MTH 612 | Complex Analysis II | 5 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 10 |
| Winter 2008 | MTH 232 | Elements of Discrete Mathematics II | 50 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 10 |
| Spring 2008 | MTH 254.040 | Vector Calculus I | 68 |
| | MTH 254.060 | Vector Calculus I | 72 |
| Fall 2008 | MTH 599 | Ecosystem Informatics (co-teaching) | 6 |
| Winter 2009 | MTH 232 | Elements of Discrete Mathematics II | 41 |
| | MTH 664 | Probability Theory I | 17 |
| | MTH 599 | Ecosystem Informatics (co-teaching) | 6 |
| Spring 2009 | MTH 665 | Probability Theory II | 17 |
| Summer 2009 | MTH 306 | Matrix and Power Series Methods | 28 |
| Fall 2009 | MTH 463/563 | Probability I | 27 |
| Winter 2010 | MTH 342 | Linear Algebra II | 21 |
| | MTH 464/564 | Probability II | 10 |
| | MTH 232 | Elem. Discr. Mathematics II (Ecampus) | 5 |
| Spring 2010 | MTH 361 | Introduction to Probability | 31 |
| | MTH 465/565 | Probability III | 8 |
| Summer 2010 | MTH 231 | Elem. Discr. Mathematics I (Ecampus) | 13 |
| | MTH 232 | Elem. Discr. Mathematics II (Ecampus) | 9 |
| Fall 2010 | MTH 311 | Advanced Calculus I | 24 |
| | MTH 341 | Linear Algebra I | 32 |
| | MTH 231 | Elem. Discr. Mathematics I (Ecampus) | 9 |

| Credit Courses | | | |
|---|---|---|---|
| Term: | Course number: | Course Title: | Enrollment: |
| Winter 2011 | MTH 306 | Matrix and Power Series Methods | 96 |
| | MTH 312 | Advanced Calculus II | 14 |
| | MTH 232 | Elem. Discr. Mathematics II (Ecampus) | 8 |
| Spring 2011 | MTH 361 | Introduction to Probability | 29 |
| | MTH 669 | Topics Stoch. Proc. - Large Deviations | 6 |
| | MTH 231 | Elem. Discr. Mathematics I (Ecampus) | 26 |
| Summer 2011 | MTH 306 | Matrix and Power Series Methods | 28 |
| | MTH 232 | Elem. Discr. Mathematics II (Ecampus) | 16 |
| Fall 2011 | MTH 232 | Elem. Discr. Mathematics II | 62 |
| | MTH 306 | Matrix and Power Series Methods | 76 |
| | MTH 231 | Elem. Discr. Mathematics I (Ecampus) | 12 |
| Winter 2012 | MTH 306H | Matrix and Power Series Methods | 19 |
| | MTH 232 | Elem. Discr. Mathematics II (Ecampus) | 16 |
| Spring 2012 | MTH 361 | Introduction to Probability | 40 |
| | MTH 231 | Elem. Discr. Mathematics I (Ecampus) | 28 |
| Summer 2012 | MTH 306 | Matrix and Power Series Methods | 19 |
| | MTH 232 | Elem. Discr. Mathematics II (Ecampus) | 17 |
| Fall 2012 | MTH 252H | Integral Calculus | 19 |
| | MTH 669 | Topics Stoch. Proc. - Random Matrices | 8 |
| Winter 2013 | MTH 664 | Probability Theory I | 23 |
| Spring 2013 | MTH 611 | Complex Analysis I | 23 |
| | MTH 665 | Probability Theory II | 12 |
| Summer 2013 | MTH 306.001 | Matrix and Power Series Methods | 31 |
| | MTH 306.002 | Matrix and Power Series Methods | 29 |
| Fall 2013 | MTH 463/563 | Probability I | 34 |
| Winter 2014 | MTH 306H | Matrix and Power Series Methods | 20 |
| | MTH 464/564 | Probability II | 11 |
| Spring 2014 | MTH 342 | Matrix and Power Series Methods | 25 |
| | MTH 465/565 | Probability II | 7 |
| Summer 2014 | MTH 306.001 | Matrix and Power Series Methods | 33 |
| | MTH 306.002 | Matrix and Power Series Methods | 25 |
| Fall 2014 | MTH 231 | Elem. Discr. Mathematics | 64 |
| | MTH 306 | Matrix and Power Series Methods | 81 |
| Winter 2015 | MTH 342 | Matrix and Power Series Methods | 26 |
| Spring 2015 | MTH 483/583 | Complex variables | 32 |
| Summer 2015 | MTH 306 | Matrix and Power Series Methods | 28 |
| | MTH 341 | Linear Algebra I | 27 |
| Fall 2015 | MTH 231 | Elem. Discr. Mathematics | 79 |
| Winter 2016 | MTH 254H | Vector Calculus I | 6 |
| | MTH 311 | Advanced Calculus I | 24 |
| Spring 2016 | MTH 312 | Advanced Calculus II | 33 |
| | MTH 499/599 | Topics Math. Bio. | 7 |

| Credit Courses | | | |
|---|---|---|---|
| Term: | Course number: | Course Title: | Enrollment: |
| Summer 2016 | MTH 361 | Introduction to Probability | 18 |
| Fall 2016 | MTH 251H | Differential Calculus | 20 |
| | MTH 343 | Intro to Modern Algebra | 23 |
| Spring 2017 | MTH 428/528 | Stochastic Elements in Math. Bio. | 10 |
| | MTH 467/567 | Actuarial Mathematics | 8 |
| Summer 2017 | MTH 361 | Introduction to Probability | 18 |
| Fall 2017 | MTH 306 | Matrix and Power Series Methods | 22 |
| | MTH 341 | Linear Algebra I | 28 |
| Spring 2018 | MTH 428/528 | Stochastic Elements in Math. Bio. | 16 |
| | MTH 467/567 | Actuarial Mathematics | 10 |
| Summer 2018 | MTH 323 | Mathematical modeling (WIC[1]) | 10 |
| Fall 2019 | MTH 323 | Mathematical modeling (WIC[1]) | 22 |
| Winter 2020 | MTH 355 | Discrete Mathematics | 35 |
| | MTH 664 | Probability Theory I | 21 |
| Spring 2020 | MTH 428/528 | Stochastic Elements in Math. Bio. | 13 |
| | MTH 665 | Probability Theory II | 15 |
| Summer 2020 | MTH 361 | Introduction to Probability | 28 |
| Fall 2020 | MTH 463/563 | Probability I | 53 |
| Winter 2021 | MTH 464/564 | Probability II | 39 |
| Spring 2021 | MTH 428/528 | Stochastic Elements in Math. Bio. | 15 |
| | MTH 465/565 | Probability III | 23 |
| Summer 2021 | MTH 361 | Introduction to Probability | 10 |
| Fall 2021 | MTH 664 | Probability Theory I | 11 |
| Winter 2022 | MTH 428/528 | Stochastic Elements in Math. Bio. | 9 |
| Summer 2022 | MTH 361 | Introduction to Probability (Ecampus) | 8 |
| Fall 2022 | MTH 463/563 | Probability I | 43 |
| Winter 2023 | MTH 312 | Advanced Calculus II | 29 |
| | MTH 467/567 | Actuarial Mathematics | 13 |
| Summer 2023 | MTH 256 | Applied Diff. Eqs. (Ecampus) | 89 |
| | MTH 361 | Introduction to Probability (Ecampus) | 17 |
| Fall 2023 | MTH 341 | Linear Algebra 1 | 69 |
| | MTH 427/527 | Introduction to Mathematical Biology | 17 |

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[1]Writing Intensive Course

# COLLABORATION

- CURRENT AND PAST COLLABORATORS

  Yehuda Ben-Zion (Earth Sciences, University of Southern California)
  Robert M. Burton (Department of Mathematics, Oregon State University)
  Efi Foufoula-Georgiou (Earth System Science, University of California, Irvine)
  Bechir Hamdaoui (Electrical Engineering and Computer Science, Oregon State U.)
  José J. C. Hernández (Dept. of Mathematics, Federal Univ. of Pernambuco, Brazil)
  Nicholas Michalowski (Dept. of Mathematical Sciences, New Mexico State University)
  Debashis Mondal (Mathematics and Statistics, Washington University in St. Louis)
  Andrey Morgun (College of Pharmacy, Oregon State University)
  Thinh Nguyen (Electrical Engineering and Computer Science, Oregon State U.)
  Eyal Nir (Department of Chemistry, Ben-Gurion University, Beer-Sheva, Israel)
  Peter T. Otto (Department of Mathematics, Willamette University)
  Scott Sheffield (Department of Mathematics, MIT)
  Anatoly Yambartsev (Probability and Statistics, University of São Paulo, Brazil)
  Nese Yildiz (Department of Economics, University of Rochester)
  Ilya Zaliapin (Department of Mathematics and Statistics, University of Nevada Reno)

- GRADUATE AND POSTDOCTORAL ADVISORS

  Amir Dembo (Stanford University) - Ph.D. advisor
  Thomas M. Liggett (University of California, Los Angeles) - postdoc mentor

## OTHER SKILLS AND ACTIVITIES

LANGUAGES: English, Russian, Portuguese, Spanish.

## AWARDS AND HONORS

- **NSF DMS-1412557 award**, National Science Foundation, 2014

- **Collaboration Grants for Mathematicians award**, Simons Foundation, 2013

- **Faculty Release Time (FRT) award**, Oregon State University, 2009

- **Sidney G. Roth Prize in Mathematics**, New York University, 1997 Sidney G. Roth Prize in Mathematics is awarded to the graduating senior who in the estimation of the Department of Mathematics shows the greatest mathematical promise and who has been of greatest service to the department and his/her fellow students.

- **Founders' Day Award**, New York University, 1997

- **Courant Scholarship** ($15,000 per year), New York University, 1994-1997