Publications: Tenure Track

Theresa Anderson, Assistant Professor

Total # of publications in the last five years: 22 publications in the last five years (going off of publication date and counting accepted works, not counting preprints)

Selected Recent Publications:

- Anderson, Theresa C., Gafni, Ayla, Hughes, Kevin, Lemke Oliver, Robert, Lowry-Duda, David, Thorne, Frank, Wang, Jiuya and Zhang, Ruixiang. Improved bounds on number fields of small degree. Submitted. Preprint on arXiv.
- Anderson, Theresa C., Gafni, Ayla, Lemke Oliver, Robert, Lowry-Duda, David, Shakan, George, and Zhang, Ruixiang. Quantitative Hilbert Irreducibility and almost prime values of polynomial discriminants. To appear in Int. Math. Res. Not. IMRN.
- Anderson, Theresa C. and Hu, Bingyang. Dyadic analysis meets number theory. To appear in IMRN.
- Anderson, Theresa C., Kumchev, A. V. and Palsson, E.A. Discrete maximal functions over surfaces of higher codimension. Matematica 1 (2022), no. 2, 442–479 (Journal of the AWM).
- Anderson, Theresa C., Cook, Brian, Hughes, Kevin, and Kumchev, Angel. On the Ergodic Waring-Goldbach Problem. J. Funct. Anal. 282 (2022), no. 5, Paper No. 109334, 39 pp.
- Anderson, Theresa C. and Hu, Bingyang. On the general dyadic grids in R^d. To appear in Canadian Journal of Math.
- Anderson, Theresa C. and Palsson, E.A.. Bounds for discrete multilinear spherical maximal operators in higher dimensions. Bull. Lond. Math. Soc.. 53 (2021), no. 3, 855–860.
- Anderson, Theresa C., Hu, Bingyang, Jiang, Liwei, Olson, Connor, and Wei, Zeyu. On the translates of general dyadic systems on $\R$. Mathematische Annalen, 377(3), 911-933.

Jeremy Avigad, Professor of Philosophy and Mathematical Sciences

Total # of publications in the last five years: 18 journal and conference publications since 2018, as well as one book and 2 online books (not including articles that have not yet appeared in print).

Selected Recent Publications:

- Jeremy Avigad, Mathematical Logic and Computation, Cambridge University Press, 2022.
- Jeremy Avigad, "Mathematics and the formal turn," to appear in the Bulletin of the American Mathematical Society.
- Jeremy Avigad, "Foundations," to appear in the Handbook of Proof Assistants and their Applications in Mathematics and Computer Science, edited by Jasmin Blanchette and Assia Mahboubi, Springer.
- Jeremy Avigad, Lior Goldberg, David Levit, Yoav Seginer, and Alon Titelman, "A proof-producing compiler for blockchain applications," in Adam Naumowicz and René Thiemann, eds., Interactive

Theorem Proving, (ITP) 2023, Schloss Dagstuhl - Leibniz-Zentrum für Mathematik, 7:1-17:19, 2023.

- Cayden Codel, Jeremy Avigad, and Marijn Heule, "Verified encodings for SAT Solvers," to appear in Formal Methods in Computer Aided Design (FMCAD) 2023.
- Jeremy Avigad, Seulkee Baek, Alexander Bentkamp, Marijn Heule, and Wojciech Nawrocki, "An impossible asylum," American Mathematical Monthly, 130(5):446-453, 2023.
- Alexander Bentkamp, Ramon Fernández Mir, and Jeremy Avigad, "Verified reductions for optimization," in Sriram Sankaranarayanan and Natasha Sharygina, eds., Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2023, Springer, 74-92, 2023.
- Zhangir Azerbayev, Bartosz Piotrowski, and Jeremy Avigad, "ProofNet: A benchmark for auto formalizing and formally proving undergraduate-level mathematics problems," MATH-AI: Toward Human-Level Mathematical Reasoning, 2022.
- Jeremy Avigad, "Varieties of mathematical understanding," Bulletin of the American Mathematical Society, 59(1):99-117, 2022.
- Jeremy Avigad, "The mechanization of mathematics," Notices of the AMS, 65:681-690, 2018. Reprinted in Mircea Pitici editor, The Best Writing on Mathematics 2019, Princeton University Press, 2019, 150-170.

Tom Bohman, Professor

Total # of publications in the last five years: 9 published since 2019.

Selected Recent Publications:

- Complexes of nearly maximum diameter (with Andrew Newman).
- A Critical Probability for Biclique Partition of the binomial random graph (with Jakob Hofstad).
- Two-Point Concentration of the Independence Number of the Random Graph (with Jakob Hofstad).
- A construction for Boolean cube Ramsey numbers (with Fei Peng), *Order*, to appear.
- Independent sets in hypergraphs omitting an intersection (with Xizhi Liu and Dhruv Mubayi), *Random Structures & Algorithms*, 2022.
- Coprime matchings and lonely runners (with Fei Peng), *Mathematika*, 2022.
- Dynamic concentration of the triangle-free process (with Peter Keevash), *Random Structures & Algorithms*, 2021.
- Large girth approximate Steiner triple systems (with Lutz Warnke), *Journal of the London Mathematical Society*, 2019.
- A natural barrier in random greedy hypergraph matching (with Patrick Bennett), *Combinatorics, Probability and Computing,* 2019.

Boris Bukh, Professor

Total # of publications in the last five years: 19 published since 2019.

Selected Recent Publications:

- Extremal graphs without exponentially-small bicliques. *Duke Math J,* in revision*.*
- Sharp density bounds on the finite field Kakeya problem (with Ting-Wei Chao). *Discrete Analysis*.
- On a fractional version of Haemers' bound (with Chris Cox). *IEEE Trans. Inform. Theory.*
- Periodic words, common subsequences and frogs (with Chris Cox). *Annals of Applied Probability*.
- Empty axis-parallel boxes (with Ting-Wei Chao). *International Math. Research Notices.*

Clinton Conley, Associate Professor

Total # of publications in the last five years: 9 publications since 2018.

Selected Recent Publications:

- One-ended spanning subforests and treeability of groups, with D. Gaboriau, A.S. Marks, and R.D. Tucker-Drob. Submitted.
- Divisibility of spheres with measurable pieces, with J. Grebík and O. Pikhurko. To appear in L'Enseignement Mathematique.
- Borel asymptotic dimension and hyperfinite equivalence relations, with S.C. Jackson, A.S. Marks, B. Seward, and R.D. Tucker-Drob. To appear in Duke Mathematical Journal.
- Equitable colourings of Borel graphs, with A. Bernshteyn, Forum of Mathematics (Pi), Volume 9, 2021, Paper e12 34
- Hyperfiniteness and Borel combinatorics, with S.C. Jackson, A.S. Marks, B. Seward, and R.D. Tucker-Drob, Journal of the European Mathematical Society, Volume 22, 2020, 877-892
- Measurable realizations of abstract systems of congruences, with A.S. Marks and S.T. Unger, Forum of Mathematics (Sigma), Volume 8, 2020, Paper e10 24.
- Folner tilings for actions of amenable groups, with S.C. Jackson, D. Kerr, A.S. Marks, B. Seward, and R.D. Tucker-Drob, Mathematische Annalen, Volume 371, 2018, 663--683.

James Cummings, Professor

Total # of publications in the last five years: 7 publications since 2018

Selected Recent Publications:

- On minimal non-sigma-scattered linear orders, with T. Eisworth and J.T. Moore, submitted
- Normal measures on large cardinals, with A. Apter, Transactions of the American Mathematical Society. Series B, Volume 10, 2023, 129-154
- The ineffable tree property and failure of the singular cardinals hypothesis, with Y. Hayut, M. Magidor, I. Neeman, D. Sinapova and S. Unger, Transactions of the American Mathematical Society, Volume 373, 2020, 5937-5955
- Ordinal definable subsets of singular cardinals, with S.-D. Friedman, M. Magidor, A. Rinot and D. Sinapova, Israel Journal of Mathematics, Volume 226, 2018, 781-804.

Irene Fonseca, Kavčić-Moura University Professor of Mathematics

Total # of publications in the last five years: 5 papers accepted, 3 book chapters. 14 papers published in research journals including: *Ann. Scuola Norm. Sup. Pisa , Arch. Rational Mech. Anal., Calc. Var. Partial Differential Equations, Interfaces Free Bound., J. Math. Pures Appl. , Journal of Nonlinear Science, SIAM J. Math. Anal., Trans. Amer. Math. Soc.*

Selected Recent Publications:

- Cristoferi, R., I. Fonseca and L. Ganedi, Homogenization and phase separation with space dependent wells - The Subcritical Case, *Arch. Rational Mech. Anal.*, accepted.
- Fonseca, I., N. Fusco, G. Leoni and M. Morini, Global and local energy minimizers for a nanowire growth model. *Ann. Inst. H. Poincaré Anal Non Linéaire*, accepted.
- Davoli, E., I. Fonseca and P. Liu, Adaptive image processing: first order PDE constraint regularizers and a bilevel training scheme, *J. Nonlinear Sci.* **33** (2023), No. 3, 38.
- Choksi, R., I. Fonseca, J. Lin and R. Venkatraman, Anisotropic surface tensions for phase transitions in periodic media, *Calc. Var. Partial Differential Equations* **61** (2022), No. 107, 41.
- Ferreira, R., I. Fonseca and R. Venkatraman, Homogenization of quasi-crystalline functionals via two-scale-cut- and-project convergence, *SIAM J. Math. Anal.* **53** (2021), 1785–1817.
- Fonseca, I., G. Leoni and M. G. Mora , A second order minimality condition for a free- boundary problem, *Ann. Scuola Norm. Sup. Pisa Cl. Sci.* **19** (2019), 1303–1358.
- Cristoferi, R., I. Fonseca, A. Hagerty and C. Popovici, A homogenization result in the gradient theory of phase transitions, *Interfaces Free Bound.* **21** (2019), 367–408.
- Dal Maso, G., I. Fonseca and G. Leoni, Asymptotic analysis of second order nonlocal Cahn-Hilliard-type functionals, *Trans. Amer. Math. Soc.* **370** (2018), 2785–2823.

Florian Frick, Associate Professor

Total # of publications in the last five years: 20 published since 2018.

Selected Recent Publications:

- Transversal generalizations of hyperplane equipartitions (with S. Murray, S. Simon, and L. Stemmler). in revision.
- On inscribed trapezoids and affinely 3-regular maps (with M. Harrison) *Proc. Roy. Soc. Edinburgh Sect. A*, to appear.
- Random complexes with free involution (with A. Newman). *Israel Journal of Mathematics*, to appear.
- The topology of projective codes and the distribution of zeros of odd maps (H. Adams and J. Bush). *Michigan Mathematics Journal*, to appear.
- What can you draw? (with F. Peng). *American Mathematics Monthly* 2023.
- Coupled embeddability (with M. Harrison). *Bulletin of the London Mathematical Society* 2022.
- A nonlinear Lazarev–Lieb theorem: L2-orthogonality via motion planning (with M. Superdock). *Journal of Topological Analysis* 2022.

- Chromatic numbers of stable Kneser hypergraphs via topological Tverberg-type theorems. *International Mathematics Research Notices* 2020.
- Variants of the square peg problem (with J. Aslam, S. Chen, S. Saloff-Coste, L. Setiabrata, and H. Thomas). *Forum of Mathematics Sigma* 2020.
- Barycenters of polytope skeleta and counterexamples to the topological Tverberg conjecture, via constraints (with P. Blagojević and G. Ziegler). *Journal of the European Mathematical Society* 2019.

Alan Frieze, Orion Hoch, S 1952, University Professor of Mathematical Sciences

Total # of publications in the last five years: 64 published since 2018.

Selected Recent Publications:

- Sequentially constrained Hamilton Cycles in random graphs, (with W. Pegden).
- A scaling limit for the length of the longest cycle in a sparse random digraph (with M. Anastos), Random Structures & Algorithms, 2022.
- The effect of adding randomly weighted edges, SIAM Journal on Discrete Mathematics, 2021.
- Maker Breaker on Digraphs (with W. Pegden), Journal of Graph Theory, 2021.
- Random volumes in d-dimensional polytopes (with W. Pegden and T. Tkocz), Discrete Analysis 2020.
- Karp's patching algorithm on random perturbations of dense digraphs (with P. Michaeli).
- On the cover time of the emerging giant (with W. Pegden and T. Tkocz), SIAM Journal on Discrete Mathematics, 2022.
- Shortest paths with a cost constraint: a probabilistic analysis (with T. Tkocz), Discrete Applied Mathematics, 2021.
- Finding maximum matchings in random regular graphs in linear expected time with M. Anastos), Random Structures & Algorithms, 2021.
- A randomly weighted minimum arborescence with a random cost constraint (with T. Tkocz), Mathematics of Operations Research, 2022.

Rami Grossberg, Professor

Total # of publications in the last five years: 1 published since 2018.

Selected Recent Publications:

- Equivalent definitions of superstability in tame abstract elementary classes, with S. Vasey, Journal of Symbolic Logic, Volume 82, 2017, 1387-1408
- Forking in short and tame abstract elementary classes, with W. Boney, Annals of Pure and Applied Logic, Volume 168, 2017, 1517-1551
- Superstability from categoricity in abstract elementary classes, with W. Boney, M. vanDieren, and S. Vasey, Annals of Pure and Applied Logic, Volume 168, 2017, 1383-1395

Gautam Iyer, Professor

Total # of publications in the last five years: Published 17 papers since 2018 (2 submitted, 3 accepted, 12 published) Published in journals such as: *Annals of Probability, Archive of Rational Mechanics, Communications in Mathematical Physics, Nonlinearity, Journal of Nonlinear Science, Journal of Mathematical Biology, SIAM Journal of Mathematical Analysis, Transactions of the AMS, Philosophical Transactions of the Royal Society.*

Selected publications:

- C. Gomez, G. Iyer, H. Le, and A. Novikov. An Oscillator Driven by Algebraically Decorrelating Noise. *Comm. Math. Phys*., 402(1):231–284, 2023
- J. Ballew, G. Iyer, C. D. Levermore, H. Liu, and R. L. Pego. Global dynamics and photon loss in the Kompaneets equation. To appear in *SIAM J. Math. Anal.,* 2023, arXiv:2208.09755.
- T. D. Drivas, T. M. Elgindi, G. Iyer, and I.-J. Jeong. Anomalous dissipation in passive scalar transport. *Arch. Ration. Mech. Anal.,* 243(3):1151–1180, 2022.
- G. Crippa, T. Elgindi, G. Iyer, and A. L. Mazzucato. Growth of Sobolev norms and loss of regularity in transport equations. *Philos. Trans. Roy. Soc. A*, 380(2225):Paper No. 24, 12, 2022.
- G. Iyer, X. Xu, and A. Zlatoš. Convection-induced singularity suppression in the Keller-Segel and other non-linear PDEs. *Trans. Amer. Math. Soc.*, 374(9):6039–6058, 2021.
- Y. Feng, Y. Feng, G. Iyer, and J.-L. Thiffeault. Phase separation in the advective Cahn-Hilliard equation. *J. Nonlinear Sci*., 30(6):2821–2845, 2020.
- Y. Feng and G. Iyer. Dissipation enhancement by mixing. *Nonlinearity*, 32(5):1810–1851, 2019.
- M. Hairer, G. Iyer, L. Koralov, A. Novikov, and Z. Pajor-Gyulai. A fractional kinetic process describing the intermediate time behaviour of cellular flows. *Ann. Probab.*, 46(2):897–955, 2018.

David Kinderlehrer, Alumni Professor of Mathematical Sciences & Professor of Materials Science and Engineering

Total # of publications in the last five years: 1 published, 1 submitted, 1 book submitted (AMS contribution cited above as presentation)

Selected Publications:

- Xiaoyao Peng, A. Bhatacharya, S. Kiana Naghibzadeh, David Kinderlehrer, Robert Suter, Kaushik Dayal, and Gregory S. Rohrer. Comparison of simulated and measured grain volume changes during grain growth. Phys. Rev. Materials, 6:033402, 2022
- Maria Emelianenko, John Gemmer, David Kinderlehrer, Patrick Shipman, A primer on mathematical methods in materials science

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Dmitry Kramkov, Mellon College of Science Professor of Mathematical Finance

Total # of publications in the last five years: 4 in total. Two papers (Kramkov and Xu (2022), Kramkov and Pulido (2019)) have been published and two (Kramkov and Sîrbu (2022a) and Kramkov and Sîrbu (2022b)) have been accepted.

Selected Recent Publications:

- Dmitry Kramkov and Sergio Pulido. Density of the set of probability measures with the martingale representation property. Ann. Probab., 47(4): 2563–2581, 2019. ISSN 0091-1798. doi: 10.1214/18-AOP1321. URL https://doi.org/10.1214/18-AOP1321.
- Dmitry Kramkov and Mihai Sîrbu. Backward martingale transport and Fitzpatrick functions in pseudo-Euclidean spaces, 2022a. URL https://arxiv.org/abs/2209.04664. To appear in The Annals of Applied Probability.
- Dmitry Kramkov and Mihai Sîrbu. Singularities of Fitzpatrick and convex functions, 2022b. URL https://arxiv.org/abs/2212.09954. To appear in Journal of Convex Analysis.
- Dmitry Kramkov and Yan Xu. An optimal transport problem with backward martingale constraints motivated by insider trading. Ann. Appl. Probab., 32(1):294–326, 2022. ISSN 1050-5164. doi: 10.1214/21-AAP1678.

Martin Larsson, Professor

Total # of publications in the last five years: 19 publications (accepted or appeared) since 2019.

Selected Recent Publications:

- Testing exchangeability: Fork-convexity, supermartingales and e-processes (with A. Ramdas, J. Ruf, and W. Koolen), International Journal of Approximate Reasoning, 141, 83-109, 2022
- A weak solution theory for stochastic Volterra equations of convolution type (with E. Abi Jaber, C. Cuchiero, and S. Pulido), Annals of Applied Probability, 31(6), 2924-2952, 2021
- Relative arbitrage: sharp time horizons and motion by curvature (with J. Ruf), Mathematical Finance, 31(3), 885-906, 2021.
- Polynomial jump-diffusion models (with D. Filipovic), Stochastic Systems, 10(5), 1-97, 2020.
- Affine Volterra processes (with E. Abi Jaber and S. Pulido), Annals of Applied Probability, 29(5), 3155-3200, 2019.
- Admissible anytime-valid sequential inference must rely on nonnegative martingales (with A. Ramdas, J. Ruf, and W. Koolen), working paper, 2020
- Linear-rational term structure models (with D. Filipovic, A. Trolle), Journal of Finance, 72(2), 655-704, 2017.
- Polynomial diffusions and applications in finance (with D. Filipovic), Finance and Stochastics, 20(4), 931-972, 2016.

Giovanni Leoni, Professor

Total # of publications in the last five years: 11 papers accepted and/or published in journals including: Advances in Calculus of Variations, Ann. Inst. H. Poincaré Anal. Non Linéaire, Annali Scuola Norm. Sup. Pisa , J. Funct. Anal., J. Math. Pures Appl., Proceedings American Mathematical Society, SIAM J. Math. Anal. , Trans. Amer. Math. Soc.

Selected Recent Publications:

- Book: G. Leoni, A First Course in fractional Sobolev Spaces, Graduate Studies in
- Mathematics. American Mathematical Society (AMS), 2023.
- G. Leoni and I. Tice, Traveling wave solutions to the free boundary incompressible Navier-Stokes equations, to appear in Comm. Pure Appl. Math.
- I. Fonseca, N. Fusco, G. Leoni, and M. Morini, Global and local energy minimizers for a nanowire growth model, to appear in Ann. Inst. H. Poincaré Anal. Non Linéaire.
- G. Dal Maso, I. Fonseca, G. Leoni, Asymptotic analysis of second order nonlocal Cahn-Hilliard-type functionals, Trans. Amer. Math. Soc. 370 (2018), no. 4, 2785-2823.
- I. Fonseca, N. Fusco, G. Leoni, and M. Morini, A model for dislocations in epitaxially strained elastic films. J. Math. Pures Appl. (9) 111 (2018), 126-160.
- G. Leoni and I. Tice, Traces for homogeneous Sobolev spaces in infinite strip-like domains. J. Funct. Anal. 277 (2019), no. 7, 2288-2380.
- G. Leoni and R. Murray, Local minimizers and slow motion for the mass preserving Allen-Cahn equation in higher dimensions. Proceedings American Mathematical Society, 147 (2019), no. 12, 5167-5182.

Po-Shen Loh, Professor

Total # of publications in the last five years: 6 published since 2018.

Selected Recent Publications:

- Lessons Learned in Piloting a Digital Personalized COVID-19 "Radar" on a University Campus (with A. Bershteyn, and S. Yee), *Public Health Reports*, 2022.
- Harnessing the Power of Smart and Connected Health to Tackle COVID-19: IoT, AI, Robotics, and Blockchain for a Better World (with F. Firouzi, B. Farahani, M. Daneshmand, K. Grise, J. Song, R. Saracco, L. Wang, K. Lo, P. Angelov, E. Soares, P, Z. Talebpour, R. Moradi, M. Goodarzi, H. Ashraf, M. Talebpour, A. Talebpour, L. Romeo, R. Das, H. Heidari, D. Pasquale, J. Moody, J. Moodys, C. Woods, E. Huang, P. Barnaghi, M. Sarrafzadeh, R. Li, K. Beck, O. Isayev, N. Sung, Z. Luo), *IEEE Internet of Things Journal*, 2021.
- Minimizing the number of copies of Kr in an F-saturated graph (with D. Chakraborti), *European Journal of Combinatorics*, 2020.
- Extremal graphs with local covering conditions (with D. Chakraborti), *SIAM Journal on Discrete Mathematics* 2020.
- Distance-Uniform Graphs with Large Diameter (M. Lavrov and A. Messegué), *SIAM Journal on Discrete Mathematics*, 2019.

Robin Neumayer, Assistant Professor

Total # of publications in the last five years: In the past five years Neumayer produced 12 research papers (8 published or accepted, 4 submitted), including publications in *Geom.Topol. Ars Inven. Anal, ARMA, and JEMS*, as well as a book chapter and 3 proceedings papers.

Selected Recent Publications:

- M. Allen, D. Kriventsov, and R. Neumayer. Sharp quantitative Faber-Krahn inequalities and the Alt-Caffarelli- Friedman monotonicity formula. *Ars Inven. Anal.* 2023, Paper No. 1, 49 pp.
- M. Allen, D. Kriventsov, and R. Neumayer. Linear Stability Implies Nonlinear Stability for Faber-Krahn Type Inequalities. *Interfaces Free Bound.* 25(2):217–324, 2023.
- M.-C. Lee, A. Naber, and R. Neumayer. dp Convergence and $epsilon_$-regularity theorems for entropy and scalar curvature lower bounds, *Geom. Topol.,* 27-1 (2023), 227–350
- M. Engelstein, R. Neumayer, and L. Spolaor. Quantitative stability for minimizing Yamabe metrics. *Trans. Amer. Math. Soc*. Ser. B., 9 (2022) 395-414.
- R. Neumayer. A note on strong-form stability for the Sobolev inequality. *Calc. Var. Partial Differential Equations,* 59 (2020), no. 1, Paper No. 25, 8pp.
- Figalli and R. Neumayer. Gradient stability for the Sobolev inequality: the case $p _\geq 2$. *J. Eur. Math. Soc. (JEMS)* 21 (2019), no. 2, 319–354.
- M.G. Delgadino, F. Maggi, C. Mihaila, and R. Neumayer. Bubbling with L2-almost constant mean curvature and an Alexandrov-type theorem for crystals. *Arch. Ration. Mech. Anal.* 230 (2018) no. 3, 1131–1177.

Wesley Pegden, Professor

Total # of publications in the last five years: 22 published since 2018.

Selected Recent Publications:

- Subexponential mixing for partition chains on grid-like graphs (with Alan Frieze). *Proceedings of the 2023 Annual ACM-SIAM Symposium on Discrete Algorithms*, 2023.
- Separating effect from significance in Markov chain tests (with Maria Chikina, Alan Frieze, and Jonathan Mattingly). *Statistics and Public Policy*, 2023.
- On the cover time of the emerging giant (with Alan Frieze, Tomasz Tkocz). *SIAM Journal on Discrete Mathematics*, 2022.
- Stability of Patterns in the Abelian Sandpile (with Charles Smart). *Ann. Henri Poincaré* 21, 2020.
- Random Volumes in D-Dimensional Polytopes (with Alan Frieze and Tomasz Tkocz). *Discrete Analysis*, 2020.
- Minors of a random binary matroid (with Colin Cooper and Alan Frieze). *Random Structures & Algorithms*, 2019.
- On the rank of a random binary matrix (with Colin Cooper and Alan Frieze). *Proceedings of the Thirtieth Annual ACM-SIAM Symposium on Discrete Algorithms*, 2019.
- Diffusion limited aggregation on the Boolean lattice (with Alan Frieze). *Annals of Applied Probability*, 2018.

Matthew Rosenzweig, Assistant Professor

Total # of publications in the last five years: 4 papers accepted, 3 papers submitted. 11 papers published in research journals including: *Adv. Math., Ann. Appl. Probab., Arch. Rational Mech. Anal., Ars Inven. Anal., Disc. Cont. Dyn. Sys., Lett. Math. Phys., Nonlinearity, Phys. D, Probab. Theory Related Fields, SIAM J. Math. Anal.*

Selected Recent Publications:

- Miller, J.K., A.R. Nahmod, N. Pavlovic, M. Rosenzweig, G. Staffilani. A rigorous derivation of the Hamiltonian structure for the Vlasov equation. *Forum Math., Sigma.,* accepted.
- Rosenzweig, M. The Mean-Field Limit of Stochastic Point Vortex Systems with Multiplicative Noise. *Comm. Pure Appl. Math.*, accepted.
- Rosenzweig, M. and G. Staffilani. Global solutions of aggregation equations and other flows with random diffusion. *Probab. Theory Related Fields* **185** (2023), no. 3-4, 1219-1262
- Rosenzweig, M. and S. Serfaty. Global-in-time mean-field convergence for singular Riesz-type diffusive flows. *Ann. Appl. Probab.* **33** (2023), no. 2, 754-798.
- Nguyen, Q.H., M. Rosenzweig, S. Serfaty. Mean-field limits of Riesz-type singular flows. *Ars Inven. Anal.* (2022), Paper No. 4, 45 pp.
- Mendelson, D., A.R. Nahmod, N. Pavlovic, M. Rosenzweig, G. Staffilani. Poisson commuting energies for a system of infinitely many bosons. Adv. Math. **406** (2022), Paper No. 108525, 148 pp.
- Rosenzweig, M. and G. Staffilani. Uniqueness of solutions to the spectral hierarchy in kinetic wave turbulence theory. Phys. D **433** (2022), Paper No. 133148, 16 pp.
- Rosenzweig, M. Mean-field convergence of point vortices to the incompressible Euler equation with vorticity in L^∞. *Arch. Ration. Mech. Anal.* **243** (2022), no. 3, 1361-1431.
- Mendelson, D., A.R. Nahmod, N. Pavlovic, M. Rosenzweig, G. Staffilani. A Rigorous Derivation of the Hamiltonian Structure for the Nonlinear Schrodinger Equation. *Adv. Math.* **365** (2020), 107054, 115 pp.

Ernest Schimmerling, Professor

Total # of publications in the last five years: None published since 2016., but one to appear soon.

Selected Recent Publications:

- William J. Mitchell and Ernest Schimmerling, Covering at limit cardinals of K, Journal of Mathematical Logic, to appear
- Separating weak partial square principles, with J. Krueger, Annals of Pure and Applied Logic, Volume 165, 2014, 609-619
- Some Calkin algebras have outer automorphisms, with I. Farah and P. McKenney, Archive for Mathematical Logic, Volume 52, 2013, 517-524

Mykhaylo (Misha) Shkolnikov, Professor

Total # of publications in the last five years: (12 total): 9 published, 3 accepted, 4 under review.

Selected Recent Publications:

- Almada Monter, S. A., Shkolnikov, M., Zhang, J. (2019). Dynamics of observables in rank-based models and performance of functionally generated portfolios. *Ann. Appl. Probab.* **29**, 2849-2883.
- Avanesyan, L., Shkolnikov, M., Sircar, R. (2020). Construction of forward performance processes in stochastic factor models and an extension of Widder's theorem. *Finance Stoch.* **24**, 981-1011.
- Nadtochiy, S., Shkolnikov, M. (2020). Mean field systems on networks, with singular interaction through hitting times. *Ann. Probab.* **48**, 1520-1556.
- Delarue, F., Nadtochiy, S., Shkolnikov, M. (2022). Global solutions to the supercooled Stefan problem with blow-ups: regularity and uniqueness. *Probab. Math. Phys.* **3**, 171-213.
- Lacker, D., Shkolnikov, M., Zhang, J. (2020). Inverting the Markovian projection, with an application to local stochastic volatility models. *Ann. Probab.* **48**, 2189-2211.
- Baker, G., Shkolnikov, M. (2022). Zero kinetic undercooling limit in the supercooled Stefan problem. *Ann. Inst. Henri Poincaré Probab. Stat.* **58**, 861-871.
- Lacker, D., Shkolnikov, M., Zhang, J. (2020). Superposition and mimicking theorems for conditional McKean-Vlasov equations. To appear in *J. Eur. Math. Soc.*
- Kaushansky, V., Reisinger, C., Shkolnikov, M., Song, Z. Q. (2023). Convergence of a time-stepping scheme to the free boundary in the supercooled Stefan problem. *Ann. Appl. Probab.* **33**, 274-298.
- Nadtochiy, S., Shkolnikov, M., Zhang, X. (2021). Scaling limits of external multi-particle DLA on the plane and the supercooled Stefan problem. To appear in *Ann. Inst. Henri Poincaré Probab. Stat.*
- Nadtochiy, S., Shkolnikov, M. (2022). Stefan problem with surface tension: global existence of physical solutions under radial symmetry. To appear in *Probab. Theory Related Fields.*

Dejan Slepčev, Professor

Total # of publications in the last five years: 15 journal papers and 3 papers in conference proceedings over the last 5 years.

Selected Recent Publications:

- Y. Lu, D. Slepčev, L. Wang, Birth-death dynamics for sampling: Global convergence, approximations and their asymptotics, to appear in Nonlinearity (2023).
- D. Slepčev, A. Warren, Nonlocal Wasserstein distance: Metric and asymptotic properties, to appear in Calculus of Variations and PDE. (2023)
- J. Calder, S. Park, D. Slepčev, Boundary estimation from point clouds: Algorithms, guarantees and applications, Journal of Scientific Computing 92 no. 2, (2022), pp. 1-59.
- L. Xu, A. Korba, D. Slepčev, Accurate quantization of measures via interacting particle-based optimization, International Conference on Machine Learning, (2022) pp. 24576-24595.

- Esposito, F.S. Patacchini, A. Schlichting, D. Slepčev, Nonlocal-interaction equation on graphs: gradient flow structure and continuum limit, Archive for Rational Mechanics and Analysis 240 no. 2, (2021) pp. 699-760.
- M. Caroccia, A. Chambolle, D. Slepčev, Mumford-Shah functionals on graphs and their asymptotics, Nonlinearity 33 no. 8, (2020) pp. 3846–3888.
- M. Dunlop, D. Slepčev, A.M. Stuart, M. Thorpe, Large data and zero noise limits of graph-based semi-supervised learning algorithms, Applied and Computational Harmonic Analysis, 49, no. 2, (2020), pp. 655 - 697.
- J. Calder, D. Slepčev, Properly-weighted graph Laplacian for semi-supervised learning, Applied Mathematics and Optimization, (2019) pp. 1-49.
- N. Garcia Trillos, M. Gerlach, M. Hein, D. Slepčev, Error estimates for spectral convergence of the graph Laplacian on random geometric graphs towards the Laplace-Beltrami operator, Foundations of Computational Mathematics, (2019) pp. 1-61.
- D. Slepčev, M. Thorpe, Analysis of p-Laplacian regularization in semi-supervised learning, SIAM Journal on Mathematical Analysis, 51, no. 3, (2019) pp. 2085-2120.

Richard Statman, Professor

Total # of publications in the last five years: 9 papers since 2018

Selected Recent Publications:

- Church's semigroup is sq-universal, LIPICS, Volume 195, 2021, Paper 6 6
- Products in a category with only one object, EPTCS, Volume 333, 2021, 347-353
- Simple subtypes of intersection types, Fundamenta Informaticae, Volume 170, 2019, 307-324
- On sets of terms having a given intersection type, with A. Polonsky, Logical Methods in Computer Science, Volume 18, 2022, Paper 35 23

Prasad Tetali, Alexander M. Knaster Professor

Total # of publications in the last five years: 15 published, 1 accepted, 1 submitted.

Selected Recent Publications:

- On the zeroes of hypergraph independence polynomials (with D. Galvin, G. McKinley, W. Perkins, and M. Sarantis), Combinatorics, Probability and Computing, to appear.

- Efficient sampling and counting algorithms for the Potts model on $\mathbb{Z}^d$ at all temperatures (with

  C. Borgs, J. Chayes, T. Helmuth, and W. Perkins), Random Structures & Algorithms, 2023.

- On min sum vertex cover and generalized min sum set cover (with N. Bansal, J. Batra, and M. Farhadi), SIAM Journal on Computing, 2023.
- Determinant maximization via matroid intersection algorithms (with A. Brown, A. Laddha, M. Pittu, and M. Singh), Proceeding of the IEEE Symposium on the Foundations of Computer Science (FOCS), 2022.
- Toppleable permutations, excedances and acyclic orientations (with A. Ayyer, and D. Hathcock), Combinatorial Theory, 2022.
- On the number of independent sets in uniform, regular, linear hypergraphs (with E. Cohen, W. Perkins, and M. Sarantis), European Journal of Combinatorics, 2022.
- Volume growth, curvature, and Buser-type inequalities in graphs (with B.Benson and P. Ralli), International Mathematics Research Notices IMRN, 2021.
- Transport proofs of some discrete variants of the Prékopa-Leindler inequality (with N. Gozlan, C. Roberto, and P. Samson), Ann. Sc. Norm. Super. Pisa Cl. Sci., 2021.
- Finding cliques using few probes (with U. Feige, D. Gamarnik, J. Neeman, and M. Rácz), Random Structures & Algorithms, 2020.

Ian Tice, Associate Professor

Total # of publications in the last five years: 18 papers accepted and 3 submitted in journals including: Journal of the European Mathematical Society, Communications on Pure and Applied Mathematics, Archive for Rational Mechanics and Analysis, Analysis and PDEs, Communications in Mathematical Physics, Journal of Functional Analysis

Selected Recent Publications:

- Y. Guo, I. Tice. Stability of contact lines in fluids: 2D Navier-Stokes flow. To appear in J. Eur. Math. Soc.
- Leoni, I. Tice. Traveling wave solutions to the free boundary incompressible Navier-Stokes equations. To appear in Comm. Pure Appl. Math.
- A. Remond-Tiedrez, I. Tice. Anisotropic micropolar fluids subject to a uniform microtorque: the unstable case. Comm. Math. Phys. 381 (2021), no. 3, 947--999.
- G. Leoni, I. Tice. Traces for homogeneous Sobolev spaces in infinite strip-like domains. J. Funct. Anal. 277 (2019), no. 7, 2288–2380.
- Y. Guo, I. Tice. Stability of contact lines in fluids: 2D Stokes Flow. Arch. Ration. Mech. Anal. 227 (2018), no. 2, 767--854.

Konstantin Tikhomirov, Associate Professor

Total # of publications in the last five years: 31 published since 2018.

Selected Recent Publications:

- K. Tikhomirov, *Quantitative invertibility of non-Hermitian random matrices,* to appear in the ICM 2022 proceedings. arXiv:2206.00601
- A.E. Litvak, K. Tikhomirov, *Singularity of sparse Bernoulli matrices*, Duke Math. J. 171 (2022), no.5, 1135-1233. arXiv:2004.03131
- G. Livshyts, K. Tikhomirov, R. Vershynin, *The smallest singular value of inhomogeneous square random matrices*, Ann. Probab. 49 (2021), no. 3, 1286-1309. arXiv:1909.04219
- G. Paouris, K. Tikhomirov, P. Valettas, *Hypercontractivity, and Lower Deviation Estimates in Normed Spaces*, Ann. Probab., to appear. arXiv:1906.03208
- K. Tikhomirov, *Singularity of random Bernoulli matrices*, Ann. of Math. (2) 191 (2020), no. 2, 593-634. arXiv:1812.09016
- A. Lytova, K. Tikhomirov, *On delocalization of eigenvectors of random non-Hermitian matrices*, Probab. Theory Related Fields 177 (2020), no. 1-2, 465-524. arXiv:1810.01590
- M. Rudelson, K. Tikhomirov, *The sparse circular law under minimal assumptions,* Geom. Funct. Anal. 29 (2019), no. 2, 561-637. arXiv:1807.08085
- K. Tikhomirov, *On the Banach-Mazur distance to cross-polytope*, Adv. Math. 345 (2019), 598-617. arXiv:1804.08212
- **A.E. Litvak**, A. Lytova, K. Tikhomirov, N. Tomczak-Jaegermann, P. Youssef, *Circular law for sparse random regular digraphs*, J. Eur. Math. Soc. (JEMS) 23 (2021), no. 2, 467-501. arXiv:1801.05576
- **A.E. Litvak**, A. Lytova, K. Tikhomirov, N. Tomczak-Jaegermann, P. Youssef, *Structure of eigenvectors of random regular digraphs*, Trans. Amer. Math. Soc. 371 (2019), no. 11, 8097-8172. arXiv:1801.05575

Tomasz Tkocz, Associate Professor

Total # of publications in the last five years: 34 published since 2018

Selected Recent Publications:

- G. Chasapis, K. Gurushankar, T. Tkocz, Sharp bounds on p-norms for sums of independent uniform random variables, $0 < p < 1$, to appear in J. Anal. Math. (2023)
- G. Chasapis, P. Nayar, T. Tkocz, Slicing l_p-balls reloaded: stability, planar sections in l_1, Ann. Probab. 50 (2022), no. 6, 2344-2372.
- H. Huang, B. A. Slomka, T. Tkocz, B-H. Vritsiou, Improved bounds for Hadwiger's covering problem via thin-shell estimates, J. Eur. Math. Soc. (JEMS) 24 (2022), no. 4, 1431-1448.
- G. Chasapis, R. Liu, T. Tkocz, Rademacher--Gaussian tail comparison for complex coefficients and related problems, Proc. Amer. Math. Soc. 150 (2022), 1339-1349.
- D. Chakraborti, T. Tkocz, B.-H. Vritsiou, A note on volume thresholds for random polytopes, Geom. Dedicata 213 (2021), 423-431.
- G. Chasapis, H. Koenig, T. Tkocz, From Ball's cube slicing inequality to Khinchin-type inequalities for negative moments, J. Funct. Anal. 281 (2021), no. 9, Paper No. 109185, 23 pp.
- W. Bednorz, T. Tkocz, Stochastic dominance and weak concentration for sums of independent symmetric random vectors, Int. Math. Res. Not. IMRN (2020), no. 23, 8997--9010.
- Bonami, R. Latala, P. Nayar, T. Tkocz, Bounds on moments of weighted sums of finite Riesz products, J. Fourier Anal. Appl. 26 (2020), no. 6, Paper No. 84, 31 pp.

- M. Madiman, P. Nayar, T. Tkocz, Two remarks on generalized entropy power inequalities, Geometric aspects of functional analysis, 169--185, Lecture Notes in Math., 2266, Springer, 2020.
- P. Nayar, T. Tkocz, On a convexity property of sections of the cross-polytope, Proc. Amer. Math. Soc. 148 (2020), no. 3, 1271--1278.

Noel Walkington, Professor

Total # of publications in the last five years: 13 research papers submitted in journals since 2018

Selected Recent Publications:

- Ondrejat, M., Prohl, A., and Walkington, N. J., Numerical Approximation of Nonlinear SPDE's, Stochastics and Partial Differential Equations: Analysis and Computations, September 2022.
- Duan, M. and Walkington, N., Models of Bacteria Swimming in a Nematic Liquid Crystal, Quarterly of Applied Math. 79, 2021, pp 695--715.
- Walkington, N., Nesterov's Method for Convex Optimization, Siam Review 65, No. 2, 2023, pp 539--562.
- Dayal, K, Naghibzadeh, K, Walkington, N. J., Surface Growth in Deformable Solids using an Eulerian Formulation, Journal of the Mechanics and Physics of Solids, 154, 2021.5
- Chu, T., Miller, G. L., Walkington, N. J., Wang, A. L., New Foundations for Cheeger--Buser Inequalities on Probability Density functions, SODA21, July 2020.
- Seguin, B. and Walkington, N. J., Multi-component multiphase flow through a poroelastic medium, Journal of Elasticity, Vol. 135, No. 1-2, pp. 485--507, February 2019.

Johannes Wiesel, Assistant Professor

Total # of publications in the last five years: 15 publications (accepted or appeared) since 2019, 3 papers under review.

Selected Recent Publications:

- J. Obloj and J. Wiesel. Robust estimation of superhedging prices, 2021. Ann. Stat. 49(1), 508-530.
- D. Bartl, S. Drapeau, J. Obloj, J. Wiesel. Sensitivity analysis of Wasserstein distributionally robust optimisation problems, 2021. Proc. Roy. Soc. A 477:20210176
- J. Backhoff, D. Bartl, M. Beiglböck, J. Wiesel. Estimating processes in adapted Wasserstein distance, 2022. Ann. Appl. Probab. 32 (1), 529-550.
- J. Wiesel. Measuring association with Wasserstein distances, 2022. Bernoulli 28(4), 2816-2832.
- M. Nutz and J. Wiesel. Entropic Optimal Transport: Convergence of Potentials, 2022. Probab. Theory Relat. Fields, 184, 401–424.
- M. Nutz and J. Wiesel. Stability of Schrödinger Potentials and Convergence of Sinkhorn's Algorithm, 2022+. Ann. Probab. (forthcoming).

- J. Wiesel. Continuity of the martingale optimal transport problem on the real line, 2023+. Ann. Appl. Probab. (forthcoming).

Michael Young, Associate Professor

Total # of publications in the last five years: 17 published since 2018.

Selected Recent Publications:

- Polychromatic Colorings on the Hypercube (with J. Goldwasser, B. Lidicky, R. Martin, D. Offner, and J. Talbot). Journal of Combinatorics, 2018.
- Rainbow Arithmetic Progressions in Finite Abelian Groups. Journal of Combinatorics, (2018).
- The inverse eigenvalue problem of a graph: Multiplicities and minors (with W. Barrett, S. Butler, S. Fallat, H. Hall, L. Hogben, J.C.-H. Lin, and B. Shader). Journal of Combinatorial Theory, Series B, 2020.
- An upper bound for the k-power domination number in r-uniform hypergraphs (with J. Alameda, F. Kenter, and K. Meagher). Discrete Mathematics, 2022.
- Anti-van der Waerden numbers on Graphs (with Z. Berikkyzy, A. Schulte, E. Sprangel, S. Walker, and N. Warnberg). Graphs and Combinatorics, 2022.
- Mathequity Hours: Fostering Wholeness (with A. Winger, I. Stovall, A. Cuoco, E. Badertscher, M. Gates, U. MacDowell, and S. Sword). in a Mathematics Learning Community. R. Gutierrez and I. Goffney (Eds.), Annual Perspectives in Mathematics Education: Rehumanizing Mathematics for Students who are Black, Indigenous, and/or Latin@/x, 2018.

Publications: Teaching Track

Noha Abdelghany, Assistant Teaching Professor

Total # of publications in the last five years: One published since 2018.

Selected Recent Publications:

- Abdelghany, Noha; Wood, Jay A. Failure of the MacWilliams identities for the Lee weight enumerator over $\mathbb{Z}_m$, $m \geq 5$. Discrete Math. 343 (2020), no. 11, 112036, 12 pp

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Jason Howell, Teaching Professor

Total # of publications in the last five years: 4 published since 2018.

Selected Recent Publications:

- M. Deliyanni, V. Gudibanda, J. S. Howell, J. T. Webster. Large Deflections of Inextensible Cantilevers: Modeling, Theory, and Simulation. Math. Model. Nat. Phenom., 15 (2020) 44.
- J. S. Howell, K. Huneycutt, J. T. Webster, S. Wilder. A thorough look at the (in)stability of piston-theoretic beams. Mathematics in Engineering, 1(3), 2019, 614--647.

John Mackey, Teaching Professor

Total # of publications in the last five years: 3 published since 2018.

Selected Recent Publications:

- A cube tiling of dimension eight with no facesharing, J Mackey, Discrete & Computational Geometry 28, 275-279, 2002
- The resolution of Keller's conjecture, J Brakensiek, M Heule, J Mackey, D Narvaez, Journal of Automated Reasoning 66 (3), 277-300, 2022
- On the Number of 5-Cycles in a Tournament, N Komarov, J Mackey, Journal of Graph Theory 86 (3), 341-356, 2017
- Tighter Bounds on Directed Ramsey Number R(7), D Neiman, J Mackey, M Heule, Graphs and Combinatorics 38 (5), 156, 2022
- A lower bound for groupies in graphs, J Mackey, Journal of Graph Theory 21 (3), 323-326, 1996
- Containment: a variation of cops and robber, D Crytser, N Komarov, J Mackey, Graphs and Combinatorics 36 (3), 591-605, 2020
- Improved upper and lower bounds on a geometric Ramsey problem, M Lavrov, M Lee, J Mackey

- European Journal of Combinatorics 42, 135-144, 2014

David Offner, Associate Teaching Professor

Total # of publications in the last five years: 8 published since 2018.

Selected Recent Publications:

- S. Gibson and D. Offner, Decompositions of even hypercubes into cycles whose length is a power of two. to appear in Involve, a Journal of Mathematics, arxiv.org/abs/2107.07450
- M. Axenovich, L. Benz, D. Offner, and C. Tompkins, Generalized Tur\'an densities in the hypercube. Discrete Math. 346 (2023), Paper 113238.
- D. Offner and K. Ojakian, Capture-time extremal cop-win graphs. Discuss. Math. Graph Theory 41 (2021) 923--948.
- M. Axenovich, D. Offner, and C. Tompkins, Long path and cycle decompositions of even hypercubes. European J. Combin. 95 (2021), 103320, 20 pp.
- D. Offner and K. Ojakian, Comparing the Power of Cops to Zombies in Pursuit-Evasion Games. Discrete Appl. Math. 271 (2019) 144--151.
- M. Axenovich, J. Goldwasser, B. Lidick\'y, R. Martin, D. Offner, J. Talbot, and M. Young, Polychromatic Colorings on the Integers. INTEGERS 19 (2019) Paper A18.

Dylan Quintana, Assistant Teaching Professor

Total # of publications in the last five years:

Selected Recent Publications: 2 published since 2018.

- *Unique Decoding of Explicit ε-Balanced Codes Near the Gilbert-Varshamov Bound*, with F. Jeronimo, S. Srivastava, and M. Tulsiani (FOCS 2020)
- *List Decoding of Direct Sum Codes*, with V. Alev, F. Jeronimo, S. Srivastava, and M. Tulsiani (SODA 2020)

Publications: Teaching Track, CMU Qatar

Hasan Demirkoparan, Teaching Professor (Qatar)

Total # of publications in the last five years: three papers that I have co-authored were published (two of them are in Mathematics and Mechanics of Materials and one in Journal of Applied and Computational Mechanics).

Niraj Khare, Associate Teaching Professor (Qatar)

Total # of publications in the last five years:

Selected Recent Publications:
- with Stoyan Dimitrov (https://www.stoyandimitrov.net/) titled "Moments of permutation statistics and Central limit theorems" has been accepted for publication in Advances in Applied Mathematics (https://doi.org/10.48550/arXiv.2109.09183).

Zelealem Yilma, Associate Teaching Professor (Qatar)

Total # of publications in the last five years: 2 published since 2018.

In the last year, research articles in which I was a co-author have been published in the Journal of Evolutionary Biology and the Electronic Journal of Combinatorics.