

Caroline Uhler

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Appointments

01/2021 – Associate Member, Broad Institute of MIT and Harvard
09/2020 – Associate Professor (with tenure), EECS & IDSS, MIT
09/2019 – 08/2020 Visiting Professor, D-BSSE, ETH Zurich
07/2018 – 08/2020 Associate Professor (without tenure), EECS & IDSS, MIT
01/2018 – 08/2018 Visiting Professor, D-BSSE, ETH Zurich
10/2015 – 06/2018 Henry L. and Grace Doherty Assistant Professor, EECS & IDSS, MIT
11/2011 – 10/2015 Assistant Professor, IST Austria
08/2013 – 12/2013 Research Fellow, Semester program: Theoretical Foundations of Big Data Analysis, Simons Institute, UC Berkeley
01/2012 – 07/2012 Postdoctoral Researcher, Seminar for Statistics, Department of Mathematics, ETH Zurich
09/2011 – 11/2011 Postdoctoral Researcher, Annual program: Mathematics of Information, Institute of Mathematics and its Applications, U. of Minnesota

Education

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|--------------------------------------|-------|---------------------------------|------|
| University of California at Berkeley | Ph.D. | Statistics | 2011 |
| Haas School of Business, UC Berkeley | MOT | Management of Technology Degree | 2011 |
| University of Zurich (Switzerland) | M.Ed. | High School Math Education | 2007 |
| University of Zurich (Switzerland) | M.Sc. | Mathematics | 2006 |
| University of Zurich (Switzerland) | B.Sc. | Biology | 2006 |
| University of Zurich (Switzerland) | B.Sc. | Mathematics | 2004 |

Main Research Interests

Machine learning and statistics (causal inference, graphical models, autoencoders, generative modeling, self-supervised learning, algebraic statistics, multivariate analysis); *Data science*; *Mathematical and computational biology* (genome packing models, inference of gene regulatory networks); *Convex optimization*; *Applied algebraic geometry*;

Awards and Distinctions

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|-------------|--|
| 2019 – 2024 | Simons Investigator in Mathematical Modeling of Living Systems |
| 2018 | Joseph A. Martore Award for Exceptional Contributions to Education, MIT |
| 2017 | Sloan Research Fellowship |
| 2017 | NSF Career Award |
| 2016 | Charles E. Reed Faculty Initiative Fund Award |
| 2015 | Doherty Professorship in Ocean Utilization |
| 2015 | START Award, Austrian Science Fund |
| 2015 | Sofja Kovalevskaja Award |
| 2014 | Elected Member of the International Statistical Institute (ISI) |
| 2013 | Research Fellowship, Simons Institute at UC Berkeley for the program “Theoretical Foundations of Big Data Analysis” during Fall 2013 |
| 2013 | Golden Chalk Award for excellence in teaching from IST Austria |
| 2010 – 2011 | Janggen-Poehn Fellowship (full tuition and stipend 2010-2011) |
| 2007 – 2010 | International Fulbright Science and Technology Award (full tuition and stipend, 30 fellows per year worldwide) |
| 2007 | Best Student Award of the University of Zurich (highest GPA) |

Grants

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| 2019 – 2024 | Simons Investigator in Mathematical Modeling of Living Systems (USD 650K) |
| 2019 – 2021 | J-Clinic: “Causal experimentation and modeling with uncertain disease labels” (USD 300K) |
| 2018 – 2021 | ONR: “Robust causal methodology for planning and learning from interventions in the face of uncertainty” (USD 250K) |
| 2018 – 2020 | MIT-IBM Watson AI Lab (USD 450K) |
| 2018 – 2020 | J-WAFS: “Novel systems biology tools for improving crop tolerance to abiotic stressors” (USD 200K) |
| 2018 – 2020 | NEC Corporation Fund for Research in Computers and Communication (USD 75K) |

- 2017 – 2022 NSF: “CAREER: Gaussian graphical models: Theory, computation, and applications” (USD 400K)
- 2017 – 2020 ONR: “Statistical learning theory of complex causal models” (USD 1.3M)
- 2017 – 2019 Alfred P. Sloan Research Fellowship (USD 60K)
- 2016 – 2018 Charles E. Reed Faculty Initiative Fund Award (USD 75K)
- 2015 – 2017 Doherty Professorship in Ocean Utilization (USD 50K)
- 2015 – 2021 START Award, Austrian Science Fund (EUR 1.2M, partially declined due to move to US)
- 2015 – 2020 Sofja Kovalevskaja Award (EUR 1.6M, declined due to move to US)

Workshop and Conference Organization

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|--------------------------------------|---|----------------------------|
| Oct 2-4, 2019 | Genomes & AI: From Packing to Regulation | NUS, Singapore |
| Jul 9-13, 2019 | Chair of SIAM Conference on Applied Algebraic Geometry | Bern, Switzerland |
| Feb 25-28, 2019 & Feb 24-27, 2020 | Telluride Workshop: Physical Genomics and Transcriptional Engineering | Telluride, Colorado |
| Jun 18-19, 2018 | BGSE Summer Forum: High-dimensional Statistics and Random Structures | Barcelona, Spain |
| Sep 21-22, 2017 | ONR Kickoff Meeting: Predictive and Causal Modeling - Bridging the Gap | MIT |
| Apr 16-22, 2017 | Workshop on Algebraic Statistics | Oberwolfach |
| Mar 2017, 2018, 2019 | Women in Data Science Conference | Cambridge, US |
| 07/25-08/19, 2016 | Short thematic program: Statistical Causal Inference and Applications to Genetics | CRM, Montréal |
| Jun 8-11, 2015 | Algebraic Statistics 2015 | University of Genoa, Italy |
| Aug 25-29, 2014 | Prague Stochastics 2014 | Academy of Sciences, CZ |
| Jul 14-17, 2014 | Algebraic Statistics Workshop | NIMS, Daejeon, South Korea |
| Sep 28-30, 2012 | Algebraic Statistics in Europe | IST Austria |

Minisymposium / Session Organization

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| 07/27-08/01, 2019 | Joint Statistical Meetings, Invited Session of the IMS | Denver |
| May 22-25, 2017 | SIAM Conference on Applied Algebraic Geometry | Georgia Tech |
| 07/30-08/04, 2016 | Topic contributed paper session sponsored by IMS | JSM, Chicago |
| Aug 3-7, 2015 | SIAM Conference on Applied Algebraic Geometry | Daejeon, Korea |
| Jul 26-31, 2015 | 60th World Statistics Congress – ISI2015 | Rio, Brazil |
| Aug 1-4, 2013 | SIAM Conference on Applied Algebraic Geometry | Colorado State |

Academic Service

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| 2021 – 2025 | Council Member (elected), International Statistical Institute |
| 2021 | Tutorial co-chair for ICML |
| 2020 | Sponsorship co-chair for ICML |
| 2020 | Damon Runyon Quantitative Biology Fellowship Award Selection Committee |
| 2020 - 2023 | Associate editor, <i>SIAM Journal on Mathematics of Data Science</i> |
| 2019 - 2022 | Associate editor, <i>SIAM Journal on Applied Algebra and Geometry</i> |
| 2019 - 2022 | Associate editor, <i>Harvard Data Science Review</i> |
| 2019 - | Statistics review board, <i>EBioMedicine</i> , <i>The Lancet</i> and Cell Press |
| 2018 – 2020 | Program Director, SIAM Activity Group on Algebraic Geometry |
| 2017 - 2020 | IMS representative, Joint Committee on Women in the Mathem. Sciences |
| 2017 | International hiring committee for research group leader at MPI Leipzig |
| 2017 | Program committee, <i>ISSAC</i> |
| 2016 – | Area chair for the major machine learning conferences |
| 2014 – | Editorial board, <i>Journal of Algebraic Statistics</i> |
| 2011 – | Reviewer for all major Statistics journals |

Outreach

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| 2015 - | Judge for the Regeneron Science Talent Search, the most prestigious science research competition for high school seniors in the US |
| 2001 - 2006 | Mathematics teacher at secondary school and high school in Switzerland |
| 2003 - 2007 | Co-founder and manager of Thailand-Volunteering Association for Swiss students to teach Mathematics and English in Nam Rong, Thailand |

Teaching

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| Fall '20 | Algorithms for Inference (6.438) | MIT |
| Fal '20 | GreatLearning, online module on data analysis | online |

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| | and visualization | |
| Fall '19 | Minicourse on Probabilistic Graphical Models Semester on Statistics with Geometry and Topology | Toulouse, France |
| Fall '16, '17, '18 | Statistics, Computation, and Applications (course IDS.012 / 6.419 / IDS.131 / 6.439) | MIT |
| 06/2018 | 1-week summer school on Graphical Models | ETH Zurich |
| Spring '17, '19 | Graphical models: A Geometric, Algebraic, and Combinatorial Perspective (course 6.244 / IDS.136) | MIT |
| Summer '16 | DataScienceX (Online MIT Professional Education Course) | MIT |
| Spring '16 | Algebraic Techniques and Semidefinite Optimization (course 6.256) | MIT |
| Spring '15 | Modeling: core PhD course | IST Austria |
| Spring '13, '14 | Applied Statistics: core PhD course | IST Austria |
| Spring '14, '15 | Convex Optimization: advanced PhD course | IST Austria |
| 06/2013 | 1-week summer school on Algebraic Statistics | Nordfjordeid, Norway |
| 2006 - 2007 | Graduate Student Instructor, Advanced Algebra | University of Zurich |
| 2001 - 2006 | High School and Middle School Teacher | Switzerland |

Students and Postdocs

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|-----------------------------|---|
| <i>PhD students:</i> | Karren Dai Yang, Raj Agrawal, Adityanarayanan Radhakrishnan, Chandler Squires, Louis Cammarata, Jiaqi Zhang |
| <i>Postdocs:</i> | Anastasiya Belyaeva, Daniel Bernstein, Jan-Christian Huetter, Neriman Tokcan |
| <i>MEng students:</i> | Eshaan Nichani, Neha Prasad |
| <i>UROP students:</i> | Josh Amaniampong, Sathwik Karnik, George Stefanakis, Michael Truell, Annie Yun |
| <i>Former PhD students:</i> | Yuhao Wang (Assistant Professor at Tsinghua University) Anastasiya Belyaeva (Postdoc at MIT) |
| <i>Former Postdocs:</i> | Abraham Martin del Campo (Research Fellow at CIMAT, Guanajuato) Anna Klimova (Statistician at German Cancer Research Center) Fatemeh Mohammadi (Associate Professor at University |

of Bristol)

Patrick Norén (Senior Lecturer at Uppsala University)

Liam Solus (Assistant Professor at KTH Stockholm)

Kaie Kubjas (Assistant Professor at Aalto University)

Elisa Perrone (Assistant Professor at TU Eindhoven)

Elina Robeva (Assistant Professor at University of British Columbia)

Former MEng students: Adityanarayanan Radhakrishnan (PhD student, MIT)

Ali C. Soylemezoglu (Microsoft)

Lawrence J. Sun (Coursera)

Abigail Katcoff (Amazon)

Uma Roy (Google Brain)

Chandler Squires (PhD student, MIT)

Basil N. Saeed (PhD student, Stanford)

Former UROPs:

Adityanarayanan Radhakrishnan (PhD student, MIT)

Madeleine Duran (PhD student, University of Washington)

Mehmet T. Savran (Google)

Ali C. Soylemezoglu (Microsoft)

Abigail Katcoff (Amazon)

Chandler Squires (PhD student, MIT)

Basil N. Saeed (PhD student, Stanford)

Eshaan Nichani (MEng student, MIT)

Neha Prasad (MEng student, MIT)

Publications

- 80 AGRAWAL, R., SQUIRES, C., PRASAD, N. AND UHLER, C., “The DeCAMFounder: Non-linear causal discovery in the presence of hidden variables”, submitted, preprint available at <https://arxiv.org/abs/2102.07921>.
- 79 BELYAEVA, A., KUBJAS, K., SUN, L.J. AND UHLER, C., “Identifying 3D genome organization in diploid organisms via Euclidean distance geometry”, submitted, preprint available at <https://arxiv.org/abs/2101.05336>.
- 78 SQUIRES, C., SHEN, D., AGARWAL, A., SHAH, D. AND UHLER, C., “Causal imputation via synthetic interventions”, submitted, preprint available at <https://arxiv.org/abs/2011.03127>.
- 77 SQUIRES, C., AMANIAMPONG, J. AND UHLER, C., “Efficient permutation discovery in causal DAGs”, submitted, preprint available at <https://arxiv.org/abs/2011.03610>.

- 76 NICHANI, E., RADHAKRISHNAN, A. AND UHLER, C., “Do deeper convolutional networks perform better? ”, submitted, preprint available at <https://arxiv.org/abs/2010.09610>.
- 75 NOVARRO, M., WANG, Y., MARQUES, A.G., UHLER, C. AND SEGARRA, S., “Joint inference of multiple graphs from matrix polynomials”, submitted, preprint available at <https://arxiv.org/abs/2010.08120>.
- 74 RADHAKRISHNAN, A., BELKIN, M. AND UHLER, C., “Linear convergence and implicit regularization of generalized mirror descent with time-dependent mirrors”, submitted, preprint available at <https://arxiv.org/abs/2009.08574>.
- 73 VLACHAS, P. R., ARAMPATZIS, G., UHLER, C. AND KOUMOUTSAKOS, P., “Learning the effective dynamics of complex multiscale systems”, submitted, preprint available at <https://arxiv.org/abs/2006.13431>.
- 72 YANG, K., GOLDMAN, S., JIN, W., LU, A., BARZILAY, R., JAAKKOLA, T. AND UHLER, C., “Improved conditional flow models for molecule to image synthesis”, submitted, preprint available at <https://arxiv.org/abs/2006.08532>.
- 70 RADHAKRISHNAN, A., NICHANI, E., BERNSTEIN, D. AND UHLER, C., “On alignment in deep linear neural networks”, submitted, preprint available at <https://arxiv.org/abs/2003.06340>.
- 70 BELYAEVA, A., SQUIRES, C. AND UHLER, C., “DCI: Learning causal differences between gene regulatory networks”, to appear in *Bioinformatics*.
- 69 BELYAEVA, A., CAMMARATA, L., RADHAKRISHNAN, A., SQUIRES, C., YANG, K. D., SHIVASHANKAR, G. V. AND UHLER, C., “Causal network models of SARS-CoV-2 expression and aging to identify candidates for drug repurposing”, to appear in *Nature Communications*.
- 68 LAURITZEN, S., UHLER, C. AND ZWIERNIK, P., “Total positivity in exponential families with application to binary variables”, to appear in *Annals of Statistics*.
- 67 ROBEVA, E., STURMFELS, B., TRAN, N. AND UHLER, C., “Maximum likelihood estimation for totally positive log-concave densities”, to appear in *Scandinavian Journal of Statistics*.
- 66 SOLUS, L., WANG AND UHLER, C., “Consistency guarantees for greedy permutation-based causal inference algorithms”, *Biometrika* (2021), asaa104.
- 65 YANG, K. D., BELYAEVA, A., VENKATCHALAPATHY, S., DAMODARAN, K., RADHAKRISHNAN, A., KATCOFF, A., SHIVASHANKAR, G. V. AND UHLER, C., “Multi-domain translation between single-cell imaging and sequencing data using autoencoders”, *Nature Communications* 12 (2021), 31.
- 64 UHLER C. AND SHIVASHANKAR G. V., “Mechanogenomic coupling of lung tissue stiffness, EMT and coronavirus pathogenicity”, *Current Opinion in Solid State and Materials Science* 25 (2021), pp. 100874.

- 63 STURMFELS, B., UHLER, C. AND ZWIERNIK, P., “Brownian motion tree models are toric”, *Kybernetika (special issue for Frantisek Matus)* 56 (2020), pp. 1154–1175.
- 62 RADHAKRISHNAN, A., BELKIN, M. AND UHLER, C., “Overparameterized neural networks implement associative memory”, *Proceedings of the National Academy of Sciences, U.S.A.* 117 (2020), pp. 27162–27170.
- 61 AGRAWAL, R., ROY, U. AND UHLER, C., “Covariance matrix estimation under total positivity for portfolio selection”, *Journal of Financial Econometrics* (2020), nbaa018.
- 60 SAEED, B., BELYAEVA, A., WANG, Y. AND UHLER, C., “Anchored causal inference in the presence of measurement error”, *Proceedings of the Thirty-Sixth Conference on Uncertainty in Artificial Intelligence (UAI 2020)*.
- 59 SQUIRES, C., WANG, Y. AND UHLER, C., “Permutation-based causal structure learning with unknown intervention targets”, *Proceedings of the Thirty-Sixth Conference on Uncertainty in Artificial Intelligence (UAI 2020)*.
- 58 SAEED, B., PANIGRAHI, S. AND UHLER, C., “Causal structure discovery from distributions arising from mixtures of DAGs”, *Proceedings of Machine Learning Research* 119 (ICML 2020).
- 57 PRASAD, N., YANG, K.D. AND UHLER, C., “Optimal transport using GANs for lineage tracing”, Workshop on Computational Biology, International Conference on Machine Learning (ICML 2020).
- 56 WANG, Y., SEGARRA, S. AND UHLER, C., “High-dimensional joint estimation of multiple directed Gaussian graphical models”, *Electronic Journal of Statistics* 14 (2020), pp. 2439–2483.
- 55 BERNSTEIN, D. I., SAEED, B., SQUIRES, C. AND UHLER, C., “Ordering-based causal structure learning in the presence of latent variables”, *Proceedings of Machine Learning Research* 108 (AISTATS 2020), pp. 4098–4108.
- 54 WANG, Y., ROY, U. AND UHLER, C., “Learning high-dimensional Gaussian graphical models under total positivity without tuning parameters”, *Proceedings of Machine Learning Research* 108 (AISTATS 2020), pp. 2698–2708.
- 53 YANG, K. D., DAMODARAN, K., VENKATCHALAPATHY, S., SOYLEMEZOGLU, A. C., SHIVASHANKAR, G. V. AND UHLER, C., “Predicting cell lineages using autoencoders and optimal transport”, *PLoS Computational Biology* 16 (2020), e1007828.
- 52 UHLER, C. AND SHIVASHANKAR, G. V., “Mechano-genomic regulation of coronaviruses and its interplay with ageing”, *Nature Reviews Molecular Cell Biology* 21 (2020), pp. 247–248.
- 51 CASANELLAS, M., PETROVIĆ, S. AND UHLER, C., “Algebraic statistics in practice: Applications to networks”, *Annual Review of Statistics and its Applications* 7 (2020), pp. 227–250.

- 50 YANG, K. D. AND UHLER, C., “Multi-domain translation by learning uncoupled autoencoders”, *Computational Biology Workshop, International Conference on Machine Learning* 2019.
- 49 RADHAKRISHNAN, A., YANG, K. D., BELKIN, M. AND UHLER, C., “Memorization in overparameterized autoencoders”, *Deep Phenomena Workshop, International Conference on Machine Learning* 2019.
- 48 PERRONE, E., SOLUS, L. AND UHLER, C., “Geometry of discrete copulas”, *Journal of Multivariate Analysis* 172 (2019), pp. 162–179.
- 47 LAURITZEN, S., UHLER, C. AND ZWIERNIK, P., “Maximum likelihood estimation in Gaussian models under total positivity”, *Annals of Statistics* 47 (2019), pp. 1835–1863.
- 46 AGRAWAL, R., SQUIRES, C., YANG, K. D., SHANMUGAM, K. AND UHLER, C., “ABCD-Strategy: Budgeted experimental design for targeted causal structure discovery”, *Proceedings of Machine Learning Research* 89 (AISTATS 2019), pp. 3400–3409.
- 45 KATZ-ROGOZHNIKOV, D., SHANMUGAM, K., SQUIRES, C. AND UHLER, C., “Size of interventional Markov equivalence classes in random DAG models”, *Proceedings of Machine Learning Research* 89 (AISTATS 2019), pp. 3234–3243.
- 44 YANG, K. D. AND UHLER, C., “Scalable unbalanced optimal transport using generative adversarial networks”, *International Conference on Learning Representations (ICLR 2019)*.
- 43 RICHARDS, D. AND UHLER, C., “Loading monotonicity of weighted premiums, and total positivity properties of weight functions”, *Journal of Mathematical Analysis and Applications*, 475 (2019), pp. 532–553.
- 42 UHLER, C. AND RICHARDS, D., “Generalized Fréchet bounds for cell entries in multidimensional contingency tables”, *Journal of Algebraic Statistics* (special issue for Stephen E. Fienberg) 10 (2019), pp. 1–12.
- 41 ROBEVA, E., STURMFELS, B. AND UHLER, C., “Geometry of log-concave density estimation”, *Discrete & Computational Geometry* 61 (2019), pp. 136–160.
- 40 UHLER, C., “Gaussian graphical models: An algebraic and geometric perspective”, book chapter in *Handbook of Graphical Models*, CRC Press (2019).
- 39 RADHAKRISHNAN, A., DURHAM, C., SOYLEMEZOGLU, A. AND UHLER, C., “PatchNet: Interpretable neural networks for image classification”, *Machine Learning for Health (ML4H) Workshop, Neural Information Processing Systems* (2018).
- 38 WANG, Y., SQUIRES, C., BELYAEVA, A. AND UHLER, C., “Direct estimation of differences in causal graphs”, *Advances in Neural Information Processing Systems* 31 (2018).
- 37 AGRAWAL, R., BRODERICK, T. AND UHLER, C., “Minimal I-MAP MCMC for scalable structure discovery in causal DAG models”, *Proceedings of Machine Learning Research* 80 (ICML 2018), pp. 89–98.

- 36 YANG, K. D., KATCOFF, A. AND UHLER, C., “Characterizing and learning equivalence classes of causal DAGs under interventions”, *Proceedings of Machine Learning Research* 80 (ICML 2018), pp. 5537–5546.
- 35 RADHAKRISHNAN, A., SOLUS, L. AND UHLER, C., “Counting Markov equivalence classes for DAG models on trees”, *Discrete Applied Mathematics* 244 (2018), pp. 170–185.
- 34 RASKUTTI, G. AND UHLER, C., “Learning directed acyclic graphs based on sparsest permutations”, *Stat* 7 (2018), e183.
- 33 UHLER, C. AND SHIVASHANKAR, G.V., “Nuclear mechanopathology and cancer diagnosis”, *Trends in Cancer* 4 (2018), pp. 320–331.
- 32 MOHAMMADI, F., UHLER, C., WANG, C. AND YU, J., “Generalized permutohedra from probabilistic graphical models”, *SIAM Journal on Discrete Mathematics* 32 (2018), pp. 64–93.
- 31 UHLER, C., LENKOSKI, A. AND RICHARDS, D., “Exact formulas for the normalizing constants of Wishart distributions for graphical models”, *Annals of Statistics* 46 (2018), pp. 90–118.
- 30 WANG, Y., SOLUS, L., YANG, K. D. AND UHLER, C., “Permutation-based causal inference algorithms with interventions”, *Advances in Neural Information Processing Systems* 30 (2017).
- 29 SEGARRA, S., WANG, Y., UHLER, C. AND MARQUES, A. G., “Joint inference of networks from stationary graph signals”, *Asilomar Conference on Signals, Systems, and Computers* (2017), pp. 975–979.
- 28 RADHAKRISHNAN, A., DAMODARAN, D., SOYLEMEZOGLU, A. C., UHLER, C. AND SHIVASHANKAR, G. V., “Machine learning for nuclear mechano-morphometric biomarkers in cancer diagnosis”, *Scientific Reports* 7 (2017), article nr. 17946.
- 27 DRTON, M., KAHLE, T., STURMFELS, B. AND UHLER, C., “Algebraic Statistics” *Oberwolfach Reports* 14.2 (2017), pp. 1207–1279.
- 26 BELYAEVA, A., VENKATACHALAPATHY, S., NAGARAJAN, M., SHIVASHANKAR, G. V. AND UHLER, C., “Network analysis identifies chromosome intermingling regions as regulatory hotspots for transcription”, *Proceedings of the National Academy of Sciences, U.S.A* 114 (2017), pp. 13714–13719.
- 25 UHLER, C. AND SHIVASHANKAR, G.V., “Regulation of genome organization and gene expression by nuclear mechanotransduction”, *Nature Reviews Molecular Cell Biology*, 18 (2017), pp. 717–727.
- 24 UHLER, C. AND SHIVASHANKAR, G.V., “Chromosome intermingling: Mechanical hotspots for genome regulation”, *Trends in Cell Biology*, 27 (2017), pp. 810–819.
- 23 ZWIERNIK, P., UHLER, C. AND RICHARDS, D., “Maximum likelihood estimation for linear Gaussian covariance models”, *Journal of the Royal Statistical Society Series B*, 79 (2017), pp. 1269–1292.

- 22 WANG, Y., NAGARAJAN, M., UHLER, C. AND SHIVASHANKAR, G.V., “Orientation and repositioning of chromosomes correlate with cell geometry-dependent gene expression”, *Molecular Biology of the Cell*, 28 (2017), pp. 1997–2009.
- 21 RADHAKRISHNAN, A., SOLUS, L. AND UHLER, C., “Counting Markov equivalence classes by number of immoralities”, *Proceedings of the Thirty-Third Conference on Uncertainty in Artificial Intelligence (UAI)*, (2017).
- 20 FALLAT, S., LAURITZEN, S., SADEGHI, K., UHLER, C., WERMUTH, N. AND ZWIERNIK, P., “Total positivity in Markov structures”, *Annals of Statistics*, 45 (2017), pp. 1152–1184.
- 19 MARTIN DEL CAMPO, A., CEPEDA, S. AND UHLER, C., “Exact goodness-of-fit testing for the Ising model”, *Scandinavian Journal of Statistics*, 44 (2017), pp. 285–306.
- 18 SOLUS, L., UHLER, C. AND YOSHIDA, R., “Extremal positive semidefinite matrices for graphs without K_5 minors”, *Linear Algebra and its Applications*, 509 (2016), pp. 247–275.
- 17 UHLER, C. AND SHIVASHANKAR, G.V., “Geometric control and modeling of genome reprogramming”, *BioArchitecture*, 6 (2016), pp. 76–84.
- 16 MICHALEK, M., STURMFELS, B., UHLER, C. AND ZWIERNIK, P., “Exponential varieties”, *Proceedings of the London Mathematical Society*, 112 (2016), pp. 27–56.
- 15 KLIMOVA, A., UHLER, C. AND RUDAS, T., “Faithfulness and learning of hypergraphs from discrete distributions”, *Journal of Computational Statistics and Data Analysis*, 87 (2015), pp. 57–72.
- 14 LIN, S., UHLER, C., STURMFELS, B. AND BÜHLMANN, P., “Hypersurfaces and their singularities in partial correlation testing”, *Foundations of Computational Mathematics*, 14 (2014), pp. 1079–1116.
- 13 YU, F., RYBAR, M., UHLER, C. AND FIENBERG, S. E., “Differentially private logistic regression for detecting multiple-SNP association in GWAS databases”, *Privacy in Statistical Databases*, 8744 (2014), pp. 170–184.
- 12 IGLESIAS-HAM, M., KERBER, M. AND UHLER, C., “Sphere packing with limited overlap”, *Proc. 26th Canadian Conference on Computational Geometry, Halifax, Nova Scotia* (2014), pp. 155–161.
- 11 YU, F., FIENBERG, S. E., SLAVKOVIĆ, A. AND UHLER, C., “Scalable privacy-preserving data sharing methodology for genome-wide association studies”, *Journal of Biomedical Informatics*, 50 (2014), pp. 133–141.
- 10 UHLER, C. AND WRIGHT, S. J., “Packing ellipsoids with overlap”, *SIAM Review*, 55 (2013), pp. 671–706. (selected as Research Spotlight).
- 9 UHLER, C., RASKUTTI, G., BÜHLMANN, P. AND YU, B., “Geometry of faithfulness assumption in causal inference”, *Annals of Statistics* 41 (2013), pp. 436–463.

- 8 UHLER, C., FIENBERG, S. E. AND SLAVKOVIĆ, A., “Privacy-preserving data sharing for genome-wide association studies”, *Journal of Privacy and Confidentiality* 5 (2013), pp. 137–166.
- 7 UHLER, C., “Geometry of maximum likelihood estimation in Gaussian graphical models”, *Annals of Statistics* 40 (2012), pp. 238–261.
- 6 FIENBERG, S. E. SLAVKOVIĆ, A. AND UHLER, C., “Privacy preserving GWAS data sharing”, *Proc. 11th IEEE International Conference on Data Mining, Vancouver, Canada* (2011), pp. 628-635.
- 5 MALASPINAS, A. AND UHLER, C., “Detecting epistasis via Markov bases”, *Journal of Algebraic Statistics* 2 (2011), pp. 36–53.
- 4 STURMFELS, B. AND UHLER, C., “Multivariate Gaussians, semidefinite matrix completion and convex algebraic geometry”, *Annals of the Institute of Statistical Mathematics* 62 (2010), pp. 603–638.
- 3 EVANS, S. N., STURMFELS, B. AND UHLER, C., “Commuting birth-and-death processes”, *Annals of Applied Probability* 20 (2010), pp. 238–266.
- 2 UHLER, C., “Mastitis in dairy production: Estimation of sensitivity, specificity and disease prevalence in the absence of a gold standard,” *Journal of Agricultural, Biological, and Environmental Statistics* 14 (2009), pp. 79–98.
- 1 GREEN, R. E., MALASPINAS, A., KRAUSE, J., BRIGGS, A. W., JOHNSON, P. L., UHLER, C., MEYER, M., GOOD, J. M., MARICIC, T., STENZEL, U., PRÜFER, K., SIEBAUER, M., BURBANO, H. A., RONAN, M., ROTHBERG, J. M., EGHOLM, M., RUDAN, P., BRAJKOVIĆ, D., KUĆAN, Z., GUSIĆ, I., WIKSTRÖM, M., LAAKKONEN, L., KELSO, J., SLATKIN, M., AND PÄÄBO, S., “A complete Neandertal mitochondrial genome sequence determined by high-throughput sequencing”, *Cell* 134 (2008), pp. 416–426.

Plenary / Keynote Talks

- 12/2020 NeurIPS Causality Workshop.
- 07/2020 BioC 2020 (Bioconductor Conference - virtual).
- 07/2020 Personalized Health Technologies Conference (virtual).
- 06/2020 Foundations of Computational Mathematics (FoCM), Vancouver (postponed).
- 05/2020 Inaugural Gaul-Lecture, Karlsruhe Institute of Technology, Germany (postponed).
- 02/2020 Bosch Distinguished Lecture on AI, Renningen, Germany.
- 08/2019 Data Learning and Inference (DALI), San Sebastian, Spain.
- 07/2019 41st Conference on Stochastic Processes and their Applications. Northwestern University.
- 05/2019 EMBO Single Cell Biology Workshop. Tokyo, Japan.

- 01/2019 Keystone Symposium on Single-Cell Biology. Breckenridge, Colorado.
- 06/2018 11th Annual Meeting of the Society for Financial Econometrics (SoFiE). Lugano.
- 08/2017 SIAM Conference on Applied Algebraic Geometry. Georgia Tech University.
- 08/2016 5th International Conference on Continuous Optimization (ICCOPT). Tokyo.
- 07/2015 Current Trends on Gröbner Bases. Osaka, Japan.
- 06/2015 Conference on Effective Methods in Algebraic Geometry (MEGA). Trento.
- 06/2012 Algebraic Statistics in the Alleghenies. Penn State University

Other Invited Talks

- 12/2020 Fulcrum Therapeutics.
- 10/2020 Virtual Mechanogenomics Seminar.
- 10/2020 AI Cures Drug Discovery Conference, MIT.
- 10/2020 Cell Circuits Seminar, Broad Institute.
- 10/2020 Biostatistics Seminar, Columbia University.
- 10/2020 Functional Organization of the Cell Nucleus, FMI.
- 09/2020 Machine Learning Frontiers in Precision Medicine, summer school, Belgium.
- 09/2020 Statistics Seminar, MIT.
- 09/2020 Single Cell OMICS Germany.
- 08/2020 Joint Statistical Meeting.
- 07/2020 CIFAR Learning in Machines and Brains Virtual Meeting on Causal Inference.
- 07/2020 Seminar on ML for Cardiovascular Diseases, Broad Institute.
- 07/2020 ICML Workshop: Inductive Biases, Invariances and Generalization in RL (virtual).
- 07/2020 One World MINDS Seminar (virtual).
- 07/2020 Online Causal Inference Seminar (virtual).
- 07/2020 ONR Review Meeting (virtual).
- 06/2020 Algebraic Statistics Online Seminar (virtual).
- 03/2020 Statistics Seminar, Ohio State University.
- 03/2020 YSPH Biostatitics Seminar, Yale University.
- 02/2020 Telluride Workshop: Physical Genomics and Transcriptional Engineering.
- 01/2020 MIFODS Workshop: Learning under Complex Structure, MIT.
- 01/2020 Workshop on Statistics and Computation, Alan Turing Institute, London, UK.
- 01/2020 Seminar, Friedrich Miescher Institute, Basel, Switzerland.
- 01/2020 Workshop on Learning Theory, TIFR, Mumbai, India.
- 12/2019 Causal Inference Opening Workshop, SAMSI.
- 11/2019 Developments in the Mathematical Sciences Conference, Max Planck Institute Leipzig, Germany.

11/2019 Seminar, Statistics and Data Science Center, EPFL, Switzerland.
10/2019 Causal Inference Seminar, Boston University.
10/2019 Conference on Genomes and AI: From Packing to Regulation, Singapore.
09/2019 Seminar, Genome Institute Singapore.
09/2019 Seminar, Department of Biosystems Science and Engineering, ETH Zurich.
09/2019 Broad Cell Circuits and Epigenomics Seminar, Broad Institute, MIT.
09/2019 QUANTBIO, Summer School, Fiesch, Switzerland.
09/2019 ELLIS Health Workshop, San Sebastian, Spain.
08/2019 Workshop on Graphical Models, Exchangeable Models and Graphons, MIT.
08/2019 Microsoft Research, New England.
08/2019 Chan Zuckerberg Initiative, Redwood City, CA.
08/2019 Freenome, San Francisco, CA.
08/2019 Joint Statistical Meetings, Denver.
07/2019 Colloquium, International Center for Theoretical Sciences, Bangalore.
07/2019 Colloquium, Simons Center for the Study of Living Machines, National Center for Biological Sciences, Bangalore.
07/2019 Seminar, Indian Institute of Science, Bangalore.
07/2019 Seminar, Indian Institute of Science, Bangalore.
07/2019 SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland.
06/2019 Workshop on Learning and Reasoning with Graph-Structured Representations, International Conference on Machine Learning, Long Beach.
06/2019 Workshop on Computational Biology, International Conference on Machine Learning, Long Beach.
06/2019 ONR Review Meeting, MIT.
05/2019 Oberwolfach Workshop on Foundations and New Horizons for Causal Inference.
05/2019 New England Statistics Symposium, Hartford.
05/2019 New England Machine Learning Day, Northeastern University.
05/2019 Seminar, Department of Statistics, Stanford University.
05/2019 Simons Workshop: Hyperbolic Polynomials and Hyperbolic Programming.
04/2019 Seminar, Department of Statistics, CMU.
04/2019 MIT Alumni Event: Spring Lecture and Luncheon.
02/2019 Telluride Workshop: Physical Genomics and Transcriptional Engineering.
02/2019 Seminar, Bioengineering, UCSB.
02/2019 Seminar, CMS, Caltech.
01/2019 SIAM PNW Distinguished Online Seminar Series.
01/2019 Operations Research Seminar, Massachusetts Institute of Technology.

01/2019 Applied Mathematics Colloquium, Illinois Institute of Technology.
11/2018 Seminar, ICERM, Brown University.
10/2018 Applied and Computational Mathematics Seminar, NUS, Singapore.
10/2018 Department of Statistics and Applied Mathematics Colloquium, NUS Singapore.
09/2018 Seminar, Topics in Information and Inference, MIT.
09/2018 Workshop on Foundations of Causal Inference, CMU.
08/2018 Workshop on Nonconvex Formulations and Algorithms in Data Sciences,
University of Wisconsin - Madison.
07/2018 Joint Statistical Meetings, Vancouver, Canada.
07/2018 Colloquium, University of Konstanz, Germany.
07/2018 IMS Annual Meeting on Probability and Statistics, Vilnius, Lithuania.
06/2018 Colloquium, Department of Biosystems Science and Engineering, ETH Zurich.
05/2018 Bay Area Optimization Meeting, Stanford.
04/2018 EMBO Workshop on Nuclear Mechanogenomics, Singapore.
04/2018 Symposium on Statistics in Complex Systems, The Royal Danish Academy of
Sciences and Letters, Copenhagen
03/2018 AI & Digital Health in Translational Medicine & Clinical Trials Summit, MIT.
02/2018 Colloquium, Department of Operations Research and Financial Engineering,
Princeton University.
02/2018 Information Theory and Applications Workshop, San Diego.
02/2018 Brummer & Partners MathDataLab Colloquium, KTH Royal Institute of
Technology, Stockholm.
12/2017 10th International Conference on Computational and Methodological Statistics
(CMStatistics 2017), London UK.
12/2017 NIPS Workshop on Advances in Modeling and Learning Interactions from Com-
plex Data, Los Angeles, CA.
11/2017 Statistics Colloquium. Harvard University.
10/2017 Colloquium. Naval Postgraduate School, Monterey.
10/2017 Beyond Convexity: Emerging Challenges in Data Science. Oaxaca.
07/2017 European Meeting of Statisticians. Helsinki.
06/2017 Workshop on Algebraic and Combinatorial Phylogenetics. Barcelona.
06/2017 Seminar. Seminar for Statistics, ETH Zurich.
06/2017 Workshop on High-Dimensional Time Series in Macroeconomics and Finance.
Institute for Advanced Studies, Vienna.
05/2017 Seminar. Department of Biosystems Science and Engineering, ETH Zurich.
05/2017 SIAM Conference on Optimization. Vancouver.

04/2017 Special Seminar. Max Planck Institute for Mathematics in the Sciences, Leipzig.
03/2017 Statistics Seminar. University of Washington.
02/2017 Women in Data Science (WiDS). Boston, MA.
01/2017 Statistics Seminar. Universitat Pompeu Fabra.
11/2016 Data Science Colloquium. Brown University.
10/2016 Mathematics Seminar. National University of Singapore.
10/2016 Conference on Conditional Independence Structures and Extremes, Munich.
10/2016 PICS Symposium “Emerging Paradigms in Scientific Discovery”, UPenn.
10/2016 Computational and Systems Biology Retreat. MIT.
08/2016 Joint Statistical Meetings (JSM). Chicago.
07/2016 SIAM Annual Meeting. Boston.
07/2016 9th World Congress on Probability and Statistics. Toronto.
06/2016 4th Institute of Mathematical Statistics Asia Pacific Rim Meeting. Hong Kong.
05/2016 MBI-IFOM Joint Retreat. Milano.
05/2016 Symposium on Mathematical & Computational Biology. UPenn.
03/2016 Symposium. LabLinks, Gene Circuits, Broad Institute, Boston.
03/2016 Scientific Computing Seminar. Division of Applied Mathematics, Brown U.
02/2016 Biophysical Society Meeting. Los Angeles.
02/2016 Seminar. Department of Statistics, University of Chicago.
02/2016 Seminar. Models, Inference and Algorithms, Broad Institute, Boston.
01/2016 Workshop on Optimization and Parsimonious Modeling. IMA, Minneapolis.
01/2016 Meeting on Information Processing in Biological Systems. ICTS, Bangalore.
12/2015 Seminar. London Business School.
12/2015 8th Intl Conference on Computational and Methodological Statistics. London.
12/2015 Seminar. Operations Research and Financial Engineering, Princeton University.
11/2015 Algebra Seminar. School of Mathematics, Georgia Tech.
11/2015 Colloquium. College of Sciences and Mathematics, Auburn University.
11/2015 Colloquium. School of Mathematics, Georgia Tech.
08/2015 Seminar. Mechanobiology Institute, National University of Singapore.
08/2015 SIAM Conference on Applied Algebraic Geometry. Daejeon, Korea
07/2015 60th World Statistics Congress – ISI2015. Rio de Janeiro, Brazil.
07/2015 Current Trends on Gröbner Bases. Osaka, Japan.
06/2015 Conference on Effective Methods in Algebraic Geometry (MEGA). Trento.
05/2015 Workshop on NonLinear Algebra. Berlin.
03/2015 Seminar. Department of Electrical Engineering and Computer Science, MIT.
03/2015 Seminar. Department of Mathematics, EPFL.

03/2015 Seminar. Department of Statistics, Université Libre de Bruxelles.

02/2015 Seminar. Department of Mathematics, MIT.

02/2015 Seminar. Department of Computing and Mathematical Sciences, Caltech.

01/2015 Colloquium. Department of Mathematics, UC Berkeley.

01/2015 Seminar. Department of Mathematics, UC San Diego.

01/2015 Seminar. Department of Statistics, Columbia University.

12/2014 Big Data Reunion Workshop. Simons Institute, UC Berkeley.

11/2014 Seminar. Department of Statistics, University of Oxford.

11/2014 Seminar. Department of Statistics, Columbia University.

11/2014 Seminar. Department of Computing and Mathematical Sciences, Caltech.

10/2014 AMS Fall Western Sectional Meeting. San Francisco State University.

10/2014 Seminar. Computational Algebraic Geometry. UC Berkeley.

10/2014 Seminar. Department of Statistics, University of Pennsylvania.

08/2014 21st International Conference on Computational Statistics. Geneva, Switzerland.

07/2014 Workshop on Algebraic Statistics. NIMS, Daejeon, South Korea.

07/2014 Australian Statistical Conference. Sydney, Australia.

06/2014 Kreisky Forum. Vienna, Austria.

06/2014 Workshop on Simplicity and Causal Discovery. Carnegie Mellon University.

05/2014 Series on Systems, Information, Learning and Optimization. Wisconsin Institute of Discovery, University of Wisconsin - Madison.

05/2014 Algebraic Statistics Meeting. IIT Chicago.

05/2014 Applied Algebra Days. University of Wisconsin-Madison.

05/2014 Statistics Seminar. Statistical Laboratory, University of Cambridge.

03/2014 Seminar. Department of Mathematics, Comenius University, Bratislava.

03/2014 Conference on Applications of Real Algebraic Geometry. Aalto U., Finland.

01/2014 Discrete Mathematics and Optimization Seminar. Alpen-Adria U., Klagenfurt.

11/2013 Research Seminar. Cell Biology, UC Berkeley.

11/2013 Workshop on Graphical Models. Ruprecht-Karls-Universität Heidelberg.

08/2013 Seminar. Institute for Infocomm Research, Singapore.

08/2013 Seminar. Mechanobiology Institute, National University of Singapore.

08/2013 SIAM Conference on Applied Algebraic Geometry. Colorado State University.

07/2013 International Conference on Continuous Optimization. Lisbon, Portugal.

07/2013 European Meeting of Statisticians. Budapest, Hungary.

06/2013 19th Conference on Applications of Computer Algebra. Malaga, Spain.

05/2013 Computer Science Seminar. IST Austria.

05/2013 Statistics Seminar. Medical University of Vienna

04/2013 Seminar on Complex and Stochastic Systems. Physics Dep., U. of Vienna.
03/2013 Colloquium. Department of Mathematics, University of Vienna
03/2013 Wien - Linz Workshop on Algebraic Geometry. Wachau, Austria.
02/2013 Seminar. Department of Statistics, Harvard University.
02/2013 Algebraic Statistics Seminar. UC Berkeley.
02/2013 Seminar. Department of Statistics, Stanford University.
01/2013 Seminar. Department of Statistics, University of Wisconsin - Madison.
10/2012 Biomathematics Seminar. University of Vienna.
09/2012 Seminar. Computational Science Center, University of Vienna.
08/2012 21st International Symposium on Mathematical Programming. Berlin.
07/2012 Series on Systems, Information, Learning and Optimization. Wisconsin
Institute of Discovery, University of Wisconsin - Madison.
06/2012 Seminar. Department of Biosystems, Science and Engineering, ETH Zurich.
06/2012 Research Seminar. Seminar for Statistics, ETH Zurich.
05/2012 Computer Algebra Seminar. Research Inst. for Symbolic Computation, Linz.
05/2012 Institute for Statistics and Operations Research Colloquium. U. of Vienna.
04/2012 Computational Algebra Seminar. UC Berkeley.
02/2012 Optimization & Applications Seminar. Institute for Operations Research,
ETH Zurich.
10/2011 IMA Postdoc Seminar. University of Minnesota.
10/2011 SIAM Conference on Applied Algebraic Geometry, North Carolina State U.
06/2011 CDI Meeting: Integrating Statistics and Computational Approaches to Data
Privacy, Penn State University.
04/2011 Seminar on Computational Topology. Stanford University.
12/2010 Research Seminar in Statistics. ETH Zurich.
09/2010 Statistics and Genomics Seminar. UC Berkeley.
06/2010 The Second CREST-SBM International Conference on Harmony of Groebner
Bases and the Modern Industrial Society. Osaka, Japan.
03/2010 AMS Sectional Meeting on Advances in Algebraic Statistics. Lexington, KY.
03/2010 Seminar on Convex Algebraic Geometry, UC Berkeley.
07/2009 Second de Brun Workshop on Computational Algebra. Galway, Ireland.
06/2009 Group meeting of Monique Laurent. CWI Amsterdam.
06/2009 EIDMA Seminar on Combinatorial Theory. Technische Universiteit Eindhoven.