Nishant Mehta

Assistant Professor
Department of Computer Science
University of Victoria
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Research Interests

Machine learning, Statistical learning theory, Online learning, Transfer learning, Representation learning, Optimization, Information theory

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Education

2006–2013	**PhD Computer Science, 2013**, *Georgia Institute of Technology*, Atlanta, GA, USA. Advisor: Alexander Gray
2001–2005	**BS Computer Science, highest honor, 2005**, *Georgia Institute of Technology*, Atlanta, GA, USA.

Experience

July 2017 – Present
Assistant Professor, *Department of Computer Science, University of Victoria*, Victoria, BC, Canada.

July 2015 – July 2017
Postdoctoral Researcher, *Centrum Wiskunde & Informatica*, Amsterdam, Netherlands, with Peter Grünwald.
- Working on problems in the intersection of statistical and online learning theory.

June 2014 – June 2015
Postdoctoral Research Fellow, *Australian National University*, Canberra, Australia, with Christfried Webers and Alistair Rendell.
- Worked on large scale distributed online learning methods.

June 2013 – June 2014
Postdoctoral Research Fellow, *Australian National University*, Canberra, Australia, with Robert Williamson.
- Worked on characterizing fast learning rates in online and statistical learning.

June 2010 – August 2010
Intern, *Microsoft Research*, Redmond, WA, USA, under mentor Alice Zheng.
- Worked on predicting branching behavior of programs when given program inputs by learning from inputs, traces, and actual branching behavior.
- Tackled prediction problem by developing a nonparametric Bayesian approach: Dirichlet process mixture of conditional linear Gaussians.

June 2005 – July 2006
Software Engineer I, *Harris Corporation*, Melbourne, FL, USA.
Independent Research & Development
- Helped maintain in-house information retrieval system.
- Performed automatic entity extraction on text documents and designed taxonomy for organizing entities.
- Developed visualization tool for document-based entity and relationship extraction.

Publications

Journal Papers

[1] Peter D Grünwald and **Nishant A Mehta**. Fast rates for general unbounded loss functions: From ERM to generalized Bayes. *Journal of Machine Learning Research*, 21(56):1–80, 2020.

[2] Tim Van Erven, Peter D. Grünwald, **Nishant A. Mehta**, Mark D. Reid, and Robert C. Williamson. Fast rates in statistical and online learning. *Journal of Machine Learning Research*, 16:1793–1861, 2015.

[3] Ryan R. Curtin, James R. Cline, Neil P. Slagle, William B. March, Parikshit Ram, **Nishant A. Mehta**, and Alexander G. Gray. MLPACK: A scalable C++ machine learning library. *Journal of Machine Learning Research*, 14:801–805, 2013.

[4] Jacqueline A. Fairley, George Georgoulas, **Nishant A. Mehta**, Alexander G. Gray, and Donald L. Bliwise. Computer detection approaches for the identification of phasic electromyographic (EMG) activity during human sleep. *Biomedical Signal Processing and Control*, 2012.

[5] **Nishant A. Mehta**, Sadhir Hussain S. Hameed, and Melody Moore Jackson. Optimal control strategies for an SSVEP-based brain-computer interface. *International Journal of Human–Computer Interaction*, 27(1):85–101, 2010.

Conference Papers

[6] **Nishant Mehta**, Junpei Komiyama, Vamsi Potluru, Andrea Nguyen, and Mica Grant-Hagen. Thresholded linear bandits. In *International Conference on Artificial Intelligence and Statistics*. PMLR, 2023.

[7] Quan Nguyen and **Nishant Mehta**. Adversarial online multi-task reinforcement learning. In *International Conference on Algorithmic Learning Theory*, pages 1124–1165. PMLR, 2023.

[8] Cristóbal Guzmán, **Nishant Mehta**, and Ali Mortazavi. Best-case lower bounds in online learning. *Advances in Neural Information Processing Systems*, 34, 2021.

[9] P Sharoff, **Nishant Mehta**, and Ravi Ganti. A Farewell to Arms: Sequential reward maximization on a budget with a giving up option. In *International Conference on Artificial Intelligence and Statistics*, pages 3707–3716. PMLR, 2020.

[10] Rianne Heide, Alisa Kirichenko, Peter Grunwald, and **Nishant Mehta**. Safe-Bayesian generalized linear regression. In *International Conference on Artificial Intelligence and Statistics*, pages 2623–2633. PMLR, 2020.

[11] Hamid Shayestehmanesh, Sajjad Azami, and **Nishant A. Mehta**. Dying experts: Efficient algorithms with optimal regret bounds. In *Advances in Neural Information Processing Systems*, pages 9983–9992, 2019.

[12] Bingshan Hu, **Nishant A. Mehta**, and Jianping Pan. Problem-dependent regret bounds for online learning with feedback graphs. In *Proceedings of the 35th conference on Uncertainty in Artificial Intelligence*. AUAI Press, 2019.

[13] Bingshan Hu, Yunjin Chen, Zhiming Huang, **Nishant A. Mehta**, and Jianping Pan. Intelligent caching algorithms in heterogeneous wireless networks with uncertainty. In *International Conference on Distributed Computing Systems*. IEEE, 2019.

[14] Rafael M. Frongillo, **Nishant A. Mehta**, Tom Morgan, and Bo Waggoner. Multi-observation regression. In *Artificial Intelligence and Statistics*, pages 2691–2700, 2019.

[15] Peter D. Grünwald and **Nishant A. Mehta**. A tight excess risk bound via a unified PAC-Bayesian–Rademacher–Shtarkov–MDL complexity. In *Algorithmic Learning Theory*, pages 433–465, 2019.

[16] Avery Hiebert, Cole Peterson, Alona Fyshe, and **Nishant A. Mehta**. Interpreting word-level hidden state behaviour of character-level LSTM language models. In *Proceedings of the 2018 EMNLP Workshop BlackboxNLP: Analyzing and Interpreting Neural Networks for NLP*, pages 258–266, 2018.

[17] **Nishant A. Mehta**. Fast rates with high probability in exp-concave statistical learning. In *Artificial Intelligence and Statistics*, pages 1085–1093, 2017.

[18] Mark D. Reid, Rafael M. Frongillo, Robert C. Williamson, and **Nishant A. Mehta**. Generalized mixability via entropic duality. In *Proceedings of The 28th Conference on Learning Theory*, 2015.

[19] **Nishant A. Mehta** and Robert C. Williamson. From stochastic mixability to fast rates. In *Advances in Neural Information Processing Systems*, pages 1197–1205, 2014.

[20] **Nishant A. Mehta** and Alexander G. Gray. Sparsity-based generalization bounds for predictive sparse coding. In *Proceedings of The 30th International Conference on Machine Learning*, pages 36–44, 2013.

[21] **Nishant A. Mehta**, Dongryeol Lee, and Alexander G. Gray. Minimax multi-task learning and a generalized loss-compositional paradigm for MTL. In F. Pereira, C. J. C. Burges, L. Bottou, and K. Q. Weinberger, editors, *Advances in Neural Information Processing Systems 25*, pages 2150–2158. Curran Associates, Inc., 2012.

[22] Jacqueline A. Fairley, George Georgoulas, **Nishant A. Mehta**, Alexander G. Gray, L.M. Trotti, A.G. Wilson, S.A. Greer, S. Hollars, and Donald L. Bliwise. Digitized features of phasic activity of surface anterior tibialis (AT) electromyogram (EMG): Validation by consensus panel. *SLEEP - Journal of Sleep and Sleep Disorders Research*, 34, Abstract Supplement, 2011.

[23] **Nishant A. Mehta**, Thad Starner, Melody Moore Jackson, Karolyn O. Babalola, and G. Andrew James. Recognizing sign language from brain imaging. In *Pattern Recognition (ICPR), 2010 20th International Conference on*, pages 3842–3845. IEEE, 2010.

[24] **Nishant A. Mehta** and Alexander G. Gray. FuncICA for time series pattern discovery. In *9th SIAM International Conference on Data Mining (DM'09)*, pages 73–84, 2009.

Working Papers

[25] Ali Mortazavi, Junhao Lin, and **Nishant A Mehta**. On the price of exact truthfulness in incentive-compatible online learning with bandit feedback: A regret lower bound for WSU-UX. *arXiv preprint arXiv:2404.05155*, 2024. To appear in AISTATS 2024.

[26] Quan Nguyen and **Nishant A Mehta**. Near-optimal per-action regret bounds for sleeping bandits. *arXiv preprint arXiv:2403.01315*, 2024. To appear in AISTATS 2024.

[27] Bingshan Hu, Zhiming Huang, **Nishant A Mehta**, and Nidhi Hegde. Optimal algorithms for differentially private online learning in a stochastic environment. *Under review at JMLR*, 2024. Vast extension of [29] further down this list.

[28] Stephen Scinocca and **Nishant A Mehta**. MD-LUCB: A best arm identification algorithm for minimax disappointment. *In submission*, 2022.

[29] Bingshan Hu, Zhiming Huang, and **Nishant A Mehta**. Optimal algorithms for private online learning in a stochastic environment. *arXiv preprint arXiv:2102.07929*, 2021.

[30] **Nishant A. Mehta**, Alistair Rendell, Anish Varghese, and Christfried Webers. CompAdaGrad: A compressed, complementary, computationally-efficient adaptive gradient method. *arXiv preprint arXiv:1609.03319*, 2016.

Workshop Presentations

- **Nishant A. Mehta**, Peter D. Grünwald. Fast rates with unbounded losses. Workshop on Theoretical Foundations for Learning from Easy Data, Lorentz Center, Leiden, Netherlands, November 2016. (Oral presentation)
- **Nishant A. Mehta**, Dongryeol Lee, and Alexander G. Gray. Minimax multi-task learning. Neural Information Processing Systems 2012, Workshop on Multi-tradeoffs in Machine Learning, Lake Tahoe, Nevada, December 2012. (Poster)
- **Nishant A. Mehta** and Alexander G. Gray. Discriminative sparse coding for classification and regression. The Learning Workshop (Snowbird), Fort Lauderdale, Florida, April 2011. (Oral presentation)
- **Nishant A. Mehta**, Alexander G. Gray, Thad T. Starner, and Melody Moore Jackson. Estimating neural signal dependence using kernels. Neural Information Processing Systems 2008, Workshop on Statistical Analysis and Modeling of Response Dependencies in Neural Populations, Vancouver, Canada, December 2008. (Oral presentation)

Invited Talks

- **University of British Columbia** (Mathematics of Information, Learning and Data group), November 2022.
- **Pontifical Catholic University of Chile**, August 2022.
- **Google Research** (Bandits group), November 2021.
- **Pontifical Catholic University of Chile**, November 2018.
- **University of Santiago, Chile**, November 2018.
- **University of Colorado, Boulder**, Statistics, Optimization, and Machine Learning Seminar, October 2018.
- **Oregon State University, School of EECS,** EECS Colloquium, May 2017
- **University of Victoria, Statistics Department,** Statistics Seminar, March 2017

Teaching Experience

Fall 2023 **Instructor**.
Data Mining (SENG 474 / CSC 503), University of Victoria.

Spring 2023 **Instructor**.
Introduction to Online Learning (CSC 482A/581A), University of Victoria.

Spring 2023 **Instructor**.
Data Mining (SENG 474 / CSC 503), University of Victoria.

Fall 2022 **Instructor**.
Algorithms and Data Structures II (CSC 226), University of Victoria.

Spring 2022 **Instructor**.
Data Mining (SENG 474 / CSC 503), University of Victoria.

Fall 2021 **Instructor**.
Machine Learning Theory (CSC 482A/581A), University of Victoria.

Fall 2021 **Instructor**.
Algorithms and Data Structures II (CSC 226), University of Victoria.

Spring 2021 **Instructor**.
Data Mining (SENG 474 / CSC 503), University of Victoria.

Spring 2021 **Instructor**.
Algorithms and Data Structures II (CSC 226), University of Victoria.

Summer 2020 **Instructor**.
Data Mining (SENG 474 / CSC 503), University of Victoria.

Spring 2020 **Instructor**.
Data Mining (SENG 474 / CSC 503), University of Victoria.

Fall 2019 **Instructor**.
Machine Learning Theory (CSC 482A/581A), University of Victoria.

Fall 2019 **Instructor**.
Algorithms and Data Structures II (CSC 226), University of Victoria.

Spring 2019 **Instructor**.
Machine Learning Theory (CSC 482A/581B), University of Victoria.

Fall 2018 **Instructor**.
Algorithms and Data Structures II (CSC 226), University of Victoria.

Spring 2018 **Instructor**.
Machine Learning Theory (CSC 482A/581A), University of Victoria.

Fall 2017 **Instructor**.
Algorithms and Data Structures II (CSC 226), University of Victoria.

Spring 2016 **Co-Instructor**.
Information-Theoretic Learning (ITL), Leiden University.

Feb-June 2015 **Guest Lecturer**.
Introduction to Statistical Machine Learning (COMP4670/8600), Australian National University.

Fall 2012 **Teaching Assistant**, *under Alberto Apostolico*.
Graduate Computational Science & Engineering Algorithms (Discrete Algorithms).
■ Designed and delivered lecture.
■ Shared responsibility for problem sets, exams, and grading.

Jan 2011 – Dec 2011 Co-organized seminar on concentration of measure and empirical processes.
■ Co-designed syllabus, with guidance from Karim Lounici and Vladimir Koltchinskii.
■ Prepared and presented four lectures to graduate students spanning multiple departments at Georgia Institute of Technology.

Fall 2010 **Teaching Assistant**, *under Guy Lebanon*.
Graduate Computational Data Analysis (Machine Learning)
■ Designed and delivered several lectures.
■ Shared responsibility for problem sets, exams, and grading.

Fall 2008 **Teaching Assistant**, *under Alexander Gray*.
Graduate Computational Data Analysis (Advanced Machine Learning)
■ Designed and delivered several lectures.
■ Shared responsibility for problem sets, project, exams, and grading.

Fall 2004 **Teaching Assistant**, *under Robert Waters*.
Undergraduate Objects and Design
■ Shared responsibility for project design and grading.

Spring 2003 **Teaching Assistant**, *under David Smith*.
Undergraduate Object Oriented Programming
■ Taught weekly 2 hour recitation to 40 students.
■ Shared grading responsibilities for exams and projects.

Students

- **Current PhD students**
  - Quan Nguyen
  - Ali Mortazavi
- **Current MSc students**
  - Andrea Nguyen
  - Mica Grant-Hagen

- **Graduated PhD students**
  - Bingshan Hu
- **Graduated MSc students**
  - Stephen Scinocca
  - Sharoff Pon Kumar
  - Sajjad Azami
  - Hamid Shayestehmanesh

Grants

- **National Sciences and Engineering Research Council (NSERC) Discovery Grant**
  $39,000/year and one-time award of $12,500, 2018–2025
  Tighter error bounds for representation learning and lifelong learning
- **New Frontiers in Research Fund**
  $125,000/year, 2019–2021 (Joint with David Leitch)
  Predicting the rates of chemical reactions by engaging a machine learning algorithm in its own education
- **JPMorgan Chase Faculty Research Award**
  $120,000 USD, 2021–2022
  Attention pays: learning a structured model of client interest for improved financial product recommendations

Service

Action Editor for Transactions on Machine Learning Research (2022–)

Area Chair for Neural Information Processing Systems (2019, 2021–), International Conference on Machine Learning (2023), AAAI Conference on Artificial Intelligence (2021, 2023), Conference on Learning Theory (2021–)

Session Chair for NeurIPS (2019, 2023), ALT (2024)

Conference Reviewer for Neural Information Processing Systems (2011-2018), International Conference on Machine Learning (2015–2017, 2019–2020), Conference on Learning Theory (2015–), Artificial Intelligence and Statistics (2015–), Algorithmic Learning Theory (2018–2020), Asian Conference on Machine Learning (2014)

Journal Reviewer for Journal of Machine Learning Research, Machine Learning, IEEE Transactions on Information Theory, Bernoulli, Annales de l'Institut Henri Poincaré, Artificial Intelligence, Journal of Artificial Intelligence Research, IEEE Transactions on Pattern Analysis and Machine Intelligence, Annals of Mathematics and Artificial Intelligence, Canadian Journal of Statistics

References

Detailed contact information available upon request

Alexander G. Gray, Head of AI Fundamental Research, IBM

Robert C. Williamson, Professor, University of Tübingen

Peter D. Grünwald, Head of Machine Learning Group, Centrum Wiskunde & Informatica and Professor, Leiden University

Farouk Nathoo, Professor, Department of Mathematics and Statistics, University of Victoria

Rafael M. Frongillo, Assistant Professor, Department of Computer Science, University of Colorado Boulder

Personal

Citizen of USA