Marcus A. Brubaker - Curriculum Vitae

CONTACT INFORMATION	*E-mail:* marcus.brubaker@yorku.ca *Twitter:* @marcusabrubaker	*Website:* mbrubake.github.io *GitHub:* github.com/mbrubake

EDUCATION

University of Toronto, Toronto, Ontario, Canada

- Ph.D. in Computer Science (Supervisor: David J. Fleet) **2011**
  Thesis Title: *Physical Models of Human Motion for Estimation and Scene Understanding*
- M.Sc. in Computer Science (Supervisor: David J. Fleet) **2006**
  Thesis Title: *Physics-based Priors for Human Pose Tracking*
- Honours B.Sc. in Computer Science with Minor in Mathematics **2004**

EMPLOYMENT HISTORY

GOOGLE DEEPMIND
Research Scientist **2024 -**

- Research on generative models and computer vision

YORK UNIVERSITY
Associate Professor **2023 -**
Assistant Professor **2016 - 2023**

- Department of Electrical Engineering and Computer Science
- Co-founder and co-director of Computational Vision and Imaging Lab
- On leave 2018 - 2020, 2024 -

STRUCTURA BIOTECHNOLOGY INC
Co-Founder & Scientific Advisor **2016 -**

- Developing algorithms and software for biomolecular structure determination with cryo-EM

SAMSUNG AI CENTER - TORONTO
Visiting Professor **2021 - 2024**

- Consulting on computer vision and machine learning research projects

BOREALIS AI / ROYAL BANK OF CANADA
Academic Advisor **2020 - 2024**
Research Director **2018 - 2020**

- Leading machine learning research for use in products and financial services at the Royal Bank of Canada. As director I managed research teams in Toronto, Montreal and Waterloo

CADRE RESEARCH LABS
Research Associate **2011 - 2018**

- Theoretical and applied consulting in computer vision, machine learning and statistics

UNIVERSITY OF TORONTO, SCARBOROUGH
Postdoctoral Fellow (Supervisor: David J. Fleet) **2014 - 2016**
Sessional Lecturer (CSCD11/CSCC11: Intro to Machine Learning) **2012 - 2015**

TTI-CHICAGO
Postdoctoral Fellow (Supervisor: Raquel Urtasun) **2011 - 2014**

- Additional supervisors and collaborators:
  Babak Taati and Alex Mihailidis (Toronto Rehabilitation Institute, 2012 - 2013)
  Michael Brudno (University of Toronto/Hospital for Sick Children, 2013 - 2014)

Other Affiliations

- Vector Institute. Faculty Affiliate (2018-)
- Department of Computer Science, University of Toronto. Assistant Professor, Status-only (2017-)
- Vision: Science to Applications (VISTA), York University. Core Faculty (2016-)
- Centre for Vision Research, York University. Faculty Member (2016-)
- NEXT Canada. Faculty Member (2018-)
- Computer Vision Foundation. Member (2013-)
- IEEE. Member (2007-)

FUNDING

- *"Joint burst image denoising and deblurring,"* **Mitacs Accelerate**, $26,000CAD, 2022. PI.
- *"Generative Modeling for Cryo-EM, Hyperspectral Imagery and Video,"* **Canada Foundation for Innovation (CFI) John R. Evans Leaders Fund (JELF)**, $280,000CAD, 2021-2026. PI.
- *"Inference and Model Building for Vision-based Estimation of Transmissive Objects,"* **Natural Science and Engineering Research Council (NSERC) Discovery**, $195,000CAD, 2017-2024. PI.
- *"Head-free 3D depth for telecommunication and e-commerce,"* **Natural Science and Engineering Research Council (NSERC) Idea to Innovation (I2I)**, $125,000CAD, 2021-2022. Co-applicant, Nikolaus Troje PI.
- *"Self-supervised Noise Modeling for Smartphone Cameras,"* **Mitacs Accelerate**, $15,000CAD, 2021. PI.
- *"Tools and Techniques for Advanced Single Particle Electron Cryomicroscopy: Accelerating the Push for Rational Drug Design,"* **FedDev Ontario Health Ecosphere Project**, $100,000CAD, 2017. PI.
- *"Firearm Forensics Black-Box Studies for Examiners and Algorithms using Measured 3D Surface Topographies,"* **National Institute of Justice (NIJ) Applied R&D in Forensic Science for Criminal Justice Purposes**, $200,000USD, 2017. Co-applicant, Ryan Lilien PI.
- *"Applied Research, Development, and Method Validation of Toolmark Imaging, Virtual Casing Comparison, and In-Lab Verification for Firearms Forensics,"* **National Institute of Justice (NIJ) Applied R&D in Forensic Science for Criminal Justice Purposes**, $217,450USD, 2016. Co-applicant, Ryan Lilien PI.
- *"Applied Research, Development and Method Validation for a Statistically Based Comparison of Tool Marks using GelSight-Based Three Dimensional Imaging and Novel Comparison Algorithms for Firearm Forensics,"* **National Institute of Justice (NIJ) Applied R&D in Forensic Science for Criminal Justice Purposes**, $190,400USD, 2015. Co-applicant, Ryan Lilien PI.
- *"Applied Research and Development of a Three-dimensional Topography System for Imaging and Analysis of Striated and Impressed Tool Marks for Firearm Identification using GelSight,"* **National Institute of Justice (NIJ) Applied R&D in Forensic Science for Criminal Justice Purposes**, $193,000USD, 2014. Co-applicant, Ryan Lilien PI.
- *"Applied Research and Development of a Three-dimensional Topography System for Firearm Identification using GelSight,"* **National Institute of Justice (NIJ) Applied R&D in Forensic Science for Criminal Justice Purposes**, $200,000USD, 2013. Co-applicant, Ryan Lilien PI.
- *"Three-dimensional Topography System for Firearm Identification using GelSight,"* **National Institute of Standards and Technology (NIST) Measurement Science and Engineering Research Grants**, $174,000USD, 2013. Co-applicant, Ryan Lilien PI.

AWARDS AND MEDIA

Awards

- Outstanding Reviewer, British Machine Vision Conference, 2021.
- Top Reviewer, International Conference on Machine Learning, 2020.
- Shortlisted Artwork [24], Workshop on Computer Vision for Fashion, Art and Design at ECCV, 2018.
- Best Poster for [66], Workshop on BioImage Computing at IEEE CVPR, 2015.
- Best Paper Runner-Up for [32], IEEE Conference on Computer Vision and Pattern Recognition 2013.
- Natural Science and Engineering Research Council, Postdoctoral Fellowship, $40,000CAD per year, 2012 - 2014.
- Natural Science and Engineering Research Council, Canadian Graduate Scholarship, $35,000CAD per year, 2008 - 2010.
- Ontario Graduate Scholarship, $15,000CAD per year 2006 - 2007.
- Ray Reiter Graduate Award in Computer Science, $500CAD, 2005.

Media Coverage, Interviews and Non-academic Talks

- *"Generative AI for Enterprise: Risks and Opportunities"*, **Vector Institute**, August 20203. Panelist.
- *"Artificial Intelligence and Academic Integrity"*, **York University Teaching Commons**, February 2023. Panelist.
- *"Making it by faking it: Toronto's Wombo becomes viral sensation by bringing deepfake technology to the masses"*, **The Globe and Mail**, June 2021. Interviewed for comment.
- *"A Binding Decision: Startup Uses Microscopy Breakthrough to Speed Creation of COVID-19 Vaccines"*, **NVIDIA News**, November 2020. Coverage of Structura Biotechnology.
- *"Toronto Biotech Startup Plays Role in 'critical breakthrough' in coronavirus research"*, **betakit**, February 2020. Coverage of Structura Biotechnology.
- *"Having Impact with AI"*, **Vector Masters AI Summit and Career Fair**, September 2019. Invited Keynote.
- *"Run by brother-sister team, this U of T startup is leading Big Pharma out of the dark"*, **UofT News**, March 2019. Coverage of Structura Biotechnology.
- *"In conversation with Prof. Marcus Brubaker"*, **Northern Frontiers**, April 2018. Interview.
- *"The Integral Cross-Discipline Approach to Pushing AI Research"*, **Tech Vibes** (now **Born Digital**), February 2018. Editorial.
- *"Lassonde partners in research that could revolutionize new drug discoveries"*, **yFile**, February 2017. Coverage of [42].
- *"Start Me Up UTSC"*, **University of Toronto Scarborough Entrepreneurship**, March 2017. Panelist.
- *"3-D vision: UTSC computer scientists develop better way to visualize molecules"*, **UofT News**, June 2015. Coverage of [29].
- *"An Algorithm Set To Revolutionize 3-D Protein Structure Discovery"*, **MIT Technology Review**, April 2015. Coverage of [29].
- *"Cars that look around to work out where they are"* **New Scientist**, July 2013. Coverage of [32].

PUBLICATIONS

Statistics

		Citations	h-index	i10-index
Google Scholar (August 23, 2024)	Total	18846	30	52
	Prev 5 Years	16485	25	44

Field-Weighted Citation Impact (August 23, 2024)
8.95

Peer-Reviewed Conference Papers

In computer vision and machine learning, the major conferences (e.g., CVPR, ECCV, ICCV, BMVC, WACV, ICML, NeurIPS, ICLR, AAAI, UAI, AISTATS, IJCAI, etc) are double blind, strongly peer-reviewed and considered a primary venue of archival publication.

[1] Jason J. Yu, Tristan Aumentado-Armstrong, Fereshteh Forghani, Konstantinos G. Derpanis, and Marcus A. Brubaker. Polyoculus: Simultaneous multi-view image-based novel view synthesis. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2024, arXiv:2402.17986 [cs.CV].

[2] Ashkan Mirzaei, Tristan Aumentado-Armstrong, Marcus A. Brubaker, Jonathan Kelly, Alex Levinshtein, Konstantinos G. Derpanis, and Igor Gilitschenski. Watch your steps: Local image and scene editing by text instructions. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2024, arXiv:2308.08947 [cs.CV].

[3] Ali Mosleh, Luxi Zhao, Atin Singh Jaeduk Han, Abhijith Punnappurath, Marcus A. Brubaker, Jihwan Choe, and Michael S. Brown. Non-parametric sensor noise modeling and synthesis. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2024.

[4] Jason J. Yu, Fereshteh Forghani, Konstantinos G. Derpanis, and Marcus A. Brubaker. Long-term photometric consistent novel view synthesis with diffusion models. In *Proceedings of the International Conference on Computer Vision (**ICCV**)*, 2023, arXiv:2304.10700 [cs.CV].

[5] Ashkan Mirzaei, Tristan Aumentado-Armstrong, Marcus A. Brubaker, Jonathan Kelly, Alex Levinshtein, Konstantinos G. Derpanis, and Igor Gilitschenski. Reference-guided controllable inpainting of neural radiance fields. In *Proceedings of the International Conference on Computer Vision (**ICCV**)*, 2023, arXiv:2304.09677 [cs.CV].

[6] Ashkan Mirzaei, Tristan Aumentado-Armstrong, Konstantinos G. Derpanis, Jonathan Kelly, Marcus A. Brubaker, Igor Gilitschenski, and Alex Levinshtein. SPIn-NeRF: Multiview Segmentation and Perceptual Inpainting with Neural Radiance Fields. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2023, arXiv:2211.12254 [cs.CV].

[7] Shayan Shekarforoush, David B. Lindell, David J. Fleet, and Marcus A. Brubaker. Residual multiplicative filter networks for multiscale reconstruction. In *Neural Information Processing Systems (**NeurIPS**)*, 2022, arXiv:2206.00746 [cs.CV].

[8] Seonghyeon Nam, Marcus A. Brubaker, and Michael S. Brown. Neural image representations for multi-image fusion and layer separation. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2022, arXiv:2108.01199 [cs.CV].

[9] Ali Maleky, Shayan Kousha, Michael S. Brown, and Marcus A. Brubaker. Noise2NoiseFlow: Realistic Camera Noise Modeling without Clean Images. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2022, arXiv:2206.01103 [cs.CV].

[10] Shayan Kousha, Ali Maleky, Michael S. Brown, and Marcus A. Brubaker. Modeling sRGB Camera Noise with Normalizing Flows. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2022, arXiv:2206.00812 [cs.CV].

[11] Seonghyeon Nam, Abhijith Punnappurath, Marcus A. Brubaker, and Michael S. Brown. Learning sRGB-to-Raw De-rendering with Content-Aware Metadata. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2022, arXiv:2206.01813 [eess.IV].

[12] James A. Brofos, Marylou Gabrié, Marcus A. Brubaker, and Roy R. Lederman. Adaptation of the independent metropolis-hastings sampler with normalizing flow proposals. In *International Conference on Artificial Intelligence and Statistics (**AISTATS**)*, 2022, arXiv:2110.13216 [stat.CO].

[13] Mahmoud Afifi, Marcus A. Brubaker, and Michael S. Brown. Auto white-balance correction for mixed-illuminant scenes. In *Proceedings of the IEEE Winter Conference on Applications of Computer Vision (**WACV**)*, 2022, arXiv:2109.08750 [cs.CV].

[14] Ruizhi Deng, Marcus A. Brubaker, Greg Mori, and Andreas Lehrmann. Continuous latent process flows. In *Neural Information Processing Systems (**NeurIPS**)*, 2021, arXiv:2106.15580 [cs.LG].

[15] Mahmoud Afifi, Marcus A. Brubaker, and Michael S. Brown. Histogan: Controlling colors of gan-generated and real images via color histograms. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2021, arXiv:2011.11731 [cs.CV].

[16] Jason J. Yu, Konstantinos Derpanis, and Marcus A. Brubaker. Wavelet Flow: Fast Training of High Resolution Normalizing Flows. In *Neural Information Processing Systems (**NeurIPS**)*, 2020, arXiv:2010.13821 [cs.CV].

[17] Ruizhi Deng, Bo Chang, Marcus A. Brubaker, Greg Mori, and Andreas Lehrmann. Modeling Continuous Stochastic Processes with Dynamic Normalizing Flows. In *Neural Information Processing Systems (**NeurIPS**)*, 2020, arXiv:2002.10516 [cs.LG].

[18] Priyank Jaini, Ivan Kobyzev, Marcus A. Brubaker, and Yaoliang Yu. Tails of lipschitz triangular flows. In *Proceedings of the International Conference on Machine Learning (**ICML**)*, 2020, arXiv:1907.04481 [math.ST].

[19] Rishab Goel, Seyed Mehran Kazemi, Marcus A. Brubaker, and Pascal Poupart. Diachronic Embedding for Temporal Knowledge Graph Completion. In *Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**)*, 2020, arXiv:1907.03143 [cs.LG].

[20] Abdelrahman Abdelhamed, Marcus A. Brubaker, and Michael S. Brown. Noise Flow: Noise Modeling with Conditional Normalizing Flows. In *Proceedings of the International Conference on Computer Vision (**ICCV**)*, 2019, arXiv:1908.08453 [cs.CV].

[21] Abbas Masoumzadeh and Marcus A. Brubaker. HydraPicker: Fully Automated Particle Picking in Cryo-EM by Utilizing Dataset Bias in Single Shot Detection. In *Proceedings of the British Machine Vision Conference (**BMVC**)*, 2019.

[22] Karen Ullrich, Rianne van den Berg, Marcus A. Brubaker, David J. Fleet, and Max Welling. Differentiable probabilistic models of scientific imaging with the Fourier slice theorem. In *Proceedings of Conference on Uncertainty in Artificial Intelligence (UAI)*, 2019, arXiv:1906.07582 [cs.LG].

[23] Yash Sharma, Gavin Weiguang Ding, and Marcus A. Brubaker. On the Effectiveness of Low Frequency Perturbations. In *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI)*, 2019, arXiv:1903.00073 [cs.CV].

[24] Matthew Tesfaldet, Marcus A. Brubaker, and Konstantinos G. Derpanis. Two-Stream Convolutional Networks for Dynamic Texture Synthesis. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018, arXiv:1706.06982 [cs.CV].

[25] Micha Livne, Leonid Sigal, Marcus A. Brubaker, and David J. Fleet. Walking on Thin Air: Environment-Free Physics-based Markerless Motion Capture. In *Proceedings of the Conference on Computer and Robot Vision (CRV)*, 2018, arXiv:1812.01203 [cs.CV].

[26] Wei-Chiu Ma, Shenlong Wang, Marcus A. Brubaker, Sanja Fidler, and Raquel Urtasun. Find your Way by Observing the Sun and Other Semantic Cues. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, 2017, arXiv:1606.07415 [cs.CV].

[27] Zhi Hao Luo, Marcus A. Brubaker, and Michael Brudno. Size and Texture-based Classification of Lung Tumors with 3D CNNs. In *Proceedings of the IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2017.

[28] Yali Wang, Marcus A. Brubaker, Brahim Chaib-draa, and Raquel Urtasun. Sequential Inference for Deep Gaussian Process. In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2016.

[29] Marcus A. Brubaker, Ali Punjani, and David J. Fleet. Building Proteins in a Day: Efficient 3D Molecular Reconstruction. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015, arXiv:1504.03573 [cs.CV].

[30] Yali Wang, Marcus A. Brubaker, Brahim Chaib-draa, and Raquel Urtasun. Bayesian Filtering with Online Gaussian Process Latent Variable Models. In *Proceedings of Conference on Uncertainty in Artificial Intelligence (UAI)*, 2014.

[31] Yanshuai Cao, Marcus A. Brubaker, Aaron Hertzmann, and David J. Fleet. Efficient Optimization for Sparse Gaussian Process Regression. In *Neural Information Processing Systems (NeurIPS)*, 2013, arXiv:1310.6007 [cs.LG].

[32] Marcus A. Brubaker, Andreas Geiger, and Raquel Urtasun. Lost! Leveraging the Crowd for Probabilistic Visual Self-Localization. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

[33] Marcus A. Brubaker, Mathieu Salzmann, and Raquel Urtasun. A Family of MCMC Methods on Implicitly Defined Manifolds. In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2012.

[34] Marcus A. Brubaker, Leonid Sigal, and David J. Fleet. Estimating Contact Dynamics. In *Proceedings of the International Conference on Computer Vision (ICCV)*, 2009.

[35] Marcus A. Brubaker and David J. Fleet. The Kneed Walker for Human Pose Tracking. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2008.

[36] Marcus A. Brubaker, David J. Fleet, and Aaron Hertzmann. Physics-based person tracking using simplified lower-body dynamics. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2007.

Journal Articles

[37] Alban Flachot, Jaykishan Patel, Khushbu Patel, Tom SA Wallis, Marcus A Brubaker, David H Brainard, and Richard F Murray. Can deep neural networks for intrinsic image decomposition model human lightness constancy? *Journal of Vision*, 23(9):5467–5467, 2023.

[38] Jaykishan Patel, Alban Flachot, Javier Vazquez-Corral, David H Brainard, Thomas SA Wallis, Marcus A Brubaker, and Richard F Murray. A deep convolutional neural network trained to infer

surface reflectance is deceived by mid-level lightness illusions. *Journal of Vision*, 23(9):4817–4817, 2023.

[39] Chandramouli Shama Sastry, Andreas Lehrmann, Marcus A. Brubaker, and Alexander Radovic. Efficient CDF Approximations for Normalizing Flows. *Transactions on Machine Learning Research (**TMLR**)*, 2022, arXiv:2202.11322 [cs.LG].

[40] Ivan Kobyzev, Simon J.D. Prince, and Marcus A. Brubaker. Normalizing flows: An introduction and review of current methods. *IEEE Transactions on Pattern Analysis and Machine Intelligence (**PAMI**)*, 2020, arXiv:1908.09257 [stat.ML].

[41] Saeed Ghorbani, Calden Wloka, Ali Etemad, Marcus A. Brubaker, and Nikolaus F. Troje. Probabilistic character motion synthesis using a hierarchical deep latent variable model. *Proceedings of Symposium on Computer Animation (SCA) in Computer Graphics Forum*, 39(8), 2020.

[42] Ali Punjani, John L. Rubinstein, David J. Fleet, and Marcus A. Brubaker. cryoSPARC: algorithms for rapid unsupervised cryo-EM structure determination. *Nature Methods*, 14(3):290 – 296, 2017.

[43] Bob Carpenter, Andrew Gelman, Matt Hoffman, Daniel Lee, Ben Goodrich, Michael Betancourt, Marcus A. Brubaker, Jiqiang Guo, Peter Li, and Allen Riddell. Stan: A Probabilistic Programming Language. *Journal of Statistical Software*, 76(1), 2017.

[44] Pierre Duez, Todd Weller, Marcus A. Brubaker, Richard E. Hockensmith, and Ryan Lilien. Development and validation of a virtual examination tool for firearm forensics. *Journal of Forensic Sciences*, 2017.

[45] Ali Punjani, Marcus A. Brubaker, and David J. Fleet. Building Proteins in a Day: Efficient 3D Molecular Structure Estimation with Electron Cryomicroscopy. *IEEE Transactions on Pattern Analysis and Machine Intelligence (**PAMI**)*, 2017.

[46] Marcus A. Brubaker, Andreas Geiger, and Raquel Urtasun. Map-based Probabilistic Visual Self-Localization. *IEEE Transactions on Pattern Analysis and Machine Intelligence (**PAMI**)*, 2016.

[47] Todd Weller, Marcus A. Brubaker, Pierre Duez, and Ryan Lilien. Introduction and Initial Evaluation of a Novel Three-Dimensional Imaging and Analysis System for Firearm Forensics. *Association of Firearm and Tool Mark Examiners (AFTE) Journal*, 47(4):198 – 208, 2015.

[48] John L. Rubinstein and Marcus A. Brubaker. Alignment of cryo-EM movies of individual particles by optimization of image translations. *Journal of Structural Biology*, 192(2):188 – 195, 2015, arXiv:1409.6789 [q-bio.QM].

[49] Jianhua Zhao, Marcus A. Brubaker, Samir Benlekbir, and John L. Rubinstein. Description and comparison of algorithms for correcting anisotropic magnification in cryo-EM images. *Journal of Structural Biology*, 192(2):209 – 215, 2015, arXiv:1501.05928 [physics.ins-det].

[50] Yanshuai Cao, Marcus A. Brubaker, David J. Fleet, and Aaron Hertzmann. Efficient Optimization for Sparse Gaussian Process Regression. *IEEE Transactions on Pattern Analysis and Machine Intelligence (**PAMI**)*, 37(12):2415 – 2427, 2015.

[51] Jianhua Zhao, Marcus A. Brubaker, and John L. Rubinstein. TMaCS: A hybrid template matching and classification system for partially-automated particle selection. *Journal of Structural Biology*, 181(3):234 – 242, 2013.

[52] Marcus A. Brubaker, David J. Fleet, and Aaron Hertzmann. Physics-based Person Tracking using the Anthropomorphic Walker. *International Journal of Computer Vision (**IJCV**)*, 87(1):140–155, 2010.

[53] Navdeep Jaitly, Marcus A. Brubaker, John Rubinstein, and Ryan H. Lilien. A Bayesian Method for 3-D Macromolecular Structure Inference using Class Average Images from Single Particle Electron Microscopy. *Bioinformatics*, 26:2406–2415, 2010.

Peer-Reviewed Workshop Papers

[54] Sarthak Mittal, Niels Leif Bracher, Guillaume Lajoie, Priyank Jaini, and Marcus A Brubaker. Exploring exchangeable dataset amortization for bayesian posterior inference. In *ICML Workshop on Structured Probabilistic Inference & Generative Modelling*, 2023.

[55] Geoffrey Woollard, Shayan Shekarforoush, Frank Wood, Marcus A. Brubaker, and Khanh Dao Duc. Physics aware inference for the cryo-em inverse problem: anisotropic network model heterogeneity, global pose and microscope defocus. In *NeurIPS Workshop on Machine Learning for Structural Biology*, 2022.

[56] James A. Brofos, Marcus A. Brubaker, and Roy R. Lederman. Manifold density estimation via generalized dequantization. In *ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models*, 2021, arXiv:2102.07143 [stat.ML].

[57] Alexander Radovic, Jiawei He, Janahan Ramanan, Marcus A. Brubaker, and Andreas Lehrmann. Agent forecasting at flexible horizons using ode flows. In *ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models*, 2021.

[58] Ruizhi Deng, Marcus A. Brubaker, Greg Mori, and Andreas Lehrmann. Continuous latent process flows. In *ICML Workshop on Time Series*, 2021, arXiv:2106.15580 [cs.LG].

[59] Shayan Kousha and Marcus A. Brubaker. Zero-shot learning with class description regularization. In *CVPR Workshop on Fine-Grained Visual Categorization*, 2021, arXiv:2106.16108 [cs.CV].

[60] Ruizhi Deng, Bo Chang, Marcus A. Brubaker, Greg Mori, and Andreas Lehrmann. Modeling continuous stochastic processes with dynamic normalizing flows. In *ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models*, 2020, arXiv:2002.10516 [cs.LG].

[61] Rishab Goel, Seyed Mehran Kazemi, Marcus A. Brubaker, and Pascal Poupart. Diachronic Embedding for Temporal Knowledge Graph Completion. In *NeurIPS Workshop on Graph Representation Learning*, December 2019, arXiv:1907.03143 [cs.LG].

[62] Nazanin Mehrasa, Ruizhi Deng, Jiawei He, Bo Chang, Thibaut Durand, Mohamed Osama Ahmed, Marcus A. Brubaker, and Greg Mori. Point Process Flows. In *NeurIPS Workshop on Learning with Temporal Point Processes*, December 2019, arXiv:1910.08281 [cs.LG].

[63] Matthew Tesfaldet, Nariman Saftarli, Marcus A. Brubaker, and Konstantinos G. Derpanis. Convolutional Photomosaic Generation via Multi-scale Perceptual Losses. In *ECCV Workshop on Computer Vision for Fashion, Art and Design*, 2018.

[64] Ali Punjani, Haowei Zhang, John Rubinstein, Marcus A. Brubaker, and David J. Fleet. Algorithmic advances in single particle cryo-em data processing. *Microscopy and Microanalysis*, 24(S1):868–869, 2018.

[65] Christopher Blake, Luyu Wang, Giuseppe Castiglione, Christopher Srinivasa, and Marcus A. Brubaker. On learning wire-length efficient neural networks. In *NeurIPS 2018 Workshop on Compact Deep Neural Network Representation with Industrial Applications*, December 2018.

[66] Marcus A. Brubaker, Ali Punjani, and David J. Fleet. Efficient 3D Macromolecular Reconstruction with Electron Cryomicroscopy. In *BioImage Computing Workshop at IEEE Conference on Computer Vision and Pattern Recognition*, June 2015.

[67] Ali Punjani and Marcus A. Brubaker. Microscopic Advances with Large-Scale Learning: Stochastic Optimization for Cryo-EM. In *Neural Information Processing Systems Workshop: Machine Learning in Computational Biology (MLCB)*, December 2014, 1501.04656.

[68] Marcus A. Brubaker, Andreas Geiger, and Raquel Urtasun. Probabilistic Map Localization Through Visual Odometry. In *Proceedings of SUNw: Scene Understanding Workshop at IEEE Conference on Computer Vision and Pattern Recognition (CVPRW)*, 2013.

[69] Navdeep Jaitly, Marcus A. Brubaker, John Rubinstein, and Ryan Lilien. A Bayesian method for 3D reconstruction of macromolecular structure using class averages from single particle electron microscopy. In *Neural Information Processing Systems Workshop: Machine Learning in Computational Biology (MLCB)*, December 2009.

[70] Marcus A. Brubaker, David J. Fleet, and Aaron Hertzmann. Physics-based Human Pose Tracking. In *Neural Information Processing Systems Workshop: Evaluation of Articulated Human Motion and Pose Estimation (EHuM)*, December 2006.

Conferences and Workshops Without Proceedings

[71] Bogdan Toader, Marcus A. Brubaker, and Roy R. Lederman. Stochastic optimization for high-resolution refinement in cryo-EM. In *Applied Inverse Problems Conference*, 2023.

[72] Ali Punjani, John Rubinstein, David J. Fleet, and Marcus A. Brubaker. New algorithms in cryoSPARC. In *Three Dimensional Electron Microscopy Gordon Research Conference*, June 2017.

[73] Bob Carpenter, Matthew D. Hoffman, Marcus A. Brubaker, Daniel Lee, Michael Betancourt, Sebastian Weber, and Rob Trangucci. Algorithmic Differentiation in the Stan Math C++ Library. In *ADMB Developers Workshop*, June 2016.

[74] Ryan Lilien, Marcus A. Brubaker, and Todd Weller. Progress Towards a Novel 3D-Topography Imaging and Analysis System for Firearm Identification, TopMatch-GS, and Results of a Large-Scale Study. In *The Association of Firearm and Tool Mark Examiners Annual Training Seminar*, May 2014.

[75] Ryan Lilien, Marcus A. Brubaker, and Todd Weller. Development of a 3D-Topography Imaging and Analysis System for Firearm Identification using GelSight and Feature Based Case Matching. In *The Association of Firearm and Tool Mark Examiners Annual Training Seminar*, June 2013.

[76] Ryan Lilien, Marcus A. Brubaker, Todd Weller, and Micah Johnson. Three-Dimensional Topography System for Firearm Identification using GelSight. In *NIJ and FBI Impression and Pattern Evidence Symposium, Clearwater, Florida*, August 2012.

[77] Marcus A. Brubaker, Ryan Lilien, Todd Weller, and Micah Johnson. Surface Topography Measurement using GelSight Elastomeric Sensor for Firearm Forensics. In *NIST Conference on Measurement Science and Standards in Forensic Firearms Analysis, Gaithersburg, Maryland*, July 2012.

Theses, Book Chapters and Other Contributions

[78] Shayan Shekarforoush, David B. Lindell, Marcus A. Brubaker, and David J. Fleet. Improving ab-initio cryo-em reconstruction with semi-amortized pose inference, 2024, arXiv:2406.10455 [cs.CV].

[79] Bogdan Toader, Marcus A. Brubaker, and Roy R. Lederman. Efficient high-resolution refinement in cryo-em with stochastic gradient descent, 2023, arXiv:2311.16100 [math.NA].

[80] Tristan Aumentado-Armstrong, Ashkan Mirzaei, Marcus A. Brubaker, Jonathan Kelly, Alex Levinshtein, Konstantinos G. Derpanis, and Igor Gilitschenski. Reconstructive latent-space neural radiance fields for efficient 3d scene representations, 2023, arXiv:2310.17880 [cs.CV].

[81] Shayan Shekarforoush, Amanpreet Walia, Marcus A. Brubaker, Konstantinos G. Derpanis, and Alex Levinshtein. Dual-camera joint deblurring-denoising, 2023, arXiv:2309.08826 [cs.CV].

[82] Avishek Joey Bose, Marcus A. Brubaker, and Ivan Kobyzev. Equivariant finite normalizing flows, 2021, arXiv:2110.08649 [cs.LG].

[83] Mahmoud Afifi, Abdullah Abuolaim, Mostafa Hussien, Marcus A. Brubaker, and Michael S. Brown. Cams: Color-aware multi-style transfer, 2021, arXiv:2106.13920 [cs.CV].

[84] Guarav Sharma, Nidhi Hegde, Simon J.D. Prince, and Marcus A. Brubaker. Differential Privacy Tutorial II: Machine Learning and Data Generation, March 2021.

[85] Marcus A. Brubaker and Simon J.D. Prince. Differential Privacy Tutorial I: Introduction, February 2021.

[86] Ruizhi Deng, Yanshuai Cao, Bo Chang, Leonid Sigal, Greg Mori, and Marcus A. Brubaker. Variational hyper rnn for sequence modeling, 2020, arXiv:2002.10501 [cs.LG].

[87] Seyed Mehran Kazemi, Rishab Goel, Sepehr Eghbali, Janahan Ramanan, Jaspreet Sahota, Sanjay Thakur, Stella Wu, Cathal Smyth, Pascal Poupart, and Marcus Brubaker. Time2vec: Learning a vector representation of time, 2019, arXiv:1907.05321 [cs.LG].

[88] Marcus A. Brubaker. The Integral Cross-Discipline Approach to Pushing AI Research. *techvibes.com*, February 2018.

[89] Bob Carpenter, Matthew D. Hoffman, Marcus A. Brubaker, Daniel Lee, Peter Li, and Michael Betancourt. The Stan Math Library: Reverse-Mode Automatic Differentiation in C++, 2015, arXiv:1509.07164 [cs.MS].

[90] Marcus A. Brubaker. *Physical Models of Human Motion for Estimation and Scene Analysis*. PhD thesis, University of Toronto, 2011.

[91] Marcus A. Brubaker, Leonid Sigal, and David J. Fleet. Video-based People Tracking. In H. Nakashima, H. Aghajan, and J.C. Augusto, editors, *Handbook on Ambient Intelligence and Smart Environments*. Springer Verlag, 2009.

[92] Marcus A. Brubaker, Leonid Sigal, and David J. Fleet. Physics-based Human Motion Modelling for people tracking: A short tutorial. Tutorial at IEEE International Conference of Computer Vision, Kyoto, Japan, 2009.

[93] Marcus A. Brubaker. Physics-based priors for human pose tracking. Master's thesis, University of Toronto, 2006.

Patents

[94] Ali Maleky, Marcus Anthony Brubaker, and Michael Scott Brown. System and method for training of noise model using noisy signal pairs, May 18 2023. US Patent App. 17/984,755.

[95] Mahmoud Afifi, Michael Brown, and Marcus A. Brubaker. System and method of white balancing a digital image with multiple light sources, March 2023. US Patent App. 17/930,213.

[96] Chandramouli Shama Sastry, Alexander Radomir Branislav Radovic, Marcus Anthony Brubaker, and Andreas Steffen Michael Lehrmann. System and method for efficient estimation of cumulative distribution function, March 2023. US Patent App. 17/954,059.

[97] Marcus Anthony Brubaker, Ali Punjani, and David James Fleet. Methods and systems for 3d structure estimation, November 2022. US Patent 11,515,002.

[98] Ruizhi Deng, Marcus Anthony Brubaker, Gregory Peter Mori, and Andreas Steffen Michael Lehrmann. System and method for continuous dynamics model from irregular time-series data, December 2022. US Patent App. 17/749,678.

[99] Alexander Radovic, Jiawei HE, Janahan Mathuran Ramanan, Marcus Anthony Brubaker, and Andreas Steffen Michael Lehrmann. System and method for conditional marginal distributions at flexible evaluation horizons, December 2022. US Patent App. 17/750,335.

[100] Ruizhi Deng, Bo Chang, Marcus Anthony Brubaker, Gregory Peter Mori, and Andreas Steffen Michael Lehrmann. Systems and methods for modeling continuous stochastic processes with dynamic normalizing flows, August 2021. US Patent App. 17/170,416.

[101] Zhexin Lai, Amir H Khoshaman, and Marcus A. Brubaker. System and method for machine learning architecture with adaptive importance sampling with normalizing flows, August 2021. US Patent App. 17/163,106.

[102] Ruizhi Deng, Yanshuai Cao, Bo Chang, and Marcus A. Brubaker. System and method for machine learning architecture with variational hyper-rnn, November 2020. US Patent App. 16/881,768.

[103] Nazanin Mehrasa, Akash Abdu Jyothi, Thibaut Durand, Jiawei He, Gregory Mori, Mohamed Ahmed, and Marcus Anthony Brubaker. System and method for generative model for stochastic point processes, May 2020. US Patent App. 16/685,327.

[104] Marcus Anthony Brubaker, Ali Punjani, and David James Fleet. Methods and systems for 3d structure estimation, February 2020. US Patent App. 16/288,429.

[105] Marcus Anthony Brubaker, Ali Punjani, and David James Fleet. Methods and systems for 3d structure estimation, May 2019. US Patent 10,282,513.

[106] Ryan Lilien, Marcus Anthony Brubaker, and Pierre Duez. Method and system for three dimensional imaging and analysis, June 2018. US Patent 9,998,729.

[107] Ali Punjani, Marcus Anthony Brubaker, and David James Fleet. Methods and systems for image alignment of at least one image to a model, November 2017. US Patent 9,830,732.

Teaching and Supervision

Graduate Students

Name	Degree	Tenure	Project	Last Seen
Harrish Thasarathan	PhD (York)	2024/01 -		

Name	Degree	Tenure	Project	Program	Last Seen
Ian MacPherson[1]	PhD (York)	2023/09 -			
Christina Wang[1]	MSc (York)	2022/09 -			
Fereshteh Forghani	MSc (York)	2022/09 -			
Niels Bracher	PhD (York)	2022/09 -			
Amin Fadaeinejad[4]	MSc (York)	2021/09 -			
Shayan Shekarforoush[3]	PhD (UToronto)	2020/09 -			
Jason Yu	PhD (York)	2020/09 -			
Harrish Thasarathan[2]	MSc (York)	2021/09 - 2023/12	*Key-frame Based Motion Representations for Pose Sequesnces*		PhD at York University
Ali Maleky[1]	MSc (York)	2021/01 - 2022/08	*Realistic Camera Noise Modeling without Clean Images*		Ecopia AI (2022)
Shayan Kousha	MSc (York)	2020/09 - 2022/04	*Modeling sRGB Camera Noise with Normalizing Flows*		Ecopia AI (2022)
Xavier Snelgrove	MSc (UToronto)	2020/09 - 2021/09	*Scale- and Translation-Invariant Distributions of Images, and How To Work With Them*		Partner at Probably Studio & Creative Technologist in Residence at BMO Creative Research Lab (2022)
Shane Segal[1]	MSc (York)	2018/09 - 2021/01	*Learned Exposure Selection for High Dynamic Range Image Synthesis*		Senior AI Engineer at Mythic AI (2022)
Jason Yu	MSc (York)	2018/09 - 2020/08	*Wavelet Flow: Fast Training of High Resolution Normalizing Flows*		PhD at York University (2022)
Abbas Masoumzadeh	MSc (York)	2017/09 - 2019/08	*Object Detection Frameworks for Fully Automated Particle Picking in Cryo-EM*		PhD at University of Alberta (2022)
Matthew Tesfaldet[2]	MSc (York)	2016/09 - 2018/08	*Two-Stream Convolutional Networks for Dynamic Texture Synthesis*		PhD at McGill University (2022)

[1]Co-supervised with Michael S. Brown. [2]Co-supervised with Konstantinos G. Derpanis. [3]Co-supervised with David J. Fleet. [4]Co-supervised with Nikolaus F. Troje.

Undergraduate Students

Name	Degree	Tenure	Project	Program	Last Seen
Ridam Loomba	BASc, UofT	2020/04 - 2020/08	High Resolution Image Datasets for Probabilistic Generative Modelling	RA	BASc at University of Toronto (2022)
Nadav Gasner	BSc, York	2018/01 - 2018/08	Particle Counting for Electron Cryomicroscopy	USRA	Medical School, McMaster University (2022)
Ekram Bhuiyan	BSc, York	2017/04 - 2017/08	Detailed Visual Face Tracking	RA	ML Software Engineer, Qualcomm (2022)

Steven (Szu-Han) Chen	BSc, York	2017/04 - 2017/08	Volumetric Super-resolution for Learning Detailed Protein Structure	LURA	Data Scientist Lead, LoyaltyOne (2022)
Kristen McIntosh	BSc, York	2017/04 - 2017/08	Object Detection in Low SNR Settings for Cryo-EM Particle Picking	LURA	Software Engineer, Amazon (2022)

Student Supervision Before 2016

- Yanshuai Cao (PhD, University of Toronto, with David J. Fleet)
  Last Seen: Research Team Lead, Borealis AI
- Martin Hjelm (MSc, TTI-Chicago, with Raquel Urtasun)
  Last Seen: PhD Student, KTH Royal Institute of Technology
- Hubert Lin (BSc, University of Toronto, with David J. Fleet)
  Last Seen: Cornell University PhD (2022), Research Scientist at Waymo
- Micha Livne (PhD, University of Toronto, with David J. Fleet)
  Last Seen: Postdoctoral Fellow, University of Toronto
- Zhi Hao (Perry) Luo (BSc, University of Toronto, with Michael Brudno)
  Last Seen: PhD Student, MILA (Montreal Polytechnique)
- Ali Punjani (PhD, University of Toronto, with David J. Fleet)
  Last Seen: PhD Student, University of Toronto & CEO Structura Biotechnology
- Yali Wang (PhD, TTI-Chicago, with Raquel Urtasun)
  Last Seen: Assistant Professor, Chinese Academy of Sciences
- Jianhua Zhao (PhD, University of Toronto with John Rubinstein)
  Last Seen: Assistant Professor, Sanford Burnham Prebys
- Yadi Zhao (BSc, University of Toronto)
  Last Seen: Senior Software Engineer, Microsoft

Supervisory Committees

Name	Supervisor	Program	Institution	Status
Jay Patel	Richard Murray	PhD Psych	York University	Current
Parham Eftekhar	Richard Wildes	PhD EECS	York University	Current
Mohammadjavad Ghorbanalivakili	Gunho Sohn	PhD Geo	York University	Current
Beixuan Yang	Michael Brown	MSc EECS	York University	Current
Farzanah Mahdisoltani	David Fleet	PhD CS	University of Toronto	Current
Hoang Le	Michael Brown	PhD EECS	York University	Current
Rezaul Karim	Richard WIldes	PhD EECS	York University	Current
Fasil Cheema	Ruth Urner	MSc EECS	York University	Current
Keyi Liu	James Elder	MSc EECS	York University	Graduated 2023/04
Andrew (Alex) Heyman	Joel Zylberberg	MSc EECS	York University	Graduated 2023/07

Ian MacPherson	Michael Brown	MSc EECS	York University	Graduated 2023/07
Mehrazin Alizadeh	Hina Tabassum	MSc EECS	York University	Graduated 2022/10
Gursahaj Kohli	Ruth Urner	MScAI EECS	York University	Graduated 2022/08
Sai Tedla	Michael Brown	MSc EECS	York University	Graduated 2022/07
Saeed Ghorbani	Nikos Troje	PhD EECS	York University	Graduated 2022/04
Paria Mehrani	John Tsotsos	PhD EECS	York University	Graduated 2021/12
Abdullah Abuolaim	Michael Brown	PhD EECS	York University	Graduated 2021/10
Chao Wang	Hui Jiang	PhD EECS	York University	Graduated 2021/10
Mahmoud Afifi	Michael Brown	PhD EECS	York University	Graduated 2021/04
Abdelrahman Abdelhamed	Michael Brown	PhD EECS	York University	Graduated 2020/11
Micha Livne	David Fleet	PhD CS	University of Toronto	Graduated 2020/04
Mahdi Biparva	John Tsotsos	PhD EECS	York University	Graduated 2019/09
Hakki Karaimer	Michael Brown	PhD EECS	York University	Graduated 2019/08
Soo Min Kang	Richard Wildes	PhD EECS	York University	Graduated 2019/08
Calden Wloka	John Tsotsos	PhD EECS	York University	Graduated 2019/08
Masoud Hoveidar-Sefid	Michael Jenkin	MSc EECS	York University	Graduated 2017/11

External Examiner
- PhD Reader, James Brofos, PhD from Yale University, Department of Statistics, April 2022.
- External Examiner, Artur Besakov, PhD from University of Edinburgh, School of Informatics, May 2022.

Courses Taught
- York University
  - ◇ EECS4404/5327: Introduction to Machine Learning and Pattern Recognition (Fall 2021, Winter 2017)
  - ◇ EECS1028: Discrete Mathematics for Engineers (Winter 2021)
  - ◇ EECS6322: Neural Networks and Deep Learning (Winter 2021)
  - ◇ EECS6323: Advanced Topics in Computer Vision (Winter 2018)
  - ◇ EECS3121: Numerical Methods I (Fall 2017)
  - ◇ EECS4070: Directed Studies (Summer 2017)
  - ◇ EECS1710: Introduction to Programming for Digital Media (Fall 2016)
- NextAI: Deep Learning in Computer Vision (2018 - 2022)
  - ◇ 2 day intensive course, co-taught with Dr. Kosta Derpanis
- University of Toronto, Scarborough
  - ◇ CSCC11/D11: Machine Learning and Data Mining (2012 - 2015)

Other Teaching

- Tutorial at IEEE Conference on Computer Vision and Pattern Recognition (2021)
  - ◇ *Normalizing Flows and Invertible Neural Networks in Computer Vision.* With Ullrich Koethe.
- Guest Lecturer at Vector Institute (2021)
  - ◇ *Unsupervised Learning and Generative Models.* Part of a Computer Vision Special Project.
- Tutorial at European Conference on Computer Vision (2020)
  - ◇ *Normalizing Flows and Invertible Neural Networks in Computer Vision.* With Ullrich Koethe and Carsten Rother.
- Guest Lecturer at Toyota Technological Institute at Chicago (2013)
  - ◇ Graduate Course on Computer Vision
- Guest Lecturer at University of Toronto (2012, 2014)
  - ◇ CSC2431: Topics in Computational Biology: Computational Methods in Medicine
  - ◇ CSC2539: Topics in Computer Vision: Detection, Tracking and Analysis of People
- Tutorial at IEEE International Conference on Computer Vision (2009)
  - ◇ *Physics-based Human Motion Modelling for People Tracking: A Short Tutorial.* With Leonid Sigal and David Fleet.
- Teaching Assistant at University of Toronto (2004 - 2010)
  - ◇ CSC320: Introduction to Visual Computing (2006 - 2010)
  - ◇ CSC2503: Foundations of Computer Vision (Graduate Course) (2007, 2010)
  - ◇ CSCD18: Computer Graphics (2004 - 2006)
  - ◇ CSC192: Computer Programming, Algorithms, Data Structures and Languages (2005)
  - ◇ CSC263: Data Structures and Analysis (2004)

SERVICE

Academic

- Senior Area Chair: *AAAI Conference on Artificial Intelligence* 2022, *AAAI Conference on Artificial Intelligence* 2023.
- Area Chair: *European Conference on Computer Vision* 2018, *IEEE Winter Conference on Applications of Computer Vision* 2019, *Conference on Uncertainty in Artificial Intelligence* 2019, *AAAI Conference on Artificial Intelligence* 2021, *IEEE Conference on Computer Vision and Pattern Recognition* 2021, *IEEE Conference on Computer Vision and Pattern Recognition* 2023, *Neural Information Processing Systems 2023.*
- Judge, *University of Toronto ProjectX* 2021.
- Associate Editor: *IET Computer Vision* (2016-2023).
- Review Editor: *Frontiers in Computer Vision* (2020-).
- Selected Reviewer Service: *IEEE Conference on Computer Vision and Pattern Recognition, IEEE International Conference on Computer Vision, European Conference on Computer Vision, Neural Information Processing Systems, International Conference on Machine Learning, International Conference on Artificial Intelligence and Statistics, Conference on Uncertainty in Artificial Intelligence, IEEE International Conference on Robotics and Automation, Journal of Structural Biology, Nature Communications,* SIGGRAPH, *IEEE Transactions on Pattern Analysis and Machine Intelligence, Springer International Journal of Computer Vision, Journal of Machine Learning Research, IEEE Transactions on Image Processing, Eurographics*

Social and Mentoring

- Alumni Mentor for *University of Toronto Department of Computer Science* 2022, 2023.
- Faculty Mentor for Mentorship Session at *IEEE Conference on Computer Vision and Pattern Recognition* 2022.
- Faculty Mentor for Mentorship Session at *IEEE International Conference on Computer Vision* 2021.
- Doctoral Consortium Co-chair, *IEEE International Conference on Computer Vision* 2021.
- Student Volunteer Chair, *IEEE Conference on Computer Vision and Pattern Recognition* 2018.

University and Faculty

- York University
  - ◇ Lassonde Graduate Learning, Curriculum and Students, Member (2022-2024)
  - ◇ Connected Minds: Facilities and Infrastructure (2023 - 2024)
  - ◇ VISTA Partnerships Committee, Member (2021 - 2023)
  - ◇ Centre for Innovation in Computing at Lassonde (IC@L), Executive Committee Member (2022 - 2024)
  - ◇ Centre for AI & Society (CAIS)
    - · Founding Member and Executive Committee Member (2021 - 2024)
    - · Facilities Committee Chair (2022 - 2024)
  - ◇ Lassonde College of Internal Peer Review (2021 - 2022)
  - ◇ VPRI Markham Research Cluster Committee, AI&Society (2021)
  - ◇ Center for Vision Research Seminar Series, Coordinator (2017 - 2018)
- University of Toronto
  - ◇ Graduate Education Council, School of Graduate Studies (2007 - 2009)
  - ◇ Committee on Student Matters, School of Graduate Studies (2008 - 2009)
  - ◇ Advisory Committee to the Provost for Appointment of Dean of Graduate Studies & Vice-Provost Graduate Education (2008 - 2009)
  - ◇ Working Group on Interdisciplinarity in Graduate Education, School of Graduate Studies (2008)
  - ◇ Committee on Program Matters, School of Graduate Studies (2007 - 2008)

Departmental

- Department of Electrical Engineering and Computer Science, York University
  - ◇ Vice-Chair, Graduate Program MSc & MScAI (2022 - 2024)
  - ◇ Graduate Admissions Committee, Chair (2022 - 2024)
  - ◇ Graduate Admissions Committee, Member (2021 - 2022)
  - ◇ T&P Adjudication Committee, Alternate Member (2021 - 2022)
  - ◇ Masters of Science AI Specialization Program Coordinator (2020 - 2022)
  - ◇ Graduate Executive Committee, Member (2020 - 2022)
  - ◇ Workload Document Review Committee, Member (2017 - 2018, 2020 - 2022)
  - ◇ T&P File Prep Committee (2020 - 2021)
  - ◇ VPRI Markham Research Cluster (AI&Society) Committee, Member (2021)
  - ◇ Hiring Committee for AI/ML Faculty Position, Chair (2020 - 2021)
  - ◇ Academic Honesty Exploratory Committee, Chair (2020)
  - ◇ Technical Support and Infrastructure Committee, Member (2017 - 2018)
  - ◇ Computer Vision Reading Group, Founder and Organizer (2016 - 2018)
- Department of Computer Science, University of Toronto
  - ◇ Computer Vision Reading Group, Founder and Organizer (2012 - 2016)
  - ◇ Departmental Computing Committee, Member (2004 - 2011)
  - ◇ Annual Departmental Retreat, Graduate Student Representative (2006 - 2007)
  - ◇ M.Sc. Program Restructuring Committee, Member (2005 - 2006)
  - ◇ Departmental Computing Transition Committee, Member(2005 - 2006)
  - ◇ External Departmental Review, Graduate Student Representative(2005)

INVITED
TALKS

1. *Tractable Deep Generative Models.* Invited Seminar, Dagstuhl Seminar on Recent Advancements in Tractable Probabilistic Inference, Germany. Apr-22.

2. *Normalizing Flows in Theory and Practice.* Invited Seminar, Microsoft Research, Redmond, WA. Nov-21.

3. *Normalizing Flows in Theory and Practice.* Invited Seminar, Vector Institute, Toronto, ON. Oct-21.

4. *Normalizing Flows in Theory and Practice.* Invited Seminar, University of Toronto Undergraduate AI Club, Toronto, ON. Oct-21.

5. *Normalizing Flows in Theory and Practice.* Invited Seminar, Alberta Machine Intelligence Institute, University of Alberta, Edmonton, AB. Sep-21.

6. *Wavelet Flow: Fast Training of High Resolution Normalizing Flows.* Invited Talk, ICML Workshop on Invertible Networks and Normalizing Flows, . Jul-21.

7. *Normalizing Flows in Theory and Practice.* Invited Seminar, Centre for Artificial Decision Making and Action, University of British Columbia, Vancouver, BC. Apr-21.

8. *Atomic Scale Computer Vision: Rapid Reconstruction of 3D Structures for CryoEM.* Invited Seminar, Vector Institute, Toronto, ON. Jul-19.

9. *Bayesian Methods and Optimization in Cryo-EM.* Invited Speaker, American Crystallographic Association Annual Meeting, Toronto, ON. Jul-18.

10. *cryoSPARC: Algorithms for Reducing the Computational Burden of CryoEM.* Invited Seminar, Vollum Institute, Oregon Health and Science University, Portland, OR. Dec-17.

11. *Bayesian Methods and Optimization in Cryo-EM.* Invited Speaker, NRAMM Workshop on Advanced Topics in EM Structure Determination: Challenges and Opportunities, New York, NY. Nov-17.

12. *Algorithms for Reducing the Computational Burden of CryoEM.* Invited Seminar, National Centre for Biotechnology, Madrid, Spain. Oct-17.

13. *Atomic Scale Computer Vision: Rapid Estimation of 3D Protein Structures with Electron Cryomicroscopy.* Invited Speaker, Conference on Big Data and Information Analytics, Toronto, ON. Sep-17.

14. *Algorithms for Reducing the Computational Burden of CryoEM.* Invited Speaker, Canadian Microscopy and Cytometry Symposium, Montreal, QC. May-17.

15. *Algorithms for Reducing the Computational Burden of CryoEM.* Invited Speaker, CryoEM Workshop at Ecole Polytechnique Federale de Lausanne, Switzerland. May-17.

16. *Algorithms for Reducing the Computational Burden of CryoEM.* Invited Speaker, IDeAS Seminar at Princeton University, Princeton, NJ. Apr-17.

17. *Algorithms for Reducing the Computational Burden of CryoEM.* Invited Seminar, Vollum Institute, Oregon Health and Science University, Portland, OR. Dec-16.

18. *Algorithms for Reducing the Computational Burden of CryoEM.* Invited Talk, Simons Electron Microscopy Workshop on Computational Methods for CryoEM, New York, NY. Oct-16.

19. *Reducing the Burden of Computation for CryoEM.* Invited Speaker, Three Dimensional Electron Microscopy Gordon Research Conference, Hong Kong. Jun-16.

20. *Efficient 3D Molecular Structure Estimation with Electron Cryomicroscopy.* Invited Speaker, IEEE Toronto Section, Computer Chapter, Toronto, ON. Nov-15.

21. *Efficient 3D Molecular Structure Estimation with Electron Cryomicroscopy.* Invited Symposium, 12th Conference on Computer and Robot Vision, Halifax, NS. Jun-15.

22. *Lost! Leveraging the Crowd for Probabilistic Visual Self-Localization.* Invited Speaker, York University, Toronto, ON. Jan-14.

23. *Lost! Leveraging the Crowd for Probabilistic Visual Self-Localization.* Invited Speaker, IEEE Toronto Section, Computer Chapter, Toronto, ON. Sep-13.

24. *Physics in Human Motion Estimation and Scene Understanding.* Invited Speaker, UOIT, Oshawa, ON. Sep-12.

25. *Physics in Human Motion Estimation and Scene Understanding.* Invited Speaker, University of Toronto, Toronto, ON. Nov-11.

26. *Human Motion and Ground Contact from Video.* Invited Speaker, Carnegie Mellon University/Disney Research, Pittsburgh, PA. May-11.

27. *Human Motion and Ground Contact from Video.* Invited Speaker, Bellairs Workshop on Computer Animation: GRAND Challenges, Animation and Geometry, Holetown, Barbados. Feb-11.

28. *Physics in Human Motion Estimation and Scene Understanding.* Invited Speaker, Toyota Technological Institute, Chicago, IL. Jan-11.

29. *Physics in Human Motion Estimation and Scene Understanding.* Invited Speaker, Dartmouth College, Hanover, NH. Dec-10.

30. *Physics in Human Motion Estimation and Scene Understanding.* Invited Speaker, Boston University, Boston, MA. Dec-10.

31. *Human Motion Estimation with Physics.* Invited Speaker, Trends in Computing, Department of Computer Science, University of Toronto, Toronto, ON. Jul-10.

32. *Estimating Contact Dynamics.* Invited Speaker, Canadian Institute for Advanced Research: Neural Computation & Adaptive Perception Summer School, Toronto, ON. Aug-09.

33. *Physics-Based Human Motion Understanding.* Invited Speaker, Rutgers University, New Brunswick, NJ. Apr-09.

34. *Bayesian Density Estimation from Cryo-EM.* Invited Speaker, University of Toronto, Toronto, ON. Sep-08.

35. *Physics-Based Models for Human Pose Tracking.* Invited Speaker, Queens University, Kingston, ON. Apr-08.

36. *The Kneed Walker for Human Pose Tracking.* Invited Speaker, Canadian Institute for Advanced Research Workshop on Neural Computation and Adaptive Perception, Vancouver, BC. Dec-07.

37. *Physics-Based Person Tracking Using Simplified Lower-Body Dynamics.* Invited Speaker, Ecole Polytechnique Federale de Lausanne, Switzerland. Aug-07.

38. *Dynamical Priors for People Tracking.* Invited Speaker, Canadian Institute for Advanced Research Workshop on Neural Computation and Adaptive Perception, Toronto, ON. Aug-06.

(Updated: August 23, 2024)