

# Marcus A. Brubaker - Curriculum Vitae

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CONTACT INFORMATION	Marcus A. Brubaker <i>E-mail:</i> <a href="mailto:mab@eecs.yorku.ca">mab@eecs.yorku.ca</a> <i>Website:</i> <a href="http://www.eecs.yorku.ca/~mab/">http://www.eecs.yorku.ca/~mab/</a>
EDUCATION	<b>University of Toronto, Toronto, Ontario, Canada</b> <ul style="list-style-type: none"><li>• Ph.D. in Computer Science (Supervisor: David J. Fleet) <b>2011</b> Thesis Title: <i>Physical Models of Human Motion for Estimation and Scene Understanding</i></li><li>• M.Sc. in Computer Science (Supervisor: David J. Fleet) <b>2006</b> Thesis Title: <i>Physics-based Priors for Human Pose Tracking</i></li><li>• Honours B.Sc. in Computer Science with Minor in Mathematics <b>2004</b></li></ul>
EMPLOYMENT HISTORY	<b>Researcher Director at Borealis AI, Toronto.</b> <a href="http://borealisai.com">http://borealisai.com</a> <b>2018-</b> <b>Assistant Professor at York University, Toronto.</b> <b>2016-</b> <b>Co-Founder of Structura Biotechnology Inc.</b> <a href="http://structura.bio">http://structura.bio</a> <b>2016-</b> <b>Research Associate at Cadre Research Labs.</b> <a href="http://cadreresearch.com">http://cadreresearch.com</a> <b>2011 - 2018</b> <ul style="list-style-type: none"><li>• Theoretical and applied consulting in computer vision, machine learning and statistics</li></ul> <b>Postdoctoral Fellow at University of Toronto, Scarborough.</b> <b>2014 - 2016</b> <ul style="list-style-type: none"><li>• Supervisor: David J. Fleet (University of Toronto)</li></ul> <b>Postdoctoral Researcher at TTI-Chicago.</b> <a href="http://ttic.edu">http://ttic.edu</a> <b>2011 - 2014</b> <ul style="list-style-type: none"><li>• Supervisor: Raquel Urtasun (TTI-Chicago)</li></ul> <b>Sessional Lecturer at University of Toronto, Scarborough.</b> <b>2012 - 2015</b> <ul style="list-style-type: none"><li>• Instructor for <i>CSCD11/CSCC11: Introduction to Machine Learning and Data Mining</i></li></ul>
AFFILIATIONS	<ul style="list-style-type: none"><li>• Researcher Director, Borealis AI, Toronto, Canada. (2018-)</li><li>• Assistant Professor, Department of Electrical Engineering and Computer Science, Lassonde School of Engineering, York University, Toronto, Canada. (2016-)</li><li>• Faculty Affiliate, Vector Institute, Toronto, Canada. (2018-)</li><li>• Adjunct Assistant Professor, Department of Computer Science, University of Toronto, Toronto, Canada. (2017-)</li><li>• Core Member, Vision: Science to Applications (VISTA), York University, Toronto, Canada. (2016-)</li><li>• Faculty Member, Centre for Vision Research, York University, Toronto, Canada. (2016-)</li><li>• Member, Computer Vision Foundation. (2013-)</li><li>• Member, IEEE. (2007-)</li></ul>
FUNDING AND AWARDS	<b>Grants</b> <ul style="list-style-type: none"><li>• “<i>Inference and Model Building for Vision-based Estimation of Transmissive Objects,</i>” <b>Natural Science and Engineering Research Council (NSERC) Discovery Grant</b>, \$195,000CAD, 2017-2022.</li><li>• “<i>Firearm Forensics Black-Box Studies for Examiners and Algorithms using Measured 3D Surface Topographies,</i>” <b>National Institute of Justice (NIJ) Applied R&amp;D in Forensic Science for Criminal Justice Purposes</b>, with Ryan H. Lilien, \$200,000USD, 2017.</li><li>• “<i>Applied Research, Development, and Method Validation of Toolmark Imaging, Virtual Casing Comparison, and In-Lab Verification for Firearms Forensics,</i>” <b>National Institute of Justice (NIJ) Applied R&amp;D in Forensic Science for Criminal Justice Purposes</b>, with Ryan H. Lilien, \$217,450USD, 2016.</li><li>• “<i>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,</i>” <b>NIJ Applied R&amp;D in Forensic Science for Criminal Justice Purposes</b>, with Ryan H. Lilien, \$190,400USD, 2015.</li></ul>

- “*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,*” **NIJ Applied R&D in Forensic Science for Criminal Justice Purposes**, with Ryan H. Lilien, \$193,000USD, 2014.
- “*Applied Research and Development of a Three-dimensional Topography System for Firearm Identification using GelSight,*” **NIJ Applied R&D in Forensic Science for Criminal Justice Purposes**, with Ryan H. Lilien and Todd Weller, \$200,000USD, 2013.
- “*Three-dimensional Topography System for Firearm Identification using GelSight,*” **National Institute of Standards and Technology, Measurement Science and Engineering Research Grants Program**, with Ryan H. Lilien and Todd Weller, \$174,000USD, 2013.

#### Scholarships and Awards

- **BioImage Computing Workshop at IEEE CVPR** **2015**  
  - ◇ Winner of Best Poster for [30]
- **IEEE Conference on Computer Vision and Pattern Recognition** **2013**  
  - ◇ Winner of Best Paper Runner-Up for [18]
- **Natural Science and Engineering Research Council** **2012 - 2014**  
  - ◇ Postdoctoral Fellowship, \$40,000CAD per year
- **Natural Science and Engineering Research Council** **2008 - 2010**  
  - ◇ Canadian Graduate Scholarship, \$35,000CAD per year
- **Ontario Graduate Scholarship** **2006 - 2007**  
  - ◇ \$15,000CAD per year
- **Ray Reiter Graduate Award in Computer Science** **2005 - 2006**  
  - ◇ \$500CAD

#### PUBLICATIONS

- [1] Matthew Tesfaldet, Marcus A. Brubaker, and Konstantinos G. Derpanis. Two-stream convolutional networks for dynamic texture synthesis. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2018.
- [2] 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.
- [3] 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.
- [4] 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.
- [5] 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 *IEEE International Conference on Robotics and Automation*, 2017.
- [6] Zhi Hao Luo, Marcus A. Brubaker, and Michael Brudno. Size and Texture-based Classification of Lung Tumors with 3D CNNs. In *IEEE Winter Conference on Applications of Computer Vision*, 2017.
- [7] 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.
- [8] 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*, 2016.

- [9] Marcus A. Brubaker, Andreas Geiger, and Raquel Urtasun. Map-based Probabilistic Visual Self-Localization. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2016.
- [10] Yali Wang, Marcus A. Brubaker, Brahim Chaib-draa, and Raquel Urtasun. Sequential Inference for Deep Gaussian Process. In *Proceedings of Nineteenth International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2016.
- [11] Marcus A. Brubaker, Ali Punjani, and David J. Fleet. Building Proteins in a Day: Efficient 3D Molecular Reconstruction. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2015.
- [12] 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.
- [13] 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.
- [14] Jianhua Zhao, Marcus A. Brubaker, Samir Benlekber, 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.
- [15] 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*, 37(12):2415 – 2427, 2015.
- [16] 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*, 2014.
- [17] Yanshuai Cao, Marcus A. Brubaker, Aaron Hertzmann, and David J. Fleet. Efficient Optimization for Sparse Gaussian Process Regression. In *Proceedings of Neural Information Processing Systems*, 2013.
- [18] Marcus A. Brubaker, Andreas Geiger, and Raquel Urtasun. Lost! Leveraging the Crowd for Probabilistic Visual Self-Localization. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2013.
- [19] 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*, 2013.
- [20] 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.
- [21] Marcus A. Brubaker, Mathieu Salzmann, and Raquel Urtasun. A Family of MCMC Methods on Implicitly Defined Manifolds. In *Proceedings of the Fifteenth International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2012.
- [22] Marcus A. Brubaker, David J. Fleet, and Aaron Hertzmann. Physics-based Person Tracking using the Anthropomorphic Walker. *International Journal of Computer Vision*, 87(1):140–155, 2010.
- [23] 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.
- [24] 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.
- [25] Marcus A. Brubaker, Leonid Sigal, and David J. Fleet. Estimating Contact Dynamics. In *Proceedings of IEEE International Conference on Computer Vision*, 2009.
- [26] Marcus A. Brubaker and David J. Fleet. The Kneed Walker for Human Pose Tracking. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2008.
- [27] Marcus A. Brubaker, David J. Fleet, and Aaron Hertzmann. Physics-based person tracking using simplified lower-body dynamics. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2007.

CONTRIBUTIONS  
WITHOUT  
PROCEEDINGS

- [28] 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.
- [29] 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.
- [30] 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.
- [31] 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.
- [32] 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.
- [33] 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.
- [34] 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.
- [35] 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.
- [36] 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.
- [37] 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.

UNREVIEWED  
CONTRIBUTIONS

- [38] Marcus A. Brubaker. The Integral Cross-Discipline Approach to Pushing AI Research. *techvibes.com*, February 2018.
- [39] 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++. *ArXiv e-prints*, cs.MS/1509.07164, September 2015.
- [40] Ali Punjani and Marcus A. Brubaker. Microscopic Advances with Large-Scale Learning: Stochastic Optimization for Cryo-EM. *ArXiv e-prints*, stat.ML/1501.04656, January 2015.
- [41] Marcus A. Brubaker. *Physical Models of Human Motion for Estimation and Scene Analysis*. PhD thesis, University of Toronto, 2011.
- [42] 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.
- [43] Marcus A. Brubaker. Physics-based priors for human pose tracking. Master's thesis, University of Toronto, 2006.

TEACHING  
AND  
SUPERVISION

**Students Supervised**

- Ekram Bhuiyan (York University, Undergrad)
- Yanshuai Cao (University of Toronto, with David J. Fleet and Aaron Hertzmann)
- Steven (Szu-Han) Chen (York University, Undergrad)
- Pierre Duez (York University)
- Nadav Gasner (York University, Undergrad)
- Martin Hjelm (Toyota Technological Institute at Chicago, with Raquel Urtasun)
- Hubert Lin (University of Toronto)
- Micha Livne (University of Toronto, with David J. Fleet)
- Zhi Hao (Perry) Luo (University of Toronto, Undergrad)
- Abbas Masoumzadeh (York University)
- Kristen McIntosh (York University, Undergrad)
- Ali Punjani (University of Toronto/UC Berkeley, with David J. Fleet)
- Matthew Tesfaldet (York University, with Kosta Derpanis)
- Yali Wang (Toyota Technological Institute at Chicago, with Raquel Urtasun)
- Jianhua Zhao (University of Toronto, with John L. Rubinstein)
- Yadi Zhao (University of Toronto)

**Teaching Experience**

- Teaching at York University
  - ◇ EECS1710: Introduction to Programming for Digital Media (Fall 2016)
  - ◇ EECS4404/5327: Introduction to Machine Learning and Pattern Recognition (Winter 2017)
  - ◇ EECS3121: Numerical Methods I (Fall 2017)
  - ◇ EECS6323: Advanced Topics in Computer Vision (Winter 2018)
- Instructor at University of Toronto, Scarborough
  - ◇ CSCC11/D11: Machine Learning and Data Mining (2012 - 2015)
- Guest Lecturer at Toyota Technological Institute at Chicago
  - ◇ Graduate Course on Computer Vision (2013)
- Guest Lecturer at University of Toronto
  - ◇ CSC2431: Topics in Computational Biology: Computational Methods in Medicine (2014)
  - ◇ CSC2539: Topics in Computer Vision: Detection, Tracking and Analysis of People (2012)
- Teaching Assistant at University of Toronto
  - ◇ 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**

- Area Chair, ECCV 2018.
- Student Volunteer Chair, IEEE CVPR 2018.
- Associate Editor, *IET Computer Vision* (2016-).
- Program Committee: *IEEE Conference on Computer Vision and Pattern Recognition* (2009 - 2018), *IEEE International Conference on Computer Vision* (2009 - 2017), *Neural Information Processing Systems* (2011 - 2017), *International Conference on Machine Learning* (2018), *International Conference on Artificial Intelligence and Statistics* (2016 - 2017), *European Conference on Computer Vision* (2010 - 2014), *Conference on Uncertainty in Artificial Intelligence* (2012 - 2014), *IEEE Workshop on Applications of Computer Vision* (2011), *IAPR International Conference on Pattern Recognition* (2008 - 2010, 2013).

- Reviewer: *Journal of Structural Biology* (2017-2018), *SIGGRAPH* (2012 - 2014), *IEEE Transactions on Pattern Analysis and Machine Intelligence* (2014, 2017), *Elsevier Computer Vision and Image Understanding* (2014), *Springer International Journal of Computer Vision* (2008, 2014), *Journal of Machine Learning Research* (2012), *IEEE Transactions on Image Processing* (2011), *IEEE Transactions on Systems, Man, and Cybernetics Part A* (2011), *Eurographics* (2011), *IEEE International Conference on Robotics and Automation* (2011), *Elsevier Image and Vision Computing* (2009), *Elsevier Pattern Recognition Letters* (2005 - 2007).

### Departmental and University

- Department of Electrical Engineering and Computer Science, York University
  - ◇ Computer Vision Reading Group Founder and Organizer (2016 - 2018)
  - ◇ Center for Vision Research Seminar Coordinator (2017 - 2018, with James Elder)
  - ◇ Technical Support and Infrastructure Committee (2017 - 2018)
  - ◇ Workload Document Review Committee (2017 - 2018)
- Department of Computer Science, University of Toronto
  - ◇ Computer Vision Reading Group Founder and Organizer (2012 - 2016)
  - ◇ Departmental Computing Committee (2004 - 2011)
  - ◇ Graduate Student Representative, Annual Departmental Retreat (2006 - 2007)
  - ◇ M.Sc. Program Restructuring Committee (2005 - 2006)
  - ◇ Departmental Computing Transition Committee (2005 - 2006)
  - ◇ Graduate Student Representative for External Departmental Review (2005)
- 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)

### PRESENTATIONS

#### Invited Talks

- *Bayesian Methods in Cryo-EM*. Invited Speaker, NRAMM Workshop on Advanced Topics in EM Structure Determination: Challenges and Opportunities in New York, NY. November 2017.
- *Algorithms for Reducing the Computational Burden of CryoEM*. Invited Seminar at the National Centre for Biotechnology, Madrid, Spain. October 2017.
- *Algorithms for Reducing the Computational Burden of CryoEM*. Invited Speaker, Canadian Microscopy and Cytometry Symposium, Montreal, QC. May 2017.
- *Algorithms for Reducing the Computational Burden of CryoEM*. Invited Speaker, CryoEM Workshop at Ecole Polytechnique Federale de Lausanne, Switzerland. May 2017.
- *Algorithms for Reducing the Computational Burden of CryoEM*. Invited Speaker, IDeAS Seminar at Princeton University, Princeton, NJ. April 2017.
- *Algorithms for Reducing the Computational Burden of CryoEM*. Invited Seminar at the Vollum Institute, Oregon Health and Science University, Portland, OR. December 2016.
- *Algorithms for Reducing the Computational Burden of CryoEM*. Invited Talk at Simons Electron Microscopy Workshop on Computational Methods for CryoEM, New York Structural Biology Center, New York, NY. Oct 2016.
- *Reducing the Burden of Computation for CryoEM*. Three Dimensional Electron Microscopy Gordon Research Conference, Hong Kong, China. Jun 2016.
- *Efficient 3D Molecular Structure Estimation with Electron Cryomicroscopy*. IEEE Toronto Section, Computer Chapter, Toronto, ON. Nov 2015.
- *Efficient 3D Molecular Structure Estimation with Electron Cryomicroscopy*. Invited Symposium at 12th Conference on Computer and Robot Vision, Halifax, NS. Jun 2015.
- *Lost! Leveraging the Crowd for Probabilistic Visual Self-Localization*. York University, Toronto, ON. Jan 2014.

- *Lost! Leveraging the Crowd for Probabilistic Visual Self-Localization*. IEEE Toronto Section, Computer Chapter, Toronto, ON. Sep 2013.
- *Physics in Human Motion Estimation and Scene Understanding*. University of Ontario Institute of Technology. Sep 2012.
- *Physics in Human Motion Estimation and Scene Understanding*. University of Toronto. Nov 2011.
- *Human Motion and Ground Contact from Video*. Carnegie Mellon University/Disney Research, Pittsburgh. May 2011.
- *Human Motion and Ground Contact from Video*. Bellairs Workshop on Computer Animation: GRAND Challenges, Animation and Geometry, Holetown, Barbados. Feb 2011.
- *Physics in Human Motion Estimation and Scene Understanding*. Toyota Technological Institute at Chicago. Jan 2011.
- *Physics in Human Motion Estimation and Scene Understanding*. Dartmouth College. Dec 2010.
- *Physics in Human Motion Estimation and Scene Understanding*. Boston University. Dec 2010.
- *Human Motion Estimation with Physics*. Trends in Computing, Department of Computer Science, University of Toronto, Jul 2010. (Runner up for Best Talk)
- *Estimating Contact Dynamics*. Canadian Institute for Advanced Research: Neural Computation & Adaptive Perception Summer School, Toronto, ON. Aug 2009.
- *Physics-Based Human Motion Understanding*. Rutgers University. Apr 2009.
- *Bayesian Density Estimation from Cryo-EM*. University of Toronto. Sep 2008.
- *Physics-Based Models for Human Pose Tracking*. Queens University. Apr 2008.
- *The Kneed Walker for Human Pose Tracking*. Canadian Institute for Advanced Research Workshop on Neural Computation and Adaptive Perception, Vancouver, BC. Dec 2007.
- *Physics-Based Person Tracking Using Simplified Lower-Body Dynamics*. Ecole Polytechnique Federale de Lausanne. Aug 2007.
- *Dynamical Priors for People Tracking*. Canadian Institute for Advanced Research: Neural Computation & Adaptive Perception Summer School, Toronto, ON. Aug 2006.