

Amirhossein Taghvaei

CONTACT INFO

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EDUCATION

University of Illinois at Urbana-Champaign, Illinois, USA

Ph.D in Mechanical Engineering (Advisor: Prashant G. Mehta)

2013- 2019 (expected)

M.S in Mathematics

2013-2017

Overall GPA: **3.98/4.0**

Sharif University of Technology, Tehran, Iran

B.Sc. in Mechanical Engineering

2008-2013

B.Sc. in Physics (Dual Major)

Overall GPA: **18.39/20**

RESEARCH INTEREST

Mean-field control theory and optimal transportation for machine learning applications such as Bayesian inference, learning generative models, optimization and sampling

SELECTED PUBLICATIONS

Journal publications:

- **A. Taghvaei**, J de Wiljes, P. G. Mehta, and S. Reich. Kalman filter and its modern extensions for the continuous-time nonlinear filtering problem. *ASME Journal of Dynamic Systems, Measurement, and Control*, Nov, 2017
- C. Zhang, **A. Taghvaei**, P. G. Mehta. A mean-field optimal control formulation for global optimization, *IEEE Transactions on Automatic Control (TAC)*, May, 2018
- C. Zhang, **A. Taghvaei**, P. G. Mehta. Feedback Particle Filter on Riemannian Manifolds and Matrix Lie groups, *IEEE Transactions on Automatic Control (TAC)*, Nov, 2017

Conference publications:

- **A. Taghvaei**, P. G. Mehta, *Accelerated gradient flow for probability distributions*, International Conference on Machine Learning (ICML), 2019 (submitted)
- **A. Taghvaei**, J. Kim, P. G. Mehta, *How regularization effects the critical points in linear neural networks*, Advances in Neural Information Processing Systems (**NIPS**), Long Beach, December, 2017
- **A. Taghvaei**, P. G. Mehta, Error analysis of the stochastic linear feedback particle filter, *IEEE Conference on Decision and Control (CDC)*, Miami Beach, December 2018.
- **A. Taghvaei**, P. G. Mehta, Error analysis of the linear feedback article filter, In Proc. of the 2018 American control conference (ACC), Milwaukee, June, 2018
- **A. Taghvaei**, P. G. Mehta. S. P. Meyn, *Error Estimates for the Kernel Gain Function Approximation in the Feedback Particle Filter*, *IEEE American Control Conference (ACC)*, Seattle, May, 2017.
- **A. Taghvaei**, P. G. Mehta. *Gain Function Approximation in the Feedback Particle Filter*, *IEEE Conference on Decision and Control (CDC)*, Las Vegas, December, 2016.
- **A. Taghvaei**, P. G. Mehta. *An Optimal Transport Formulation of Linear Feedback Particle Filter*, In Proc. of the 2016 American Control Conference (ACC), Boston, June, 2016.

INTERNSHIP EXPERIENCE

AI Researcher, with Dr. Amin Jalali, Technicolor AI Research Lab, Palo Alto, Summer, 2018

- Project: Restricted Convex Potentials for Approximating the Wasserstein Metric and the Optimal Transport Mapping

Algorithm developer, with university start-up company, Rithmio,

2014-2015

- Project: Development of algorithms and software for real time classification of physical activities, based on wearable inertial sensors

HONOURS AND AWARDS	<p>CSE Fellow¹, Computational Science and Engineering, UIUC, 2016-2017,</p> <p>Ranked 9th in National University Entrance Exam, Iran, 2008</p>
TEACHING EXPERIENCE	<p>Teaching Assistant (TA) in Statistical Learning with Prof. Bruce Hajek, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Illinois, USA, Fall 2017</p> <p>Teaching Assistant (TA) in <i>Mathematical Methods in Engineering II</i> with Prof. Prashant Mehta, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Illinois, USA, Fall 2016</p> <p>Teaching Assistant (TA) in <i>Analytical Mechanics I</i> with Professor Akhavan, Department of Physics, Sharif University of Technology, Fall Semester 2012, Tehran, Iran</p> <p>Teaching Assistant (TA) in <i>Mechanics of Material III (Advanced)</i> with Professor Noseir, Department of Mechanical Engineering, Sharif University of Technology, Fall Semester 2012, Tehran, Iran</p>
WORKSHOP PRESENTATIONS	<p>(<i>invited talk</i>) <i>Poisson Equation in Learning and Classification</i>, 4th Workshop on Cognition and Control, University of Florida, Gainesville, January, 2016</p> <p>(<i>invited talk</i>) <i>Bias-Variance Tradeoff in solution to the Poisson Equation</i>, 5th Workshop on Cognition and Control, University of Florida, Gainesville, January, 2017</p> <p>(<i>talk</i>) <i>Gain Function Approximation in the Feedback Particle Filter</i>, 5th Workshop on Control and Game Theory, Purdue University, Purdue, April, 2016</p> <p>(<i>poster presentation</i>) (<i>Best poster award</i>) <i>Numerical methods to solve the weighted Poisson equation</i>, Coordinated Science Laboratory Student Conference, University of Illinois at Urbana-Champaign, February, 2017</p> <p>(<i>poster presentation</i>) <i>Mean-field optimal control formulation for global optimization</i>, IPAM Workshop on mean-field games, Los Angeles, August, 2018</p> <p>(<i>poster presentation</i>) <i>Optimization in linear neural networks</i>, Midwest Machine Learning Symposium, Chicago, June, 2018</p>
ACTIVITIES	<p>Mentorship of five undergraduate and Master's students: Tixian Wang, Ayano Hiranaka, Kumar Gandhi, Peter Ivanov, Ulzee An</p> <p>Reviewer of TAC, JCOMP, ASME, NIPS'16, ICML'19</p> <p>Organizer of the of the Coordinated Science Laboratory Student Conference, 2015-2018</p> <p>Organizer of the Coordinated Science Laboratory (CSL) Social Hour, 2015-2017</p> <p>Organizer of the Machine Learning reading group, CSL, Fall, 2018</p> <p>Participation in Engineering Volunteering In Stem Education (ENVISION), University of Illinois at Urbana-Champaign, Spring and Fall 2017</p> <p>Participation in the Mentoring Undergraduates in Science and Engineering (MUSE) program, University of Illinois at Urbana-Champaign, 2015-2016</p> <p>Organizer of the introduction to Persian new year and Persian classical music, Coordinated Science Laboratory (CSL) Social Hour, March, 2017</p>

¹Annual award to outstanding graduate students with interdisciplinary and computationally oriented research.