

# STEFANIE JEGELKA

## CURRICULUM VITAE

Massachusetts Institute of Technology  
Dept. of EECS and Computer Science and Artificial Intelligence Laboratory (CSAIL)  
Cambridge, MA 02139  
stefje@mit.edu

### RESEARCH INTERESTS

My research interests lie in machine learning. In particular, my research aims to expose and exploit *combinatorial, geometric and algebraic* structure in machine learning problems, to design and analyze models that represent important interdependencies in data, and to develop *resource-efficient, reliable* learning and optimization algorithms. This includes learning with discrete objects, such as graphs or sets; discrete probability; and the interplay of discrete and continuous optimization.

### POSITIONS HELD

**X-Consortium Career Development Associate Professor**, since Feb 2019  
Dept. of EECS, MIT

**X-Consortium Career Development Assistant Professor**, Jan 2015 – Feb 2019  
Dept. of EECS, MIT

**Postdoctoral Researcher**, May 2012–Dec 2014  
Dept of EECS, University of California Berkeley  
Advisors: Michael I. Jordan, Trevor Darrell

### EDUCATION

**Ph.D. (Dr.sc. ETH Zürich) in Computer Science**, Feb 2008 – March 2012  
Max Planck Institute for Intelligent Systems, Tübingen, Germany and ETH Zurich, Switzerland  
Dissertation Title: *Combinatorial Problems with Submodular Coupling in Machine Learning and Computer Vision*  
Advisors: Jeff Bilmes, Bernhard Schölkopf, Andreas Krause

**Diplom in Bioinformatics** with distinction, Dec 2007  
University of Tübingen, Germany  
Thesis: *Statistical Learning Theory Approaches to Clustering*  
Thesis advisors: Ulrike von Luxburg, Michael Kaufmann

**Exchange student**, Aug 2003 - May 2004  
The University of Texas at Austin, Dept. of Computer Science

### VISITING POSITIONS AND CONSULTING

**Advisory Board**  
macro-eyes health, since Aug 2020

**Visiting Professor**  
ETH Zürich, Dept. of CS, July-Aug 2019

**Consulting Researcher**  
Microsoft Research New England; Dec 2017–Dec 2018

**Invited Long-Term Participant**  
Simons Institute for the Theory of Computing, Program on *Bridging Continuous and Discrete Optimization*; Fall 2017

### **Invited Long-Term Participant**

Simons Institute for the Theory of Computing, Program on *Foundations of Machine Learning*; Spring 2017

### **OTHER RESEARCH EXPERIENCE**

**Research Intern**, Microsoft Research, Redmond; June-Sept 2011

Advisors: Eric Horvitz, Ashish Kapoor

**Research Assistant**, Max Planck Institute for Biological Cybernetics, Germany; 2005-2007

Advisors: Arthur Gretton, Ulrike von Luxburg

**Research Intern**, Georgetown University, Dept. of Neuroscience, Washington D.C.; May-Oct 2004

Advisor: Maximilian Riesenhuber

**Conference Course**, The University of Texas at Austin, Dept. of Computer Science; Jan-May 2004

Advisors: James A. Bednar, Risto Miikkulainen

### **SELECTED HONORS, AWARDS AND FELLOWSHIPS**

Two Sigma Faculty Research Award, 2020

Sloan Research Fellowship, 2018

Joseph A Martore Award (for Exceptional Contributions to Education in the MIT Institute for Data, Systems and Society), 2017

DARPA Young Faculty Award (YFA), 2017

Adobe Research Award, 2017

Google Faculty Research Award, 2016 & 2021

NSF CAREER Award, 2016

German Pattern Recognition Award (Deutscher Mustererkennungspreis), 2015

ICML Best Paper Award (International Conference on Machine Learning), 2013

Google Anita Borg Europe Fellowship, 2008

Diplom with Distinction, University of Tübingen, 2007

Member of the Scientific College for Neuroscience, German National Academic Foundation, 2005-2007

Honors List, The University of Texas at Austin, Dec 2003

Scholar of the German National Academic Foundation (Studienstiftung des Deutschen Volkes), Feb 2003-Aug 2007

### **PUBLICATIONS**

*In machine learning, the main conferences are very competitive and the main venues of publication. They are equivalent to good journal publications in other fields.*

#### **Journal Papers**

1. E. Kim, Z. Jensen, A. van Grootel, K. Huang, M. Staib, S. Mysore, H.-S. Chang, E. Strubell, A. McCalum, S. Jegelka, E. Olivetti. Inorganic Materials Synthesis Planning with Literature-Trained Neural Networks. *Journal of Chemical Information and Modeling*, 2020.
2. M. Staib and S. Jegelka. Robust Budget Allocation via Continuous Submodular Functions. *Applied Mathematics and Optimization, Special issue on Optimization for Data Sciences*. 2019.
3. G. Shulkind, S. Jegelka and G.W. Wornell. Sensor Array Design Through Submodular Optimization. *IEEE Transactions on Information Theory*, 2018.

4. E. Kim, K. Huang, S. Jegelka and E. Olivetti. Virtual Screening of Inorganic Materials Synthesis Parameters with Deep Learning. *npj Computational Materials*, 3(53), 2017.
5. S. Jegelka and J. Bilmes. Graph Cuts with Interacting Edge Costs – Examples, Approximations, and Algorithms. *Mathematical Programming Series A* 162, pp. 241-282, 2017.
6. S. Jegelka, A. Kapoor and E. Horvitz. An Interactive Approach to Solving Correspondence Problems. *International Journal of Computer Vision*, 2013.
7. H. Shen, S. Jegelka and A. Gretton. Fast Kernel-based Independent Component Analysis. *IEEE Transactions on Signal Processing* 57(9), pp. 3498–3511, 2009.
8. S. Jegelka, J. A. Bednar and R. Miikkulainen. Prenatal Development of Ocular Dominance in a Self-organizing Model of V1. *Neurocomputing* 69, pp. 1291–1296, 2006. Presented at the *Computational Neuroscience Meeting*, 2005.

### Conference Papers and Book Chapters

9. K. Xu, M. Zhang, J. Li, S. S. Du, K. Kawarabayashi, S. Jegelka. How Neural Networks Extrapolate: From Feedforward to Graph Neural Networks. *International Conference on Learning Representations (ICLR)*, 2021. **Oral Presentation.**
10. J. Robinson, C.-Y. Chuang, S. Sra, S. Jegelka. Contrastive Learning with Hard Negative Samples. *International Conference on Learning Representations (ICLR)*, 2021.
11. C.-Y. Chuang, J. Robinson, L. Yen-Chen, A. Torralba, S. Jegelka. Debaised Contrastive Learning. *Neural Information Processing Systems (NeurIPS)*, 2020. **Spotlight.**
12. K. Gatmiry, M. Aliakbarpour, S. Jegelka. Testing Determinantal Point Processes. *Neural Information Processing Systems (NeurIPS)*, 2020. **Spotlight.**
13. Y. Arjevani, J. Bruna, B. Can, M. Gürbüzbalaban, S. Jegelka, H. Lin. IDEAL: Inexact DEcentralized Accelerated Augmented Lagrangian Method. *Neural Information Processing Systems (NeurIPS)*, 2020. **Spotlight.**
14. S. Curi, K.Y. Levy, S. Jegelka, A. Krause. Adaptive Sampling for Stochastic Risk-Averse Learning. *Neural Information Processing Systems (NeurIPS)*, 2020.
15. J. Robinson, S. Jegelka, S. Sra. Strength from Weakness: Fast Learning Using Weak Supervision. *International Conference on Machine Learning (ICML)*, 2020.
16. V. K. Garg, S. Jegelka, T. Jaakkola. Generalization and Representational Limits of Graph Neural Networks. *International Conference on Machine Learning (ICML)*, 2020.
17. C.-Y. Chuang, A. Torralba, S. Jegelka. Estimating Generalization under Distribution Shifts via Domain-Invariant Representations. *International Conference on Machine Learning (ICML)*, 2020.
18. M. El Halabi, S. Jegelka. Minimizing approximately submodular functions. *International Conference on Machine Learning (ICML)*, 2020.
19. J. Zhang, H. Lin, S. Jegelka, A. Jadbabaie, S. Sra. On Complexity of Finding Stationary Points of Nonsmooth Nonconvex Functions. *International Conference on Machine Learning (ICML)*, 2020.
20. J. Kirschner, I. Bogunovic, S. Jegelka, A. Krause. Distributionally Robust Bayesian Optimization. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2020.
21. K. Xu, J. Li, M. Zhang, S. Du, K. Kawarabayashi and S. Jegelka. What Can Neural Networks Reason About? *International Conference on Learning Representations (ICLR)*, 2020. **Spotlight**
22. J. Robinson, S. Sra and S. Jegelka. Flexible Modeling of Diversity with Strongly Log-Concave Distributions. *Neural Information Processing Systems (NeurIPS)*, 2019.
23. M. Staib and S. Jegelka. Distributionally Robust Optimization and Generalization in Kernel Methods. *Neural Information Processing Systems (NeurIPS)*, 2019.

24. M. Zhang, K. Xu, K. Kawarabayashi, S. Jegelka and J. Boyd-Graber. Are Girls Neko or Shojo? Cross-Lingual Mapping of Non-Isomorphic Embedding with Iterative Normalization. *ACL Short paper*, 2019.
25. C. Bunne, D. Alvarez Melis, A. Krause and S. Jegelka. Learning Generative Models across Incomparable Spaces. *International Conference on Machine Learning (ICML)*, 2019.
26. D. Alvarez Melis, S. Jegelka and T. Jaakkola. Towards Optimal Transport with Global Invariances. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2019.
27. M. Staib, B. Wilder and S. Jegelka. Distributionally Robust Submodular Maximization. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2019.
28. K. Xu, W. Hu, J. Leskovec and S. Jegelka. How Powerful are Graph Neural Networks? *International Conference on Learning Representations (ICLR)*, 2019. **Oral Presentation**
29. H. Lin and S. Jegelka. ResNet with one-neuron hidden layers is a Universal Approximator. *Neural Information Processing Systems (NIPS)*, 2018. **Spotlight**
30. I. Bogunovic, J. Scarlett, S. Jegelka, V. Cevher. Adversarially Robust Optimization with Gaussian Processes. *Neural Information Processing Systems (NIPS)*, 2018. **Spotlight**
31. Z. Mariet, S. Sra, S. Jegelka. Exponentiated Strongly Rayleigh Distributions. *Neural Information Processing Systems (NIPS)*, 2018.
32. J. Djolonga, S. Jegelka and A. Krause. Provable Variational Inference for Constrained Log-Submodular Models. *Neural Information Processing Systems (NIPS)*, 2018.
33. A. Gkotovos, S. Jegelka, H. Hassani and A. Krause. Discrete Sampling using Semigradient-based Product Mixtures. *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2018. **Oral presentation**
34. K. Xu, C. Li, Y. Tian, T. Sonobe, K. Kawarabayashi and S. Jegelka. Representation Learning on Graphs with Jumping Knowledge Networks. *International Conference on Machine Learning (ICML)*, 2018. **Long talk**
35. D. Alvarez-Melis, T.S. Jaakkola and S. Jegelka. Structured Optimal Transport. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2018. **Oral presentation**
36. Z. Wang, C. Gehring, P. Kohli and S. Jegelka. Batched Large-scale Bayesian Optimization in High-dimensional Spaces. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2018.
37. B. Mirzasoleiman, S. Jegelka and A. Krause. Streaming Non-monotone Submodular Maximization: Personalized Video Summarization on the Fly. *AAAI Conference on Artificial Intelligence (AAAI)*, 2018.
38. M. Staib, S. Claiici, J. Solomon and S. Jegelka. Parallel Streaming Wasserstein Barycenters. *Neural Information Processing Systems (NIPS)*, 2017.
39. C. Li, S. Jegelka, S. Sra. Column Subset Selection via Polynomial Time Dual Volume Sampling. *Neural Information Processing Systems (NIPS)*, 2017.
40. M. Staib, S. Jegelka. Robust Budget Allocation via Continuous Submodular Functions. *International Conference on Machine Learning (ICML)*, 2017.
41. Z. Wang, S. Jegelka. Max-value Entropy Search for Efficient Bayesian Optimization. *International Conference on Machine Learning (ICML)*, 2017.
42. Z. Wang, C. Li, S. Jegelka, P. Kohli. Batched High-dimensional Bayesian Optimization via Structural Kernel Learning. *International Conference on Machine Learning (ICML)*, 2017.
43. H. Song, S. Jegelka, V. Rathod and K. Murphy. Deep Metric Learning via Facility Location. *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017. **Spotlight**
44. Z. Wang, S. Jegelka, L. P. Kaelbling and T. Lozano-Perez. Focused Model-Learning and Planning for Non-Gaussian Continuous State-Action Systems. *IEEE International Conference on Robotics and Automation (ICRA)*, 2017.
45. G. Shulkind, S. Jegelka and G. W. Wornell. Multiple wavelength sensing array design. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* 2017.

46. C. Li, S. Sra, S. Jegelka. Fast Mixing Markov Chains for Strongly Rayleigh Measures, DPPs, and Constrained Sampling. *Neural Information Processing Systems (NIPS)*, 2016. (covered by MIT News and ACM Technews)
47. J. Djolonga, S. Jegelka, S. Tschiatschek, A. Krause. Cooperative Graphical Models. *Neural Information Processing Systems (NIPS)*, 2016.
48. C. Li, S. Sra, and S. Jegelka. Gaussian quadrature for matrix inverse forms with applications. *International Conference on Machine Learning (ICML)*, 2016.
49. C. Li, S. Jegelka, S. Sra. Fast DPP Sampling for Nyström with Application to Kernel Methods. *International Conference on Machine Learning (ICML)*, 2016.
50. H. Song, Y. Xiang, S. Jegelka and S. Savarese. Deep Metric Learning via Lifted Structured Feature Embedding. *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016. **Spotlight**
51. C. Li, S. Jegelka and S. Sra. Efficient Sampling for k-Determinantal Point Processes. *Conference on Artificial Intelligence and Statistics (AISTATS)*, 2016. **Oral presentation.**
52. Z. Wang, B. Zhou and S. Jegelka. Optimization as Estimation with Gaussian Processes in Bandit Settings. *Conference on Artificial Intelligence and Statistics (AISTATS)*, 2016. **Oral presentation.**
53. S. Azadi, J. Feng, S. Jegelka and T. Darrell. Auxiliary Image Regularization for Deep CNNs with Noisy Labels. *International Conference on Learning Representations (ICLR)*, 2016.
54. X. Pan, S. Jegelka, J. Gonzalez, J. Bradley and M.I. Jordan. Parallel Double Greedy Submodular Maximization. *28th Annual Conference on Neural Information Processing Systems (NIPS)*, 2014.
55. R. Nishihara, S. Jegelka and M.I. Jordan. On the Linear Convergence Rate of Decomposable Submodular Function Minimization. *28th Annual Conference on Neural Information Processing Systems (NIPS)*, 2014.
56. A. Prasad, S. Jegelka and D. Batra. Submodular meets Structured: Finding Diverse Subsets in Exponentially-Large Structured Item Sets. *28th Annual Conference on Neural Information Processing Systems (NIPS)*, 2014. **Spotlight.**
57. H. Song, Y.J. Lee, S. Jegelka and T. Darrell. Weakly-supervised Discovery of Visual Pattern Configurations. *28th Annual Conference on Neural Information Processing Systems (NIPS)*, 2014.
58. V. Strnadova, A. Buluc, J. Chapman, J. Gonzalez, S. Jegelka, J. Gilbert, D. Rokhsar and L. Olikar. Efficient and Accurate Clustering for Large-Scale Genetic Mapping. *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2014.
59. R. Iyer, S. Jegelka and J. Bilmes. Monotone Closure of Relaxed Constraints in Submodular Optimization: Connections Between Minimization and Maximization. *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2014.
60. H. Song, R. Girshick, S. Jegelka, J. Mairal, Z. Harchaoui and T. Darrell. On learning to localize objects with minimal supervision. *International Conference on Machine Learning (ICML)*, 2014.
61. J. Feng, S. Jegelka and T. Darrell. Learning Scalable Discriminative Attributes with Sample Relatedness. *IEEE Conference of Computer Vision and Pattern Recognition (CVPR)*, 2014. **Oral presentation.**
62. X. Pan, J. Gonzalez, S. Jegelka, T. Broderick and M.I. Jordan. Optimistic Concurrency Control for Distributed Unsupervised Learning. *27th Annual Conference on Neural Information Processing Systems (NIPS)*, 2013.
63. S. Jegelka, F. Bach and S. Sra. Reflection methods for User-Friendly Submodular Optimization. *27th Annual Conference on Neural Information Processing Systems (NIPS)*, 2013.
64. R. Iyer, S. Jegelka and J. Bilmes. Curvature and Optimal Algorithms for Learning and Minimizing Submodular Functions. *27th Annual Conference on Neural Information Processing Systems (NIPS)*, 2013.
65. R. Iyer, S. Jegelka and J. Bilmes. Fast Semidifferential-based Submodular Function Optimization. *30th International Conference on Machine Learning (ICML)*, 2013. **Best Paper Award.**

66. P. Kohli, A. Osokin and S. Jegelka. A Principled Deep Random Field for Image Segmentation. *IEEE Conference of Computer Vision and Pattern Recognition (CVPR)*, 2013.
67. S. Jegelka, H. Lin and J. Bilmes. On Fast Approximate Submodular Optimization. *25th Annual Conference on Neural Information Processing Systems (NIPS)*, 2011.
68. S. Jegelka and J. Bilmes. Online Submodular Minimization for Combinatorial Structures. *28th International Conference on Machine Learning (ICML)*, 2011.
69. S. Jegelka and J. Bilmes. Approximation Bounds for Inference using Cooperative Cut. *28th International Conference on Machine Learning (ICML)*, 2011.
70. S. Jegelka and J. Bilmes. Submodularity beyond Submodular Energies: Coupling Edges in Graph Cuts. *IEEE Conference of Computer Vision and Pattern Recognition (CVPR)*, 2011. **Oral presentation**
71. S. Jegelka, S. Sra and A. Banerjee. Approximation Algorithms for Tensor Clustering. *Algorithmic Learning Theory: 20th International Conference (ALT)*, 2009.
72. S. Nowozin and S. Jegelka. Solution Stability in Linear Programming Relaxations: Graph Partitioning and Unsupervised Learning. *26th International Conference on Machine Learning (ICML)*, 2009.
73. S. Jegelka, A. Gretton, B. Schölkopf, B.K. Sriperumbudur and U. von Luxburg. Generalized Clustering via Kernel Embeddings. *KI 2009: Advances in Artificial Intelligence*, 2009.
74. U. von Luxburg, S. Bubeck, S. Jegelka and M. Kaufmann. Consistent Minimization of Clustering Objective Functions. *21st Annual Conference on Neural Information Processing Systems (NIPS)*, 2007.
75. H. Shen, S. Jegelka and A. Gretton. Fast Kernel ICA using an Approximate Newton Method. *11th Conference on Artificial Intelligence and Statistics (AISTATS)*, 2007.
76. S. Jegelka and A. Gretton. Brisk Kernel Independent Component Analysis. In L. Bottou, O. Chapelle, D. DeCoste, J. Weston, editors. *Large Scale Kernel Machines*, pp. 225–250. MIT Press, 2007.

#### **Abstracts and Contributions to Peer-reviewed Workshops**

77. Z. Mariet, J. Robinson, J. Smith, S. Sra, S. Jegelka. Optimal Batch Variance with Second-Order Marginals. *ICML Workshop on Real World Experiment Design and Active Learning*, 2020.
78. M. El Halabi and S. Jegelka. Minimizing approximately submodular functions. *OPT 2019, Optimization for Machine Learning*, 2019. **Oral presentation**
79. Z. Xu, C. Li and S. Jegelka. Exploring the Robustness of GANs to Internal Perturbations. *ICML workshop on Security and Privacy on Machine Learning*, 2019.
80. C.-Y. Chuang, A. Torralba and S. Jegelka. The Role of Embedding-complexity in Domain-invariant Representations. *ICML workshop on Adaptive and Multitask Learning*, 2019.
81. C. Bunne, D. Alvarez Melis, A. Krause and S. Jegelka. Learning Generative Models Across Incomparable Spaces. *NIPS workshop on Relational Representation Learning*, 2018. **Best Paper Award**
82. M. Staib, B. Wilder and S. Jegelka. Distributionally Robust Submodular Maximization. *ICML Workshop on Modern Trends in Nonconvex Optimization for Machine Learning*, 2018. **Spotlight**.
83. M. Staib and S. Jegelka. Distributionally Robust Deep Learning as a Generalization of Adversarial Training. *NIPS Machine Learning and Computer Security Workshop*, 2017.
84. A. Lenail, L. Schmidt, J. Li, T. Ehrenberger, K. Sachs, S. Jegelka and E. Fraenkel. Graph-Sparse Logistic Regression. *NIPS workshop on Discrete Structure in Machine Learning (DISCML)*, 2017.
85. Z. Wang, C. Gehring, P. Kohli, S. Jegelka. Batched Large-scale Bayesian Optimization in High-dimensional Spaces. *NIPS workshop on Bayesian Optimization (BayesOpt)*, 2017.
86. D. Alvarez Melis, T. Jaakkola and S. Jegelka. Structured Optimal Transport. *NIPS workshop on Optimal Transport and Machine Learning (OTML)*, 2017. **Oral presentation**.
87. M. Cohen, L. Schmidt, C. Hegde, S. Jegelka. Efficiently Optimizing over (Non-Convex) Cones via Approximate Projections. *NIPS workshop on Optimization in Machine Learning (OPTML)*, 2017. **Oral presentation**.

88. M. Staib and S. Jegelka. Wasserstein k-means++ for Cloud Regime Histogram Clustering. *Climate Informatics*, 2017.
89. Z. Wang, B. Zhou and S. Jegelka. Optimization as Estimation with Gaussian Processes in Bandit Settings. *NIPS 2015 workshop on Bayesian Optimization: Scalability and Flexibility*.
90. E. Shelhamer, S. Jegelka and T. Darrell. Communal Cuts. *NIPS 2014 Workshop on Discrete Optimization in Machine Learning*.
91. V. Strnadova, A. Buluç, L. Olikar, J. Gonzalez, S. Jegelka, J. Chapman and J. R. Gilbert. Fast Clustering Methods for Genetic Mapping in Plants. *16th SIAM Conference on Parallel Processing for Scientific Computing (PP14)*, 2014.
92. A. Prasad, S. Jegelka and D. Batra. Submodular Maximization and Diversity in Structured Output Spaces. *NIPS 2013 Workshop on Discrete and Combinatorial Problems in Machine Learning*.
93. R. Iyer, S. Jegelka and J. Bilmes. Mirror-Descent like Algorithms for Submodular Optimization. *NIPS 2012 Workshop on Discrete Optimization in Machine Learning*.
94. P. Kohli, A. Osokin and S. Jegelka. A Principled Deep Random Field for Image Segmentation. *NIPS 2012 Workshop on Discrete Optimization in Machine Learning*.
95. S. Jegelka and J. Bilmes. Multi-label Cooperative Cuts. *CVPR 2011 Workshop on Inference in Graphical Models with Structured Potentials*.
96. S. Jegelka and J. Bilmes. Coupling Edges in Graph Cuts. *SIAM Conference on Optimization*, 2011.
97. S. Jegelka and J. Bilmes. Online Algorithms for Submodular Minimization with Combinatorial Constraints. *NIPS 2010 Workshop on Discrete Optimization in Machine Learning*.
98. S. Jegelka and J. Bilmes. Cooperative Cuts: Graph Cuts with Submodular Edge Weights. *EURO XXIV (24th European Conference on Operational Research)*, 2010.
99. S. Jegelka and J. Bilmes. Notes on Graph Cuts with Submodular Edge Weights. *NIPS 2009 Workshop on Discrete Optimization in Machine Learning*.
100. C. Lippert, O. Stegle, S. Jegelka, Y. Altun and K. M. Borgwardt. Predicting related traits from SNP markers by multi-task learning. *German Conference on Bioinformatics*, 2009.
101. S. Jegelka, A. Gretton and D. Achlioptas. Kernel ICA for Large Scale Problems. *NIPS 2005 Workshop on Large Scale Kernel Machines*.

### **Technical Reports**

102. S. Jegelka and J. Bilmes. Cooperative Cuts for Image Segmentation, UWEETR-1020-0003, University of Washington, 2010.
103. S. Jegelka and J. Bilmes. Cooperative Cuts: Graph Cuts with Submodular Edge Weights. MPI-TR 189, 2010.
104. S. Sra, S. Jegelka and A. Banerjee. Approximation Algorithms for Bregman Clustering, Co-Clustering and Tensor Clustering. MPI-TR 177, 2008.
105. B. Kulis, S. Sra and S. Jegelka. Scalable Semidefinite Programming using Convex Perturbations. TR 07-47, University of Texas at Austin, 2007.
106. H. Shen, S. Jegelka and A. Gretton. Geometric Analysis of Hilbert Schmidt Independence Criterion based ICA contrast function. TR PA006080, NICTA, 2006.

## INVITED TALKS AND TUTORIALS

### Tutorials and summer school courses

1. S. Jegelka. Graph Neural Networks. Invited tutorial at the MINDS TRIPODS winter school on Graph and Deep Learning, Johns Hopkins University, Jan 2021.
2. S. Jegelka. Submodularity and Machine Learning. Invited lecture at the Machine Learning Summer School (MLSS), London, July 2019.
3. S. Sra and S. Jegelka. Negative dependence, stable polynomials and all that. Tutorial at ETH Zurich, July 2019.
4. S. Sra and S. Jegelka. Negative dependence, stable polynomials and all that. Tutorial at the Conference on Neural Information Processing Systems (NeurIPS), Dec 2018.
5. L. Orecchia, M. Fazel and S. Jegelka. Continuous Methods for Discrete Optimization. Invited lectures at the Bridging Continuous and Discrete Optimization Bootcamp, Simons Institute for the Theory of Computing (Program on Bridging Continuous and Discrete Optimization), Berkeley, Aug 2017.
6. S. Jegelka. Submodular Functions and Machine Learning. Invited lectures at the Machine Learning Summer School (MLSS), Tübingen, June 2017.
7. A. Krause and S. Jegelka. Submodularity: Theory and Applications. Invited lectures at the Machine Learning Bootcamp, Simons Institute for the Theory of Computing (Program on Foundations of Machine Learning), Berkeley, Jan 2017.
8. S. Jegelka. Submodular Functions and Machine Learning. Invited lectures at the Machine Learning Summer School (MLSS), Cádiz, May 2016.
9. S. Jegelka. Submodular Functions and Machine Learning. Invited short course at the University of Heidelberg, Germany, Jan 2016.
10. S. Jegelka. Submodularity in Machine Learning. Invited lectures at the Machine Learning Summer School (MLSS), Kyoto, Aug 2015.
11. S. Jegelka. Submodular Optimization and Machine Learning. Invited lectures at the Microsoft Research Summer School on Machine Learning, Bangalore, June 2015.
12. S. Jegelka, L. Ladicky, S. Ramalingam, C. Russell. Energy Minimization and Discrete Optimization. Full day tutorial at the IEEE International Conference on Computer Vision (CVPR), Boston, June 2015.
13. S. Jegelka. Efficiently Handling Discrete Structure in Machine Learning. Invited lectures at the MADALGO summer school, Aarhus, Aug 2014.
14. A. Krause and S. Jegelka. Submodularity in Machine Learning: New Directions. Tutorial at the International Conference on Machine Learning, Atlanta, June 2013.
15. S. Jegelka and A. Krause. Submodularity in Machine Learning and Computer Vision. Tutorial at the DAGM-OAGM Symposium, Graz, Aug 2012.
16. A. Krause and S. Jegelka. Submodularity in Artificial Intelligence. Invited Tutorial at the European Conference on Artificial Intelligence (ECAI), Montpellier, Aug 2012.

### Invited Talks

17. Invited Sectional Lecture, International Congress of Mathematicians (ICM), Saint Petersburg, 2022 (*upcoming*)
18. Semi-plenary speaker, International Symposium on Mathematical Programming, Beijing, 2022 (*upcoming*)
19. Plenary Speaker, annual meeting of the Canadian Applied and Industrial Mathematics Society, June 2021 (*upcoming*)



20. Workshop on The Multifaceted Complexity of Machine Learning, Institute for Mathematical and Statistical Innovation (IMSI) (virtual), University of Chicago, April 2021
21. Women in Theoretical Machine Learning Symposium (WTMLS) (virtual), TTIC, April 2021
22. Theory of Machine Learning seminar (virtual), Harvard University, April 2021
23. Applied Mathematics Seminar, Yale University, March 2021
24. IPAM workshop on Deep Learning and Combinatorial Optimization (virtual), Institute for Pure and Applied Mathematics, UCLA, Feb 2021
25. MINDS TRIPODS workshop on Graph and Deep Learning (virtual), Johns Hopkins University, Jan 2021
26. Flatiron Institute, Mathematics of Deep Learning seminar (virtual), Nov 2020
27. Two Sigma (virtual), Nov 2020
28. University of Texas at Austin, ML seminar series (virtual), Nov 2020
29. DeepMath workshop (virtual), Nov 2020
30. Conference *Machine Learning in Science*, University of Tuebingen (virtual), July 2020
31. ICML workshop on Negative Dependence and Submodularity: Theory and Applications in Machine Learning (virtual), July 2020
32. Mathematical Institute for Data Science (MINDS) (virtual), Johns Hopkins University, April 2020
33. Math and Data (MAD) seminar, Center for Data Science and Courant Institute, New York University, Feb 2020
34. Machine Learning Advances and Applications Seminar, Vector and Fields Institutes, University of Toronto, Feb 2020
35. NeurIPS workshop on Optimal Transport in Machine Learning (OTML), Vancouver, Dec 2019
36. NeurIPS workshop on Sets and Partitions, Vancouver, Dec 2019
37. MIT Sports Summit, Nov 2019
38. Workshop on Theory of Deep Learning: Where next? IAS, Princeton, Oct 2019
39. Microsoft Research Distinguished AI Lecture, Redmond, Oct 2019
40. Google ML Theory workshop, NYC, Sep 2019
41. IBM Watson AI Week, Foundations of Safe Learning workshop, Cambridge, Sep 2019
42. Keynote Talk, Conference on Uncertainty in Artificial Intelligence (UAI), Tel Aviv, July 2019
43. SIAM Conference on Applied Algebraic Geometry, Session on Positive and Negative Dependence, Bern, July 2019
44. ETH Zurich, Dept of Computer Science, July 2019
45. University of Pennsylvania Warren Center, Theory Seminar, Apr 2019
46. Women in Data Science Conference (WiDS), Cambridge, March 2019
47. MIFODS workshop on Non-convex Optimization and Deep Learning, MIT, Jan 2019
48. Probability and Statistics Seminar, Boston University, Nov 2018
49. Computational Research in Boston and Beyond (CRIBB) seminar, MIT, Nov 2018
50. International Conference on Complex Systems (ICCS), Cambridge, July 2018
51. SIAM Discrete Mathematics Conference, Minisymposium on *Foundations of Data Science*, Denver, June 2018
52. NIPS workshop *Bayesian Optimization for Science and Engineering (BayesOpt)*, Los Angeles, Dec 2017
53. CISE seminar, Center for Information and Systems Engineering, Boston University, Oct 2017
54. Berkeley Information Systems Seminar, UC Berkeley, Oct 2017

55. Neyman seminar, Dept. of Statistics, UC Berkeley, Sep 2017
56. Georgia Tech ARC Colloquium, Algorithms and Randomness Center, Sep 2017
57. MSR Colloquium, MSR New England, Aug 2017
58. University College London, Gatsby Unit, May 2017
59. Machine Learning Diversity Event, Department of Statistics, Oxford University, May 2017
60. Workshop on *Optimization and Statistical Learning*, Les Houches, April 2017
61. Models, Inference & Algorithms Seminar, Broad Institute, Cambridge, Mar 2017
62. NIPS workshop on *Nonconvex Optimization*, Barcelona, Dec 2016
63. New England Machine Learning Day, Microsoft Research New England, May 2016
64. Image and Video Computing Seminar, Boston University, Apr 2016
65. ORC seminar, Operations Research Center, MIT, March 2016
66. Applied Statistics seminar, Harvard University, March 2016
67. Pattern Theory Seminar, Dept. of Applied Mathematics, Brown University, Feb 2016
68. Center for Scientific Computing, University of Heidelberg, Germany, Jan 2016
69. CMStatistics, London, Dec 2015
70. WNCG seminar, University of Texas at Austin, Nov 2015
71. Award lecture, German Conference on Pattern Recognition, RWTH Aachen University, Oct 2015
72. Strata + Hadoop World, Hardcore Data Science Track, New York, Sept 2015
73. Workshop on *Data-driven Algorithmics*, Harvard University, Sept 2015
74. IMA workshop on *Convexity and Optimization: Theory and Applications*. Institute for Mathematics and its Applications, Univ. of Minnesota, Feb 2015
75. Simons Institute for the Theory of Computing, UC Berkeley, Nov 2014
76. Cornell University, Dept. of Computer Science, May 2014
77. University of California San Diego, Dept. of Computer Science (CSE), April 2014
78. MIT, Dept. of EECS, April 2014
79. Princeton University, Dept. of Computer Science, April 2014
80. Cornell University, Dept. of Operations Research and Information Engineering, March 2014
81. Harvard University, Dept. of Computer Science (SEAS), March 2014
82. Microsoft Research, Cambridge, UK, March 2014
83. California Institute of Technology, Dept. of Electrical Engineering, March 2014
84. University College London, Gatsby Unit, March 2014
85. Saarland University, Saarbrücken, Germany, March 2014
86. University of British Columbia, Dept. of Computer Science, Vancouver, Feb 2014
87. Algebraic Statistics Seminar, UC Berkeley, Feb 2014
88. The University of Tokyo, Optimization Seminar, Dept. of Mathematical Informatics, Jan 2014
89. Carnegie Mellon University, Dept. of Statistics, Pittsburgh, Nov 2013
90. Washington University St. Louis, Dept. of Computer Science, Oct 2013
91. Carnegie Mellon University, Dept. of Machine Learning, Pittsburgh, Sep 2013
92. EPFL, School of Computer and Communication Sciences (IC), Lausanne, April 2013
93. UC Davis, seminar on Algebra and Discrete Mathematics, Feb 2013
94. INRIA, SIERRA team, Paris, Dec 2012

95. International Symposium on Mathematical Programming (ISMP), Session on “Methods from Discrete Mathematics in Systems Biology”, Berlin, 2012
96. Mitsubishi Electric Research Lab (MERL), Boston, March 2012
97. Technical University Munich, Dept. of Mathematics, Oct 2011
98. UC Berkeley, Dept. of EECS, Sept 2011
99. Cornell University, Dept. of Computer Science, Ithaca, Sept. 2011
100. Toyota Technological Institute (TTI) Chicago, Aug 2011
101. Microsoft Research Redmond, Computer Vision Group, July 2011
102. ETH Zurich, Dept. of Computer Science, April 2011
103. COSA workshop: Combinatorial Optimization, Statistics and Applications, Technical University Munich, March 2011
104. Symposium on Computer Vision and Machine Learning, Institute of Science and Technology Austria, Oct 2010

## TEACHING

### At MIT:

**6.419/439, IDS.012/131 Statistics, Computation and Applications**, Lecturer

Dept. of EECS and Institute for Data, Systems and Society, MIT (with Caroline Uhler), Spring 2021

**Great Learning: Applied Datascience Bootcamp**, Lecturer

(with Devavrat Shah, Munther Dahleh, Caroline Uhler, John Tsitsiklis)

Lectures on Deep Learning and Computer Vision, Dec 2020

**MIT Professional Education: Ethics of AI**, Lecturer

with Bernhardt Trout, Sep 2020

**MIT Professional Education: Machine Learning and Big Data**, Lecturer

with Tommi Jaakkola, Regina Barzilay, June 2020

**6.862 Applied Machine Learning**, Lecturer

Dept. of EECS, MIT, Spring 2020

**6.419/439, IDS.012/131 Statistics, Computation and Applications**, Lecturer

Dept. of EECS and Institute for Data, Systems and Society, MIT (with Munther Dahleh), Fall 2019

**MIT Professional Education: Ethics of AI**, Lecturer

with Bernhardt Trout, Oct 2019

**MIT Professional Education: Machine Learning and Big Data**, Lecturer

with Tommi Jaakkola, Regina Barzilay, June and Nov 2019

**6.862 Applied Machine Learning**, Lecturer

Dept. of EECS, MIT, Spring 2019

**MIT Management Executive Education: Machine Learning in Business**, online course, Lecturer

MIT Sloan School of Management and CSAIL (course organizer: Thomas Malone), running in 2020

**6.419/439, IDS.012/131 Statistics, Computation and Applications**, Lecturer

Dept. of EECS and Institute for Data, Systems and Society, MIT (with Caroline Uhler), Fall 2018

**6.419/439, IDS.012/131 Statistics, Computation and Applications**, Lecturer

Dept. of EECS and Institute for Data, Systems and Society, MIT (with Caroline Uhler), Fall 2017

**MIT Professional Education: Machine Learning and Big Data**, Lecturer

with Tommi Jaakkola, Regina Barzilay, June 2017

**6.862 Applied Machine Learning**, Lecturer

Dept. of EECS, MIT, Spring 2017

**IDS.012/131 Statistics, Computation and Applications**, Lecturer

Dept. of EECS and Institute for Data, Systems and Society, MIT (with Caroline Uhler), Fall 2016

**MITx Professional Education: Data Science: Data to Insights**, Lecturer  
Institute for Data, Systems and Society, MIT (course organizers: Devavrat Shah, Philippe Rigollet),  
Summer/Fall 2016 (and recurring every semester)

**6.046/18.410 Design and Analysis of Algorithms**, Lecturer  
Dept. of EECS, MIT (with Constantinos Daskalakis, Vinod Vaikuntanathan), Spring 2016

**6.883 Advanced Machine Learning: Learning with Combinatorial Structure**, Lecturer  
Dept. of EECS, MIT, Fall 2015

**6.437 Inference and Information**, Lecturer  
Dept. of EECS, MIT (with Gregory Wornell), Spring 2015

**Other Teaching:**

**Discrete Mathematics and Logic**, Teaching Assistant; Dept. of Mathematics, University of Tübingen,  
Spring 2003

**Advanced C++**, Grader; Dept. of Computer Science, University of Tübingen, Fall 2002

**Guest lectures**

6.034 Artificial Intelligence, MIT, Nov 2015

EE 227A Convex Optimization, UC Berkeley, Feb 2013

**STUDENTS SUPERVISED**

**Postdocs**

Alkis Gkotovos, since Aug 2019

Marwa El Halabi, Oct 2018-Oct 2020, *next position: Mila*

Hongzhou Lin, Jan 2018-June 2020; *next position: Amazon*

**Graduate students (current)**

Behrooz Tahmasebi, MIT EECS, since 2019

Khashayar Gatmiry, MIT EECS, since 2019

Thien Le, MIT EECS, since 2019

Ching-Yao Chuang, MIT EECS, (co-advised with Antonio Torralba), since 2018

Joshua Robinson, MIT EECS, (co-advised with Suvrit Sra), since 2018

Michael Murphy, MIT Computational and Systems Biology PhD Program (co-advised with Ernest  
Fraenkel), since 2018

Keyulu Xu, MIT EECS, since 2016

**Graduate students (past)**

Matthew J. Staib, MIT EECS, since 2015; *next position: Two Sigma*

Chengtao Li, MIT, (co-advised with Suvrit Sra), 2019; *founded a startup*

Zi Wang, MIT, (Master, co-advised with Leslie Kaelbling and Tomas Lozano-Pérez)

Robert Nishihara, UC Berkeley, (with Michael I. Jordan), Spring 2014

Evan Shelhamer, UC Berkeley, (with Trevor Darrell), Spring 2013–Fall 2013

Hyun Oh Song, UC Berkeley, (with Trevor Darrell), Fall 2012–Fall 2013, *now Assistant Professor at  
Seoul National University*

Charlotte Bunne, Master's student from ETH, Summer/Fall 2018

Ilija Bogunovic, visiting student from EPFL, Fall 2017

Alkis Gkotovos, visiting student from ETH, Summer 2016

Josip Djolonga, visiting student from ETH, Summer 2015

**Undergraduate students**

Kritkorn Karntikoon, MIT SuperUROP, Fall 2017-Spring 2018, *now PhD student at Princeton*

Andreea Bobu, MIT SuperUROP, Fall 2016-Spring 2017 (with Polina Golland), *now PhD student at  
UC Berkeley*

Yi (Tony) Zeng, MIT UROP, Spring 2017 (with Elsa Olivetti), *now at Lyft*  
Victoria Gong, MIT SuperUROP, Fall 2015-Spring 2016 (with Elsa Olivetti)  
Thanard Kurutach, MIT UROP, Summer 2015, *now PhD student at UC Berkeley*  
Wei Hu, MIT UROP, visiting undergraduate student from Tsinghua University, Spring 2015, *now PhD student at Princeton*

**Ph.D. Thesis committee member**

David Alvarez Melis, MIT EECS  
Ilija Bogunovic, Dept. of EE, EPFL  
Aleksandar Bojchevski, Dept of CS, Technical University (TU) Munich  
Sebastian Claiici, MIT EECS  
Theresa Cloutier, MIT Chemical Engineering  
Jennifer Drexler, MIT EECS  
Andreea Gane, MIT EECS  
Vikas Garg, MIT EECS  
Aude Genevay, Dept of Mathematics, Université Paris Dauphine and Ecole Normale Supérieure  
Alkis Gkotovos, Dept of CS, ETH Zurich  
Maxwell Philip Gold, MIT Bioengineering  
Paul Grigas, MIT ORC  
Jonathan Frankle, MIT EECS  
Chinmay Kulkarni, MIT Mechanical Eng.  
Guang-He Lee, MIT EECS  
Renjie Liao, Dept of CS, University of Toronto  
Hongzhou Lin, INRIA  
Sepideh Mahabadi, MIT EECS  
Paresh Malalur, MIT EECS  
Zelda Mariet, MIT EECS  
David Reshef, MIT EECS  
Alvin Shi, MIT Computational and Systems Biology PhD Program (CSB)  
Miriam Shiffman, MIT Computational and Systems Biology PhD Program (CSB)  
Gal Shulkind, MIT EECS  
Will Stephenson, MIT EECS  
Berk Ustun, MIT EECS  
Fulton Wang, MIT EECS  
Shenhao Wang, MIT Urban Studies and Planning  
Tong Wang, MIT EECS  
Young Gyu Yoon, MIT EECS  
Chiyuan Zhang, MIT EECS  
Yan Zhao, MIT EECS

**PROFESSIONAL SERVICE**

**Workshop/Session/Seminar Organization**

- IPAM workshop on “Deep Learning and Combinatorial Optimization”, Feb 2021  
with Peter Battaglia, Xavier Bresson, Yann LeCun, Andrea Lodi, Stanley Osher, Oriol Vinyals, Max Welling
- ICML workshop on “Graph Representation Learning and Beyond”, July 2020  
with Michael Bronstein, Andreea Deac, William L. Hamilton, Jessica B. Hamrick, Milad Hashemi, Jure Leskovec, Renjie Liao, Federico Monti, Yizhou Sun, Kevin Swersky, Petar Veličković, Rex Ying, Marinka Žitnick
- Workshop “Women in Data Science (WiDS)”, Cambridge, February 2017, March 2018, March 2019, March 2020, March 2021

- MIT Institute for Foundations of Data Science, workshop “Learning under complex structure”, Jan 2020  
with Philippe Rigollet, Constantinos Daskalakis, Jonathan Kelner, Ankur Moitra
- NeurIPS workshop on “Graph Representation Learning”, Vancouver, Dec 2019  
with Rianne van den Berg, Michael Bronstein, William L. Hamilton, Thomas Kipf, Jure Leskovec, Renjie Liao, Yizhou Sun, Petar Velicković
- MIT Institute for Foundations of Data Science, workshop “Non-convex optimization and deep learning”, Jan 2020  
with Aleksander Madry, Joan Bruna, Constantinos Daskalakis, Ankur Moitra, Alexander Rakhlin, Shai Shalev-Shwartz, Yaron Singer, Harrison Zhou
- DIMACS workshop on “Optimization and Machine Learning”, Lehigh University, Aug 2018  
with Katya Scheinberg, Martin Takac, Courtney Paquette, Edo Liberty, Frank E. Curtis, Satyen Kale, Francesco Orabona
- NIPS workshop on “Discrete Structure in Machine Learning”, Los Angeles, Dec 2017  
with Yaron Singer, Amin Karbasi, Jeff Bilmes, Andreas Krause
- NIPS workshop on “Nonconvex Optimization”, Barcelona, Dec 2016  
with Percy Liang, Anima Anandkumar, Hossein Mobahi, Anna Choromanska
- Workshop on “Learning and Optimization”, Data Learning and Inference meeting (DALI), Sestri Levante, April 2016  
with Guillaume Obozinski
- Invited session on “Submodularity in Machine Learning – Theory and Practice”  
International Symposium on Mathematical Programming, Pittsburg, July 2015
- New England Machine Learning Day (NEML), Cambridge, May 2015  
with Carla Brodley, Finale Doshi-Velez, Adam Kalai
- NIPS Workshop “Discrete Optimization in Machine Learning (DISCML)”, Montréal, Dec 2014  
with Jeff Bilmes, Andreas Krause
- NIPS Workshop “Discrete Optimization in Machine Learning (DISCML)”, Vancouver/Granada/Lake Tahoe, Dec 2010-2013  
with Jeff Bilmes, Andreas Krause, Pradeep Ravikumar
- Short Course on Theoretical Neuroscience; for the College of Neuroscience, German National Academic Foundation (Studienstiftung), Tübingen, 2006  
with Philipp Berens
- MIT Machine Learning Colloquium, organizer, since 2016

#### **Area Chair / Senior Program Committee**

- Conference on Neural Information Processing Systems (NIPS/NeurIPS) 2016-19
- International Conference on Machine Learning (ICML) 2016-17,2019-20
- Conference on Artificial Intelligence and Statistics (AISTATS) 2016
- Conference on Uncertainty in Artificial Intelligence (UAI) 2015, 2020

#### **Other Chairing / Committees**

- Program co-chair, International Conference on Machine Learning (ICML) 2022
- Communications Co-chair, International Conference on Machine Learning (ICML), 2021
- Advisory Board, Learning Theory Alliance, since 2020
- Faculty Mentor, Rising Stars workshop, 2020
- Workshop Co-Chair, Conference on Neural Information Processing Systems (NeurIPS), 2020

- Press Co-chair, International Conference on Machine Learning (ICML), 2020
- Test of Time Award Committee, International Conference on Machine Learning (ICML), 2020
- Member of the Open Graph Benchmark steering committee, since 2019
- Steering Committee, DIMACS/Simons Collaboration on *Bridging Continuous and Discrete Optimization*, 2018–2020  
special focus program as a follow-up to the Simons Institute Program with the same title
- Awards Committee, International Conference on Machine Learning (ICML), 2017
- Proceedings Chair, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2016
- Advisory Board for Societal and Ethical Responsibilities of Computing, MIT Schwarzman College of Computing, since 2019.

### **Editorial Board**

- Action Editor, *Journal of Machine Learning Research*, since 2019

### **Reviewing**

- Journal of Machine Learning Research
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- Mathematical Programming
- SIAM Journal on Computing
- International Conference on Machine Learning (ICML) 2009, 2012, 2013, 2015
- Conference on Uncertainty in Artificial Intelligence (UAI) 2012
- Annual Conference on Neural Information Processing Systems (NIPS) 2009, 2010, 2014
- AAAI Conference on Artificial Intelligence (AAAI) 2010
- Annual Conference on Learning Theory (COLT) 2010, 2013, 2015, 2016
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (SIGKDD) 2009, 2010
- NIPS Workshop on Discrete Optimization in Machine Learning 2010-2014
- ACM-SIAM Symposium on Discrete Algorithms (SODA) 2015
- IEEE Annual Symposium on Foundations of Computer Science (FOCS) 2016