

## Jacquelyn A. Shelton

---

### CONTACT INFORMATION

Ann Arbor, MI  
USA

Voice: +1 810 282 4353  
E-mail: [jacquelyn.ann.shelton@gmail.com](mailto:jacquelyn.ann.shelton@gmail.com)  
Web: [fatflake.github.io](https://fatflake.github.io)

### CITIZENSHIP

USA

### EDUCATION

Technische Universität Berlin,  
Dr. rer. nat., Computer Science, 6.2018

- Advisor: Jörg Lücke
- Supervisor: Klaus-Robert Müller
- Committee: Matthew Blaschko, Jörg Lücke, Klaus-Robert Müller, Manfred Opper
- Thesis: Large-scale Approximate EM-style Learning and Inference in Generative Graphical Models for Sparse Coding
- Group: Machine Learning and Intelligent Data Analysis

Frankfurt Institute for Advanced Studies,  
Researcher, Computer Science, 10.2010 – 2013

- Advisor: Jörg Lücke
- Group: Machine Learning and Computational Neuroscience
- Reviewer: IEEE-TPAMI, NIPS, and IEEE-TKDE

Eberhard Karls Universität Tübingen,  
M.Sc., Computer Science, 8.2010

- Advisors: Matthew Blaschko, Christoph Lampert, Andreas Bartels
- Thesis: Semi-supervised Subspace Learning and Application to Human Functional Magnetic Brain Resonance Imaging Data
- Conducted at Max Planck Institute for Biological Cybernetics, Dept. Schölkopf, Empirical Inference, *now known as the Max Planck Institute for Intelligent Systems*
- Minor in Psychology

Cornell University

- Teaching Assistantship, College of Arts and Sciences, 1.2006 – 4.2007
- Graduate Research Assistantship, Psychology Department, Field Lab, 4.2006 – 9.2006
- Teaching Assistantship, College of Life Science, 8.2005 – 12.2005

University of Michigan–Flint,  
B.S., Experimental Psychology, 8.2005

- with Honors
- Minor in Computer Science

### PUBLICATIONS

Shelton, J. A., Robel, A. A., Hoffman, M., and Price, S.: *Generating Antarctic sub-shelf melt using recurrent neural network-based Generative Adversarial Models on pixel clusters*. Machine Learning for Polar Regions Workshop, 2022.

Shelton, J. A., Robel, A. A., Hoffman, M., and Price, S.: *Towards generating stationary realizations of simulated Antarctic ice shelf melt rates from limited model output*. Climate Informatics, 2022.

Shelton, J., Polewski, P., Yao, W., and Heurich, M.: *A hybrid convolutional neural network/active contour approach to segmenting dead trees in aerial imagery*. NeurIPS workshop on Tackling Climate Change with Machine Learning, Virtual Worldwide (12 2021).

Polewski, P., Shelton, J., Yao, W., and Heurich, M.: *Instance segmentation of fallen trees in aerial color infrared imagery using active multi-contour evolution with fully convolutional network-based intensity priors*. ISPRS Journal of Photogrammetry and Remote Sensing, (178): 297–313, 2021.

Shelton, J., Polewski, P., Yao, W.: *U-Net For Learning And Inference Of Dense Representation Of Multiple Air Pollutants From Satellite Imagery*. Climate Informatics, Virtual Worldwide (9 2020). *Selected for Highlight talk*.

Shelton, J., Polewski, P., Yao, W.: *In the Danger Zone: U-Net Driven Quantile Regression can Predict High-risk SARS-CoV-2 Regions via Pollutant Particulate Matter and Satellite Imagery*. ICML Workshop on Healthcare Systems, Population Health, and the Role of Health-Tech, Virtual Worldwide (7 2020).

Polewski, P., Shelton, J., Yao, W., and Heurich, M.: *Segmentation of single standing dead trees in high-resolution aerial imagery with generative adversarial network-based shape priors*. International Arch. Photogramm. Remote Sensing Spatial Inf. Sci., XLIII-B2-2020: 717–723, 2020.

Shelton, J. A., Gasthaus, J., Dai, Z., Lücke, J., and Gretton, A.: *GP-select: Accelerating EM using adaptive subspace preselection*. Neural Computation 29(8):21772202, 2017.

Shelton, J. A., Sheikh, A-S., Bornschein, J., Sterne, P., and Lücke, J.: *Nonlinear spike-and-slab sparse coding for interpretable image encoding*. PLOS ONE, May 08, 2015.

Shelton, J. A., Gasthaus, J., Dai, Z., Lücke, J., and Gretton, A.: *GP-select: Accelerating EM using adaptive subspace preselection*. Women in Machine Learning Workshop in conjunction with NIPS, 2014.

Sheikh, A-S., Shelton, J. A., and Lücke, J.: *A Truncated EM Approach for Spike-and-Slab Sparse Coding*. Journal of Machine Learning Research (JMLR), 15:2653-2687, 2014.

Shelton, J. and Lampert, C.: *Approximate Inference with  $\epsilon$ -insensitive Marginal Loss*. Women in Machine Learning Workshop in conjunction with NIPS, 2013.

Lücke, J., Shelton, J., Bornschein, J., Sterne, P., Berkes, P., and Sheikh, A-S: *Combining Feed-Forward Processing and Sampling for Neurally Plausible Encoding Models*. Cosyne, 2013.

Shelton, J.A., Sterne, P., J. Bornschein, A.-S. Sheikh, and J. Lücke: *Why MCA? Non-linear sparse coding with spike-and-slab prior for neurally plausible image encoding*. Proceedings of the Twenty-Sixth Annual Conference on Neural Information Processing Systems, (NIPS 2012).

Shelton, J.A., J. Bornschein, A.-S. Sheikh, P. Berkes, and Lücke, J. *Select and Sample A Model of Efficient Neural Inference and Learning*. Proceedings of the Twenty-Fifth Annual Conference on Neural Information Processing Systems, (NIPS 2011).

Dai, Z., Shelton, J., Bornschein, J., Sheikh, A. S., and Lücke, J. *Combining approximate inference methods for efficient learning on large computer clusters*. NIPS'11 workshop on Big Learning: Algorithms, Systems, and Tools for Learning at Scale, 2011.

Bornschein, J., Shelton, J. A., Sheikh, A. S., and Lücke, J. *The Maximal Causes of Binary Data*. Bernstein Conference on Comp. Neuroscience (BCCN), 2011.

Blaschko, M., Shelton, J., Bartels, A., Lampert, C., H., and Gretton, A. *Semi-supervised Kernel Canonical Correlation Analysis with Application to human fMRI*. Pattern Recognition Letters, 32(11):1572-1583, 2011.

Shelton, J. A., Blaschko, M. B., Gretton, A., Müller, J., Fischer, E., and Bartels, A.: *Similarities in Resting State and Feature-driven Activity: Non-parametric Evaluation of Human fMRI*. NIPS Workshop on Learning and Planning from Batch Time Series Data, 2010.

Blaschko, M., Shelton, J., and Bartels, A. *Augmenting Feature-driven fMRI Analyses: Semi-supervised learning and resting state activity*. Proceedings of the Twenty-Third Annual Conference on Neural Information Processing Systems (NIPS 2009).

Shelton, J., Blaschko, M., Lampert, C. H., and Bartels, A. *Semi-supervised Analysis of Human fMRI data*, Berlin Brain Computer Interface Workshop on Advances in Neurotechnology, July 2009.

Shelton, J., Blaschko, M., and Bartels, A. *Semi-supervised subspace analysis of human functional magnetic resonance imaging data*, Max Planck Institute Tech Report, (185), May 2009.

## INVITED TALKS

- Probabilistic Machine Learning, Bayesian Inference, and Remote Sensing for Environmental Data.  
*Statistical Models and Learning Methods in Wildfire Science*.  
*Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematics of Planet Earth*, Pittsburgh, USA, (SIAM video), (7 2022).
- Deep learning and energy models for fine dead wood segmentation.  
*Machine Learning for Climate Conference*.  
University of California, Santa Barbara, Kavli Institute for Theoretical Physics, California, USA, (11 2021).
- U-Net For Learning And Inference Of Dense Representation Of Multiple Air Pollutants From Satellite Imagery.  
*Climate Informatics 2020*, (Worldwide), (9 2020). *Highlight talk*.
- Lecture series on Probabilistic Machine Learning and Bayesian Reasoning  
*Data Science Retreat*, Berlin, Germany, (2014 – 2015).
- Select and Sample - A Model of Efficient Neural Inference and Learning.
  - *Technical University Darmstadt*, Darmstadt, Germany, (6 2012).
  - *Institute for Science and Technology (IST) Austria*, Vienna, Austria, (2 2012).
  - *Radboud University Nijmegen*, Nijmegen, Netherlands, (1 2012).
- Semi-supervised Kernel Canonical Correlation Analysis of Human fMRI Data,  
*Women in Machine Learning Workshop*, held in conjunction with NIPS. (12 2009).

## EMPLOYMENT

- [Hong Kong Polytechnic University](#), Hong Kong  
Post Doctoral Researcher, Department of Land Surveying and Geo-Informatics, 3D Geospatial Vision Group, Prof. Dr. Wei Yao, 11.2019 – **present**
- [TomTom](#), Berlin  
Develop machine learning methods and models for geospatial data, Artificial Intelligence Geospatial Research Group, 10.2018 – 10.2019
- [Data Science Retreat](#), Berlin  
Lecture series on Bayesian Reasoning and Probabilistic Modelling, 2014 – 2015
- [Max Planck Institute for Intelligent Systems](#), Germany  
Hilfswissenschaftler (Research Assistant), Department of Empirical Inference, Prof. Dr. Schölkopf, 5.2009 – 8.2010  
Hilfswissenschaftler (Research Assistant), Department of Psychophysics, Prof. Dr. Bühlhoff, 8.2007 – 10.2007
- [Cornell University](#), Ithaca, NY  
Teaching Assistantship, College of Arts and Sciences, 1.2006 – 4.2007  
Teaching Assistantship, College of Life Science, 8.2005 – 12.2005
- [University of Michigan-Flint](#), Flint, MI  
Statistics Tutor, 2003 – 2005  
Research Assistant to Prof. Dr. T. William Altermatt, 2002 – 2005  
Computer Lab Assistant, 2002 – 2005

## RESEARCH INTERNSHIPS

- [Institute of Science and Technology Austria](#), 3.2013 – 6.2013  
[Computer Vision and Machine Learning](#) – Prof. Dr. Christoph Lampert  
Project on efficient inference using Gibbs sampling in undirected graphs
- [Gatsby Computational Neuroscience Unit](#), 10.2011 – 1.2012  
with Prof. Dr. [Arthur Gretton](#)  
Project on accelerating EM using adaptive subspace preselection
- [Eberhard Karls Universität Tübingen](#), 6.2008 – 12.2008  
[Graphical Interactive Systems Department](#) – Prof. Dr. Strasser  
Project on spatial-temporal induced boundaries
- [Cornell University](#), Ithaca, NY, 1.2006 – 4.2007  
[Field \(Vision Science\) Lab](#) – Prof. Dr. David J. Field  
Project on statistics of natural images
- [University of California](#), Santa Barbara, CA, 4.2004 – 6.2004  
[Research Center for Virtual Environments and Behavior](#) – Prof. Dr. Jim Blascovich  
Undergraduate Honors Thesis on perception in virtual environments

## SCIENTIFIC PARTICIPATION

- Chair: ECML 2021 session on Generative Models
- Reviewer: NeurIPS, Artificial Intelligence and Statistics (AISTATS), IEEE-TPAMI, IEEE-TKDE, Environmental Data Science, Climate Informatics
- Teaching: Data Science retreat, 2014 – 2015, Berlin, Germany

## SCHOLARSHIPS AND AWARDS

- Women in Machine Learning, travel grant for conference attendance (NIPS 2013, 2012, 2011, 2010, 2009)
- Advanced Computing Machines (ACM), grant for women in computing for conference attendance (NIPS 2009)
- National Geospatial Intelligence Agency, grant for satellite image analysis Cornell University, Graduate Research Assistantship, Summer 2006
- [National Science Foundation](#) Graduate Research Fellowship Honorable Mention, 2006
- [National Science Foundation](#) Graduate Research Fellowship Honorable Mention, 2005  
Start-up grant, Partnership for Advanced Computational Infrastructure facility
- Raphaelson Prize, University of Michigan–Flint, 2004
- Psi Chi Summer Research Grant, 2004
- Frances Frazier Student Travel Grant, University of Michigan–Flint, 2004
- Honors Off-Campus Study Grant, University of Michigan–Flint, 2004
- Office of Research Annual Fund Grant, University of Michigan–Flint, 2004
- Undergraduate and Graduate Research, Scholarly and Creative Activity Grant, University of Michigan–Flint, 2004
- Harold and Agape Kallis Scholarship, University of Michigan–Flint, 2004
- Honors Scholar Program Scholarship, University of Michigan–Flint, 2003 – 2005
- Freeman Distance Learning Scholarship, University of Michigan–Flint, 2003 – 2005
- Freeman Psychology Scholarship, University of Michigan–Flint, 2003 – 2005
- MEAP (Michigan Educational Assessment Program) Scholarship, 2001

## LANGUAGES

- English, Native
- German, Professional fluency

## REFERENCES

- [Prof. Dr. Andreas Bartels](#)  
Department of Neurophysiology, Max Planck Institute for Biological Cybernetics, Tübingen, Germany  
Centre for Integrative Neuroscience, Universität Tübingen, Germany  
Email: [andreas.bartels@tuebingen.mpg.de](mailto:andreas.bartels@tuebingen.mpg.de)
- [Prof. Dr. Matthew Blaschko](#)  
Center for Processing Speech & Images, KU Leuven, Leuven, Belgium  
Email: [matthew.blaschko@esat.kuleuven.be](mailto:matthew.blaschko@esat.kuleuven.be)
- [Prof. Dr. Arthur Gretton](#)  
Gatsby Computational Neuroscience Unit, University College London, UK  
Machine Learning Department, Carnegie Mellon University, USA  
Department of Empirical Inference, Max Planck Institute for Intelligent Systems, Germany  
Email: [arthur.gretton@gmail.com](mailto:arthur.gretton@gmail.com)

- Prof. Dr. Christoph H. Lampert  
Department of Computer Vision and Machine Learning, Institute for Science and Technology Vienna, Austria  
Email: chl@ist.ac.at
- Prof. Dr. Jörg Lücke  
Arbeitsgruppe Machine Learning und Exzellenzcluster Hearing4all  
Department für Medizinische Physik und Akustik, Universität Oldenburg, Germany  
Email: joerg.luecke@uni-oldenburg.de
- Prof. Dr. Klaus-Robert Müller  
TU Berlin, Machine Learning Group  
Department of Software Engineering and Theoretical Computer Science, Germany  
Email: klaus-robert.mueller@tu-berlin.de
- Prof. Dr. Bernhard Schölkopf  
Department of Empirical Inference, Max Planck Institute for Intelligent Systems, Tübingen, Germany  
Email: bs@tuebingen.mpg.de
- Prof. Dr. Wei Yao  
Department of Land Surveying and Geo-Informatics, Hong Kong Polytechnic University, Hong Kong  
Email: wei.hn.yao@polyu.edu.hk