

Jacquelyn A. Shelton

CONTACT INFORMATION

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CITIZENSHIP USA

EDUCATION

[Technische Universität Berlin](#),
Dr. rer. nat., Computer Science, 6.2018

- Advisor: Jörg Lücke
- Supervisor: Klaus-Robert Müller
- 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
- 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., 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 as Highligh 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 ϵ -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

- Deep learning and energy models for fine dead wood segmentation.
Machine Learning for Climate Conference 2021.
University of California, Santa Barbara, Kavli Institute for Theoretical Physics, California, USA.
- 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

- 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. Schölkopf, 5.2009 – 8.2010
Hilfswissenschaftler (Research Assistant), Department of Psychophysics, Prof. 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 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](#) – Dr. Christoph Lampert
Project on efficient inference using Gibbs sampling in undirected graphs
- [Gatsby Computational Neuroscience Unit](#), 10.2011 – 1.2012
with Dr. Arthur Gretton
Project on accelerating EM using adaptive subspace preselection
- [Eberhard Karls Universität Tübingen](#), 6.2008 – 12.2008
[Graphical Interactive Systems Department](#) – Dr. Strasser
Project on spatial-temporal induced boundaries
- [Cornell University](#), Ithaca, NY, 1.2006 – 4.2007
[Field \(Vision Science\) Lab](#) – 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](#) – Dr. Jim Blascovich
Undergraduate Honors Thesis on perception in virtual environments

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
- [Raphelson 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
- [Prof. Dr. Matthew Blaschko](#)
Center for Processing Speech & Images, KU Leuven, Leuven, Belgium
Email: 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
- [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 Mueller](#)
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