

# Andreas Christian Müller

Machine Learning Scientist

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## Education and Qualifications

- 2009 Diploma in Mathematics, University of Bonn  
Thesis: “Singularities of Minimal Degenerations in Affine Grassmannians”
- 2014 PhD in Computer Science, University of Bonn  
Thesis: “Methods for Learning Structured Prediction in Semantic Segmentation”

## Current Position

since 2020 **Principal Research SDE at Microsoft**  
Research and open source activities in the Gray Systems Lab.

## Past Positions

- 2010–2013 **PhD Student at the Department of Computer Science, University of Bonn, Germany**  
Advisor: Prof. Sven Behnke.
- 2010–2013 PhD Scholarship of the B-IT, Bonn/Aachen, Germany
- 2011 and 2013 Lecture Assistant at the Department of Computer Science, University of Bonn, Germany
- 2013–2014 **Machine Learning Scientist at Amazon Development Center Germany**  
Design and implementation of large-scale machine learning and computer vision applications.
- 2014–2016 **Research Engineer at the NYU Center for Data Science**  
Development of open source tools for machine learning and data science.
- 2016–2020 **Lecturer in Discipline, Associate Research Scientist at Columbia University**  
Teaching in the Data Science Master program,  
scikit-learn development and various research activities.

## Awarded Grants

- *Scikit-learn maintenance and enhancement to gradient boosting and search* (PI). Chan-Zuckerberg Initiative \$150k. 2019-2020.
- *Extension & Maintenance of Scikit-learn* (PI). Alfred P. Sloan Foundation. \$313k. 2017-2019.
- *Analysis and Extension of Scikit-learn* (PI). Bloomberg. \$63k. 2017-2018.
- *SI2-SSE: Improving Scikit-learn usability and automation* (PI). NSF. \$400k. 2017-2020.
- *Big Data Map and Assets Platform (BDMAP) Phase I - Collaborative Resource and Understanding eXchange (CRUX)* (senior personel, project lead). NSF. \$100k. 2017-2018.
- *Building blocks and Search Improvements for Automated Machine Learning Model Selection* (PI). DARPA. \$351k. 2018.

## Open Source Contributions

- Core developer and member of the Technical Committee for the Python machine learning package “scikit-learn”<sup>1</sup>.
- Creator and maintainer of the Python package “PyStruct”<sup>2</sup> for structured prediction.
- Co-author of “CUV”, a C++ and Python interface for CUDA, targeted at deep learning.<sup>3</sup>
- Contributor to the Python computer vision package “scikit-image”<sup>4</sup>.

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<sup>1</sup><http://scikit-learn.org/>

<sup>2</sup><http://pystruct.github.org/>

<sup>3</sup><https://github.com/deeplearningais/CUV>

<sup>4</sup><http://scikit-image.org/>

## Professional Activities

### Journal Editorial Board

- Action Editor, Journal of Machine Learning Research, OSS Track

### Journal and Convergence Reviewing

- Nature
- Neural Information Processing System
- International Conference of Machine Learning
- European Conference of Computer Vision
- Journal of Statistical Software
- Journal of Machine Learning Research
- Journal of Pattern Analysis and Machine Intelligence

### Postdoctoral Fellows

- Jan van Rijn
- Nicolas Hug

### Advising and Consulting

- Scientific Advisor, Life Epigenetics
- Scientific Advisor, Ocean Protocol Foundation Ltd
- Advisory board, Scikit-learn @ Inria Foundation

## Publications

### Books

1. Müller, A and Guido, S. (2016). *Introduction to Machine Learning with Python*. O'Reilly.

### Journal Publications

1. Schulz, H., A. Müller, and S. Behnke (2011). Exploiting local structure in Boltzmann machines. *Neurocomputing* 74(9), 1411–1417. issn: 0925-2312.
2. Abraham, A., F. Pedregosa, M. Eickenberg, P. Gervais, A. Müller, J. Kossaifi, A. Gramfort, B. Thirion, and G. Varoquaux (2014). Machine learning for neuroimaging with scikit-learn. *Frontiers in Neuroinformatics*.
3. Müller, A. and S. Behnke (2014b). PyStruct: Structured Prediction in Python. *Journal of Machine Learning Research*.
4. Varoquaux, G., L. Buitinck, G. Louppe, O. Grisel, F. Pedregosa, and A. Müller (2015). Scikit-learn: Machine Learning Without Learning the Machinery. *GetMobile: Mobile Computing and Communications* 19(1), 29–33.
5. Huppenkothen, D., L. M. Heil, D. W. Hogg, and A. Mueller (2016). Using machine learning to explore the long-term evolution of GRS 1915+ 105. *Monthly Notices of the Royal Astronomical Society* 466(2), 2364–2377.
6. Severin, R. K., X. Li, K. Qian, A. C. Mueller, and L. Petukhova (2017). Computational derivation of a molecular framework for hair follicle biology from disease genes. *Scientific reports* 7(1), 16303.

### Conference Publications

1. Müller, A., H. Schulz, and S. Behnke (2010). Topological Features in Locally Connected RBMs. In: *Proceedings of the International Joint Conference on Neural Networks (IJCNN)*.
2. Scherer, D., A. Müller, and S. Behnke (2010). Evaluation of pooling operations in convolutional architectures for object recognition. In: *Proceedings of the International Conference on Artificial Neural Networks (ICANN)*. Springer, pp.92–101.

3. Schulz, H., A. Müller, and S. Behnke (2010a). Exploiting local structure in stacked Boltzmann machines. In: *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)*.
4. Müller, A., S. Nowozin, and C. Lampert (2012). Information Theoretic Clustering Using Minimum Spanning Trees. In: *Proceedings of DAGM / OAGM*, pp.205–215.
5. Müller, A. and S. Behnke (2014a). Learning Depth-Sensitive Conditional Random Fields for Semantic Segmentation of RGB-D Images. In: *Proceedings of the International Conference of Robotics and Automation (ICRA)*.

### Workshop Publications

1. Schulz, H., A. Müller, and S. Behnke (2010b). Investigating Convergence of Restricted Boltzmann Machine Learning. In: *Advances in Neural Information Processing Systems (NIPS), Deep Learning and Unsupervised Feature Learning Workshop*.
2. Müller, A. and S. Behnke (2011). Multi-Instance Methods for Partially Supervised Image Segmentation. In: *IAPR TC3 Workshop on Partially Supervised Learning*.
3. Buitinck, L., G. Louppe, M. Blondel, F. Pedregosa, A. Müller, O. Grisel, V. Niculae, P. Prettenhofer, A. Gramfort, J. Grobler, et al. (2013). API design for machine learning software: experiences from the scikit-learn project. *ECML PKDD 2013 Workshop on Languages for Data Mining and Machine Learning*.