

Dr. Uwe Schmidt

Born on February 27, 1983
German citizen

Max Planck Institute of
Molecular Cell Biology and Genetics

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Education

- 2010–2016 **PHD (Dr.-Ing.) in Computer Science** (summa cum laude)
Technische Universität Darmstadt, Germany
Thesis: Half-quadratic Inference and Learning for Natural Images
Advisor: Prof. Stefan Roth, PhD
- 2006–2010 **MSc in Computer Science** (final grade 1.2, awarded with distinction)
Technische Universität Darmstadt, Germany
Thesis: Learning and Evaluating Markov Random Fields for Natural Images
Advisor: Prof. Stefan Roth, PhD
- 2006–2007 **Visiting Graduate Student (Department of Computer Science)**
University of British Columbia, Vancouver, Canada
- 2002–2006 **BSc in Computer Science** (final grade 2.2)
Technische Universität Darmstadt, Germany
Thesis: A Peer-to-Peer Simulator
Advisor: Prof. Dr. Jussi Kangasharju
- 1993–2002 **Abitur** (general qualification for university entrance)
Franziskanergymnasium Kreuzburg, Großkrotzenburg, Germany

Academic experience

- Since 2015 **MPI of Molecular Cell Biology and Genetics, Dresden, Germany**
Group of Gene Myers / Affiliated with Carsten Rother's group at TU Dresden (until 2017)
Research Assistant
- Summer 2016 **Technische Universität Dresden, Germany**
Department of Computer Science (Computer Vision Lab Dresden)
Devised and lectured course on *Image Processing* (jointly with Dr. Anita Sellent)
- Mar 2010–
May 2015 **Technische Universität Darmstadt, Germany**
Department of Computer Science (Interactive Graphics Systems Group & Visual Inference Group)
Research Assistant (advised by Prof. Stefan Roth, PhD)
- Winter 2012,
Winter 2014 **Technische Universität Darmstadt, Germany**
Department of Computer Science (Interactive Graphics Systems Group & Visual Inference Group)
Teaching Assistant for *Machine Learning: Statistical Approaches 2*
- Summer 2014 **Technische Universität Darmstadt, Germany**
Department of Computer Science (Visual Inference Group)
Teaching Assistant for *Computer Vision II*

- Sep 2006–
Dec 2006 **University of British Columbia, Vancouver, Canada**
Department of Computer Science
Teaching Assistant for *Introduction to Software Engineering*
- Oct 2005–
Aug 2006 **Technische Universität Darmstadt, Germany**
Department of Engineering (Automotive Engineering Group)
Undergraduate Research Assistant: Electronics & software conception and implementation for a test-platform for collision warning systems [VIDEO EXCERPT FROM GERMAN TELEVISION]
- Winter 2004,
Winter 2005 **Technische Universität Darmstadt, Germany**
Department of Computer Science
Undergraduate Teaching Assistant for *Introduction to Computer Science 1*

Work experience

- Jul 2012–
Sep 2012 **Microsoft Research, Cambridge, United Kingdom**
Machine Learning and Perception Group
Internship (advised by Carsten Rother, PhD)
- Aug 2003 **ABB Calor Emag Hochspannung GmbH, Hanau, Germany**
Summer job: Migrating quality assurance data from a PostgreSQL database to SAP
- Mar 2001–
Dec 2001 **blubeo GmbH, Offenbach am Main, Germany**
Part-time Web Developer (PHP & MySQL)

Peer-reviewed publications & talks

- 2020 C. Broaddus, A. Krull, M. Weigert, U. Schmidt, and G. Myers. **Removing Structured Noise with Self-Supervised Blind-Spot Networks** In *Proc. of the IEEE 16th International Symposium on Biomedical Imaging (ISBI)*, Iowa City, Iowa, April 2020. *To Appear*.
- M. Weigert, U. Schmidt, R. Haase, K. Sugawara, and G. Myers. **Star-convex Polyhedra for 3D Object Detection and Segmentation in Microscopy** In *Proc. of the IEEE Winter Conference on Applications of Computer Vision (WACV)*, Snowmass village, Colorado, March 2020. *To Appear*.
- R. Haase, L. A. Royer, P. Steinbach, D. Schmidt, A. Dibrov, U. Schmidt, M. Weigert, N. Maghelli, P. Tomancak, F. Jug, and E. W. Myers. **CLIJ: GPU-accelerated image processing for everyone.** *Nature Methods* 17.01 (2020): 5–6.
- 2018 M. Weigert, U. Schmidt, T. Boothe, A. Müller, A. Dibrov, A. Jain, B. Wilhelm, D. Schmidt, C. Broaddus, S. Culley, M. Rocha-Martins, F. Segovia-Miranda, C. Norden, R. Henriques, M. Zerial, M. Solimena, J. Rink, P. Tomancak, L. Royer, F. Jug, and E. W. Myers. **Content-Aware Image Restoration: Pushing the Limits of Fluorescence Microscopy.** *Nature Methods* 15.12 (2018): 1090–1097.
- U. Schmidt, M. Weigert, C. Broaddus, and G. Myers. **Cell Detection with Star-Convex Polygons.** In *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Granada, Spain, September 2018.
- 2017 J. Kruse, C. Rother, and U. Schmidt. **Learning to Push the Limits of Efficient FFT-based Image Deconvolution.** In *Proc. of the IEEE International Conference on Computer Vision (ICCV)*, Venice, Italy, October 2017. *Spotlight presentation (acceptance rate 4.7%)*.
- 2016 U. Schmidt, J. Jancsary, S. Nowozin, S. Roth, and C. Rother. **Cascades of Regression Tree Fields for Image Restoration.** *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)* 38.4 (2016): 677–689.

- 2014 U. Schmidt and S. Roth. **Shrinkage Fields for Effective Image Restoration**. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, Columbus, Ohio, June 2014. *Oral presentation (acceptance rate 5.75%)*.
- 2013 U. Schmidt, C. Rother, S. Nowozin, J. Jancsary, and S. Roth. **Discriminative Non-blind Deblurring**. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, Portland, Oregon, June 2013. *Oral presentation (acceptance rate 3.3%). Best Student Paper Award*.
- 2012 T. Franzel, U. Schmidt, and S. Roth. **Object Detection in Multi-View X-Ray Images**. In *Joint Pattern Recognition Symposium (34th DAGM, 36th OAGM)*, Graz, Austria, August 2012. *Oral presentation*.
- U. Schmidt and S. Roth. **Learning Rotation-Aware Features: From Invariant Priors to Equivariant Descriptors**. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, Providence, Rhode Island, June 2012. *Oral presentation (acceptance rate 2.5%)*.
- 2011 U. Schmidt, K. Schelten, and S. Roth. **Bayesian Deblurring with Integrated Noise Estimation**. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, Colorado Springs, Colorado, June 2011.
- 2010 U. Schmidt, Q. Gao, and S. Roth. **A Generative Perspective on MRFs in Low-Level Vision**. In *Proc. of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, California, June 2010. *Oral presentation (acceptance rate 4.5%)*.
- 2007 J. Kangasharju, U. Schmidt, D. Bradler, and J. Schröder-Bernhardi. **ChunkSim: Simulating Peer-to-Peer Content Distribution**. In *Communications and Networking Simulation Symposium*, 2007.

Professional activities

Journal Reviewing:

- ACM Transactions on Graphics (TOG): 2013
- IEEE Signal Processing Letters: 2015
- IEEE Transactions on Image Processing (TIP): 2013
- IEEE Transactions On Pattern Analysis And Machine Intelligence (PAMI): 2015, 2017
- Journal of Machine Learning Research (JMLR): 2015, 2019
- International Journal of Computer Vision (IJCV): 2014
- Journal of Visual Communication and Image Representation (JVCIR): 2012, 2013

Conference Reviewing:

- European Conference on Computer Vision (ECCV): 2012, 2014, 2016, 2020
- IEEE International Conference on Computer Vision (ICCV): 2013, 2015, 2017
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR): 2013, 2015, 2016, 2017, 2018, 2019
- Bioimage Computing workshop (CVPR 2019)
- ACM Special Interest Group on Graphics and Interactive Techniques (SIGGRAPH): 2014
- International Conference on Machine Learning (ICML): 2015
- Conference on Neural Information Processing Systems (NeurIPS): 2015, 2016, 2017, 2018
- International Conference on Learning Representations (ICLR): 2019

Other Activities:

- 2020 Trainer at EMBL Course “Deep Learning for Image Analysis” (Heidelberg, Germany) [\[WEB\]](#)
- 2019 Trainer at NEUBIAS “Training School for Facility Staff and Bioimage Analysts” (Porto, Portugal) [\[WEB\]](#)
- Mentor at “Dresden Deep Learning Hackathon” (Dresden, Germany) [\[WEB\]](#)

- 2018 Visiting researcher (2 weeks) at Saalfeld Lab, Janelia Research Campus (Ashburn, Virginia, USA)
- 2018 Invited talk (jointly with Martin Weigert) at “Deep Learning Club” of the Preibisch Lab, Max Delbrück Center for Molecular Medicine (Berlin, Germany)
- Trainer at workshop “Machine Learning for Image Analysis” (Heidelberg, Germany) [WEB]
- Instructor at “Deep Learning Bootcamp” (Dresden, Germany) [WEB]
- Lecture/Assistance at EMBO Practical Course “Light sheet microscopy” (Dresden, Germany) [WEB]
- 2014 Visiting researcher (6 weeks) at TU Dresden (Dresden, Germany) with Prof. Carsten Rother, PhD
- 2013 Invited talk “Discriminative Non-blind Deblurring” at Max Planck Institute for Intelligent Systems (Tübingen, Germany)
- Participated in International Computer Vision Summer School 2013 (Calabria, Italy)
- Participated in R³ (Recent Related Research) Poster Session at GCPR 2013 (Saarbrücken, Germany)
- Participated in two-day academic leadership course “Personalführung für Doktorandinnen und Doktoranden” at TU Darmstadt (Darmstadt, Germany)
- 2012 Participated in Microsoft Research PhD Summer School 2012 (Cambridge, UK)
- Participated in Rank Prize Symposium “Machine Learning and Computer Vision” (Grasmere, UK)
- Visiting researcher (6 weeks) at Microsoft Research (Cambridge, UK) with Carsten Rother, PhD
- 2010 Student volunteer at DAGM 2010 (Darmstadt, Germany)

(Co-)Supervised undergraduate theses

- Dec 2016 Jan Vincent Latzko, TU Darmstadt, DIPLOM in Electrical Engineering and Information Technology. Thesis title: “Robust Time of Flight Depth Estimation Using RTFs”.
- Sep 2016 Jakob Kruse, TU Dresden, MSc in Computer Science. Thesis title: “Comparison of Learned Inference Approaches for Image Restoration”. Awarded *Diplompreis für Informatik* by *Carl Zeiss Innovationszentrum für Messtechnik GmbH*.
- Dec 2012 Mark Sollweck, TU Darmstadt, MSc in Computer Science. Thesis title: “Sampling-based Bayesian Inference for Optical Flow”.
- Jan 2012 Thorsten Franzel, TU Darmstadt, MSc in Computer Science. Thesis title: “Object Detection in Multi-View X-Ray Images”.

Awards & scholarships

- 2016 Best PHD thesis in computer science by the *Association of Friends of TU Darmstadt*. € 2 500
- 2014 Best paper award for Fraunhofer IGD and GRIS publications 2013 in the category “Impact on Research” (First Prize) for *Discriminative Non-blind Deblurring* (CVPR 2013). (jointly with Carsten Rother, Sebastian Nowozin, Jeremy Jancsary, and Stefan Roth) € 3 000
- 2013 Best student paper award at CVPR 2013 for *Discriminative Non-blind Deblurring*. \$ 3 000 (jointly with Carsten Rother, Sebastian Nowozin, Jeremy Jancsary, and Stefan Roth)
- 2012 Best paper award for Fraunhofer IGD and GRIS publications 2011 in the category “Impact on Research” (Honorable Mention) for *Bayesian Deblurring with Integrated Noise Estimation* (CVPR 2011). (jointly with Kevin Schelten and Stefan Roth)

- 2011 Best paper award for Fraunhofer IGD and GRIS publications 2010 in the category “Impact on Research” (First Prize) for *A Generative Perspective on MRFs in Low-Level Vision* (CVPR 2010). (jointly with Qi Gao and Stefan Roth) € 3 000
- 2011–2013 Microsoft Research PhD Scholarship.
- 2010 Best (MSc) thesis award of Fraunhofer IGD and the Interactive Graphics Systems Group (GRIS) of TU Darmstadt. paid-for conference attendance

Computer skills

Programming in procedural, object-oriented, and functional paradigms (most experience with Matlab, Julia, Java, Python, and C).

Familiar with *operating systems* macOS, Linux, and Windows.

Creating basic websites with PHP, MySQL, HTML, CSS, and JavaScript.

Typesetting documents with \LaTeX .

Languages

German native speaker

Fluent in *English* (111/120 TOEFL iBT, May 2006)

Significant software projects

- Since 2018 **StarDist** [[GITHUB](#)] (founder, maintainer, developer, support)
Python package for object detection and segmentation with star-convex shapes.
- Since 2018 **CSBDeep** [[GITHUB](#)] (founder, maintainer, developer, support)
Python package focused on content-aware restoration of fluorescence microscopy images (CARE).
- 2008–2013 **Java Wiimote Whiteboard** [[WEB](#)] (personal solo project)
An enhanced, open-source and cross-platform implementation of *Johnny Lee’s Wiimote Whiteboard idea* [[WEB](#)] that allows to use the Wii Remote (Wiimote) to turn any surface into a low-cost interactive whiteboard. More than 300 000 copies had been downloaded by the end of 2015; it has also been shown on *BBC Three* [[VIDEO](#)].