Dr. Uwe Schmidt

Born on February 27, 1983
German citizen

Email: research@uweschmidt.org
Web: uweschmidt.org/research

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

2015–2020 **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

Since 2020 **Freelance work**
Machine Learning Consulting and Software Development

2020–2022 **asgen GmbH & Co. KG, Dresden, Germany**
Chief Technology Officer

Sep 2020–Mar 2021 **Lipotype GmbH, Dresden, Germany**
Deep Learning Expert (part-time)

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

2022 M. Weigert and U. Schmidt. **Nuclei Instance Segmentation and Classification in Histopathology Images with StarDist**. In *Proc. of the IEEE International Symposium on Biomedical Imaging Challenges (ISBIC)*, Kolkata, India, March 2022.

2021 Y. Wang, M. Eddison, G. Fleishman, M. Weigert, S. Xu, T. Wang, K. Rokicki, C. Goina, F. E. Henry, A. L. Lemire, U. Schmidt, H. Yang, K. Svoboda, E. W. Myers, S. Saalfeld, W. Korff, S. M. Sternson, and P. W. Tillberg. **EASI-FISH for thick tissue defines lateral hypothalamus spatio-molecular organization**. *Cell* 184.26 (2021): 6361–6377.

2020 D. Saha, U. Schmidt, Q. Zhang, A. Barbotin, Q. Hu, N. Ji, M. J. Booth, M. Weigert, and E. W. Myers. **Practical sensorless aberration estimation for 3D microscopy with deep learning**. *Optics Express* 28.20 (2020): 29044–29053.

G. Dey, S. Culley, S. Curran, U. Schmidt, R. Henriques, W. Kukulski, and B. Baum. **Closed mitosis requires local disassembly of the nuclear envelope**. *Nature* 585 (2020): 119–123.

A. A. Pulschen, D. R. Mutavchiev, S. Culley, K. N. Sebastian, J. Roubinet, M. Roubinet, G. T. Risa, M. van Wolferen, C. Roubinet, U. Schmidt, G. Dey, S. Albers, R. Henriques, and B. Baum. **Live Imaging of a Hyperthermophilic Archaeon Reveals Distinct Roles for Two ESCRT-III Homologs**

in Ensuring a Robust and Symmetric Division. *Current Biology* 30.14 (2020): 2852–2859.

S. Schmell, F. Zakrzewski, W. de Back, M. Weigert, U. Schmidt, T. Wenke, S. Zeugner, R. Mantey, C. Sperling, I. Roeder, P. Hoenscheid, D. Aust, and G. Baretton. **An interpretable automated detection system for FISH-based HER2 oncogene amplification testing in histo-pathological routine images of breast and gastric cancer diagnostics**. Short paper at *Medical Imaging with Deep Learning (MIDL)*, Montréal, Canada, July 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 17th International Symposium on Biomedical Imaging (ISBI)*, Iowa City, Iowa, April 2020. *Best paper award finalist.*

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, Colorado, March 2020.

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:

2023 Trainer at EMBL Course "Deep Learning for Image Analysis" (Heidelberg, Germany) [Web]

2021 Trainer at EMBL Course "Deep Learning for Image Analysis" (Virtual) [Web]

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]

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 R^3 (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). € 3 000
(jointly with Carsten Rother, Sebastian Nowozin, Jeremy Jancsary, and Stefan Roth)

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] (co-founder, maintainer, developer, support)
Python package for object detection and segmentation with star-convex shapes.

Since 2018 **CSBDeep** [GitHub] (co-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].