

CONTACT INFORMATION Janelia Research Campus
Advanced Imaging Center
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Ashburn, VA 20147 USA

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SUMMARY Physicist, microscope builder & data scientist with a passion for community building/engagement, outreach, and teaching: I have over ten years of experience in building and running advanced light microscopy systems, analyzing microscopy data, and developing image acquisition & analysis workflows. Furthermore, I am highly engaged in community building/engagement, outreach, and teaching activities focusing on community service, women/diversity in science, open science, and microscopy for more than 15 years.

RESEARCH INTERESTS

- Microscope design, development, and application across a wide range of biological models
- Development of image and data processing and analysis tools
- Machine learning and its application in microscopic image analysis
- Statistical methods for large datasets
- Open software and hardware tools for imaging and microscopy

POSITIONS **Research Specialist** 2019 - present
Janelia Research Campus, Advanced Imaging Center, Ashburn, VA, USA

- Handling and troubleshooting of advanced light microscopes (iPALM, Lattice Light Sheet Microscope, SiMView Light Sheet Microscope, Aberration Corrected Multifocal Microscope, MOSAIC, FIB-SEM, cryo-SIM, etc.), sample preparation and image analysis
- Support of (inter)national visitors during technical consultations and their imaging sessions at the microscopes of Janelia's Advanced Imaging Center
- Development and implementation of new image and data analysis strategies for users from around the world
- Review of proposal drafts, and proposals submitted to the Advanced Imaging Center
- Design and realization of microscopy and data analysis workshops and conferences

Postdoctoral Research Fellow 2017 - 2018
National Institutes of Health, National Cancer Institute, Bethesda, MD, USA

- Design and construction a microscope for live-cell 5-color single-molecule transcription imaging in eukaryotic cells at high resolution in time and space to capture promoter-enhancer interactions
- Development of advanced fluorescence labeling strategies for the genome based on dCas9 (CAS-FISH)
- Computational modeling and data analysis of 4D genome data

Ph.D. Student 2010 - 2016

Max Planck Institute for Biophysical Chemistry, Göttingen, Germany

Department of NanoBiophotonics (Prof. Dr. Stefan W. Hell)

Dissertation title: "4Pi-RESOLFT nanoscopy"

Advisor: Prof. Dr. Stefan W. Hell

- Running of various imaging experiments (samples: block copolymers, synaptic vesicles) on an isoSTED microscope
- Design and construction of a two-color STED microscope
- Design and construction of a 4Pi-RESOLFT nanoscope, including optical and acquisition system.
- Development of acquisition software
- System/sample testing and optimization

	Master Student	2009
	Max Planck Institute of Biochemistry, Martinsried/Munich, Germany	
	Department of Molecular Structural Biology (Prof. Dr. Wolfgang Baumeister)	
	<i>Dissertation title:</i> "Correlative microscopy at liquid nitrogen temperature"	
	<i>Advisors:</i> Dr. Jürgen M. Plitzko, Prof. Dr. Wolfgang Baumeister	
	<ul style="list-style-type: none"> • Development and testing of a cryo transfer shuttle (CryoStage²) for the reliable transfer of amorphous frozen-hydrated samples from a fluorescence to an electron microscope for correlative microscopy • Further development and testing of the software based on scale-invariant feature transform (SIFT) for the correlative microscopy approach 	
	Undergraduate Researcher - various research assistant positions	2005 - 2008
	<ul style="list-style-type: none"> • Evaluation of the mechanical properties of actin filaments in combination with different actin-binding proteins at the Physics Department of the Technical University of Munich, Germany - Prof Andreas Bausch (2008) • Study of HEK cells with FLIC-microscopy at the Max Planck Institute of Biochemistry, Martinsried, Germany - Prof Peter Fromherz (2008) • Analysis of Multi-SANS data (with MIRA) and data of Cytochrome C (with the Neutron Spin Echo RESEDA) at the Research Neutron Source Heinz Maier-Leibnitz (FRM II), Munich, Germany - Dr Robert Georgii and Prof Peter Böni (2007) • Study of surfaces and DNA with an AFM at the Physics Department of the Technical University of Munich, Germany - Prof Thorsten Hugel (2006) • Performance evaluation of an animal PET scanner at the university hospital "rechts der Isar" , Munich, Germany - Prof Sibylle Ziegler (2006) • Data analysis of water levels of the Baltic Sea at the Leibnitz Institute for Baltic Sea Research, Warnemünde, Germany - Dr Torsten Seifert (2005) 	
EDUCATION	MicroMasters in Statistics and Data Science	2020 - 2021
	Massachusetts Institute of Technology / MITx, Cambridge, MA, USA	
	Ph.D. in Physics	2010 - 2015
	Heidelberg University, Heidelberg, Germany	
	Diploma in Physics	2004 - 2009
	Technical University of Munich, Munich, Germany	
HONORS & AWARDS	Helmsley Fellowship , Helmsley Charitable Trust	2017
	66th Lindau Nobel Laureate Meeting , Participant	2016
	Excellence Award , Max Planck Society	2010
	Oskar Karl Forster Scholarship , Technical University of Munich	2009
	Study Career Scholarship , Technical University of Munich	2008
PUBLICATIONS	18. Boehm U.* , Nelson G.* et al., <i>QUAREP-LiMi: A community-driven initiative to establish guidelines for quality assessment and reproducibility for instruments and images in light microscopy</i> . Journal of Microscopy, p1-18 (2021). doi: https://doi.org/10.1111/jmi.13041	
	17. Boehm U. , Galbraith C. <i>Extending the performance capabilities of isoSTED</i> . Biophysical Journal, p3237-3239 (2021). doi: https://doi.org/10.1016/j.bpj.2021.07.005	
	16. Rigano A., . . . , Boehm U. et al., <i>Micro-Meta App: an interactive software tool to facilitate the collection of microscopy metadata based on community-driven specifications</i> . bioRxiv, p1-23 (2021). doi: https://doi.org/10.1101/2021.05.31.446382	
	15. Boehm U.* , Nelson G.* et al., <i>QUAREP-LiMi: a community endeavor to advance quality assessment and reproducibility in light microscopy</i> . Nature Methods, p1-4 (2021).	

doi:<https://doi.org/10.1038/s41592-021-01162-y>

14. Huisman M., Hammer M., Rigano A., **Boehm U.** et al., *A perspective on Microscopy Metadata: data provenance and quality control*. arXiv, p1-15 (2021). doi:<https://arxiv.org/abs/1910.11370>
13. Hammer M., Huisman M., Rigano A., **Boehm U.** et al., *Towards community-driven metadata standards for light microscopy: tiered specifications extending the OME model*. bioRxiv, p1-27 (2021). doi:<https://doi.org/10.1101/2021.04.25.441198>
12. Rigano A., **Boehm U.** et al., *WU-BIMAC/NBOMicroscopyMetadataSpecs: 4DN-BINA-OME (NBO) Microscopy Metadata Specifications*. zenodo, (2021). doi:<https://doi.org/10.5281/zenodo.4710731>
11. **Boehm U.***, Nelson G.* et al., *QUAREP-LiMi: A community-driven initiative to establish guidelines for quality assessment and reproducibility for instruments and images in light microscopy*. arXiv, p1-17 (2021). doi:<https://arxiv.org/abs/2101.09153>
10. Galbraith J., Aaron J., **Boehm U.**, Chew T.-L. and Galbraith C., *Resolving the 3D Nano-architecture of the Actin Cytoskeleton*. Microscopy and Microanalysis, p1 (2020). doi:10.1017/S1431927620016736
9. Brown-Harding H., Cordelieres F., Poujol C., **Boehm U.**, Collinson L., *A 'lockdown post' from facility managers across the world*. FocalPlane, p1 (2020). doi:10.1242/focalplane.1244
8. **Boehm U.**, Hell S.W., Schmidt, R., *4Pi-RESOLFT nanoscopy*. Nature Comm. 7 (10504), p1-8 (2016). doi:10.1038/ncomms10504
7. **Boehm U.**, *4Pi-RESOLFT nanoscopy*. PhD Thesis, Heidelberg University (2016) doi: 10.11588/HEIDOK.00020200
6. **Boehm U.**, Schmidt R., Hell S.W., *Live cell 4pi nanoscopy*. European Biophysics Journal with Biophysics Letters 2015 Jul 1 (Vol. 44, pp. S75-S75). 233 SPRING ST, NEW YORK, NY 10013 USA: SPRINGER.
5. Ullal C.K., Primpke S., Schmidt R., **Boehm, U.**, Egner A., Vana P, Hell S.W., *Flexible Microdomain Specific Staining of Block Copolymers for 3D Optical Nanoscopy*. Macromolecules, 44, p7508–7510 (2011). doi: 10.1021/ma201504f
4. Ullal C., Schmidt R., **Boehm U.**, Primpke S., Vana P, Hell W.S., *STED Microscopy as a Characterization Tool for Three Dimensionally Nanostructured Block Copolymer Thin Films*. APS. 2011 Mar;2011:A43-002.
3. Rigort A., Bäuerlein F.J., Leis A., Gruska M., Hoffmann C., Laugks T., **Boehm U.**, Eibauer M., Gnaegi H., Baumeister W. and Plitzko J.M., *Micromachining tools and correlative approaches for cellular cryo-electron tomography*. J. Struct. Biol. 172, p169–179 (2010). doi: 10.1016/j.jsb.2010.02.011
2. Rigort A., Mathisen C., **Boehm U.**, Leis A., Lich B., Hayles M., Laugks T., Baumeister W. and Plitzko J.M., *Integrative Cryo-Correlative Microscopy Approaches*. Microscopy and Microanalysis. Vol 16(S2), p186–187 (2010). doi: 10.1017/S1431927610058216
1. **Boehm U.**, *Korrelative Mikroskopie bei Flüssigstickstoff-Temperatur*. Diploma Thesis, Technical University of Munich (2010)

* these authors contributed equally to this work

PEER REVIEW

Angewandte Chemie (International ed.)
Biophysical Journal
Biophysical Reports
Journal of Cell Science
Journal of Microscopy
Nature Methods

Review Commons

PRESENTATIONS	Chromatin Imaging/Nuclear Architecture SubGroup (<i>invited</i>), Harvard & MIT, Boston, United States of America	2021
	Janelia Advisory Committee Meeting Better Science through Open Science and Collaborative Teams (<i>invited</i>), Janelia Research Campus, Ashburn, United States of America	2021
	Junior Scientist Workshop on Biological Optical Microscopy (<i>invited</i>), Janelia Research Campus, Ashburn, United States of America	2019
	Transcription Seminar (<i>invited</i>), Albert Einstein College of Medicine New York, United States of America	2019
	Microscopy Seminar (<i>invited</i>), Havard Medical School Boston, United States of America	2019
	Microscopy Lunch Seminar (<i>invited</i>), UMass Medical School Worcester, United States of America	2019
	Single Biomolecules Meeting , Cold Spring Harbor Laboratories Cold Spring Harbor, United States of America	2018
	NIH Light Microscopy Interest Group Seminar (<i>invited</i>), Bethesda, United States of America	2018
	Chan Zuckerberg Initiative Imaging Workshop (<i>invited</i>), CZ Biohub San Francisco, United States of America	2017
	Chesapeake Bay Area Single Molecule Biology Meeting , Baltimore, United States of America	2017
	Frontiers in Imaging Science Conference , Ashburn, United States of America	2017
	Single Molecule Biophysics Conference , Aspen, United States of America	2017
	Labeling and Nanoscopy Conference , Heidelberg, Germany	2016
	MPIbpc Campus Seminar (<i>invited</i>), Göttingen, Germany	2016
	NCI Departmental Seminar (<i>invited</i>), Bethesda, United States of America	2016
	Departmental Seminar (<i>invited</i>), Wyss Institute at Havard University, Boston, United States of America	2016
	Lunch Talk (<i>invited</i>), Havard, Cambridge, United States of America	2016
	Biophysical Society Annual Meeting , Los Angeles, United States of America	2016
	Seeing Is Believing Symposium , Heidelberg, Germany	2015
	Deutsche Physikerinnen Tagung (<i>invited</i>), Göttingen, Germany	2015
Annual meeting of the European Light Microscopy Initiative (ELMI) , Sitges, Spain	2015	
Focus On Microscopy (FOM) , Göttingen, Germany	2015	
PROSPECTS. First Plenary Meeting , Punta Negra, Majorca/Spain	2010	
TEACHING	NIH FAES Imaging - From IF and FISH to Automated and Confocal Microscopy (virtual workshop), Instructor of the Image Analysis Bootcamp, National Institutes of Health, Bethesda, United States of America	2021
	Fiji Image Processing and Analysis Workshop (virtual workshop)	2021

Instructor of the Superresolution Data Handling Module,
Turku Bioscience Centre, Turku, Finland

NIH FAES Super Resolution Workshop (virtual workshop) 2021
Instructor, Foundation for Advanced Education in the Sciences (FAES)
Bethesda, United States of America

Fiji Macros Programming (virtual workshop) 2020
Instructor, Janelia Research Campus, Ashburn, United States of America

DECODE for Single Molecule Localization Microscopy (virtual workshop) 2020
at the *From Image to Knowledge with ImageJ & Friends* conference
Instructor, Janelia Research Campus, Ashburn, United States of America

NIH FAES Image Processing and Analysis workshop (virtual workshop) 2019-2021
Instructor, National Institutes of Health, Bethesda, United States of America

Open Science in Imaging and Microscopy (breakout session during a workshop) 2019
Instructor, Janelia Research Campus, Ashburn, United States of America

Advanced Imaging Techniques in Biomedical Sciences (summer intern journal club) 2018
Instructor, National Institutes of Health, Bethesda, United States of America

Introduction to microscopy (graduate course) 2017
Teaching assistant, University of Massachusetts Medical School, Worcester,
United States of America

Optical Microscopy & Imaging in the Biomedical Sciences 2017
(summer intern journal club)
Lead instructor, National Institutes of Health, Bethesda, United States of America

Advanced physics laboratory course for physics students (undergraduate course) 2011
Teaching assistant, Heidelberg University, Germany

Experimental Physics III: Optics (undergraduate course) 2011
Teaching assistant, University of Göttingen, Germany

Experimental Physics IV: Quantum, atomic and molecular physics 2010
(undergraduate course), Teaching assistant, University of Göttingen, Germany

Theoretical Physics I: Theoretical Mechanics (undergraduate course) 2009
Teaching assistant, Technical University of Munich, Germany

Theoretical Physics II: Electrodynamics (undergraduate course) 2008
Teaching assistant, Technical University of Munich, Germany

MENTORING

Janelia Buddy Program for International Scientists 2020 - present
Focus: Facilitating the transition of international scientists to Janelia in partnership
with Janelia's Human Resource Department
Janelia Research Campus, Ashburn, United States of America

Mentoring of Postbac Students 2020 - present
Focus: Navigating a scientific career
Janelia Research Campus, Ashburn, United States of America

Mentoring of PhD, College and High School Students 2017 - 2018
Focus: Navigating a scientific career, how to work in an optics laboratory &
in-depth support with individual research projects
National Institutes of Health, Bethesda, United States of America

Mentoring of Ph.D. students and Master Students 2010 - 2016
Focus: Navigating a scientific career, how to work in an optics laboratory &
in-depth support with individual research projects
Max Planck Institute for Biophysical Chemistry, Göttingen, Germany

CONFERENCE ORGANIZATION	OIG-ABG Educational Lectures , Organizer Ashburn, United States of America	2021 - present
	Janelia & EMBL BioImaging Seminar Series , Organizer Ashburn, United States of America	2020 - present
	Virtual Optical Interest Group (OIG) Seminar Series , Co-organizer Virtual seminar series with external speakers via Zoom during the COVID-19 lockdown Ashburn, United States of America	2020
	Imaging Africa Microscopy Club , Webinar support Ashburn, United States of America	2020
	Frontiers in Imaging Science Conference , Member of the local support team Ashburn, United States of America	2019
	Labeling and Nanoscopy Conference 2018 , Website and social media support Heidelberg, Germany	2018
	Division of International Services (DIS) Immigration Symposium , Organizer National Institutes of Health, Bethesda, United States of America	2018
	International Opportunities EXPO , Organizer National Institutes of Health, Bethesda, United States of America	2018
	Division of International Services (DIS) Immigration Symposium , Organizer National Institutes of Health, Bethesda, United States of America	2017
	I, Scientist Conference , Organizer Berlin, Germany	2017
	Labeling and Nanoscopy Conference 2016 , Organizer Heidelberg, Germany	2016
	Focus On Microscopy (FOM) , Social media support	2015 - 2019
	PhDnet General Meeting , Organizer Bonn, Germany	2011
PROFESSIONAL SERVICES	Wiley Analytical Science Magazine , Editorial Board Member Weinheim, Germany	2021 - present
	CZI Expanding Global Access to Bioimaging , Grant reviewer San Francisco, United States of America	2021
	QUAREP-LiMi , Chair of the "White Paper" working group Freiburg, Germany	2020 - present
	Frontiers in Bioinformatics , Review Editor for Computational BioImaging Lausanne, Switzerland	2020 - present
	CZI Imaging Scientists Round 2 , Grant reviewer San Francisco, United States of America	2020
	QUAREP-LiMi , Vice-chair of the "Image Quality" working group Freiburg, Germany	2020 - present
	German BioImaging , Committee member of the working groups for (1) Training and Knowledge Transfer and (2) Image Data Analysis & Management	2020 - present
	BioImaging North America (BINA) , Committee member of the "Quality Control and Data Management" working group	2020 - present
	Janelia's Optical Interest Group (OIG) , Co-coordinator Ashburn, Virginia, United States of America	2020 - present
	GSO German Scholars Organization e.V. , Coordinator for Local Chapter of German Scientists, Ashburn	2020 - present

Accelerating Science and Publication in Biology (ASAPbio) , Ambassador	2018 - present
eLife Early-Career Advisory Group , Ambassador	2017 - 2019
NIH Laser Safety Advisory Committee , Committee member for the NCI National Institutes of Health, Bethesda, United States of America	2018
NIH Visiting Fellows Committee , Co-chair National Institutes of Health, Bethesda, United States of America	2017 - 2018
NIH Light Microscopy Interest Group , Co-coordinator National Institutes of Health, Bethesda, United States of America	2016 - present
DPG Arbeitskreis für Challengleichheit , Board member Bad Honnef, Germany	2016 - present
Lindau Nobel Laureate Meeting , Freelance writer Lindau, Germany	2016 - present
66th Lindau Nobel Laureate Meeting , “Women in Science”-correspondent Lindau, Germany	2016
Lise Meitner Gesellschaft e.V. , Co-founder and board member Berlin, Germany	2011
Max Planck PhDnet , Steering group 2011 member & deputy spokesperson Max Planck Society, Munich, Germany	2011
PhD/Postdoc Community , PhD/Postdoc representative Max Planck Institute for Biophysical Chemistry, Göttingen, Germany	2011 - 2014

CERTIFICATES &
TRAINING

Fundamentals of Statistics A 18-week in-depth introduction course by MITx to develop and understand fundamental statistical principles on firm mathematical grounds starting from the construction of estimators and tests, as well as an analysis of their asymptotic performance.	2021
Leadership Principles for Scientists, Engineers, and Researchers A four-month and four-course online program from MIT that empowers engineers, scientists, and researchers with the leadership acumen needed to solve problems, innovate, and drive change.	2021
Machine Learning with Python: from Linear Models to Deep Learning A 15-week in-depth introduction course by MITx to the field of machine learning, from linear models to deep learning and reinforcement learning, through hands-on Python projects.	2021
Data Analysis for Social Scientists A 11-week course by MITx to learn methods for harnessing and analyzing data to answer questions of cultural, social, economic, and policy interest.	2020
Probability - The Science of Uncertainty and Data A 16-week course by MITx to build foundational knowledge of data science with an introduction to probabilistic models, including random processes and the basic elements of statistical inference.	2020
Fierce Conversations program A 6-week course offered by Howard Hughes Medical Institute about Feedback, Confrontation, Team, Delegation, Coaching and Accountability.	2020
LabVIEW Core 2 A certificate course offered by National Instruments about the LabVIEW basics.	2020
LabVIEW Core 1 A certificate course offered by National Instruments about the LabVIEW basics.	2020

	HBS Entrepreneurship Essentials	2020
	Entrepreneurship Essentials is a 4-week, 30-hour online certificate program from Harvard Business School. Entrepreneurship Essentials introduces participants to the entrepreneurial journey from finding an idea to gaining traction in the marketplace to raising capital for a venture. Participants learn an overarching framework - People, Opportunity, Context, Deal - to evaluate opportunities, manage start-ups, and finance ventures.	
	HBS Management Essentials	2019
	Management Essentials is an 8-week, 35-hour online certificate program from Harvard Business School. Management Essentials takes a distinctive, hands-on approach to management. Participants in this course learn to identify, understand, design, and shape critical organizational and managerial processes as a means of getting the work done.	
	HBS CORE (Credential of Readiness)	2019
	CORE (Credential of Readiness) is a 150-hour certificate program on the fundamentals of business from Harvard Business School. CORE is comprised of three courses - Business Analytics, Economics for Managers, and Financial Accounting - developed by leading Harvard Business School faculty and delivered in an active learning environment based on the HBS signature case-based learning model.	
	Scientists Teaching Science	2018
	at the Office of Intramural Training and Education (OITE) at the National Institutes of Health, Bethesda, United States of America (9-week online pedagogy course)	
	Research Mentor Training	2018
	at the Office of Intramural Training and Education (OITE) at the National Institutes of Health, Bethesda, United States of America	
	Business of Science for Scientists	2018
	by SciPhD at the National Cancer Institute in Shady Grove, United States of America	
	Chromatin, Epigenetics and Gene Expression Course	2018
	at the Cold Spring Harbor Laboratory (CSHL) in Cold Spring Harbor, NY, United States of America, Course instructors: Prof Karen Adelman, Dr Luciano Di Croce, Prof Geeta Narlikar, Prof Ali Shilatifard	
	BioTech2: Recombinant DNA Methodology	2017
	at the Foundation for Advanced Education in the Sciences at the NIH (FAES), Bethesda, United States of America	
	Management Bootcamp for Postdocs	2017
	at the Office of Intramural Training and Education (OITE) at the National Institutes of Health, Bethesda, United States of America	
	Ethics in Research Training for Postdocs	2017
	at the Office of Intramural Training and Education (OITE) at the National Institutes of Health, Bethesda, United States of America	
	Workplace Dynamic Series	2016
	about Self-Awareness, Conflict & Feedback, Team Skills, Diversity In A Multicultural Society at the Office of Intramural Training and Education (OITE) at the National Institutes of Health, Bethesda, United States of America	
COMPUTER SKILLS	Languages: Python, MATLAB, LabVIEW, R Software: Inventor (CAD), Zemax, Imaris, Fiji, ImageJ	
PROFESSIONAL AFFILIATION	American Physical Society, German Physical Society, BioImaging North America (BINA), German	

BioImaging Society, Network of European BioImage Analyst (NEUBIAS), Quantitative BioImaging Society

LANGUAGES German - native language
 English - fluent, spoken and written
 French - basic knowledge
 Swedish - basic knowledge

REFERENCES Available upon request

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