Coleman Broaddus

Max Planck Institute of
Molecular Cell Biology and Genetics

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Birth: September 8, 1987
Citizenship: United States

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Education

2005-2010 **Bsc, Physics**; Carnegie Mellon University (Pittsburgh, PA)

2011-2015 **Msc, NanoBioPhysics**; Dresden University of Technology (Dresden, DE)
Thesis: *Pattern formation in chemically reactive, phase-separating systems*

2015-present **PhD, Computer Science**; Max Planck Institute for Molecular Cell Biology and Genetics (Dresden, DE)
Thesis: *TBA*

Research Experience

Oct 2010 — Mar 2011 Internship at MPI-PKS (Dresden, DE)
Supervisors: David Zwicker, Frank Jülicher
Brownian Dynamics simulation of centrosome growth process based on the model in [Zwicker et al. PNAS 2014].

Mar 2013 — Oct 2013 Master's Thesis at MPI-PKS (Dresden, DE)
Supervisors: David Zwicker, Frank Jülicher
Pattern formation in chemically reactive, phase-separating systems.
Lattice simulations of binary chemical mixtures with phase-separation and particle interchange mimicking simple chemical reactions.

Jul 2014 — Dec 2014 Internship at MPI-PKS (Dresden, DE)
Supervisors: Christoph Weber, Vasily Zaburdaev
Particle based solutions to nonlocal PDE model of colony formation based on [Weber et al. Phys Rev E. 2015]

Oct 2014 — Jun 2015 Internship at MPI-CBG (Dresden, DE)
Supervisors: Florian Jug, Dagmar Kainmüller; Gene Myers
Instance segmentation of zebrafish mesynchymal cells from fluorescence images during embryogenesis.
Work incorporated in [Stapel et al., Development 2016].

Nov 2015 — Present Doctoral Theis at MPI-CBG (Dresden, DE)
Supervisor: Gene Myers
Automated cell tracking during development
State of the art models for cell detection, segmentation and tracking based on deep learning and ILP based tracking models.

Software

Languages: python, c, clojure, java, html, css, julia, bash
Libraries: numpy, scipy, pytorch, scikit-image, scikit-learn, keras, tensorflow

Work Experience

May 2007 — Aug 2007
B & L Builders, Inc.
Housing construction and lawn care

Jan 2008 — Dec 2008
Guru Networks, Inc.
Java based web development

May 2009 – Aug 2009
Self employed
Landscape architecture and construction

Publications

Broaddus C, Krull A, Weigert M, Schmidt U, Myers G. **Removing Structured Noise With Self-supervised Blind-spot Networks.** ISBI 2020.

Schmidt U, Weigert M, Broaddus C, Myers G. **Cell Detection with Star-convex Polygons.** MICCAI 2018.

Weigert M, et al. **Content-aware image restoration: pushing the limits of fluorescence microscopy.** Nature Methods 15 (2018). 236463.

Stapel LC, Broaddus C, Vastenhouw NL. **Detection and Automated Analysis of Single Transcripts at Subcellular Resolution in Zebrafish Embryos**. InRNA Detection 2018 (pp. 143-162). Humana Press, New York, NY.

Stapel LC, Lombardot B, Broaddus C, Kainmueller D, Jug F, Myers EW, Vastenhouw NL. **Automated detection and quantification of single RNAs at cellular resolution in zebrafish embryos**. Development. 2016 Feb 1;143(3):540-6.