Zach Marin

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Academic Qualifications

University of Texas Southwestern Medical Center Dallas, TX, USA
Postdoc, Lyda Hill Department of Bioinformatics. Advisor: Kevin Dean.

Yale University New Haven, CT, USA
Doctor of Philosophy, Biomedical Engineering, May 2022. Advisors: Joerg Bewersdorf and David Baddeley. Dissertation: Quantifying Membrane Topology at the Nanoscale.

University of Maine Orono, ME, USA
Master of Arts, Mathematics, May 2017. Advisor: Andre Khalil. Thesis: Wavelet-based particle tracking in unreconstructed, off-axis holograms.
Bachelor of Science, Bioengineering, *summa cum laude*, May 2015.
Bachelor of Arts, Mathematics, *summa cum laude*, May 2015.

Work Experience

Maritime Applied Physics Corporation Brunswick, ME
Managed interstate multi-platform computer network and information service technologies for 80 employees. Created inventory database to integrate financial and engineering sides of the business. Designed cost-effective in-house g-force monitor using commercial off-the-shelf technology. Co-designed and programmed real-time seawater quality monitoring system. Programmed network connectivity module for wave prediction system. Programmed data-loggers for in-house testing. January 2011 – August 2012 and July – August 2013.

Awards & Honors

Chase Distinguished Research Assistantship (2016). Interdisciplinary Teaching Assistantship in Biology (2015). Presidential Scholar (2015). Tau Beta Pi (2014). Dean's List (2012-2015).

Leadership

Yale Graduate Student Assembly, Representative (2017-2021) and Service Committee Co-Chair (2018-2019).

Technical Skills

Fluent in Python, C, MATLAB, LabView. Proficient with Tcl, C++, OpenCL, OpenGL, CUDA, Java, R. Image processing and data analysis algorithm development. Optical system design and development, specializing in differential interference contrast and single-molecule localization microscopes. Systems integration of electronics, optics and control and analysis software. Basic wet lab techniques.

Teaching Experience

Co-developer and teacher of inaugural Yale BBS Diversity and Inclusion Collective Biomedical Image Analysis Workshop (Fall 2021). Lab Leader, Physiological Systems Lab, Yale (Fall 2018, Fall 2019, Fall 2020). Mathematics Tutor, International Study Center, University of Maine (2015-2016).Teaching Assistant, Biology of Organisms, University of Maine (Spring 2015).Teaching Assistant, Basic Biology, University of Maine (Fall 2015).

Peer-reviewed Journal Articles

Marin, Z., Graff, M., Barentine, A. E. S., Soeller, C., Chung, K. K. H., Fuentes, L. A. & Baddeley, D. PYMEVisualize: an open-source tool for exploring 3D super-resolution data. *Nature Methods* **18,** 582–584. http://www.nature.com/articles/s41592-021-01165-9 (2021).

Marin, Z., Wallace, J. K., Nadeau, J. & Khalil, A. Wavelet-based tracking of bacteria in unreconstructed off-axis holograms. *Methods* **136,** 60–65. https://www.sciencedirect.com/science/article/pii/S1046202317302219 (2018).

Marin, Z., Batchelder, K. A., Toner, B. C., Guimond, L., Gerasimova-Chechkina, E., Harrow, A. R., Arneodo, A. & Khalil, A. Mammographic evidence of microenvironment changes in tumorous breasts. *Medical Physics* **44,** 1324–1336. https://aapm.onlinelibrary.wiley.com/doi/abs/10.1002/mp.12120 (2017).

Plourde, S. M., **Marin, Z.**, Smith, Z. R., Toner, B. C., Batchelder, K. A. & Khalil, A. Computational growth model of breast microcalcification clusters in simulated mammographic environments. *Computers in Biology and Medicine* **76,** 7–13. https://www.sciencedirect.com/science/article/pii/S0010482516301585 (2016).

Gerasimova-Chechkina, E., Toner, B., **Marin, Z.**, Audit, B., Roux, S. G., Argoul, F., Khalil, A., Gileva, O., Naimark, O. & Arneodo, A. in *AIP Conference Proceedings* **1760** (2016), 020018. https://aip.scitation.org/doi/abs/10.1063/1.4960237.

Gerasimova-Chechkina, E., Toner, B., **Marin, Z.**, Audit, B., Roux, S. G., Argoul, F., Khalil, A., Gileva, O., Naimark, O. & Arneodo, A. Comparative Multifractal Analysis of Dynamic Infrared Thermograms and X-Ray Mammograms Enlightens Changes in the Environment of Malignant Tumors. *Frontiers in Physiology* **7,** 336. https://www.frontiersin.org/article/10.3389/fphys.2016.00336 (2016).

Invited & Selected Talks

Extracting organelle membrane topology from super-resolution microscopy data. Focus on Microscopy 2022, Online. April 2022.

Extracting organelle membrane topology from super-resolution microscopy data. Single Molecule Localization Microscopy Symposium 2021, Lausanne, CH. August 2021.

Extracting organelle membrane topology from super-resolution microscopy data. Biophysical Society Annual Meeting 2021, Virtual. February 2021.

Imaging endoplasmic reticulum membrane topology and dynamics at the nanoscale. University of Maine Chemical and Biomedical Engineering Seminar Series. Virtual. October 2020.

Simulating FPALM/(d)STORM data based on measured photokinetic properties. 2018 Quantitative BioImaging Conference, Göttingen, DE. January 2018.

Wavelet-based particle tracking in unreconstructed, off-axis holograms. 2017 UMaine Student Research Symposium, Cross Insurance Center, Bangor, ME. April 2017.

Loss of tissue homeostasis in mammographic breast tumor environment. 43rd Maine Biological and Medical Sciences Symposium, MDI Biological Lab, Bar Harbor, ME. April 2016.

Characterization of Chromosome Territory Morphology and Intermingling in Mouse Nuclei. 2016 UMaine Student Research Symposium, Cross Insurance Center, Bangor, ME. April 2016.

Conference Presentations

Marin, Z., Graff, M., Bewersdorf, J., Baddeley, D. Extracting organelle membrane topology from super-resolution microscopy data. *EMBO | EMBL Symposium: Seeing is Believing - Imaging the Molecular Processes of Life.* Heidelberg, DE. Poster session (2019).

Marin, Z., Graff, M., Bewersdorf, J., Baddeley, D. Visualization of endoplasmic reticulum membrane topology based on super-resolution microscopy data. *BPS Thematic Meeting: Quantitative Aspects of Membrane Fusion and Fission.* Padova, IT. Poster session (2019).

Marin, Z., Rollins, B. D., Chung, K. K. H., Grace, M., Sun M, Bewersdorf, J., Baddeley, D. Simulation of single molecule switching nanoscopy using model-free kinetics. *Auckland Bioengineering Institute Research Forum.* Auckland, NZ. Poster session (2019).

Marin, Z., Rollins, B. D., Chung, K. K. H, Grace, M., Sun, M., Baddeley, D., Bewersdorf J. Simulation of single molecule switching nanoscopy using model-free kinetics. *Labeling and Nanoscopy.* Heidelberg, DE. Poster session (2018).

Marin, Z., Khalil, A. Wavelet-based particle tracking in unreconstructed, off-axis holograms. *44th Maine Biological and Medical Sciences Symposium.* Bar Harbor, ME, USA. Poster session (2017).