

# Morgan Sarah Schwartz

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## EDUCATION

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- FALL 2018 PhD in Biology  
- PRESENT **California Institute of Technology**, Pasadena, CA
- SEPT 2014 BA in Biology  
- MAY 2018 **Smith College**, Northampton, MA

## RESEARCH EXPERIENCE

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- JAN 2019 -  
PRESENT Graduate Student, PI: Dr. David Van Valen, California Institute of Technology  
*Developing a spatial optical barcode method to perform high-throughput live cell pooled library screens.*
- OCT 2018 -  
DEC 2018 Rotation Graduate Student, PI: Dr. Angelike Stathopoulos, California Institute of Technology  
*Developed transgenic fly lines in order to study germband extension and explored the application of vector field analysis for quantifying the process.*
- SEPT 2015 -  
AUG 2018 STRIDE Research Scholar, PI: Dr. Michael Barresi, Smith College  
*Led a team investigating zebrafish forebrain development and developing software to analyze 3D structures in the brain to enable analytical comparisons of complex structures. Concluding in an honors thesis.*
- JUNE - AUG  
2016 Janelia Undergraduate Scholar, PI: Dr. Philipp Keller, Janelia Research Campus, Howard Hughes Medical Institute  
*Studied time-lapse microscopy datasets and developed Python-based tools for characterizing metrics of cell behavior in Drosophila brain development.*
- SUMMER  
2015 Intern, PI: Dr. Marwan Sabbagh, Banner Sun Health Research Institute  
*Analyzed the pathological and clinical presentation of Neurofibrillary Tangle Predominant Dementia in comparison to Alzheimer's Disease.*
- AUG 2014 -  
MAY 2015 STRIDE Research Scholar, PI: Dr. Laura Katz, Smith College  
*Studied the biodiversity of plankton populations in tide pools by isolating and sequencing the DNA of individual species.*

AUG 2014 - MAY 2015	Research Assistant, PI: Dr. Thomas Riddell, Smith College <i>Developed a proposal for walking tour and accompanying marker text to memorialize the Northampton State Hospital.</i>
JAN - JUNE 2014	Research Assistant, Southwest Autism Research and Resource Center <i>Studied the effect of volunteer work with rescue animals on the social skills of young adults with Autism Spectrum Disorder.</i>

## HONORS AND AWARDS

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2020	<b>Honorable Mention</b> , National Science Foundation Graduate Research Fellowship
2019	<b>Undergraduate Teaching Award</b> , Caltech Student Committee for Biology Advancement
2018	<b>Highest Honors</b> , Smith College Biology Department
2018	<b>First Place Undergraduate Poster</b> , New England Society for Developmental Biology
2018	<b>Finalist</b> , Rhodes Fellowship
2018	<b>Finalist</b> , Marshall Scholarship
2017	<b>Goldwater Scholar</b> , Barry Goldwater Scholarship and Excellence in Education Foundation
2017	<b>Associate Membership</b> , Sigma Xi, The Scientific Research Honor Society
2017	<b>First Place Undergraduate Poster</b> , National Society for Developmental Biology
2016	<b>First Place Undergraduate Poster</b> , New England Society for Developmental Biology
2014-2018	<b>Dean's List</b> , Smith College
2014-2018	<b>STRIDE Scholar</b> , Smith College
2014	<b>Faculty Prize</b> , Phoenix Country Day School
2014	<b>National Merit Scholar</b> , National Merit Scholarship Program

## PUBLICATIONS

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Schnabl JM, Litz M, Schwartz M, Barresi MJ et al. (In preparation) **Cranial neural crest cell immigration is required for forebrain formation in zebrafish.**

Bannon D, Moen E, Schwartz M, Van Valen D, et al. (2020) **Dynamic allocation of computational resources for deep learning-enabled cellular image analysis with Kubernetes.** bioRxiv, 505032. (Under review by Nature Methods) [<https://github.com/vanvalenlab/kiosk-console>]

Schnabl JM, Litz M, Schneider C, PendkoffLidbeck N, Bashiruddin S, Schwartz M, Alligood K, Barresi MJ (2020) **Characterizing the diverse cells that associate with**

**the developing commissures of the zebrafish forebrain.** bioRxiv, 205153. (Accepted with revisions by Developmental Neurobiology)

Schwartz M, Schnabl JM, Litz M, Baumer BS, Barresi MJ. (2020)  **$\Delta$ SCOPE: A new method to quantify 3D biological structures and identify differences in zebrafish forebrain development.** Developmental Biology, 460.2. [<https://github.com/msschwartz21/deltascope>]

Moen E, Borba E, Miller G, Schwartz M, Van Valen D, et al. (2019) **Accurate cell tracking and lineage construction in live-cell imaging experiments with deep learning.** bioRxiv, 803205. [<https://github.com/vanvalenlab/deepcell-tracking>]

Schwartz M, Sabbagh M et al. (2016) **Neurofibrillary Tangle Predominant Dementia: Clinical and pathological description in a case series.** Journal of Alzheimer's Disease and Parkinsonism, 6:204.

## POSTERS AND PRESENTATIONS

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Schwartz M, Van Valen D, et al. (2019) **Deep learning enabled image analysis unites high throughput functional genomics with live cell imaging.** Presentation. Women in Computational Biology, Janelia Research Campus, VA.

Schwartz M, Barresi MJ, et al. (2018)  **$\Delta$ SCOPE: A new method to quantify biological structures and identify differences in zebrafish forebrain development.** Poster. New England Society for Developmental Biology, Woods Hole, MA.

Schwartz M, Barresi MJ, et al. (2017) **A new computational method to quantify 3D image data to detail changes in morphological structure and spatial relationships during nervous system development.** Poster. National Society for Developmental Biology, Minnesota, USA.

Schwartz M. (2016) **Untangling brain development at Janelia Research Campus.** Presentation. Smith in the World, Massachusetts, USA.

Schwartz M, Barresi MJ, et al. (2016) **Investigating the role of robo4 in glial bridge condensation and its influence on the formation of the post-optic commissure.** Poster. New England Society for Developmental Biology, Massachusetts, USA.

Schwartz M, Browne B, Sabbagh M. (2015) **Barriers and solutions to under-enrollment in Alzheimer's Disease clinical trials.** Poster. Banner Health Summer Research Symposium, Arizona, USA.

Schwartz M, McDannell B, El-Banna G, Grattepanche JD, Katz LA. (2015) **Microbial biodiversity in the ocean.** Poster. Smith College Celebrating Collaborations, Massachusetts, USA.

Schwartz M, Smith S, Riddell T. (2015) **A walking tour of Northampton State Hospital.** Presentation. Smith College Celebrating Collaborations, Massachusetts, USA.

## PATENTS

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Schwartz M, Pao E, Van Valen D. **Deep learning enabled spatial optical barcodes for pooled library screens.** Filed 13 Nov 2019. US Provisional Patent.

## TEACHING EXPERIENCE

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- FALL 2019 & 2020 **Teaching Assistant for Bi 122: Genetics**, California Institute of Technology  
*Collaborated with a team of four teaching assistants to write homework assignments and exam material.*
- SPRING 2019 **Head Teaching Assistant for Bi 1: Principles of Biology**, California Institute of Technology  
*Led a team of two professors and eighteen teaching assistants to manage a required non-major course of 200 students. Earned a teaching award.*
- WINTER 2019 **Teaching Assistant for Bi 8: Introduction to Molecular Biology**, California Institute of Technology  
*Worked with a team of six graduate teaching assistants to write homework and exam material and hold weekly recitation sections to supplement lecture material.*
- FALL 2017 **Lab Assistant for Bio 303: Developmental Biology**, Smith College  
*Worked collaboratively with the instructor and a three-person team to prepare experiments and was personally responsible for confocal microscope imaging.*
- SPRING 2016 **Tutor for Bio 230: Genomes and Genetic Analysis**, Smith College  
*Led weekly and on request tutoring sessions, where I helped students master unfamiliar material and prepare for tests.*