ASHLEY VALENTINA SCHWARTZ

Curriculum Vitae

Southern California ● https://ashleyschwartz.com ● https://linkedin.com/in/ashleyvsch

Date of CV: September 2024

PROFILE

Computational science PhD candidate at San Diego State University and the University of California Irvine. Strong organization and time-management skills gained through research, teaching, and mentoring while maintaining a high GPA. Dedicated to developing and utilizing mathematical and computational models in an interdisciplinary setting. Continually bridging the gap between applied mathematics, computer science, and biology with a specialization in developmental toxicology.

EDUCATION

Doctor of Philosophy, Computational Science   **08/2020 – present**
University of California Irvine, Irvine, California & San Diego State University, San Diego, California
Advisors: Dr. Uduak George, Department of Mathematics & Dr. Karilyn Sant, School of Public Health
Dissertation Title: Computational Models to Assess the Role of Environmental Exposures in Development

Graduate Coursework, Applied Mathematics   **08/2019 – 05/2020**
San Diego State University, San Diego, California

Bachelor of Science *Cum Laude*, Applied Mathematics   **08/2015 – 05/2019**
San Diego State University, San Diego, California

INDUSTRY EXPERIENCE

Quantitative Systems Pharmacology Intern   **06/2022– 08/2022**
Takeda Pharmaceuticals, Quantitative Translational Sciences (San Diego, California)
- Developed a quantitative systems pharmacology (QSP) model to simulate the neuropathology of Parkinson's Disease.
- Determined the optimal time for therapeutic intervention to support the neuroscience interdisciplinary program at Takeda.
- Utilized quantitative techniques such as pharmacokinetics and pharmacodynamics (PK/PD) modeling to translate preclinical data and predictions to the clinic.

RESEARCH EXPERIENCE

Doctoral Researcher   **08/2020 – present**
Computational Science Research Center, San Diego State University (San Diego, California)
- Conducted computational developmental toxicology research under the guidance of Drs. Uduak George and Karilyn Sant.
- Employed advanced mathematical and computational models to elucidate the impact of toxicants on embryonic development.
- Disseminated research findings through authoring publications and delivering presentations at conferences.

Graduate Research Assistant   **05/2019 – present**
Department of Mathematics and Statistics, San Diego State University (San Diego, California)
- Conducted interdisciplinary research projects as an applied mathematician and modeler under the supervision of Dr. George.
- Developed and implemented advanced image analysis and segmentation algorithms for lung inflammation applications using magnetic resonance and microscopy images.

- Provided consultation to research teams, offering valuable insights and guidance on image analysis and modeling techniques.
- Mentored both undergraduate and graduate students, overseeing and supporting their research projects to foster their academic and professional growth.

School of Public Health, San Diego State University (San Diego, California)
- Execute bioinformatics pipelines and conduct comprehensive analysis for RNA-sequencing projects in the field of developmental toxicology.
- Collaborate in designing optimized wet lab experiments to generate data for accurate analysis and development of mathematical models.
- Successfully led a team in executing a complex toxicology microscopy experiment, overseeing all aspects from chemical handling and exposures to fish staging and imaging, ensuring precise and reliable results.

Graduate Research Fellow   09/2021 – 06/2022
Institute for Genomics and Bioinformatics, Department of Computer Science, University of California Irvine (Irvine, California)
- Conducted research under the advisement of Dr. Pierre Baldi.
- Gained extensive expertise in computational techniques for computational biology and bioinformatics, specifically focusing on machine learning approaches such as Markov-chain, Monte-Carlo methods, and clustering.
- Acquired hands-on experience and practical knowledge in applying these computational techniques to address complex problems in the field of computational biology and bioinformatics.

Undergraduate Research Assistant   01/2018 – 05/2019
Department of Mathematics and Statistics, San Diego State University (San Diego, California)
- Engaged in biomathematics research within the George Lab, under the supervision of Dr. George, and the Disease Modeling Lab, led by Dr. Naveen Vaidya.
- Developed an image processing algorithm capable of accurately identifying the pancreas area in zebrafish.
- Applied advanced statistical and mathematical techniques to investigate the dynamics of Human Immunodeficiency Virus (HIV) in individuals under the influence of drugs of abuse.

TEACHING EXPERIENCE

Python Programming with Libraries Graduate Teaching Assistant   09/2021 – 03/2022
University of California Irvine Donald Bren School of Information and Computer Sciences (Irvine, California)
- Provided interactive tutoring sessions to students, guiding them in mastering essential Python programming skills.
- Successfully managed administrative tasks, including grading, and providing support to a diverse group of over 100 students.

Calculus For Life Sciences Graduate Teaching Assistant   08/2020 – 05/2021
San Diego State University Department of Mathematics and Statistics (San Diego, California)
- Conducted engaging bi-weekly activity sessions to reinforce student understanding of calculus through real-world applications.
- Developed comprehensive lesson plans and gathered student feedback to enhance course materials and student success.
- Efficiently handled administrative responsibilities such as grading and providing ongoing support to students.

Precalculus Teaching Assistant Lead   08/2017 – 05/2019
San Diego State University Department of Mathematics and Statistics (San Diego, California)
- Facilitated interactive precalculus activity sessions, focusing on active learning and applications of mathematical concepts.
- Demonstrated strong leadership skills by developing and organizing lesson plans for a team of teaching assistants.

FELLOWSHIPS AND SCHOLARHIPS

$35,000/year – University Graduate Fellow   2024-present
San Diego State University College of Graduate Studies

$10,000/year – ARCS Scholar   2022-present
Achievement Rewards for College Scientists, San Diego Chapter

$30,000 – ACM SIGHPC Computational and Data Science Fellow   2020-2022
Association for Computing and Machinery Special Interest Group on High-Performance Computing

$20,000 – NSF S-STEM ASSICS Scholar   2020-2022
National Science Foundation Funded Academic Support & Scholarships for Interdisciplinary Computational Scientists

$3,500 – Howell-CSUPERB Research Scholar   2018
Doris A. Howell Foundation – California State University Program for Education & Research in Biotechnology

SCHOLARLY AWARDS

03/2024	**Windover Ventures Award,** Computational Science Research Center Applied Computational Science and Engineering Student Showcase
03/2024	**Raymond Moberly Service Award,** Computational Science Research Center Applied Computational Science and Engineering Student Showcase
11/2023	**Graduate Student Travel Award,** Predictive Modeling in Biology and Biomedicine Conference
10/2023	**Advanced Research Course Tuition and Travel Award,** Marine Biological Laboratory Advanced Research Course on Gene Regulatory Networks for Development
05/2023	**Diversity Initiatives Career Development Award,** Society of Toxicology
04/2023	**Director's Award (1st Place),** Computational Science Research Center Applied Computational Science and Engineering Student Showcase
03/2023	**Finalist - Best Trainee Abstract Award,** Biological Modeling Specialty Section, Society of Toxicology Annual Meeting 2023
04/2021	**1st Place - Physical and Mathematical Sciences; Interdisciplinary,** California State University Student Research Competition, SDSU delegate
03/2021	**Director's Award (1st Place),** Computational Science Research Center Applied Computational Science and Engineering Student Showcase
03/2021	**President's Award,** San Diego State University Student Research Symposium
03/2019	**Undergraduate Research Excellence Award,** San Diego State University Student Research Symposium

RESEARCH

PUBLICATIONS

1. Schwartz A.V., Sant K.E., George U.Z. danRerLib: a python package for zebrafish transcriptomics. *Bioinformatics Advances.* Published online May 6, 2024. https://doi.org/10.1093/bioadv/vbae065.

2. Adam Ahmed Adam M.*, Robinson M.*, Schwartz A.V.*, Wells G.*, Hoang A., Albekioni E., Chao G., Weeks J., George U.Z., House C.D., Turcan Ş., Sohl C.D. Catalytically distinct IDH1 mutants tune phenotype severity in tumor models. *bioRxiv [preprint].* Published online April 23, 2024. https://doi.org/10.1101/2024.04.22.590655. *These authors contributed equally to this manuscript.

3. Schwartz A.V., Sant K.E., George U.Z. Development of a Dynamic Network Model to Identify Temporal Patterns of Structural Malformations in Zebrafish Embryos Exposed to a Model Toxicant, Tris(4-chlorophenyl)methanol. *Journal of Xenobiotics.* Published online June 16, 2023. https://doi.org/10.3390/jox13020021.

4. **Schwartz A.V.***, Lee A.N.*, Theilmann R.J., George U.Z. Spatial heterogeneity of excess lung fluid in cystic fibrosis: generalized, localized diffuse, and localized presentations. *Applied Sciences.* Published online October 21, 2022. https://doi.org/10.3390/app122010647. ***These authors contributed equally to this manuscript.**
5. **Schwartz A.V.**, Sant K.E., Navarrete J., George U.Z. Mathematical modeling of the interaction between yolk utilization and fish growth in zebrafish, Danio rerio. *Development*. Published online May 7, 2021. https://doi.org/10.1242/dev.193508.
6. Navarrete J., Wilson P., Allsing N, Gordon C., Margolis R, **Schwartz A.V.**, Rogowski B., Topps J., George U.Z., Sant K.E. The ecotoxicological contaminant Tris(4-chlorophenyl)methanol (TCPMOH) impacts embryonic development in zebrafish (Danio rerio). *Aquatic Toxicology*. Published online March 26, 2021. https://doi.org/10.1016/j.aquatox.2021.105815.
7. Lee A.N., **Schwartz A.V.**, Theilmann R.J., George U.Z. Characterization of mucus in digital image analysis of cystic fibrosis lungs. *Proceedings of the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C)*. Vail, CO, June 17-20.
8. Horkowitz, A.P., **Schwartz A.V.**, Alvarez, C.A., Herrera, E.B., Thoman, M.L., Chat-field, D.A., Osborn, K.G., Feuer, R., George U.Z., Phillips, J.A. Acetylcholine Regulates Pulmonary Pathology During Viral Infection and Recovery. *Immunotargets and Therapy*. Published online December 17, 2020. https://doi.org/10.2147/ITT.S279228.
9. Bowers J.S., Poole B.D., Maher-Boulis C., **Schwartz A.V.**, Bloomquist A., Young E.S. The Roles and Benefits of Using Undergraduate Teaching Assistants to Support the Work of SUMMIT-P. *Journal of Mathematics and Science: Collaborative Explorations*. Published online August 11, 2020. https://doi.org/10.25891/zdjg-m390.

SELECTED PRESENTATIONS

1. **Award Recipient.** danRerLib: A Python Package for Zebrafish Transcriptomics. Oral and poster presentation at the Computational Science Research Center Applied Computational Science and Engineering Student Showcase. San Diego, CA. 2024 Mar 22.
2. Machine learning identifies the chemical properties that predict pancreas toxicity in the zebrafish model. Poster presentation at the Predictive Modeling in Biology and Biomedicine Conference. Riverside, CA. 2024 Nov 17-19.
3. **Award Recipient.** Machine learning identifies the chemical properties that predict pancreas toxicity in the zebrafish model. Oral and poster presentation at the Computational Science Research Center Applied Computational Science and Engineering Student Showcase. San Diego, CA. 2023 Apr 7.
4. **Award Recipient.** Mathematical modeling of the interaction between yolk utilization and fish growth in zebrafish following developmental exposure to Tris(4-chlorophenyl)methanol (TCPMOH). Poster presentation at the Society of Toxicology Annual Meeting, Biological Modeling Poster Session. Nashville, TN. 2023 March 19-23.
5. **Selected Featured Speaker.** Machine learning and high-performance computing for the aggregation of publicly available data sets. Platform session oral presentation at the Southern California Chapter of the Society of Toxicology; Emerging Topics in Systems Toxicology. San Diego, CA. 2022 October 6.
6. A developed complex network model for zebrafish embryonic deformity incidence following developmental exposure to Tris(4-chlorophenyl methanol (TCPMOH). Poster presentation at the Society of Toxicology Annual Meeting, Computational Toxicology Poster Session. San Diego. 2022 March 27-31.
7. Mathematical and network models reveal significant developmental deformities induced by the ecotoxicological contaminant Tris(4-chlorophenyl)methanol (TCPMOH) in zebrafish (Danio rerio). Oral presentation at the Society for Industrial and Applied Mathematicians Annual Meeting. Virtual. 2021 July 11-15.
8. **Invited Speaker.** New metrics for quantifying the spatial inhomogeneity of abnormal lung fluid in MR images of cystic fibrosis lungs. Invited oral presentation at the Society of Mathematical Biology Annual Meeting, Minisymposia on understanding lung function and disease through mathematical modeling and experiment. Virtual. 2021 June 13-17.
9. Mathematical and network models reveal significant developmental deformities induced by the ecotoxicological contaminant Tris(4-chlorophenyl)methanol (TCPMOH) in zebrafish (Danio rerio). Oral presentation at the American Mathematical Society Fall Western Sectional Meeting. Virtual. 2021 October 23-24.

10. **Invited Speaker, Award Recipient.** Network models for analyzing the deformities induced by the ecotoxicological contaminant Tris(4-chlorophenyl)methanol (TCPMOH) in developing zebrafish (Danio rerio). Oral presentation at the California State University Student Research Competition. Virtual. 2021 April 30 – May 1.
11. **Award Recipient**. Developmental deformities induced by the ecotoxicological contaminant Tris(4-chlorophenyl)methanol (TCPMOH) in zebrafish (Danio rerio). Oral presentation at the Computational Science Research Center Applied Computational Science and Engineering Student Showcase. Virtual. 2021.
12. **Award Recipient.** Network models for analyzing the deformities induced by the ecotoxicological contaminant Tris(4-chlorophenyl)methanol (TCPMOH) in developing zebrafish (Danio rerio). Oral presentation at the San Diego State University Student Research Symposium. Virtual. 2021 March 26.
13. An automated algorithm for the spatial identification of abnormal lung fluid in cystic fibrosis patients. Oral presentation at the Viral Information Institute Annual Meeting. Virtual. 2021 January 15.
14. A mathematical model describing the interaction between embryonic nutrition and overall growth. Oral presentation at the San Diego State University Student Research Symposium. San Diego, CA. 2020 February 28-29.
15. Tris(4-chlorophenyl)methanol contributes to embryonic nutrition perturbation, a mathematical model. Oral presentation at the American Mathematical Society Fall Western Sectional Meeting. Riverside, CA. 2019 Nov 9-10.
16. **Selected Featured Speaker.** Analyzing the effect of perfluorobutane sulfonic acid on pancreatic organogenesis in zebrafish using automated image segmentation. Platform session oral presentation at the Southern California Chapter of the Society of Toxicology; Emerging Topics in Computational, Drug Discovery, Neuro-, and Environmental Toxicology. San Diego, CA. 2019 November 7.
17. **Invited.** Mathematical and computational models analyzing the effects of common pollutants in the zebrafish model. Poster presentation at the San Diego State University Student Research Symposium Showcase; Inauguration of SDSU President Dr. Adella De La Torre. San Diego, CA. 2019 April 11.
18. **Award Recipient.** Mathematical and computational models analyzing the effects of common pollutants in the zebrafish model. San Diego State University Student Research Symposium. San Diego, CA. 2019 March 1-2.
19. Mathematical models to predict the risk of HIV infection under drugs of abuse. San Diego State University Student Research Symposium. San Diego, CA. 2018 March 2-3.

UNDERGRADUATE AND GRADUATE RESEARCH PROJECTS ADVISED
1. Rachel Hobbs, Applied Mathematics, SDSU. Project: Proteomics data analysis for the understanding the role of protein mutations in cancer.
2. Anh Nuygen, Applied Mathematics, SDSU. Project: Spatial transcriptomics for the understanding of immune function in vaping-associated pulmonary injury.
3. Mariel Reyes, Computer Science, SDSU. Project: Computer-aided disease classification of Cystic Fibrosis.
4. Jasmine Camacho and Aqueycha Chavira Guajardo, Mathematics, SDSU. Project: Analyzing the interaction between FGF10 and SHH proteins in early lung development through mathematical and computational models.
5. Amanda Lee, Mathematics, SDSU. Project: Computer-aided disease classification of Cystic Fibrosis.

SERVICE

2023- **President, San Diego State University Society for Industrial and Applied Mathematicians Student Chapter**
Elected as President of the SDSU SIAM chapter, responsible for organizing chapter events, maintaining communication with the national chapter, and cultivating a vibrant community for computational science students on campus.

2023- **Scientific Communication Blogger, ashleyschwartz.com**
Maintain a STEM blog focused on improving scientific communication by providing free and accessible information on complex research topics. Author bioinformatics and machine learning tutorials, and share updates on conferences attended and published works, expanding the reach of my research and fostering engagement with a diverse audience.

2023-2024	Graduate Student Representative, San Diego State University College of Sciences Student Council

2023-2024   **Graduate Student Representative, San Diego State University College of Sciences Student Council**
Serve on the SDSU College of Sciences Student Council to represent and advocate for the graduate student population within the boarder SDSU community.

2023   **Graduate Student Sub-Committee, Faculty Search Committee, Computational Science Faculty**
Volunteered for the faculty search committee including attending candidate talks, participating in candidate lunches to discuss student perspectives, and participating in discussions to submit final recommendations to the faculty search committee.

2023   **Mentor, Society of Toxicology Committee for Diversity Initiatives Undergraduate Education Program**
Participated as a mentor in the Undergraduate Education Program and the session titled "Graduate School: How to get in and what to expect? Graduate student and academic Advisor perspectives."

2020-2021   **Mentor, SDSU Women in Science Society**
Mentored women in STEM through their undergraduate careers by providing advice on ways to get involved and stay successful on campus.

2018-2020   **Calculus Ambassador, Underrepresented Minorities in STEM Retention Rate Project**
Presented real-world applications of calculus to Calculus 1 students at SDSU aiming to inspire students about their impact as STEM majors.

2018-2019   **Vice President and Co-Founder, STEM Education Club**
Established club presence on the San Diego State University campus through administrative tasks, marketing, meeting facilitation, panel, and guest speaker organization.

2017-2019   **Volunteer Tutor, Grossmont High School Department of Mathematics**
Assisted high school mathematics teachers in attending to student questions during class time.

2015-2018   **Volunteer Reading Tutor, Read-Lead-Achieve Champions are Readers Philanthropy.**
Participated in and organized fundraising events to purchase books for inner-city San Diego elementary schools. Visited the schools to deliver books, provide reading supplies, and facilitate reading groups.

PROFESSIONAL AFFILIATIONS

2022-   **Society of Toxicology – Graduate Student Member**
Computational Toxicology Specialty Section, Biological Modeling Specialty Section, Mechanisms and Systems Biology Specialty Section, Hispanic Organization of Toxicologists

2022-   **Society for Industrial and Applied Mathematicians – Student Member**

2020-2022   **Association for Computing and Machinery – Member**
Special Interest Group on High-Performance Computing

RELEVANT COURSEWORK

2022   Machine Learning (A), Statistical Methods Categorical Data Sets (A), Merging Models and Data (A-)
2021   Introduction to Artificial Intelligence (A), Statistical Methods for Data Analysis (A), Principles of Scientific Computing (A), Parallel Computing (A), Computational Database Fundamentals (A), Research Ethics Seminar (CR)
2020   Computational Methods for Scientists (A), Advanced Computational Methods for Optimization (A), Mathematical Modeling with Applications in Biology (A), Numerical Partial Differential Equations (A), Advanced Biostatistical Methods 2 (A)
2019   Mathematical Physiology (A), Advanced Biostatistical Methods 1 (B+), Continuous Dynamical Systems and Chaos (A), Numerical Matrix Analysis (A), Partial Differential Equations (A)
2018   Functions of a Complex Variable (A), Abstract Algebra (A), Inro to Numerical Analysis and Computing (A), Mathematical Biology and Biomedicine (A)
2017   Applied Probability (A), Advanced Linear Algebra (A), Elementary Differential Equations (A)

SKILLS

Programming Languages: *Advanced*: Python R, MATLAB | *Intermediate*: C, C++, R, FORTRAN 90, Perl, SQL

Machine Learning Libraries: Pytorch, Keras, Tensorflow, Scikit-Learn, NumPy

Other Tools: LaTeX, ImageJ, Simpleware, Microsoft, macOS, Linux

Scientific Computing: image analysis, optimization, numerical analysis, database design, algorithm development, cluster computing, machine learning, high performance computing

Soft Skills: team player, problem solver, creative thinking, project development

REFERENCES

UDUAK GEORGE
Assistant Professor
Department of Mathematics and Statistics
San Diego State University
e. ugeorge@sdsu.edu
*Note: Dr. George is my primary research advisor (2018-present)
and can speak on my mathematical and computational abilities.*

KARILYN SANT
Assistant Professor
Division of Environmental Health, School of Public Health
San Diego State University
e: ksant@sdsu.edu
*Note: Dr. Sant is my secondary research mentor (2018-present)
and can speak on my applied knowledge in the toxicology field.*

ANTONI LUQUE
Assistant Professor
Department of Mathematics and Statistics
San Diego State University
e. aluque@sdsu.edu
*Note: Dr. Luque is the lead professor for the Calculus for Life
Sciences and can speak to my teaching abilities (2020-2021).*