

VIVASWAT SHASTRY

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EDUCATION

- Master of Science* 2018–present University of Wyoming, Laramie
Major: Botany
Advisor: [Prof. C. Alex Buerkle](#)
- Bachelor of Science* 2014–2017 University of Wyoming, Laramie
Major: Electrical Engineering
Minor: Interdisciplinary Computational Science
Honors: *summa cum laude*
Advisor: [Prof. Suresh S. Muknahallipatna](#)

RESEARCH POSITIONS

- University of Wyoming* *Graduate Research Assistant, Botany*
January 2018–present
Investigating the effects of variational recombination rate on genomic diversity estimates. Extended a hierarchical Bayesian model for genotype and ancestry estimation to polyploid and mixed-ploidy populations. Improved the performance of a generative model for analyzing microbial count data by porting to a more efficient computational scheme.
PI: Prof. C. Alex Buerkle
- Undergraduate Research Assistant, Mathematics*
August 2017–December 2017
Implemented and built a C++ package for a second-order ODE solver employing a control-value finite-element method.
PI: Prof. Victor E. Ginting
- EPSCoR Undergraduate Research Fellow, Electrical and Computer Engineering*
September 2015–May 2016
Developed and benchmarked methods for parallelized numerical integration on a graphical processing unit (GPU).
PI: Prof. Suresh S. Muknahallipatna

PUBLICATIONS

- 2019 J. G. Harrison, W. J. Calder, **V. Shastry**, C. A. Buerkle. Dirichlet-multinomial modelling outperforms alternatives for analysis of microbiome and other ecological count data. (accepted at Molecular Ecology Resources; [bioRxiv](#))
- Forthcoming* **V. Shastry**, P. Adams, D. Lindtke, E. G. Mandeville, T. L. Parchman, Z. Gompert, C. A. Buerkle. Model-based genotype and ancestry estimation for potential hybrids in mixed-ploidy populations. (in internal review)

ACADEMIC WORK POSITIONS

University of
Wyoming

Undergraduate Assistant, Engineering Summer Program for Teachers (ESP4T)
May 2016–December 2017

Participated in independent research projects based on computer vision and parallel programming. Implemented modules in science and math for the Arduino and Raspberry Pi platforms to be used in K-12 classrooms. Assisted in summer workshops focused on teaching engineering concepts to high-school instructors.

Computing Intern, Advanced Research Computing Center (ARCC)
May 2016–August 2017

Investigated benchmarks on a compute cluster to detect bottlenecks for various programming paradigms by writing scripts for metrics analysis. Developed and taught material on basic high-performance computing topics to researchers via programming bootcamps.

Tutor, Math Assistance Center
September 2015–May 2016

Assisted students with calculus, linear algebra and numerical math applications in engineering.

RESEARCH AND TRAVEL GRANTS

2018–INBRE Bioinformatics Core Travel for Training Award (\$1,200)

2015–Wyoming EPSCoR Research Fellowship (\$1,600)

AWARDS AND HONORS

2019–Department of Botany Wilhelm G Solheim Scholarship (\$600)

2017/2018–National Tau Beta Pi Scholarship Award (\$2,000)

2017/2018–W. E. Kuhn Foreign Student Scholarship (\$816)

2014 to 2017–Engineering Undergraduate Research Award (total \$24,000)

2014 to 2017–Rocky Mountain International Scholarship (total \$17,500)

2014 to 2017–Rocky Mountain Plus International Scholarship (total \$1,750)

2014 to 2017–University of Wyoming President's Honor Roll (6 semesters) & Dean's Honor Roll (1 semester)

2017–Best Poster at the Rocky Mountain Advanced Computing Consortium HPC Symposium (Boulder, CO)

2017–Best Software Design Project at the Wyoming Undergraduate Research Day (Laramie, WY)

2017–Junior Phi Kappa Phi Scholarship (\$150)

2016–Carl Oslund (Wyoming Engineering Society) Scholarship (\$2,500)

2016–University of Wyoming Tau Beta Pi Outstanding Junior

2015–University of Wyoming Tau Beta Pi Outstanding Freshman

TECHNICAL EXPERTISE

Computational skills

Programming languages: R, Python, MATLAB, C/C++, Eidos, Perl, bash, Verilog HDL, x86 assembly

Packages and paradigms: SLiM3, tskit, GATK, SAMtools, bwa, GSL, HDF5, Stan, JAGS/BUGS, mlr, OpenMP, OpenACC, MPI protocols

Miscellaneous: Job scheduling and management with Slurm, html, L^AT_EX, MS Office, Make & autotools, version control with git, basic regular expressions, general-purpose parallel programming via multithreading & distributed computing

Analytical expertise

Statistical: data wrangling and various analytical methods, including Bayesian statistical modeling, frequentist univariate and multivariate techniques, including machine learning approaches and neural networks, generalized linear models for spatial statistics, Markov-chain Monte Carlo sampling techniques

Biological: variant calling for polyploid sequencing data, bioinformatics for GBS-based population genetics and genomics, coalescent and forward genetic simulations, macroevolutionary principles (phylogenetics, trait evolution and diversification)

Mathematical: numerical methods to solve linear (first- and second-order) ODEs, PDEs, matrix theory and linear algebra as applied in image processing and computer vision algorithms

SCIENCE OUTREACH AND VOLUNTEERING

International Graduate Student Orientation, University of Wyoming, Laramie
2019

Panelist. Briefing incoming students on the general topic of how to navigate graduate school.

Data Science Center, University of Wyoming, Laramie
2018–present

Active member. Assisted other members with a variety of computational tasks.

“Ask an Expert” session at the NCAR booth, Supercomputing17, Denver
November 2017

Student assistant. Volunteered at a ‘High-Performance Computing and Weather Forecasting on a Raspberry Pi’ station set up for high-schoolers attending the conference.

NCAR Diversity in Parallel Computing Workshop series, Miami Dade College,
Miami

March 2017

Student presenter. Conducted a tutorial on distributed parallel programming with a cluster of Raspberry Pis to junior faculty members.

Open Science Days, NCAR Wyoming Supercomputing Center, Cheyenne
2015–2017

Science outreach volunteer. Presented basic projects in science, engineering,

and computing in an effort to encourage participation in typically underrepresented communities in computing.

Electrical and Computer Engineering, University of Wyoming, Laramie
2016–2017

Project mentor. Mentored incoming freshmen and sophomores with their independent research projects.

2014–2017

Undergraduate ambassador. Organized and conducted research exhibition demos of ongoing projects to Women in Computing symposiums, Wyoming government officials, high-school students, and prospective donors.

SELECTED PRESENTATIONS

Spoken presentations

December 2018–Genotype and Ancestry Estimation in Polyploids. ForBio course: Population Genetics for Polyploids (Drøbak, Norway)

March 2017–Parallel computing with the Raspberry Pi. NCAR Diversity in Parallel Computing Workshop (Miami, FL)

Poster presentations

August 2017–Parallel Optimization to Obtain a High-Quality Depth Map from an Uncalibrated Small Motion Clip. Rocky Mountain Advanced Computing Consortium HPC Symposium (Boulder, CO)

May 2016–GPGPU Computing for Numerical Integration Methods on the NVIDIA Jetson TK1. Wyoming Undergraduate Research Day (Laramie, WY)

LEADERSHIP AND PROFESSIONAL ACTIVITIES

September 2019–Participant at the Introduction to Data Science and Machine Learning in R Workshop (Laramie, WY)

July/August 2019–Participant of the Long Course at the Computational Genomics Summer Institute (CGSI) in UCLA (Los Angeles, CA)

December 2018–Participant of ForBio course: Polyploid Population Genetics (Drøbak, Norway)

2017–Senator for the College of Engineering and Applied Sciences, Associated Students of the University of Wyoming (ASUW)

2017/2018–Recording Secretary for the Tau Beta Pi Wyoming Alpha chapter

November 2016–Exploring HPC for Undergraduates at SC16 (one of 30 students selected worldwide for an all-expense paid trip to Salt Lake City, UT)

2016/2017–Secretary for the International Students' Association at the University of Wyoming

2016–President of the Indian Students' Organization at the University of Wyoming

2015–Vice President of the Indian Students' Organization at the University of Wyoming

December 22, 2019