

# VIVASWAT SHASTRY

email [vivaswat@uchicago.edu](mailto:vivaswat@uchicago.edu)  
website <http://vivaswats.github.io/>

## EDUCATION

Doctor of Philosophy	2020 - present	University of Chicago Committee on Genetics, Genomics and Systems Biology Advisor: <a href="#">Dr. John P. Novembre</a>
Master of Science	2018 - 2020	University of Wyoming Botany Advisor: <a href="#">Dr. C. Alex Buerkle</a>
Bachelor of Science	2014 - 2017	University of Wyoming Major: Electrical Engineering Minor: Interdisciplinary Computational Science Honors: <i>summa cum laude</i> Advisor: <a href="#">Dr. Suresh S. Muknahallipatna</a>

## RESEARCH POSITIONS

University of Chicago	<i>Rotation Student, Committee on GGSB</i> January 2021–March 2021 Examined the accuracy and efficacy of a two-locus likelihood model for detecting selection from haplotypic data using standard population genetics simulations. PI: Dr. Matthias Steinrücken
University of Wyoming	<i>Graduate Research Assistant, Botany</i> January 2018–present Extended a hierarchical Bayesian model for genotype and ancestry estimation to polyploid and mixed-ploidy populations. PI: Dr. C. Alex Buerkle
	<i>EPSCoR Undergraduate Research Fellow, Electrical and Computer Engineering</i> September 2015–May 2016 Developed and benchmarked methods for parallelized numerical integration on a graphical processing unit (GPU). PI: Dr. Suresh S. Muknahallipatna

## PUBLICATIONS

2020	J. G. Harrison, W. J. Calder, <b>V. Shastry</b> , C. A. Buerkle. Dirichlet-multinomial modelling outperforms alternatives for analysis of microbiome and other ecological count data. (published in <i>Molecular Ecology Resources</i> ; <a href="#">bioRxiv</a> )
2021	<b>V. Shastry</b> , 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. (published in <i>Molecular Ecology Resources</i> ; <a href="#">bioRxiv</a> )

## 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

2020–Aven Nelson Fellowship in Systematic Botany (\$1,300)

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)

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<sup>A</sup>T<sub>E</sub>X, 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

March 4, 2021