

Schuyler D. Smith, Ph.D.

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Education

Ph.D. Bioinformatics and Computational Biology	2021
Iowa State University, Ames, IA	
<i>Characterization of environmental microbiomes impacted by Iowa agriculture.</i>	
M.S. Quantitative Genetics	2015
Texas A&M University, College Station, TX	
<i>Molecular Characterization of the Texas Maize Breeding Program.</i>	
B.S. Genetics	2012
Iowa State University, Ames, IA	

Experience

Senior Computational Scientist, Bioinformatics	2022 – present
Agronomic and Environmental Sciences Nutrien Ag Solutions - Champaign, Illinois	
<i>Full-stack bioinformatician, in charge of building pipelines in NextFlow and setting up cloud-computing environments for AWS and GCP, developing custom software and packages for analyses, and analyzing of microbiome data to present to stakeholders.</i>	
Graduate Research Assistant - Ph.D.	2015 – 2016
Potato Breeding and Genetics Laboratory University of Wisconsin - Madison - Madison, Wisconsin	
<i>Developed a pipeline for processing NGS sequencing data and SNP-calling for auto-tetraploid crops, performed GWAS, and investigated ML methods for imputation of auto-tetraploid genotypes.</i>	
Biological Science Technician - Internship	2014
Arid-Land Agricultural Research Center United States Department of Agriculture - Maricopa, Arizona	
<i>Evaluated high-throughput phenotyping platforms for crop traits such as canopy cover, plant height, and seed counting.</i>	
Maize Breeding Intern	2012
Huxley Research Station Monsanto Company - Huxley, Iowa	
Maize Product Trait Development Intern – 6 month	2011
Willmar Research Station DuPont Pioneer - Willmar, Minnesota	
Undergraduate Research Assistant	2010 - 2011
Soybean Genomics Laboratory - Graham Lab United States Department of Agriculture - Ames, Iowa	

Applicable Skills

R	AWS / GCP / Slurm	Shiny / Dash / Power BI
python	NextFlow / SnakeMake	Markdown / HTML / CSS
C++	AirFlow / MetaFlow	L ^A T _E X
Shell	CI / CD (Git / Jenkins)	Image J
SQL	Docker / Singularity	Linux / Windows / MacOS

Software

phyloSMITH: R package for reproducible and efficient microbiome analysis with phyloseq-objects.

NextFlow Workflows: Nextflow Workflows I've built for various bioinformatics analyses.

smartchip_analyzer: C++ program for processing data from a SmartChip qPCR.

weather_api: python package with modules for accessing a weather-data API.

ssBLAST: R package wrapping functions written in C++ to parse BLAST outputs and manipulate corresponding FASTQ/FASTA files.

simple.dada: R package for streamlined implementation of the dada2 processing pipeline.

schuyIR: R package of various functions that I often find useful.

linux_box_sync: BASH program to sync a local Box directory on a Linux machine to the cloud.

hpcc_R_setup: BASH program to setup R on the MSU-HPCC.

Selected Publications

Schuyler D. Smith, Choi, J., Howe, A. *Diversity of Antibiotic Resistance genes and Transfer Elements-Quantitative Monitoring (DARTE-QM): a method for sequencing microbiome functional profiles*. Communications Biology 2021.

Schuyler D. Smith, Colgan, P., Yang, F., Rieke, E.L., Soupir, M.L., Moorman, T.B., Allen, H.K., Howe, A. *Investigating the dispersal of antibiotic resistance associated genes from manure application to soil and drainage waters in simulated agricultural farmland systems*. 2019.

Schuyler D. Smith *phyloSMITH: an R-package for reproducible and efficient microbiome analysis with phyloseq-objects*. 2019.

Schuyler D. Smith, Heffner, E., Murray, S.C. *Molecular analysis of genetic diversity in a Texas maize breeding program*. 2015.

Workshops Taught

Data Carpentry: Genomics, Oklahoma State University, online	2021
Software Carpentry: Shell, Git, R for Reproducible Scientific Analysis, University of Idaho, online	2021
Data Carpentry: Ecology, Merck & Co., online	2020
Data Carpentry: Genomics, George Washington University, Washington, D.C.	2020
Data Carpentry: Ecology, Merck & Co., Upper Gwynedd, PA	2019
Girls in Science Initiative, Science Center of Iowa, Des Moines, IA	2019
Introduction to Data Analysis, Iowa State University, Ames, IA	2017 & 2018
Iowa State BCB Data Analysis Language Workshops Introduction to Unix	2017 & 2018
Iowa State BCB Data Analysis Language Workshops Introduction to Python	2017
Explorations in Data Analyses for Metagenomic Advances in Microbial Ecology	2017 & 2018