Schuyler D. Smith, Ph.D.

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Education

Ph.D. **Bioinformatics and Computational Biology** 2021
Iowa State University, Ames, IA
Characterization of environmental microbiomes impacted by Iowa agriculture.

M.S. **Plant Breeding** 2015
Texas A&M University, College Station, TX
Molecular Characterization of the Texas Maize Breeding Program.

B.S. **Genetics** 2012
Iowa State University, Ames, IA

Experience

Senior Computational Scientist, Bioinformatics 2022 – *present*
Nutrien Ag Solutions - Champaign, Illinois
Agronomic and Environmental Sciences
Full-stack bioinformatician, in charge of building data-pipelines and setting up cloud-computing environments for AWS and GCP, developing custom software and packages for analyses of microbiome data to present to stakeholders.

Graduate Research Assistant - Ph.D. 2017 – 2021
Iowa State University - Ames, Iowa
Genomics and Environmental Research in Microbial Systems Laboratory
Developed pipeline for processing 16S sequencing data on a SLURM HPCC, conducted research on antibiotic-resistance genes, harmful algal blooms, and developed an R-packages for enabling microbiome research.

Graduate Research Assistant - Ph.D. 2015 – 2016
University of Wisconsin - Madison - Madison, Wisconsin
Potato Breeding and Genetics Laboratory
Developed a pipeline for processing NGS sequencing data and SNP-calling for auto-tetraploid crops, GWAS, and ML methods for auto-tetraploid genotyping.

Biological Science Technician - Internship 2014
United States Department of Agriculture - Maricopa, Arizona
Arid-Land Agricultural Research Center
Evaluated high-throughput phenotyping platforms and image analysis.

Graduate Research Assistant - M.S. 2013 - 2015
Texas A&M University - College Station, Texas
Maize Breeding and Genetics Program
Molecular characterization of Texas maize germplasm.

Maize Breeding Intern 2012
Monsanto Company - Huxley, Iowa
Huxley Research Station

Maize Product Trait Development Intern – 6 month 2011
DuPont Pioneer - Willmar, Minnesota
Willmar Research Station

Applicable Skills

python	AWS / GCP / SLURM	Shiny / Dash / Power BI
R	NextFlow / SnakeMake	Markdown / HTML / CSS
C++	AirFlow / MetaFlow	LaTeX
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: Workflows I am building 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.

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

Selected Publications

Valeria Velásquez-Zapata, **Schuyler D. Smith**, Priyanka Surana, Antony V. E. Chapman, Roger P. Wise. *Transcriptome-based host epistasis and pathogen co-expression in barley-powdery mildew interactions*. bioR$_x$iv preprint 2023.

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.

Yu, W., Lawrence, N. C., Sooksa-Nguan, T., **Smith, S.D.**, Tenesaca, C., Howe, A. C., Hall, S. J. *Microbial linkages to soil biogeochemical processes in a poorly drained agricultural ecosystem*. 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 Initiaive, 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