

PAUL VILLANUEVA

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SUMMARY

I research how human activity in the environment, such as manure application, urbanization, and conversion of natural land to agricultural use, impacts human health. In particular, I am interested in how microbial biodiversity changes in response to these activities and how these changes precipitate increases in human risk factors such as antimicrobial resistance and harmful algal blooms in lakes. Previously, I worked on MetaFunPrimer, a command line-based pipeline to design primers for high-throughput qPCR. Outside of my research, I'm interested in literate programming, data science, learning new technologies, and teaching.

EDUCATION

PhD, Bioinformatics and Computational Biology (*in progress*) *exp. Spring 2023*
Iowa State University

MS, Bioinformatics and Computational Biology *July 2021*
Iowa State University

BS, Mathematics (minor in computer science) *June 2017*
California State University, Long Beach

Orange Coast Community College *January 2014 - June 2017*

PUBLICATIONS

Liu, J., Villanueva, P., Lee J., Howe, A., *MetaFunPrimer: primer design for targeting genes observed in metagenomes*

Blair, R., Kjachukova, A., Velazquez, R., Villanueva, P., *Wirtinger systems of generators of knot groups*

Sermet, Y., Villanueva, P., Demir, I., *Crowdsourced approaches for stage measurements at ungauged locations using smartphones*

SELECTED WORKSHOPS, SEMINARS, AND TALKS

R Markdown for Reproducible Research (*scheduled*), 8/2021, R/Medicine Virtual Conference

Quarto Workflows for RStudio, Jupyter, and VIM, 7/2021, R Studio

Plotting Shapefiles with ggplot2, 11/2020, Iowa State University

Getting Started with BASH and BLAST for Biologists, 11/2020, VI Escuela Regional de Microbiologa, Remote

Predictive Plant Phenomics: Programming Bootcamp and Data Applications, 8/2019, Iowa State University

GERMS-ML, 1/2019 - 5/2020, Iowa State University

Introduction to Jupyter Notebooks, Git, and Scikit-learn, 12/2018, Iowa State University

Machine learning in MATLAB, 10/2018, Iowa State University,

An algebraic definition of the bridge number of a knot, 4/2018, USTARS 2018, Portland, OR

Reproducible research using Jupyter Notebooks and Git, 8/2018, Iowa State University

EXPERIENCE

R Markdown Intern at RStudio

6/2021 - 9/2021

I helped test and troubleshoot Quarto, R Studio's new documentation framework, during its development. I transitioned one of RStudio's sites over to Quarto, including configuring and maintaining the continuous integration pipelines to work with the new framework. I wrote [quarto-render](#), a Github Action that uses Quarto to render and publish Github repos.

GERMS-ML

1/2019 - 5/2020

[GERMS-ML](#) is a machine learning study group that teaches machine learning literacy to biologists. We emphasize practical application of machine learning algorithms and packages (such as Keras and SciKit-Learn), but we also spend time teaching the theory motivating key algorithms.

Predictive Plant Phenomics Symposium Coordinator

1 - 11/2018

Oversaw the planning and execution of the first annual Predictive Plant Phenomics symposium in November, 2018.

Workshop Coordinator

1/2017 - 12/2018

Organized programming workshops for the Bioinformatics and Computational Biology (BCB) program and Predictive Plant Phenomics program at Iowa State University. Developed material for all workshops. Topics covered: R, Python, UNIX, Git, MATLAB, Biopython, Jupyter Notebooks, Pandas, machine learning, reproducible research, and data visualization.

Bioinformatics and Computational Biology Research Outreach Officer

1/2018 - 1/2019

SELECTED SCHOLARSHIPS AND GRANTS

Iowa State University

- NSF-NRT Predictive Plant Phenomics Fellowship 2017-2018
- Brown Fellowship 2017-2018

California State University, Long Beach

- Robert D. Rhodes 2017 Outstanding Baccalaureate in Mathematics and Statistics June, 2017
- Norman Sexauer Councilman Scholarship September, 2016
- PUMP Undergraduate Research Grant July 2016
- PUMP Summer Program Grant July 2015

Orange Coast College

- Osher Reentry Scholarship June, 2014

SELECTED SKILLS

Proficient: R (tidyverse, tidymodels, R Markdown, Quarto), Python (Jupyter, Pandas, sci-kit learn, Keras), \LaTeX , Git, Github Actions, BASH, Slurm, web scraping, Excel

Familiar: Docker, TypeScript, React, HTML, CSS, Jenkins,