

HUA WALLY XIE

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EDUCATION

University of California, Irvine

Ph.D. in Mathematical, Computational, and Systems Biology

Aug. 2015 - Oct. 2022

Northwestern University, Evanston

B.S. in Biological Sciences and Radio/Television/Film

Aug. 2008 - Jun. 2012

SELECTED WORK EXPERIENCE

University of California | Ph.D. Candidate Graduate Student Researcher

Irvine, CA

Python (PyTorch, pandas, NumPy, SciPy), R, Stan, Julia, Mathematica, MATLAB, Bash, Git

Jun. 2016 - current

- Parameterized and refined stochastic differential equation soil carbon models; resulted in more realistic soil system simulations.
- Created statistical frameworks rigorously assessing the ability of soil carbon models to predict global soil changes.
- Co-developed cutting edge Bayesian deep learning variational inference algorithms for model fitting and parameter estimation.
- Merged and munged large soil experiment data sets spanning decades to compose data products ready for machine learning.

Qchain | Chief Executive Officer

Irvine, CA

R, JavaScript (React), Bash, Git

Mar. 2017 - Aug. 2019

- Fundraised \$800,000 from venture capital and crowdfunding to build a branded content marketplace.
- Assembled data visualizations for pitch decks, business plans, website graphics, and internal financial reports.
- Contributed to the development of Qchain's performant, responsive, and mobile-friendly website in Jekyll.
- Contributed to the development of Qchain's marketplace web application front-end in JavaScript frameworks.

National Institute of Diabetes and Digestive and Kidney Diseases | Intramural Research Fellow

Bethesda, MD

Python, Julia, C, R, Stan, Mathematica, Bash

Oct. 2013 - Jul. 2015

- Performed computational neuroscience research that investigated observed human neural phenomena and operations.
- Constructed and simulated biophysically realistic neuron population models using a variety of scientific computing tools.
- Developed parallel, distributed Bayesian Markov chain Monte Carlo algorithms assimilating neuron models with empirical data.

PUBLICATIONS

Hua W. Xie, Debora Sujono, Tom Ryder, Erik B. Sudderth, and Steven D. Allison. 2022. "A framework for variational inference and data assimilation of soil biogeochemical models using state space approximations and normalizing flows." *ESSOAr*.

Debora Sujono, **Hua W. Xie**, Steven D. Allison, and Erik B. Sudderth. 2022. "Variational Inference for Soil Biogeochemical Models." *ICML 2022 2nd AI for Science Workshop*.

Hua W. Xie, Steven D. Allison, Elizabeth Duan, and Brian Chung. "Advancing Quantitative Models of Soil Microbiology, Ecology, and Biochemistry" in *Soil Microbiology, Ecology and Biochemistry, Fifth Edition*, ed. Eldor A. Paul and Serita Frey (Amsterdam, Netherlands: Elsevier, 2022).

Hua W. Xie, Adriana L. Romero-Olivares, Michele Guindani, and Steven D. Allison. 2020. "A Bayesian approach to evaluation of soil biogeochemical models." *Biogeosciences*. 17:4043 - 4057.

Shashaank Vattikuti, Phyllis Thangaraj, **Hua W. Xie**, Stephen J. Gotts, Alex Martin, and Carson C. Chow. 2016. "Canonical cortical circuit model explains rivalry, intermittent rivalry, and rivalry memory." *PLoS Comput Bio*. 12:e1004903.

SELECTED PROJECTS

Algorithm for Variational Inference of Soil Carbon Models Using Normalizing Flows

Python (PyTorch, pandas, NumPy, SciPy), R, Stan, Julia, Mathematica, Bash, Git

2022

Co-developed stochastic deep learning variational inference algorithm advancing the fitting of soil carbon models to soil measurements by approximating models with normalizing flows. Resulted in substantial efficiency and accuracy improvements in parameter estimation and data assimilation compared to established deterministic Markov chain Monte Carlo inference approaches.

The Influence of Receiver Routes and Separation from Defenders on Third Down Conversions

R, Bash, Git

2019

Led 2019 NFL Big Data Bowl team that first developed an algorithm to classify wide receiver routes informed by on-field player-tracking data from the 2017 NFL regular season and subsequently analyzed the influence of receiver route classes and defender separation on successful third down conversions with a logit model.