

Maxwell G. De Jong

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EDUCATION

Doctoral Student in Physics August 2015 - Present
University of Michigan
2015 Colegrove Fellow
GPA: 3.7

Bachelor of Science in Applied Physics with Honors June 2015
California Institute of Technology
GPA: 3.8

TECHNICAL SKILLS

- Proficient in Python, C, C++, Cython, Mathematica, LaTeX
- Experienced in pytorch, numpy, scipy, scikit-learn, pytorch, tensorflow
- Familiar with machine learning and deep learning

WORK EXPERIENCE

University of Michigan, Wood Lab, Ann Arbor, MI August 2015 - Present
Graduate Student

- Simulating the effect of spatial drug heterogeneities on microbial communities
- Modeling community dynamics in bacteria evolution
- Performing tensor decomposition to understand fixation times in spatially-structured communities
- Investigating the Kosterlitz-Thouless transition in a 2-D population of coupled oscillators

Caltech, Schwab Lab, Pasadena, CA September 2014 - June 2015
Senior Thesis Student

- Designed an apparatus to detect Josephson oscillations using helium-4
- Coded a relaxation algorithm to calculate coupling capacitance between components
- Designed a niobium microwave resonator to serve as a level meter with picometer precision
- Created a script to characterize voltage-controlled attenuators using a DAQ and network analyzer

Silicon Valley X-Ray, San Jose, CA Summer 2014
Optics Research Assistant

- Refined the visible optics of a prototype machine designed to image packaging technologies with x-rays
- Developed procedure to remove vignetting in images taken with a prototype of the product
- Automated the extraction of MTF curves from images taken with the prototype optical system
- Developed method to characterize optical performance of various optical systems over their field of view
- Final program used to optimize optical design to maximize resolution over a wide field of view

Caltech, Bellan Lab, Pasadena, CA

June 2013 - June 2014

Hannah Bradley Summer Undergraduate Research Fellow

- Developed linear imager to photograph developing plasma jets
- Designed circuit to control commercial image sensor
- Retrofitted spectrometer to observe spectral lines of plasma to calculate density at microsecond timescale
- Presented initial results at annual APS meeting of plasma physics
- Coded an MCMC to analyze spheromak evolution parameters

Caltech, Bock Lab, Pasadena, CA

Summer 2012

Bill Davis Summer Undergraduate Research Fellow

- Examined the particle response of the detectors used by SPIDER to study cosmic microwave background
- Modeled particle interactions and created a radioactive source to test effects of cosmic rays
- Designed new procedure for creating radioactive sources safe for cryogenics
- Results revealed a flaw in the detector electronics that led to changes on SPIDER instrument

PUBLICATIONS

- M. G. De Jong and K. B. Wood. "Tuning Spatial Profiles of Selection Pressure to Modulate the Evolution of Drug Resistance." *Physical Review Letters* 120.23 (2018)

CONFERENCE PRESENTATIONS

- "Investigating the Role of Temperature and Non-Monotonic Spatial Heterogeneity on the Evolution of Resistance," qbio, Vanderbilt University 2016
- "Investigating the Role of Spatial Selection Pressure on the Evolution of Resistance," qbio, Rutgers University 2017
- "Tuning Spatial Profiles of Selection Pressure to Modulate the Evolution of Resistance," qbio, Rice University 2018
- "Tuning Spatial Profiles of Selection Pressure to Modulate the Evolution of Drug Resistance," Gordon Research Conference on Stochastic Physics in Biology, Ventura 2019
- "Tuning Spatial Profiles of Selection Pressure to Modulate the Evolution of Antibiotic Resistance," APS March Meeting, Boston 2019
- "Tuning Spatial Profiles of Selection Pressure to Modulate the Evolution of Antibiotic Resistance," qbio, San Francisco State University 2019

VOLUNTEERING

Caltech, RISE Program, Pasadena, CA

January 2014 - June 2015

High School Tutor

- Met weekly with students struggling with math and science classes
- Retought challenging concepts and answered questions
- Improved test scores and helped improve study habits

University of Michigan, SLATE Program, Ann Arbor, MI

July 2015 - June 2016

Youth Mentor

- Met weekly with a middle school student from an underprivileged community
- Helped improve school performance and reading level
- Developed after school programming through the Ann Arbor CAN