# Jeremy Don Wayland

PhD Candidate | Research Scientist

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## Education

**Present – August 2022** | Department of Mathematics, Technical University of Munich Helmholtz Munich
- 1st year Doctoral Candidate in the AIDOS Lab
- Dual appointment as a Doctoral Researcher at Helmholtz Munich in the HELENA Graduate School. Advised by Dr. Bastian Rieck and Dr. Ulrich Bauer.

**May 2022 – September 2020** | Schmid College of Science and Technology, Chapman University
- M.S. Computational and Data Sciences
- Coursework Completed : *Mathematical Modeling, Multivariate Statistics and Data Analysis, Data Mining and Machine Learning, Information Theory, Game Theory, Natural Language Processing.*

**December 2019 – August 2015** | University of California, Berkeley
- B.A. Mathematics (Honors) | B.A. Astrophysics | Minor in Logic
- Relevant Coursework : *Quantum Mechanics, Quantum Logic, Point-Set/Algebraic/Differential Topology, Algebra, Intuitionistic Logic, Computability, Set Theory, Relativistic Cosmology, Planetary Astrophysics, Data Science, Machine Learning*

**June 2015 – September 2011** | El Toro High School, Lake Forest California
- International Baccalaureate Diploma and AP Scholar
- Class Rank : 6, SAT : 2190/2400

## Professional Experience

**June 2022 – January 2022** | Grant Funded Research Computational Scientist, Children's Hospital of Orange County Orange CA
- Predicting onset of sepsis for ED patients using machine learning and artificial intelligence.
- Spearheading multicenter collaboration between CHOC, UCI, McMaster, and University of Iowa for predictive risk analysis of recurring urinary tract infections (UTIs) among children using machine learning and topological data analysis.

Sepsis | Urology | Deep Learning | Python | R | Computational Topology | Persistent Homology

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**December 2021 – July 2021** | Data Science Research Intern, Children's Hospital of Orange County Orange CA
- Implementing machine learning models to improve hospital operations and predict diagnoses.
- Assisting Physicians with computational research questions.

Python | R | Machine Learning | Care Coordination | Improving Quality of Care

**December 2021 – January 2020** | Software/Research Developer (Part Time), Encryptek LLC Lake Forest CA
- Deploying Radium product-line onto Amazon's Cloud Marketplace via AWS FPGA development.
- Cryptography and Cryptocurrency market research.
- Hardware resales.

Amazon Cloud Computing | AWS EC2 Development | C++ | Verilog | FPGAs | Hardware | Blockchain

April 2020 – February 2020
**Machine Learning, Independent Consultant Lake Forest CA**
*Madiba LLC* SAP Software Consulting
- Incorporated predictive analytics using open source tools in tandem with in house SAP tools to compare performance and flexibility of different machine learning packages.
- Built TensorFlow models to analyze multivariate irregular time series data.

TensorFlow | SAP | python | jupyter notebooks | pandas

October 2017 – July 2017
**Remote Data Analyst, NBC Universal Los Angeles, California**
- Contractor for Corporate Finance under Senior Project Manager Tracy Bohush.
- Analyzed quarter approval results to streamline and restructure invoice throughput hierarchy for their international finance department.

Microsoft Excel | SAP | Financial Analytics

## Honors and Awards

2020-2022 Awarded a full tuition Fowler Computer Science Fellowship for the CADS program at Chapman University.
2019 Graduated with **honors** from Berkeley Mathematics by thesis and advanced coursework performance.
2018 Awarded the Mckinley Fellowship by SURF L&S at UC Berkeley for work on observing jet simulations.

## Research Experience

December 2019 – April 2019
**Senior Honors thesis, advised by Dr. Wesley Holliday , UC Berkeley Department of Mathematics**
- *An Investigation into Strategic Voting and the Commutative Monoidal Structure of Elections*
- Characterization of specific uncertainty sets in regards to prevalent strategic voting situations.
- Application of categorical machinery developed by John Baez (UC Riverside), displaying the underlying structure of elections.

Applied Category Theory | Social Choice Theory | Strategic Voting

December 2018 – May 2018
**SURF Research Fellow, advised by Dr. Richard Anantua , UC Berkeley**
- Built C++/Python pipeline from scratch to generate theoretical images by observing GRMHD simulations using different radiative processes.
- Working collaboratively with Dr. Anantua on the third paper in a series of work devoted to observing simulations : "On the Comparison of AGN with GRMHD Simulations : III. 3C 279"

General Relativity | Magento-Hydrodynamics | Quantum Field Theory | Radiative Processes | Python | C++

December 2019 – April 2018
**Undergraduate Researcher, Alexei Filippenko Research Team UC Berkeley Dept. of Astronomy**
- Gather observational astronomy data using KAIT and Nickel telescopes.
- Investigate the nature of the expanding universe by analyzing supernovae.

Image Analysis | Observational Astronomy | Spectra Analysis

December 2017 – August 2017
**Undergraduate Research Apprentice, working with Dr. Alejandro Rico-Guevara , UC Berkeley Animal Flight Laboratory**
- Analysis of wild hummingbird species' flight and feeding patterns from high speed videos.

Adobe Premier | Phenotype Evolution

May 2018 – February 2017
**Undergraduate Researcher, working with Dr. Richard Anantua , UC Berkeley Theoretical Astrophysics Center**
- Comparisons of general relativistic magnetohydrodynamic (GRMHD) simulations and observations of Active Galactic Nuclei (AGN).
- Graduate level radiaitve processes coursework (Rybicki and Lightman) applied in LaTeX.

Simulation Modeling | High Energy Astrophysics | Radiative Processes | C++ | Unix | Python | Mathematica

## Teaching Experience

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|---|---|
| Chapman University | **Graduate Teaching Assistant,**<br>› **Physics Lab Instructor :** Undergraduate Mechanics course.(Fall 2021,Spring 2021,2022)<br>› **Mathematics Instructor :** Undergraduate precalculus course. (Fall 2020) |
| UC Berkeley | **Undergraduate Student Instructor, Berkeley**<br>› **Astronomy instructor :** Introduction to astronomy/astrophysics course taught by Dr. Alex Filippenko.(Fall 2019) |
| El Toro High School | **Private Tutor, Lake Forest**<br>› Tutor for chemistry, physics, mathematics, english, and SAT prep for high school students. Recommended through El Toro's guidance department.(2014-2016) |

## Presentations

**An Introduction to Point-free Topology and Quantum Mechanics** — February 2021

Computational and Sciences Seminar
Speaker for the computational and sciences seminar at Chapman University. This talk motivated locales as a candidate structure for quantum theory due to the point-free nature of the Heisenberg Uncertainty Principle.

Point-free Topology | Quantum Mechanics

**The Commutative Monoidal Structure of Elections** — December 2020

github.com/https://github.com/jwayland-cads/ElectionsAsNetworks Spin Group
Speaker for Spin Group Journal Club. Presentation on an introduction to category and network theory, as well as conclusions/implementations of results from my undergraduate thesis.

Applied Category Theory | Voting | R

**Observing Jet Simulations of Sgr A* and 3C 279** — August 2018

Project Description
Speaker at the Berkeley SURF Conference 2018. Presented my results of modeling emissions of 3C 279 and Sgr A*, outlining the pipeline I built to reverse engineer theoretical light curves and intensity maps from GRMHD simulations.

Radiative Physics | C++ | Python

## Observational Astronomy Contributions

*As a telescope operator for the Filippenko Lab, my observations from the Nickel and KAIT Telescopes at the Lick Observatory in Mount Hamilton, California contributed to the following publications :*

| | |
|---|---|
| July 2021 | PIPS, an advanced platform for period detection in time series – I. Fourier-likelihood periodogram and application to RR Lyrae Stars. (Submitted to MNRAS) arXiv preprint |
| January 2021 | Periods and classifications of RR Lyrae stars in the globular cluster M15 MNRAS Article |
| October 2019 | Lick Observatory Supernova Search follow-up program : photometry data release of 93 Type Ia Supernovae MNRAS Article |
| September 2019 | The Berkeley sample of Type II supernovae : BVRI light curves and spectroscopy of 55 SNe II MNRAS Article |

## Programming Languages

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|---|---|
| Python | ●●●●● |
| LateX | ●●●●● |
| C++ | ●●●●○ |
| SQL | ●●●●○ |
| Julia | ●●●○○ |
| Mathematica | ●●●○○ |
| Verilog | ●●●○○ |

## Skills

- TensorFlow
- Pyspark
- Git
- AWS Cloud Computing & EC2 Development
- Microsoft Office
- Overleaf
- Jupyter Notebooks
- Linux Operating Systems

## References


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Dr. Louis Ehwerhemuepha
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