

MADISON ELL

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EDUCATION

University of California, Los Angeles

June 2023 - Present

B.S. Statistics and Data Science

Minor in Data Science Engineering

Fullerton College

June 2017 - May 2023

A.S. Mathematics

EXPERIENCE

Harvard University

June 2024 - August 2024

Research Assistant

- Developed Python and Fortran code for KINETICS modeling to simulate gaseous hydrogen escape on Mars during solar flare events
- Analyzed NASA MAVEN orbiter data to assess ion-neutral chemistry and atmospheric heating contributions to hydrogen escape
- Generated preliminary results showing ion-neutral reactions accelerate hydrogen escape
- Improved predictive statistical models of Martian atmospheric dynamics

University of California, Los Angeles

October 2023 - March 2024

Research Assistant

- Conducted computational networking research in collaboration with the Santa Fe Institute Complex Systems Summer School (CSSS)
- Developed database scrapers in R and Python to aggregate participant and research output data

University of California, Davis

June 2023 - August 2023

Research Assistant

- Cataloged topological properties of DNA knots from bacteriophage P4
- Automated electron microscopy image enhancement, contour tracing, and the identification of basic knot forms using Python
- Enhanced the identification of the topological properties of P4 DNA knots

Lafayette College

June 2022 - August 2022

Research Assistant

- Conducted Bayesian statistical breakpoint analysis and modeling
- Developed two novel Bayesian Markov Chain Monte Carlo breakpoint detection algorithms in R: Bayesian Adaptive Auto-Regressive (BAAR) and Bayesian Adaptive Moving Average (BAMA)

University of California, Irvine School of Medicine

July 2019 - August 2019

Research Assistant Intern

- Compiled and reviewed clinical research on the effects of aromatherapy in oncology patients receiving chemotherapy

PUBLICATIONS

Williams, J., Bade, I., Arora, S., Ell, M., Shen, G., Udata, S., Afghani, B. **Use of aromatherapy as a complementary therapy in alleviating chemotherapy related adverse effects in cancer patients.** Journal of Investigative Medicine, 68, 1, American Federation for Medical Research, 2020, University of Southern California, Los Angeles, CA; University of California Irvine, Irvine, CA; CHOC Hospital of Orange County, Orange, CA.

SKILLS

Computer Languages	C/C++, Python, R, x86 Assembly
Software & Tools	Linux/UNIX, Git, GitHub, GitLab, LaTeX, Excel, Word, PowerPoint

PRESENTATIONS

Ell, M., Adams, D., Thiemann, E., Wordsworth, R., Wong, M. L., Mayyasi, M., Yung, Y. L. (2024, December 9-13). **Hydrogen escape from the Martian upper atmosphere during the September 2017 X8.2 solar flare** [Conference presentation].
American Geophysical Union 2024, Washington, D.C., United States.
<https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1533900>

Ell, M., Klingbeil, S., Higgins, D., Wilson, N., Liebner, J. (2023, January 4-7). **Improving Bayesian methods for locating breakpoints in time series data** [Conference presentation].
2023 Joint Mathematics Meetings, Boston, MA, United States.
<https://meetings.ams.org/math/jmm2023/meetingapp.cgi/Paper/15315>

Ell, M. (2022, November 17). **Research Experiences for Undergraduates (REU) with a Fullerton College student** [Conference presentation].
Fullerton College, Fullerton, CA, United States.

Ell, M. (2022, August 18). **Improving Bayesian methods for locating breakpoints in time series data** [Conference presentation].
Pacific Summer Open Mathematics Seminar (PSOMS), Fullerton, CA, United States.

AWARDS

2023 Fullerton College Student of Distinction
2020 AthenaHacks Best Use of Twilio API