Marina M. Dunn

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Profile

Highly enthusiastic, motivated, determined Data Science Graduate Student doing interdisciplinary Machine Learning & Astrophysics research. Experience working in industry, government, & academia, and passionate about STEM outreach.

Education

M.Sc. Engineering: Data Science   **SPRING 2023 (EXPECTED)**

University of California, Riverside (Riverside, CA)

Advisor: Dr. Bahram Mobasher

Coursework: Data Science, Statistical Computing, Research Design, Data Mining, Machine Learning, Engineering Principles

Additional Course in Data Science (Non-Degree Seeking)   **SUMMER 2020**

University of California, Berkeley (Berkeley, CA)

Coursework: Data Science

B.Sc. Astronomy   **MAY 2018**

University of Arizona Steward Observatory (Tucson, AZ)

Coursework: Classical & Quantum Physics, Theoretical & Observational Astrophysics, Orbital Dynamics, Computational Programming (including Astrophysics Applications, i.e. Galactic Data Modeling & Analysis), Mathematics

Skills

- Python, Unix, Linux, SQL, HTML, R
- TensorFlow, Scikit-learn, PyTorch, Apache Spark
- Jupyter, Numpy, Pandas, Matplotlib, Plotly, AWS S3, Git
- Astronomy Software: IRAF, SAOImage/DS9, Aladin
- Microsoft Office Suite, Apple iWork, Confluence, Slack
- Data Science, ML, Deep Learning, Data Visualization & Analysis
- Telescope Operations, Astronomical Image Processing
- Certifications: Apple Certified iOS Technician, Systems Tool Kit

- Web Design & Development, Digital Art
- Developing Research Proposals, Technical Reports & Presentations
- Excellent Oral & Written Communication
- Virtual & In-Person Collaboration
- Problem Solving, Decision Making, Public Speaking
- Event Planning & Fundraising, Public Outreach
- Retail, Customer Service, Customer Experience
- Rapport-Building, Active Listening, Empathy, Conflict Resolution

Work Experience

Data Science Graduate Intern – NASA Langley Research Center   **AUGUST 2022 - PRESENT**

- Developing simplified, cloud-based, "read-to-try" Machine Learning models, visualization tools, and online content for NASA teams to evaluate potential of using Machine Learning approaches for their work.

Computing Scholar, Data Science Summer Institute – Lawrence Livermore National Laboratory   **MAY 2022 - AUGUST 2022**

- Developed tool for visualizing model optimization for the scalable Gaussian Process method MuyGPs, used to predictively fill in gaps of observations of orbital debris.
- Researched various ML approaches using molecular descriptors and 3D atomic representations to rapidly screen drug-like compounds targeting SARS-CoV-2 in an effort to identify which may best treat the virus.

Graduate Intern – Biospheric Sciences Laboratory, NASA Goddard Space Flight Center   **AUG 2021 - MAY 2022**

- Researched how to optimally migrate NASA Earth Science data and models to cloud-optimized, analysis-ready formats.
- Developed improved interactive visualization/analysis dashboards for NASA fire & vegetation data.

Data Science Engineer – Apple Inc.   **JAN 2021 - JUNE 2021 (6-month Program)**

- Developed data pipeline with Python that utilizes web APIs to create & maintain records of "high priority/VIP" consumer information to prevent possible unwarranted internal searches by Apple employees, & send a weekly team report with statistics (i.e. recent-additions, global page visits, commonality, etc.).

Data Engineer – Apple Inc.   **JAN 2020 - JULY 2020 (7-month Program)**

- Developed & deployed code that utilizes Apache Spark, Python, and SQL to create interactive historical table of active iOS devices that transmit diagnostics & usage analytics data to Apple with statistics (i.e. current OS), which informs other Apple teams about device populations used for business-critical reports, & allows for less-expensive lookups.

Technical Expert (Previously Technical Specialist) – Apple Inc.   **OCT 2018 - AUG 2021**

- Resolved customer technical issues at the Apple Store Genius Bar, including software troubleshooting & hardware repairs, & re-built customer relationships by de-escalating & approaching situations with empathy & practical, ethical problem-solving.

- Provided exceptional customer experience, demonstrated ability to be flexible and knowledgeable in a high-pressure, fast-paced environment as products & services evolve.
- Supported additional departments, including in-house technology diagnostics & troubleshooting, visual merchandising, leading creative sessions (i.e. coding, visual art), & inventory operations.

Chief Telescope Operator – University of Arizona Steward Observatory   **AUG 2014 - MAY 2018**

- Oversaw weekly operations of multiple on-campus telescopes, led nightly public astronomy talks, and managed a team of student telescope operators. Organized local private & educational STEM outreach events.
- Assisted astronomy professors with teaching assistant-like tasks, such as grading & class preparation.

Instructional Specialist – University of Arizona Steward Observatory (Supervisor: Dr. Don McCarthy)   **JUNE 2015, 2018, 2019**

- Developed educational content (including computational astronomy projects) & oversaw operations for middle school students at the annual Astronomy Camp. Educated students in basic principles of astronomy, physics, engineering, environmental science, and computing using inquiry-based learning techniques.
- Facilitated all-night astronomy observing sessions with professional telescopes and educated students about large-aperture telescopes, electronic instrumentation, & astronomy image processing software.
- Administered medical care, worked extended & irregular hours, & managed large groups of students for 8 consecutive days/nights at Kitt Peak, Mt. Graham, & Mt. Lemmon Observatories.

Research Experience

Graduate Researcher – University of California, Riverside (Advisor: Dr. Bahram Mobasher)   **SEP 2021 - PRESENT**

- Currently researching using Bayesian Neural Networks to accurately classify morphologies of galaxies in the early universe with simulated data of different observing years and noise levels from the Legacy Survey of Space & Time.

Undergraduate Research Assistant – University of Arizona Steward Observatory (Advisor: Dr. Chris Walker)   **JUNE 2016 - SEP 2017**

- Wrote proposals for a high resolution, spherical, space-based, inflatable observatory Terahertz Space Telescope. Presented proposal at the 2017 American Astronomical Society conference in Grapevine, TX.
- Built and tested radio telescope antenna prototypes in a welding shop, presented preliminary results for the Office of Naval Research (ONR), resulting in full project funding.
- Wrote significant proposal components, procured institutional letters of intent and instrument estimates, and managed large budgets for two NASA missions: the balloon-borne observatory GUSTO, and the Europa Ice and Ocean Structure Seismometer (SIIOS).
- Supported weekly meetings with team of scientists and engineers, and organized preparations for the 2017 NASA site visit, marking project transition into the next mission phase, and $40 million in funding.
- Analyzed sub-millimeter astronomy data of molecular transitions, created visual maps of gas within a giant molecular clouds using Python, and confirmed previous hypotheses about suspected ongoing star formation.

Undergraduate Researcher – University of Arizona Astronomy Club (Advisor: Dr. Yancy Shirley)   **JAN 2015 - MAY 2018**

- Observed 101 dense, dark molecular clouds with the 12-Meter Arizona Radio Observatory Telescope on Kitt Peak, AZ; mathematically determined which ones were actively collecting enough material to produce future stars. Published research in 2018.

Undergraduate Researcher – University of Arizona Steward Observatory/LPL (Advisor: Dr. Robert Zellem)   **AUG 2014 - DEC 2016**

- Observed transiting exoplanets and operated the Kuiper 61" Telescope on Mt. Bigelow, AZ, and analyzed observational data in multiple wavelengths to determine the composition of their atmospheres.
- Determined which data reduction techniques better reveal atmospheric characteristics, such as using brighter nearby reference stars.
- Presented research at the 2016 American Astronomical Society conference in Kissimmee, FL

Volunteer & Outreach Experience

Astronomer – Vanderbilt University Dyer Observatory   **JUNE 2009 - PRESENT**

- At age 13, began volunteering as an astronomer and space camp counselor at Vanderbilt Dyer Observatory, operating professional telescopes, leading monthly telescope evening lectures and tours, teaching school groups about astronomy/physics concepts, and performing science outreach experiments.

Outreach Coordinator (2016 - 2017), President (2017 - 2018) – University of Arizona Astronomy Club   **AUG 2014 - MAY 2018**

- Presented engaging content weekly for undergraduate students passionate about Astrophysics.
- Organized club meetings, fundraisers, and professional research opportunities.
- Partnered with local Tucson schools to provide more than 300 events with telescope viewings and STEM activities at no cost.
- Established the free Astronomy Tutoring of Majors & Minors (ATOMM) tutoring service for upper-division astronomy and physics classes.

TIMESTEP Student Leader – University of Arizona   **AUG 2015 - MAY 2018**

- Led discussion groups for Tucson Initiative for Minority Engagement in Science and Technology Program (TIMESTEP) focused on topics such as how to be successful in academia, and how to retain underrepresented individuals in STEM fields.
- Coordinated hands-on workshops for topics such as battling persistent stereotypes in STEM, developing professional skills to achieve career goals, how to be a better advocate and challenges faced by marginalized groups in STEM.

- As of 2022, continue to lead panel discussions about my own experiences navigating my degree and career in industry and government.

Awards & Distinctions

Grace Hopper Celebration Student Scholar (2022) - AnitaB.org,

WE22 Conference Grant (2022) - Society of Women Engineers,

Uncertainty Quantification for Machine Learning Integrated Physics Modeling Travel Award (2022) - NSF & Sandia Laboratories,

Astronomy Department Scholarship (2018) - University of Arizona,

Honors College Alumni Legacy Grant (2016) - The University of Arizona Honors College,

Langadas Astronomy Department Scholarship (2017) - University of Arizona,

Arizona Excellence Scholarship (2014) - University of Arizona

Past & Present Professional Memberships & Service

American Astronomical Society, Women in Physics, Out in STEM, Association for Computing Machinery, Deep Skies Lab, Women in Computing @ UCR, Society of Women Engineers, Rubin Observatory LSST Science Collaborations (Informatics & Statistics, Galaxies) and Data Preview 0.2 Delegate, Tucson Initiative for Minority Engagement in Science and Technology Program (TIMESTEP)

Posters & Presentations

Dunn, M. M., Lesser, D., O'Dougherty, S., Swift, B., Pat, T., Cortez, G., Smith, S., Goldsmith, P., & Walker, C. K. (2017). Terahertz Space Telescope (TST). *American Astronomical Society Meeting Abstracts #229*, *229*, 238.30. tinyurl.com/zppnpy9p

Dunn, M., Chazaro Cortes, J., Nguyen, D. M. (2021, December 8). *Optimizing Data Formats for Earth Information System Fire Portal*. [PowerPoint slides]. NASA Goddard Space Flight Center. tinyurl.com/26hk5v89

Dunn, M., Chazaro Cortes, J., Nguyen, D. M. (2022, May 9). *Cloud-Optimized Tools for the Surface Biology & Geology High-Frequency Time Series Campaign*. [PowerPoint slides]. NASA Goddard Space Flight Center. tinyurl.com/3ufmr6us

Dunn, M. (2022, August 4). *Visualizing Model Optimization for Orbital Debris Characterization.* [PowerPoint slides]. Data Science Summer Institute, Lawrence Livermore National Laboratory. t.co/glpf9klu55

Dunn, M. (2022, August 9). *DSSI Challenge Problem*: *Machine Learning Methods to Screen Compounds Targeting COVID-19* . [PowerPoint slides]. Data Science Summer Institute, Lawrence Livermore National Laboratory. tinyurl.com/3v9xed69

Peters-Lidard, C., Shiklomanov, A., Kumar, S., & Felikson, D. (2021, November 12). *Analysis-ready Fire, Freshwater, and Sea Level Change Products*. NASA@Supercomputing Conference 2021. www.nas.nasa.gov/SC21/research/project41.html

Ryleigh Fitzpatrick, M., Pearson, K., Griffith, C. A., Dunn, M., Montiel, N. J., Zellem, R. T., … AzGOE. (2016, January). A Study of the Effects of Underlying Assumptions in the Reduction of Multi-Object Photometry of Transiting Exoplanets. *American Astronomical Society Meeting Abstracts #227*, 227, 138.07. tinyurl.com/yw5ff28w

Publications

Calahan, J. K., Shirley, Y. L., Svoboda, B. E., Ivanov, E. A., Schmid, J. R., Pulley, A., Lautenbach, J., Zawadzki, N., Bullivant, C., Cook, C. W., Gray, L., Henrici, A., Pascale, M., Bosse, C., Chance, Q., Choi, S., Dunn, M., Jaime-Frias, R., Kearsley, I., … Robinson, D. R. (2018). Searching for Inflow Toward Massive Starless Clump Candidates Identified in the BOLOCAM Galactic Plane Survey. *The Astrophysical Journal*, *862*(1), 63. doi.org/10.3847/1538-4357/aabfea

Dunn, M. M. (2023). *Classifying Galaxy Morphologies Using Bayesian Neural Networks for LSST*. [Unpublished master's thesis]. University of California, Riverside.

Nguyen, D. M. T., Chazaro Cortes, J., Dunn, M. M., & Shiklomanov, A. N. (2022). *Optimal Chunking Strategies for Cloud-based Storage of Geospatial Data Using Zarr* [Unpublished manuscript]. doi.org/10.1002/essoar.10511054.1

Press & Contributions

Dunn, M., Fulmer, L., & Gagliano, A. (2018, May 6). *How to Land a Post-Baccalaureate Research Experience*. tinyurl.com/3uzc7x67

Lewis, B. (2021, December 3). *Bringing Together Art & the Cosmos*. Astrobites. tinyurl.com/36muac7c

Million STEM. (2020, May 18). *Marina Madeline Dunn*. Million STEM. tinyurl.com/y8d2kbbt