M. Ryleigh **Davis**

PH.D. STUDENT IN PLANETARY SCIENCE

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Education

California Institute of Technology — *Pasadena, CA*
PHD IN PLANETARY SCIENCE — *2020-*

Northern Arizona University — *Flagstaff, AZ*
MSC IN APPLIED PHYSICS — *2018-2020*

University of Arizona — *Tucson, AZ*
B.S. IN ASTRONOMY & PHYSICS
MINOR IN MATHEMATICS — *2013 - 2017*

Skills

Programming	Python, C/C++, IRAF, IDL, Matlab, Bash Script, Spark, SQL, LaTeX
Software	LabView, Zemax, SQL Server Database, AWS, Azure, Cloud Based Distributed Computing
Certifications	Bok 2.3m/BCSpec & 90Prime Operator, Kuiper 1.5m/Mont4K Operator, Ray White 21" Operator

Work Experience

Graduate Teaching Assistant — *Flagstaff, AZ*
NORTHERN ARIZONA UNIVERSITY — *2018 - 2020*

- Instructor for several Introductory Electricity and Magnetism laboratory sessions (4 semesters).
- Teaching Assistant and Grading for Indigenous Astronomy.

Senior Associate Consultant — *Chicago IL*
CLARITY INSIGHTS: DATA ANALYTICS CONSULTING — *2017-2018*

- Lead developer for a team developing a platform for distributed computations and data analytics on the cloud for a major financial institution.
- Created a user friendly tool for completing data analytics using distributed computations via pySpark and AWS instances on the cloud.
- Worked with the Data Science team to implement relevant machine learning and predictive algorithms within the data analytics tool.

Steward Observatory Education Group — *Tucson, AZ*
STUDENT EDUCATOR AND VIDEO PRODUCER — *2016 - 2017*

- Communicated with and educated the public on Astronomy and science related topics via production of YouTube videos on the Active Galactic Videos channel (>6.5K subscribers)
- Aided in curriculum development, filming, and video editing for an Introductory Astronomy online course (hosted on *Coursera*) with Professor Chris Impey.

Telescope Operator — *Tucson, AZ*
UNIVERSITY OF ARIZONA - STEWARD OBSERVATORY — *2014 - 2017*

- Operated Kuiper 1.5m and Bok 2.3m telescopes for research data acquisition.
- Ran public observing nights and observations for students in astronomy courses at the Ray White 21" telescope.
- Trained and certified new observers on telescope and instrument systems for the Bok 2.2m/B&C Spec, Bok 2.2m/90Prime, Kuiper 1.55m/Mont4k, Ray White 21"
- Assisted Mountain Operations with Instrument changes, system testing, cleaning of mirrors and filters and other telescope maintenance projects and updates.

NASA Space Grant Intern — *Tucson, AZ*
ARIZONA SPACE GRANT CONSORTIUM - UNIVERSITY OF ARIZONA — *2015 - 2016*

- Selected for a competitive year-long paid research internship funded through NASA and the Arizona Space Grant Consortium.
- Worked with Dr. Caitlin Griffith of the University of Arizona's Lunar and Planetary Lab observing and reducing Kuiper 1.55m telescope data to examine and characterize the atmospheres of hot Jupiter exoplanets.

Special Projects Assistant - Education and Public Outreach — *Tucson, AZ*
NATIONAL OPTICAL ASTRONOMY OBSERVATORY — *2014 - 2015*

- Developed Astronomy and STEM related education projects and outreach activities for the National Optical Astronomy Observatory
- Coordinated and ran large and small public events including: outreach programs at Kitt Peak National Observatory; citizen science campaigns such as Globe at Night; teacher training's and workshops, classroom teaching, and developing kits and programs for use in Astronomy and Space Education both in and out of the classroom
- Helped run a training session for Astronomers interested in outreach and education at the *2016 AAS Winter Meeting*

Engineering & Robotics Instructor — *Chandler, AZ*
ENGINEERING FOR KIDS — *2014*

- Taught a science, engineering, and robotics related curriculum to summer camp students including a Lego Robotics class for students aged 3-7 and an Engineering Basics and Design course for students aged 8-14.

Selected Publications & Conference Presentations

Davis, M.R., Meier, R.M., Cooper, J.F. and Loeffler, M.J. (2020). "The Contribution of Energetic Electrons to the Sputter-Produced O_2 Exosphere on Europa", Submitted to The Astrophysical Journal Letters, (under revision in Jan. 2021)

Fitzpatrick, M. R. (2020). "Low Energy Electron Sputtering of Water Ice", (Master's thesis, Northern Arizona University)

Zellem, R.T., Griffith, C.A., Pearson, K.A., Turner, J.D., Henry, G.W., Williamson, M.H., **Fitzpatrick, M.R.**, Teske, J.K. and Biddle, L.I. (2015). "XO-2b: A hot jupiter with a variable host star that potentially affects its measured transit depth", The Astrophysical Journal, 810(1), 11.

M. Ryleigh Fitzpatrick and Caitlin Griffith (2020, January). "New Reduction Techniques for Echelle Spectroscopy of Extended Objects: Creating a Global Map of Titan's Tropospheric Methane Humidity", AAS Meeting # 235, Honolulu, HI, 278.04

Fitzpatrick, M. R., & Loeffler, M. J. (2019, December). "The Sputtering Yield of Electron Irradiated Water Ice and Its Dependence on Temperature", 2019 AGU Fall Meeting, San Francisco, CA, P51D-3407

M. Ryleigh Fitzpatrick and Mark Loeffler (2019, September), "Composition of the Sputtered Flux in Electron Irradiated Ices", 2019 Flagstaff Astronomy Symposium, Flagstaff, AZ

M. Ryleigh Fitzpatrick and Caitlin Griffith (2019, February), "Mapping the Surface Methane Humidity on Titan", 2019 Women in Space conference, Phoenix, AZ

Sotin, C., Griffith, C. A., **Fitzpatrick, M. R.**, Lawrence, K. J., and The Cassini VIMS Science Implementation Team (2017, December), "Joint observations of Titan's North Pole by Cassini/VIMS and Keck/NIRSPEC", 2017 AGU Fall Meeting, New Orleans, LA, P12B-04

Harris,W.M., Ryan,E.L., Springmann,A., Mueller,B.E.A., Samarasinha,N.H., KikwayaElou,J-B., Howell,E.S., Lejoly,C., Bodnarik,J., **Fitzpatrick,R.**, Maciel, R., Mitchell, A., Watson, Z.T. (2017, October) "The radial and azimuthal properties of volatiles and dust in the inner coma of Comet 45P/Honda-Mrkos-Pajdušáková" , AAS, DPS Meeting #49, id.305.05

Mueller,B.E.A., Samarasinha,N.H., Harris,W.M., Springmann,A., Lejoly,C., Bodnarik,J., Howell,E.S., Ryan,E.L., KikwayaEluo,J-B., **Ryleigh Fitzpatrick**,M., Watson, Z.T., Maciel, R., Macieira Mitchell, A., Scotti, J.V. (2017, October), "The sunward continuum feature of Comet 45P/Honda-Mrkos-Pajdušáková", AAS, DPS Meeting #49, id.414.04

Austin, Carmen, Jenny Calahan, Alexandria Resi Baucco, Christopher William Bullivant, Ross Eckley, W. Haydon Ekstrom, **M. Ryleigh Fitzpatrick** et al. (2017, January) "Active Galactic Videos: A YouTube Channel for Astronomy Education and Outreach", AAS Meeting #229, 335-04

Fitzpatrick, M. R., Martins-Filho, W., Griffith, C. A., Pearson, K., Zellem, R.T., AzGOE (2016, October), "A Study of the Effects of Underlying Assumptions in the Reduction of Multi-Object Photometry of Transiting Exoplanets", AAS, DPS Meeting #48, Pasadena, CA, 122-23

Fitzpatrick, M. R., Pearson, K., Griffith, C. A. (2016, March), "The Effects of Reference Star Choice on the Calculated Signal to Noise in Multi-Object Photometric Reductions", Biological, Engineering, and Chemical Undergraduate Research (BECUR) Conference, Tucson, AZ

Fitzpatrick, M. R., Pearson, K., Griffith, C. A., Dunn, M., Montiel, N., Zellem. R. T., Calahan, J., Chance, Q., Henrici, A., Sanchez, D., AzGOE (2016, January), "Preliminary Results: The Effects of Underlying Assumptions in Multi-Object Photometic Reductions", AAS Meeting #227, Kissimmee, FL, 138-07

McGraw, Allison M., Carmen Austin, Matthew Noyes, Jenny Calahan, Jennifer Lautenbach, Andrew Henrici, **M. Ryleigh Fitzpatrick**, and Yancy L. Shirley (2016, January), "Promoting undergraduate involvement through the University of Arizona Astronomy Club", AAS Meeting #227, Kissimmee, FL, 138-07

Fitzpatrick, M. R., Watson, Z., Zellem, R. T., Pearson, K., Griffith, C. A., AzGOE (2015, January), "High-precision ground-based observations of transiting exoplanets to detect their magnetic fields and undiscovered companions", AAS Meeting #225, Seattle, WA, 257-26

Science Communication Outreach

Society of Women in Space Exploration (SWISE) — *Flagstaff, AZ*

NAU chapter co-founder and Vice President — *2018 - 2020*

- Support and engage with women in science fields related to space exploration at the undergraduate, graduate, and professional levels.
- Conduct outreach and host public events to promote public interest and diversity in science.

Middle School Science Mentor — *Flagstaff, AZ*

Sinagua Middle School — *2019-PRESENT*

- Mentored middle school students who are interested in pursuing careers in STEM.
- Work with students to develop a science project related to the research I am conducting.

Public Science Lectures — *Flagstaff, AZ*

Flagstaff Community — *2019*

- 1 hr. public lecture on Cassini mission and the Titan methane humidity research at local Flagstaff Star Party
- Science Talks at Sinagua Middle School

University of Arizona Astronomy Club — *Tucson, AZ*

President (2015-2016) and Member — *2013-2017*

- Organized research, outreach and tutoring projects for undergraduate students interested in Astronomy
- Planned, organized and conducted public outreach events in Tucson to educate the public on Astronomy related topics including star parties, local school programs, and weekly meetings

Honors & Awards

2019	**Grad College/GSG Academic Scholarship Award**, Northern Arizona University Graduate College	*Flagstaff, AZ*
2017	**Undergraduate Research Achievement**, University of Arizona Department of Astronomy	*Tucson, AZ*
2015	**Best Poster**, 2016 BECUR Conference	*Tucson, AZ*
2013-17	**Arizona Excellence Award**, University of Arizona	*Tucson, AZ*