

# Keara Burke

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## EDUCATION AND ORGANIZATIONS

**Bachelor of Science in Mathematics** with emphasis in Statistics and Probability May 2019  
**Bachelor of Science in Systems Engineering** May 2019  
University of Arizona, College of Engineering/College of Science, Honors College, Tucson, AZ

## PROFESSIONAL EXPERIENCE

**Lunar and Planetary Laboratory**, Tucson, Arizona  
*Systems and Data Analysis Engineer; OSIRIS-REx, SIIOS, IVO* May 2019 – Present

- Assist with the production of GIS routines, workflows, and data analysis for the OSIRIS-REx asteroid sample return mission.
- Perform the systems engineering and requirements definition for future spaceflight instrumentation being developed within LPL. Current projects include a seismometer technology development effort (SIIOS) funded through ICEE-2, DALI, and PSTAR, and work with the RUSHeS and SWAC instrument development for IVO.
- Managed the formal reporting to NASA HQ for the SIIOS ICEE-2 project.
- Participated in field work in AK to deploy seismometers for data collection purposes related to SIIOS.

*Image Processing Intern; OSIRIS-REx* January 2017 – May 2019

- Developed MATLAB process to calculate particle size frequency distributions (PSFD) of hazards on simulated asteroid surface to test viability of hazard identification methods on asteroid (101955) Bennu.
- Established spatial database of hazard information for ease of data processing and team access.
- Ensure stakeholder needs for data processing are met through collaboration with team on calculation results.
- Generate and analyze mosaics of simulated image data using bash scripting and ISIS3 to determine suitability for use in testing IPWG processing pipelines.
- Designed a pipeline using ISIS3 to automatically process and ingest images for database upload.
- Implement the necessary GIS and image processing methods to extract image information, perform data analysis, and visualize clustered (reduced) data.
- Identified the appropriate techniques to produce local and regional maps to minimize distortion for ROIs.
- Assist with the management of a student intern team by mentoring and delegating hazard identification tasks.
- Gave an oral presentation on PSFD results at the AGU Fall meeting in 2018 to over 200 attendees.

**Biosphere 2**, Tucson, Arizona  
*Honors Research Intern* January 2016 – April 2016

- Researched the combined effects of CO<sub>2</sub> levels, temperature, and plant type on basalt rock weathering to understand the impact of rising global temperatures.
- Presented findings during poster session at Honors Engagement Expo to groups of 100+ faculty and students.

## LEADERSHIP & VOLUNTEER EXPERIENCE

**The University of Arizona Engineering Student Council**, Tucson, Arizona  
*Vice President* April 2018 – April 2019

- Direct full council meetings, encourage member involvement, and support initiatives to represent engineering clubs and students to the college and community.
- Led the planning and development of ESC's Five-Year Plan to increase student engagement, bolster club support, and create an engineering community to coincide with the COE's transition of leadership.
- Implemented working meetings as opposed to traditional PowerPoint meetings to recoup lost time.

*Director of Corporate Relations* March 2017 – March 2018

- Organized Arizona's largest student-run engineering career fair attended by 50 companies and 800 students.
- Hosted professional development workshops for ESC council members to advance professional growth.

Member

September 2016 – May 2019

- Collaborate with peers to implement professional development plans and motivate engagement in engineering.
- Attended two national conferences to network and collaborate with like-minded peers on the functions of Engineering Leadership at our respective institutions.

### **The University of Arizona Engineering Ambassadors, Tucson, Arizona**

Member

April 2017 – May 2019

- Assist in outreach events for the College of Engineering. Provide tours and speak at information sessions to support recruiting of potential engineering students.
- Educate K-12 students on the importance of STEM to grow awareness and interest in pursuing careers in STEM.

## **CORE TECHNOLOGIES & SKILLS**

*Languages:* Bash/Unix, PSQL, C, R

*Software:* MATLAB, ISIS3, ArcGIS, QGIS, SPICE, Arena, Simulink, Enterprise Architect

*Tools & Skills:* Data Analysis, Modeling, Database Management

## **HONORS & AWARDS**

Galileo Circle, *Scholar*, Tucson, AZ

April 2019

Astronaut Foundation Scholarship, *Nominee* & Goldwater Scholarship, *Nominee*

March 2018

Phi Beta Kappa, *Member*, Tucson, AZ

March 2018 – Present

Omicron Delta Kappa, *Member*, Tucson, AZ

November 2016 – Present

Tau Beta Pi, *Member*, Tucson, AZ

September 2016 – Present

## **PUBLICATIONS & PRESENTATIONS**

Bennett, C.A., DellaGiustina, D.N., Becker, K.J., Becker, T.L., Edmundson, K.L., Golish, D.R, Bennett, R.J., Burke, K.N., ... & Lauretta, D.S. (2020). A high-resolution global basemap of (101955) Bennu. *Icarus*, 113690.

DellaGiustina, D. N., Emery, J. P., Golish, D. R., Rozitis, B., Bennett, C. A., Burke, K. N., ... & Hamilton, V. E. (2019). Properties of rubble-pile asteroid (101955) Bennu from OSIRIS-REx imaging and thermal analysis. *Nature Astronomy*, 1.

Barnouin, O. S., Daly, M. G., Palmer, E. E., Gaskell, R. W., Weirich, J. R., Johnson, C. L., ... Burke, K. N., ... et al. (2019). Shape of (101955) Bennu indicative of a rubble pile with internal stiffness. *Nature Geoscience*, 1.

Walsh, K. J., Jawin, E. R., Ballouz, R. L., Barnouin, O. S., Bierhaus, E. B., Connolly, H. C., ... Burke, K. N., ... et al. (2019). Craters, boulders and regolith of (101955) Bennu indicative of an old and dynamic surface. *Nature Geoscience*, 1.

Lauretta, D. S., Barnouin, O. S., Becker, K., Bennett, C. A., Bierhaus, B., Boynton, W. V., Burke, K. N., ... et al. (2018). OSIRIS-REx Encounters Bennu: Initial Assessment from the Approach Phase. *Proceedings of the AGU Fall Meeting, Washington D.C., December 2018*.

Burke, K.N., DellaGiustina, D.N., Bennett, C.A., Bierhaus, E.B., Pajola, M., Golish, D.R, Walsh, K.J., Jawin, E.R., Becker, K.J., Daly, M.G., Barnouin, O.S., Habib, N., Rizk, B., Nolan, M.C., Lauretta, D.S., and the OSIRIS-REx Team. Boulder Size Frequency Distribution (SFD) of (101955) Bennu. *Proceedings of the AGU Fall Meeting, Washington D.C., December 2018*.

DellaGiustina, D. N., Bennett, C. A., Becker, K., Golish, D. R., Le Corre, L., Cook, D. A., ... Burke, K. N., ... et al. (2018). Overcoming the challenges associated with image-based mapping of small bodies in preparation for the OSIRIS-REx mission to (101955) Bennu. *Earth and Space Science*, 5, 929-949.