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### EDUCATION

- 2018 **Ph.D.**, Earth, Environmental, and Planetary Sciences, Brown University, Providence, RI  
*Dissertation:* Human Exploration Destinations: Non-Polar Ice on Mars and Large Pyroclastic Deposits on the Moon, *Advisor:* James W. Head
- 2015 **Sc.M.**, Earth, Environmental, and Planetary Sciences, Brown University, Providence, RI  
*Dissertation:* The paraglacial period as a conceptual framework for post-glacial activity in mid-latitude martian craters, *Advisor:* James W. Head
- 2012 **B.A.**, Astronomy, Geology (Minor), Mount Holyoke College, South Hadley, MA  
*Dissertation:* The relationship between radar scattering and surface roughness of lunar volcanic features, *Advisor:* M. Darby Dyar, Caleb I. Fassett

### PROFESSIONAL EXPERIENCE

- 2021 – present **Postdoctoral Research Geologist**, Smithsonian Institution National Air and Space Museum, Washington, DC *Advisor:* Bruce Campbell
- 2018 – 2021 **Postdoctoral Research Geologist**, Smithsonian Institution National Museum of Natural History, Washington, DC *Advisor:* Timothy McCoy
- 2013 – 2018 **Graduate Research Associate**, Department of Earth, Environmental, and Planetary Sciences, Brown University, Providence, RI *Advisor:* James Head
- 2012 – 2013 **Visiting Scientist**, European Space Research and Technology Centre (ESTEC), Noordwijk, The Netherlands *Advisor:* Sébastien Besse
- 2010 – 2013 **Undergraduate Research Assistant**, Mount Holyoke Astronomy Department Lab, South Hadley, MA *Advisor:* M. Darby Dyar, Caleb Fassett
- 2011 **Summer Research Intern**, Lunar and Planetary Institute, Houston, TX  
*Advisor:* Walter Kiefer, Paul Spudis

### FUNDING

- 2024 **NASA New Frontiers Program (Co-I)**, OSIRIS-REx Extended Mission Apophis Explorer, OSIRIS-APEX
- 2023 **NASA LDAP (Co-I)**, Exploring the Volcanic History of the Crisium Basin through Geologic Mapping, 80NSSC23K1339
- 2022 **NASA New Frontiers Data Analysis Program (Co-I)**, Timescales for boulder evolution from thermal fatigue and impacts on asteroid (101955) Bennu, 80NSSC22K1073
- 2022 **NASA Discovery Data Analysis Program (Co-I)**, Exploring the Earliest Stages of Explosive Volcanism on Mercury, 80NSSC22K1065
- 2021 **NASA New Frontiers Data Analysis Program (PI)**, Integrated boulder properties on rubble pile asteroid (101955) Bennu as tracers of parent body history, 80NSSC21K0827
- 2020 **NASA Solar System Workings Program (Collaborator)**, Pyroclastic Eruption Conditions on the Moon and Mercury

### PUBLICATIONS (H-index: 22, Citations: 2241)

#### *First-Authored Publications*

- (43) **Jawin, ER**, RL Ballouz, AJ Ryan, HH Kaplan, TJ McCoy, MM Al Asad, JL Molaro, B Rozitis, LP Keller. Boulder Diversity in the Nightingale Region of Asteroid (101955) Bennu

- and Predictions for Physical Properties of the OSIRIS-REx Sample. *JGR: Planets*, 128, e2023JE005019. <https://doi.org/10.1029/2023JE008019>
- (42) **Jawin, ER**, BA Campbell, JL Whitten, GA Morgan (2022). The Lateral Continuity and Vertical Arrangement of Dust Layers in the Martian North Polar Cap From SHARAD Multiband Data. *GRL*, 49, 17, e2022GL099896. <https://doi.org/10.1029/2022GL099896>
- (41) **Jawin, ER**, TJ McCoy, KJ Walsh, HC Connolly, R-L Ballouz, AJ Ryan, HH Kaplan, M Pajola, VE Hamilton, OS Barnouin, JP Emery, DN DellaGiustina, MG Daly, CA Bennett, DR Golish, ME Perry, RT Daly, EB Bierhaus, MC Nolan, HL Enos, DS Lauretta (2022). Global geologic map of asteroid (101955) Bennu indicates heterogeneous resurfacing in the past 500,000 years. *Icarus*, 381, 114992, <https://doi.org/10.1016/j.icarus.2022.114992>
- (40) **Jawin, ER**, JW Head (2021), Patterns of Martian Deglaciation: Assessing the Distribution of Late Amazonian Paraglacial Features in Mid-Latitude Craters, *Icarus*, 355, 114117
- (39) **Jawin, ER**, KJ Walsh, TJ McCoy, OS Barnouin, R-L Ballouz, H Susorney, HH Kaplan, JL Molaro, D DellaGiustina, CA Bennett, KN Burke, D Scheeres, M Daly, M Al Asad, RT Daly, EB Bierhaus, HC Connolly Jr., M Nolan, H Enos, and DS Lauretta (2020), Global patterns of mass movement on Bennu, *JGR: Planets*, 125 (9), e2020JE006475.
- (38) **Jawin, ER**, S Valencia, R Watkins, J Crowell, C Neal, G Schmidt (2019), Lunar Science for Landed Missions Workshop Findings Report, *Earth and Space Sciences*, 6, 2–40.
- (37) **Jawin, ER**, JW Head, and DR Marchant (2018), Transient Post-Glacial Processes on Mars: Geomorphologic Evidence for a Paraglacial Period, *Icarus*, 309, 187-206.
- (36) **Jawin, ER**, S Besse, LR Gaddis, JM Sunshine, JW Head, S Mazrouei (2015), Examining Spectral Variations in Lunar Pyroclastic Deposits, *Journal of Geophysical Research: Planets*, 120, 1310-1331.
- (35) **Jawin, ER**, WS Kiefer, CI Fassett, DBJ Bussey, JTS Cahill, MD Dyar, SJ Lawrence, and PD Spudis (2014), The relationship between radar scattering and surface roughness of lunar volcanic features, *Journal of Geophysical Research: Planets*, 119, 2331–2348.

#### Co-Authored Publications

- (34) DN DellaGiustina, MC Nolan, AT Polit, MC Moreau, DR Golish, AA Simon, CD Adam, PG Antreasian, R.-L. Ballouz, OS Barnouin, KJ Becker, CA Bennett, RP Binzel, BJ Bos, R Burns, N Castro, SR Chesley, PR Christensen, MK Crombie, MG Daly, RT Daly, HL Enos, D Farnocchia, SF Kasper, R Garcia, KM Getzandanner, SD Guzewich, CW Haberle, T Haltigin, VE Hamilton, K Harshman, N Hatten, KM Hughes, **ER Jawin**, HH Kaplan, DS Lauretta, JM Leonard, AH Levine, AJ Liounis, CW May, LC Mayorga, L Nguyen, LC Quick, DC Reuter, B Rizk, HL Roper, AJ Ryan, B Sutter, MM Westermann, DR Wibben, BG Williams, K Williams and CWV Wolner (2023), OSIRIS APEX: An OSIRIS-REx Extended Mission to Asteroid Apophis, *PSJ*, 4, 198, DOI: 10.3847/PSJ/acf75e
- (33) Morgan, G.A., **Jawin, E.R.**, Campbell, B.A., Patterson, G.W., Bramson, A.M., Nypaver, C.A., Stopar, J.D. Jozwiak, L.M., Stickle, A.M., Bhiravarasu, S.S. (2023). Radar perspective of the Aristarchus pyroclastic deposit and implications for future missions. *Planetary Science Journal*, 4, 11, DOI: 10.3847/PSJ/ad023a.
- (32) Clark, B. E., Sen, A., Zou, X. D., Dellagiustina, D. N., Sugita, S., Sakatani, N., M. Thompson, D. Trang, E. Tatsumi, M.A. Barucci, M. Barker, H. Campins, T. Morota, C. Lantz, A.R. Hendrix, F. Vilas, L. Keller, V.E. Hamilton, K. Kitazato, S. Sasaki, M. Matsuoka, T. Nakamura, A. Praet, S.M. Ferrone, T. Hiroi, H.H. Kaplan, W.F. Bottke, J. Y.

- Li, L. Le Corre, J.L. Molaro, R.-L. Ballouz, C.W. Hergenrother, B. Rizk, K.N. Burke, C.A. Bennett, D.R. Golish, E.S. Howell, K. Becker, A.J. Ryan, J.P. Emery, S. Fornasier, A.A. Simon, D.C. Reuter, L.F. Lim, G. Poggiali, P. Michel, M. Delbo, O.S. Barnouin, **E.R. Jawin** [7 others] (2023). Overview of the search for signs of space weathering on the low-albedo asteroid (101955) Bennu. *Icarus*, 115563.
- (31) Walsh, KJ, R-L, Ballouz, **ER Jawin**, C Avdellidou, OS Barnouin, CA Bennett, EB Bierhaus, BJ Bos, S Cambioni, HC Connolly Jr, M Delbo, DN DellaGiustina, J DeMartini, JP Emery, DR Golish, PC Haas, CW Hergenrother H Ma, P Michel, MC Nolan, R Olds, B Rozitis, DC Richardson, B Rizk, AJ Ryan, P Sánchez, DJ Scheeres, SR Schwartz, SH Selznick, Y Zhang, DS Lauretta (2022). Near-zero cohesion and loose packing of Bennu's near-subsurface revealed by spacecraft contact, *Sci Adv*, 8(27), eabm6229. DOI: 10.1126/sciadv.abm6229
- (30) Daly, RT, OS Barnouin, EB Bierhaus, MG Daly, JA Seabrook, RL Ballouz, H Nair, RC Espiritu, **ER Jawin**, D Trang, DN DellaGiustina, KN Burke, JL Brodbeck, KJ Walsh (2022). The morphometry of small impact craters on Bennu: Relationships to geologic units, boulders, and impact armoring. *Icarus*, 384, 115058. DOI: 10.1016/j.icarus.2022.115058
- (29) Walsh, KJ, EB Bierhaus, DS Lauretta, MC Nolan, R-L Ballouz, CA Bennett, **ER Jawin**, OS Barnouin, K Berry, KN Burke, B Brodbeck, R Burns, BC Clark, BE Clark, S Cambioni, HC Connolly, MG Daly, M Delbo, DN DellaGiustina, JP Dworkin, HL Enos, JP Emery, P Gay, DR Golish, VE Hamilton, R Hoover, M Lujan, Timothy McCoy, RG Mink, MC Moreau, J Nolau, J Padilla, M Pajola, AT Polit, SJ Robbins, AJ Ryan, SH Selznick, S Stewart, CWV Wolner (2022). Assessing the Sampleability of Bennu's Surface for the OSIRIS-REx Asteroid Sample Return Mission. *Space Science Reviews*, 218(20). DOI: 10.1007/s11214-022-00887-2
- (28) Bierhaus, EB, D Trang, RT Daly, CA Bennett, OS Barnouin, KJ Walsh, R-L Ballouz, WF Bottke, KN Burke, ME Perry, **ER Jawin**, TJ McCoy, HC Connolly Jr., MG Daly, JP Dworkin, DN DellaGiustina, PL Gay, JI Brodbeck, J Nolau, J Padilla, S Stewart, S Schwartz, P Michel, M Pajola, and DS Lauretta (2022). Crater population on asteroid (101955) Bennu indicates impact armouring and a young surface. *Nature Geoscience*, DOI: 10.1038/s41561-022-00914-5
- (27) Perry ME, OS Barnouin, RT Daly, EB Bierhaus, R-L Ballouz, KJ Walsh, MG Daly, DN DellaGiustina, MC Nolan, JP Emery, MM Asad, CL Johnson, CM Ernst, **ER Jawin**, P Michel, DR Golish, WF Bottke, J Seabrook, and DS Lauretta (2022). Low surface strength of the asteroid Bennu inferred from impact ejecta deposit. *Nature Geoscience*, DOI: 10.1038/s41561-022-00937-y
- (26) Barnouin, OS, **ER Jawin**, RT Daly, R-L Ballouz, MG Daly, JA Seabrook, P Michel, Y Zhang, CL Johnson, KJ Walsh, MM Al Asad, R Gaskell, J Weirich, E Palmer, EB Bierhaus, MC Nolan, CWV Wolner, DS Lauretta (2022). Geologic Context of the OSIRIS-REx Sample Site from High-resolution Topography and Imaging. *The Planetary Science Journal*, 3(4): 75. DOI:10.3847/PSJ/ac5597
- (25) Barnouin, OS, MG Daly, JA Seabrook, Y Zhang, F Thuillet, P Michel, JH Roberts, RT Daly, ME Perry, HCM Susorney, **ER Jawin**, R-L Ballouz, KJ Walsh, MM Sevalia, MM Al Asad, CL Johnson, EB Bierhaus, RW Gaskell, EE Palmer, J Weirich, B Rizk, CY Drouet D'Aubigny, MC Nolan, DN DellaGiustina, DJ Scheeres, JW McMahon, HC Connolly Jr,

- DC Richardson, CWV Wolner, DS Lauretta (2022). The Formation of Terraces on Asteroid (101955) Bennu. *JGR Planets*, 127(4). DOI: 10.1029/2021JE006927
- (24) Glotch, TD, **ER Jawin**, BT Greenhagen, JT Cahill, DJ Lawrence, RN Watkins, DP Moriarty, S Li, PG Lucey, N Kumari, MA Siegler, J Feng, LB Breitenfeld, CC Allen, H Nekvasil, DA Paige (2021). The Scientific Value of a Sustained Exploration Program at the Aristarchus Plateau, *Planetary Science Journal*, 2, 136.
- (23) Trang, D, MS Thompson, BE Clark, HH Kaplan, X-D Zou, J-Y Li, SM Ferrone, VE Hamilton, AA Simon, DC Reuter, LP Keller, MA Barucci, H Campins, C Lantz, DN DellaGiustina, R-L Ballouz, **ER Jawin**, HC Connolly, KJ Walsh, DS Lauretta (2021). The Role of Hydrated Minerals and Space Weathering Products in the Bluing of Carbonaceous Asteroids, *Planetary Science Journal*, 2, 68.
- (22) Burke, KN, DellaGiustina, DN, Bennett, CA, Walsh, KJ, Pajola, M, Bierhaus, EB, Nolan, MC, Boynton, WB, Brodbeck, JI, Connolly, HC, Prasanna Deshapriya, J, Dworkin, JP, Elder, CM, Golish, DR, Hoover, RH, **Jawin, ER**, et al. (2021). Particle Size-Frequency Distributions of the OSIRIS-REx Candidate Sample Sites on Asteroid (101955) Bennu. *Remote Sensing*, 13(7), 1315.
- (21) Golish, DR, Shultz, NK, Becker, TL, Becker, KJ, Edmundson, KL, DellaGiustina, DN, C Drouet d'Aubigny, CA Bennett, B Rizk, OS Barnouin, MG Daly, JA Seabrook, L Philpott, MM Al Asad, CL Johnson, J-Y Li, R-L Ballouz, **ER Jawin**, DS Lauretta (2021). A high-resolution normal albedo map of asteroid (101955) Bennu. *Icarus*, 355, 114133.
- (20) Susorney, HCM, LC Philpott, R-L Ballouz, CL Johnson, B Rozitis, **ER Jawin** (2021) Geological and geophysical constraints on Itokawa's past spin periods, *Icarus*, 357, 114265.
- (19) Daly, MG, OS Barnouin, JA Seabrook, J Roberts, C Dickinson, KJ Walsh, **ER Jawin**, EE Palmer, R Gaskell, J Weirich, T Haltigin, D Gaudreau, C Brunet, G Cunningham, P Michel, Y Zhang, R-L Ballouz, G Neumann, ME Perry, L Philpott, MM Al Asad, CL Johnson, CD Adam, JM Leonard, JL Geeraert, K Getzandanner, MC Nolan, RT Daly, EB Bierhaus, E Mazarico, B Rozitis, AJ Ryan, DN Dellaguistina, B Rizk, HCM Susorney, HL Enos, DS Lauretta (2020), Hemispherical differences in the shape and topography of asteroid (101955) Bennu, *Science Advances*, 6, 41, eabd3649.
- (18) Scheeres, DS, AS French, P Tricarico, SR Chesley, Y Takahashi, D Farnocchia, JW McMahon, DN Brack, AB Davis, RL Ballouz, **ER Jawin**, B Rozitis, JP Emery, AJ Ryan, RS Park, BP Rush, N Mastrodemos, BM Kennedy, J Bellerose, DP Lubey, D Velez, AT Vaughan, JM Leonard, J Geeraert, B Page, P Antreasian, E Mazarico, K Getzandanner, D Rowlands, MC Moreau, J Small, DE Highsmith, S Goossens, EE Palmer, JR Weirich, RW Gaskell, OS Barnouin, MG Daly, JA Seabrook, MM Al Asad, LC Philpott, CL Johnson, CM Hartzell, VE Hamilton, P Michel, KJ Walsh, MC Nolan, DS Lauretta (2020), Heterogenous mass distribution of the rubble-pile asteroid (101955) Bennu, *Science Advances*, 6, 41, eabc3350.
- (17) Kaplan, HH, DS Lauretta, AA Simon, VE Hamilton, DN DellaGiustina, DR Golish, DC Reuter, CA Bennett, KN Burke, H Campins, HC Connolly Jr., JP Dworkin, JP Emery, DP Glavin, TD Glotch, R Hanna, K Ishimaru, **ER Jawin**, TJ McCoy, N Porter, SA Sandford, S Ferrone, BE Clark, J-Y Li, X-D Zou, MG Daly, OS Barnouin, JA Seabrook, HL Enos (2020), Bright carbonate veins on asteroid (101955) Bennu: Implications for aqueous alteration history, *Science*, 370, 6517, eabc3557.
- (16) Rozitis, B, AJ Ryan, JP Emery, PR Christensen, VE Hamilton, AA Simon, DC Reuter, M Al Asad, R-L Ballouz, JL Bandfield, OS Barnouin, CA Bennett, M Bernacki, KN Burke, S

- Cambioni, BE Clark, MG Daly, M Delbo, DN DellaGiustina, CM Elder, RD Hanna, CW Haberle, ES Howell, DR Golish, **ER Jawin**, HH Kaplan, LF Lim, JL Molaro, D Pino Munoz, MC Nolan, B Rizk, MA Siegler, HCM Susorney, KJ Walsh, DS Lauretta (2020), Asteroid (101955) Bennu's weak boulders and thermally anomalous equator, *Science Advances*, 6, 41, eabc3699.
- (15) DellaGiustina, DN, KN Burke, KJ Walsh, PH Smith, DR Golish, EB Bierhaus, R-L Ballouz, TL Becker, H Campins, E Tatsumi, K Yumoto, S Sugita, JD Prasanna Deshapriya, EA Cloutis, BE Clark, AR Hendrix, A Sen, MM Al Asad, MG Daly, DM Applin, C Avdellidou, MA Barucci, KJ Becker, CA Bennett, WF Bottke, JI Brodbeck, HC Connolly Jr., M Delbo, J de Leon, CY Drouet d'Aubigny, KL Edmundson, S Fornasier, VE Hamilton, PH Hasselmann, CW Hergenrother, ES Howell, **ER Jawin**, HH Kaplan, L Le Corre, LF Lim, JY Li, P Michel, JL Molaro, MC Nolan, J Nola, M Pajola, A Parkinson, M Popescu, NA Porter, B Rizk, JL Rizos, AJ Ryan, B Rozitis, NK Shultz, AA Simon, D Trang, RB Van Auken, CWV Wolner, DS Lauretta (2020), Variations in color and reflectance on the surface of asteroid (101955) Bennu, *Science*, 370, 6517, eabc3660.
- (14) Daly, RT, EB Bierhaus, OS Barnouin, MG Daly, JA Seabrook, JH Roberts, CM Ernst, ME Perry, H Nair, RC Espiritu, EE Palmer, RW Gaskell, JR Weirich, HCM Susorney, CL Johnson, KJ Walsh, MC Nolan, **ER Jawin**, P Michel, D Trang, and DS Lauretta (2020), The morphometry of impact craters on Bennu, *Geophysical Research Letters*, e2020GL089672.
- (13) Ballouz, R-L, Walsh, KJ, Barnouin, OS, DellaGiustina, DN, Al Asad, M, **Jawin, ER**, Daly, MG, Bottke, WF, Michel, P, Avdellidou, C, Delbo, M, Daly, RT, Asphaug, E, Bennett, CA, Bierhaus, EB, Connolly Jr., HC, Golish, DR, Molaro, JL, Nolan, MC, Pajola, M, Rizk, B, Schwartz, SR, Trang, D, Wolner, CWV, Lauretta, DS (2020), Bennu's near-Earth lifetime of 1.75 million years inferred from craters on its boulders, *Nature*, 587, 205-209.
- (12) DellaGiustina, DN, Kaplan, HH, Simon, AA, Bottke, WF, Avdellidou, C, Delbo, M, Golish, DR, Ballouz, RL, Popescu, M, Campins, H, Barucci, MA, Poggiali, G, Daly, RT, Le Corre, L, Hamilton, VE, Walsh, KJ, Porter, N, **Jawin, ER**, McCoy, TJ, Connolly Jr., HC, Rizos Garcia, JL, Tatsumi, E, de Leon, J, Licandro, J, Fornasier, S, Daly, MG, Al Asad, MM, Philpott, L, Seabrook, J, Barnouin, OS, Clark, BE, Nolan, MC, Howel, ES, Binzel, RP, Rizk, B, Reuter, DC, Lauretta, DS (2020), Exogenic Basalt on Asteroid (101955) Bennu, *Nature Astronomy*, 5, 31-38.
- (11) Molaro, JM, Walsh, KJ, **Jawin, ER**, Ballouz, R-L, Bennett, CA, DellaGiustina, DN, Golish, DR, Drouet d'Aubigny, C, Rizk, B., Schwartz, SR, Delbo, M, Hanna, RD, Martel, SJ, Pajola, M, Campins, H, Ryan, AJ, Bottke, WF, Lauretta, DS (2020), In situ evidence of thermally induced rock breakdown widespread on Bennu's surface, *Nature Communications*, 11, 2913.
- (10) Bennett, CA, D DellaGiustina, K Becker, T Becker, K Edmundson, D Golish, R Bennett, K Burke, N Cue, BE Clark, J Contreras, JDP Deshapriya, CD d'Aubigny, **ER Jawin**, T Nolan, N Porter, M Riehl, H Roper, B Rizk, Y Tang, Z Zeszut, R Gaskell, E Palmer, J Weirich, M Al Asad, L Philpott, M Daly, O Barnouin, H Enos, D Lauretta (2020), A High-Resolution Global Basemap of (101995) Bennu, *Icarus*, 357, 113690.
- (9) Walsh, KJ, **ER Jawin**, R-L Ballouz, OS Barnouin, EB Bierhaus, HC Connolly Jr., JL Molaro, TJ McCoy, M Delbo, CM Hartzell, M Pajola, SR Schwartz, D Trang, E Asphaug, KJ Becker, CB Beddingfield, CA Bennett, WF Bottke, KN Burke, BC Clark, MG Daly, DN DellaGiustina, JP Dworkin, CM Elder, DR Golish, AR Hildebrand, R Malhotra, J Marshall,

- P Michel, MC Nolan, ME Perry, B Rizk, A Ryan, SA Sandford, DJ Scheeres, HCM Susorney, F Thuillet, DS Lauretta (2019), Craters, boulders and regolith of (101955) Bennu indicative of an old and dynamic surface, *Nature Geoscience*, 12 (4), 242.
- (8) Barnouin, OS, MG Daly, EE Palmer, RW Gaskell, JR Weirich, CL Johnson, MM Al Asad, JH Roberts, ME Perry, HCM Susorney, RT Daly, EB Bierhaus, JA Seabrook, RC Espiritu, AH Nair, L Nguyen, GA Neumann, CM Ernst, WV Boynton, MC Nolan, CD Adam, MC Moreau, B Rizk, CY Drouet D'Aubigny, **ER Jawin**, KJ Walsh, P Michel, SR Schwartz, R-L Ballouz, EM Mazarico, DJ Scheeres, JW McMahon, WF Bottke, S Sugita, N Hirata, N Hirata, S-I Watanabe, KN Burke, DN DellaGiustina, CA Bennett, DS Lauretta (2019), Shape of (101955) Bennu indicative of a rubble pile with internal stiffness, *Nature Geoscience*, 12 (4), 247.
- (7) DellaGiustina, DN, JP Emery, DR Golish, Benjamin Rozitis, CA Bennett, KN Burke, R-L Ballouz, KJ Becker, PR Christensen, CY Drouet d'Aubigny, VE Hamilton, DC Reuter, B Rizk, AA Simon, E Asphaug, JL Bandfield, OS Barnouin, MA Barucci, EB Bierhaus, RP Binzel, WF Bottke, NE Bowles, H Campins, BC Clark, BE Clark, HC Connolly, MG Daly, J de Leon, M Delbo, JDP Deshapriya, CM Elder, S Fornasier, CW Hergenrother, ES Howell, **ER Jawin**, HH Kaplan, TR Kareta, L Le Corre, J-Y Li, J Licandro, LF Lim, P Michel, J Molaro, MC Nolan, M Pajola, M Popescu, JL Rizos Garcia, A Ryan, SR Schwartz, N Shultz, MA Siegler, PH Smith, E Tatsumi, CA Thomas, KJ Walsh, CWV Wolner, X-D Zou, DS Lauretta (2019), Properties of rubble-pile asteroid (101955) Bennu from OSIRIS-REx imaging and thermal analysis, *Nature Astronomy*, 3 (4), 341.
- (6) Lauretta, DS, CW Hergenrother, SR Chesley, JM Leonard, JY Pelgrift, CD Adam, M Al Asad, PG Antreasian, RL Ballouz, KJ Becker, CA Bennett, BJ Bos, WF Bottke, M Brozović, H Campins, HC Connolly Jr., MG Daly, AB Davis, J de León, DN DellaGiustina, CY Drouet d'Aubigny, JP Dworkin, JP Emery, D Farnocchia, DP Glavin, DR Golish, CM Hartzell, RA Jacobson, **ER Jawin**, P Jenniskens, JN Kidd Jr., EJ Lessac-Chenen, JY Li, G Libourel, J Licandro, AJ Liounis, CK Maleszewski, C Manzoni, B May, LK McCarthy, JW McMahon, P Michel, JL Molaro, MC Moreau, DS Nelson, WM Owen Jr., B Rizk, HL Roper, B Rozitis, EM Sahr, DJ Scheeres, JA Seabrook, SH Selznick, Y Takahashi, F Thuillet, P Tricarico, D Vokrouhlický, CWV Wolner (2019), Episodes of particle ejection from the surface of the active asteroid (101955) Bennu, *Science*, 366, 6470.
- (5) Scheeres, DJ, JW McMahon, AS French, DN Brack, SR Chesley, D Farnocchia, Y Takahashi, JM Leonard, J Geeraert, B Page, P Antreasian, K Getzandanner, D Rowlands, EM Mazarico, J Small, DE Highsmith, M Moreau, JP Emery, Benjamin Rozitis, M Hirabayashi, P Sánchez, P Tricarico, R-L Ballouz, CL Johnson, MM Al Asad, HCM Susorney, OS Barnouin, MG Daly, JA Seabrook, RW Gaskell, EE Palmer, JR Weirich, KJ Walsh, **ER Jawin**, EB Bierhaus, P Michel, WF Bottke, MC Nolan, HC Connolly Jr, DS Lauretta (2019), The dynamic geophysical environment of (101955) Bennu based on OSIRIS-REx measurements, *Nature Astronomy*, 3 (4), 352.
- (4) Howell, S, L Chou, M Thompson, M Bouchard, S Cusson, M Marcus, H Smith, S Bhattaru, J Blalock, S Brueshaber, S Eggel, **E Jawin**, K Miller, M Rizzo, K Steakley, N Thomas, K Trent, M Ugelow, C Budney, K Mitchell, L Lowes (2018), Camilla: A centaur reconnaissance and impact mission concept, *Planetary and Space Sciences*, 164, 184-193.
- (3) Deutsch, AN, JW Head, KR Ramsley, CM Pieters, RWK Potter, AM Palumbo, MS Bramble, JP Cassanelli, **ER Jawin**, LM Jozwiak, HH Kaplan, CF Lynch, AC Pascuzzo, L Qiao, DK

- Weiss (2018), Science exploration architecture for Phobos and Deimos: The role of Phobos and Deimos in the future exploration of Mars, *Advances in Space Research*, 62, 2174-2186.
- (2) Dyar, MD, **ER Jawin**, E Breves, G Marchand, M Nelms, MD Lane, SA Mertzman, DL Bish, JL Bishop (2014), Mössbauer parameters of iron in phosphate minerals: Implications for interpretation of martian data, *American Mineralogist*, 99(5-6), 914–942.
- (1) Dyar, MD, E Breves, **ER Jawin**, G Marchand, M Nelms, V O'Connor, S Peel, Y Rothstein, EC Sklute, MD Lane, JL Bishop, SA Mertzman (2013), Mössbauer parameters of iron sulfate minerals, *American Mineralogist*, 98(11-12), 1943-1965.

### **INVITED PRESENTATIONS**

- (14) *Southwest Research Institute Colloquium*, Global geology of Bennu and links to sample return, 2023
- (13) *University of Georgia Department of Physics and Astronomy Colloquium*, OSIRIS-REx mission and the global geology of Bennu, 2023.
- (12) *Gordon Research Conference*, Geology of Bennu, links to meteorites, and predictions for the returned sample, 2023.
- (11) E. R. Jawin [12 others]. Investigating the heterogeneity of asteroid Bennu's parent body by linking micro- and macro-scale (*Invited*), *American Geophysical Union*, 2023. Abstract DI51A-02
- (10) *Seminar Series, Smithsonian National Air and Space Museum*, Ancient Origins: Asteroid (101955) Bennu and the OSIRIS-REx mission, 2021
- (9) **ER Jawin**, KJ Walsh, TJ McCoy, HC Connolly Jr., AJ Ryan, RL Ballouz, DN DellaGiustina, CA Bennett, OS Barnouin, JP Emery, VE Hamilton, EB Bierhaus, MG Daly, M Delbo, JL Molaro, MC Nolan, J Marshall, C Beddingfield, M Pajola, ME Perry, B Rizk, DJ Scheeres, SR Schwartz, BE Clark, DS Lauretta, Diverse Boulders and Recent Mass Movement: Two Years of OSIRIS-REx Observations of the Geology of Asteroid (101955) Bennu (*Invited*), *Division of Planetary Science Annual Meeting*, Virtual, 2020.
- (8) *Planetary Lunch Seminar, Brown University*, Asteroid (101955) Bennu as seen by OSIRIS-REx: Global geology and preparations for sample collection, 2020
- (7) *Departmental Colloquium, Washington University in St. Louis*, Decoding the Past: Surface Processes as a Key to Planetary Evolution, 2020
- (6) **Jawin, ER**, KJ Walsh, TJ McCoy, HC Connolly, DS Lauretta, R-L Ballouz, OS Barnouin, C Beddingfield, CA Bennett, EB Bierhaus, KN Burke, B Clark, MG Daly, M Delbo, D DellaGiustina, JP Dworkin, C Hartzell, J Marshall, P Michel, JL Molaro, M Nolan, M Pajola, M Perry, B Rizk, S Sandford, DJ Scheeres, SR Schwartz, D Trang, Global geology of asteroid Bennu (*Invited*), *Geological Society of America Annual Meeting*, Phoenix, AZ, 2019
- (5) **Jawin, ER**, KJ Walsh, TJ McCoy, HC Connolly, DS Lauretta, RL Ballouz, JL Molaro, OS Barnouin, M Nolan, Evidence of Mass Movement and Boulder Transport on Bennu from NASA's OSIRIS-REx Space Mission (*Invited*), *Japanese Geoscience Union*, Japan, 2019
- (4) **Jawin, ER**, KJ Walsh, TJ McCoy, HC Connolly, DS Lauretta, R-L Ballouz, OS Barnouin, C Beddingfield, CA Bennett, EB Bierhaus, KN Burke, B Clark, MG Daly, M Delbo, D DellaGiustina, JP Dworkin, C Hartzell, J Marshall, P Michel, JL Molaro, M Nolan, M Pajola, M Perry, B Rizk, S Sandford, DJ Scheeres, SR Schwartz, D Trang, Global geology of Bennu from NASA's OSIRIS-REx (*Invited*), *Japanese Geoscience Union*, Chiba, Japan, 2019
- (3) *Seminar, NASA Goddard Space Flight Research Center*, Global Geology of Bennu, 2019

- (2) *Seminar, Johns Hopkins Applied Physics Laboratory, Future human exploration destinations on the Moon and Mars, 2018*
- (1) *Smithsonian Institution NMNH Department of Mineral Sciences, Future human exploration destinations on the Moon and Mars, 2018*

### **WHITE PAPERS AND SELECT PUBLISHED ABSTRACTS**

#### *White Papers*

- (2) **ER Jawin**, T. Glotch, R. Watkins, L. Jozwiak, S. Valencia, H. Meyer, R. A. Yingst, B. Denevi, D. Moriarty, D. Needham, S. Besse, S. Shukla, B. Jolliff, L. Gaddis, K. Bennett, J. Clark. Exploring End-Member Volcanism on the Moon at the Aristarchus Plateau. White Paper Submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032.
- (1) **ER Jawin**, B Denevi, B Cohen, S Lawrence, C Neal, RN Watkins, A Deutsch, B Farrell, C Grava, G Kramer, P Prem, N Zellner. Planetary Science Priorities for the Moon in the Decade 2023-2032: Lunar Science is Planetary Science. White Paper Submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032.

#### *Recent Published Abstracts*

- (7) **E. R. Jawin** [12 others]. Investigating the heterogeneity of asteroid Bennu's parent body by linking micro- and macro-scale (Invited). American Geophysical Union (2023), Abstract DI51A-02
- (6) **E. R. Jawin**, R.-L. Ballouz, H. H. Kaplan, A. J. Ryan, M. M. Al Asad, J. L. Molaro, B. Rozitis, PREDICTIONS FOR THE PHYSICAL PROPERTIES OF THE OSIRIS-REX SAMPLE OF ASTEROID BENNU. Asteroids, Comets, Meteors (2023), Abstract #2071.
- (5) **E. R. Jawin**, B. A. Campbell. SHARAD MULTIBAND ANALYSIS OF RADAR SURFACE REFLECTIVITY IN THE MARTIAN POLAR LAYERED DEPOSITS. Lunar and Planetary Science Conference (2023), Abstract #1536
- (4) **E. R. Jawin**, R.-L. Ballouz, H. H. Kaplan, A. J. Ryan, M. M. Al Asad, J. L. Molaro, and B. Rozitis. INTEGRATED BOULDER ANALYSIS AT NIGHTINGALE CAN INFORM SAMPLE RETURN FROM ASTEROID BENNU. Lunar and Planetary Science Conference (2023), Abstract #1807
- (3) **Jawin, ER**, R-L Ballouz, HH Kaplan, AJ Ryan, MM Al Asad, JL Molaro, and B Rozitis. Characterizing boulders on Asteroid Bennu. Submitted to the Exploration Science Forum, July 2022.
- (2) **E. R. Jawin**, B. A. Campbell, J. L. Whitten, G. A. Morgan. What Makes a Layer? Investigating Variable Layer Behavior in Martian North Polar Layered Deposits Using SHARAD Multiband Data. 53<sup>rd</sup> LPSC (2022), Abstract #1457
- (1) **E. R. Jawin**, T. J. McCoy, A. J. Ryan, H. H. Kaplan, R.-L. Ballouz, K. J. Walsh, D. N. DellaGiustina, J. P. Emery, V. E. Hamilton, L. E. Melendez, H. C. Connolly Jr., O. S. Barnouin, C. A. Bennett, J. L. Molaro, M. Pajola, D. R. Golish, B. Rizk, D. S. Lauretta. Boulder Classification on Bennu Based on Morphology and Albedo. 53<sup>rd</sup> LPSC (2022), Abstract #2066



## SELECTED HONORS AND AWARDS

- 2022 John L. “Jack” Swigert, Jr., Award for Space Exploration, to the OSIRIS-Rex Sample Return Mission Team
- Top cited article in *JGR Planets*, 2020 to 2021: Jawin et al., Global Patterns of Recent Mass Movement on Asteroid (101955) Bennu
- Top 10% most downloaded paper AGU journals of 2020: Jawin et al., Global Patterns of Recent Mass Movement on Asteroid (101955) Bennu
- Top 10% most downloaded paper in *Earth and Space Science*, Jan 2018 to Dec 2019: Jawin et al., Lunar Science for Landed Missions Workshop Findings Report
- Asteroid 2000 KX57 was renamed, (28886) Ericajawin, 2021
- *Sleeping Bear Award* (for the best moment of comedy in a scientific talk), Geological Society of Washington, 2020
- *Dwornik Award*, Best Graduate Oral Presentation: Honorable Mention, 49<sup>th</sup> LPSC, 2018
- *Brown University Dissertation Fellowship*, Spring 2018
- *Bernard Ray Hawke Next Lunar Generation Career Development Award*, October 2017
- *First Prize, Student Poster Award*, Solar System Exploration Research Virtual Institute (SSERVI) Exploration Science Forum, NASA Ames, July 2017
- *Zonta International Amelia Earhart Fellowship* for women in aerospace research, AY 2015
- *Honorable Mention, Archambault Award for Teaching with Distinction*, Summer 2016
- *Brown University First Year Fellowship*, 2013-2014
- *Mary Dailey Irvine Prize*, Best Thesis in the Five College Astronomy Department, 2012

## TECHNICAL SKILLS

### *Mission Experience:*

- Origins, Spectral Interpretation, Resource Identification, and Security-Regolith Explorer (OSIRIS-REx): Postdoctoral Research Geologist, Regolith Development Working Group
- Postdoctoral Researcher, MRO SHARAD radar instrument
- Co-I, OSIRIS-APEX Extended Mission to Asteroid Apophis
- Participating in developing multiple Discovery mission proposals, to be submitted to next call
- Co-Investigator, Small Innovative Mission for Planetary Exploration (SIMPLEx) mission proposal, to be submitted to next upcoming call
- Participant in the NASA Jet Propulsion Laboratory 2017 Planetary Science Summer School

### *Spacecraft Data*

- **Moon:** Lunar Reconnaissance Orbiter’s *Lunar Reconnaissance Orbiter Narrow Angle Camera* (LROC NAC) and *Wide Angle Camera* (WAC), *Miniature-Radio Frequency* (Mini-RF), *Lunar Orbiter Laser Altimeter* (LOLA); Earth-based Arecibo radar data; Chandrayaan-1’s *Moon Mineralogy Mapper* (M<sup>3</sup>)
- **Mars:** Mars Reconnaissance Orbiter *High-Resolution Imaging Science Experiment* (HiRISE), *Context Camera* (CTX), *Compact Reconnaissance Imaging Spectrometer for Mars* (CRISM), Shallow Radar (SHARAD) sounder
- **Small Bodies: Bennu,** OSIRIS-REx *OSIRIS-REx Camera Suite* (OCAMS), *OSIRIS-REx Laser Altimeter* (OLA), *OSIRIS-REx Visible and Infrared Spectrometer* (OVIRS); **Ryugu,**

Hayabusa2 *Optical Navigation Camera (ONC-T)*; **Itokawa**, Hayabusa *Asteroid Multi-band Imaging Camera (AMICA)*

*Computer languages and software:*

- Extensive experience: ESRI ArcGIS, Small Body Mapping Tool (SBMT), JMars, Adobe Creative Suite, Python, MATLAB. Moderate experience: ISIS, UNIX, IDL, Exelis ENVI,

**MENTORING AND TEACHING**

2023 Fall	Guest Lecture, <i>Planetary Surface Processes</i> , Johns Hopkins University
2022 Summer	Summer intern advisor, National Air and Space Museum, Tallulah Cassidy, “Characterizing boulder morphology on asteroid Bennu”
2022 Summer	Summer mentor, Emerson Collective Youth Collaborative, Makiyah Adams
2021 Summer	Summer intern advisor, Smithsonian Natural History Research Experience, Lisette Melendez, “Linking boulder diversity on asteroid 101955 Bennu to carbonaceous chondrite meteorites”
2020-2021	External undergraduate thesis advisor, Lisette Melendez, University of Southern Florida, “Quantifying the Environmental Response to Deglaciation in Martian Craters Throughout the Late Amazonian”
2020 Summer	Summer intern advisor, Smithsonian National Museum of Natural History, Lisette Melendez, “Postglacial activity on Mars”
2019, 2020 Fall	Guest Lecture, <i>Mineralogy and Petrology</i> , Rowan University
2017 Fall	TA, <i>GEOL2920K The Hydrological Cycle on Mars</i> , Brown University
2016 Spring	TA, <i>GEOL0010 Face of the Earth</i> , Brown University
2014-15 Fall	TA, <i>GEOL0050 Mars, Moon, and Earth</i> , Brown University
2017 Summer	Group Mentor, DEEPS Leadership Alliance Program, Brown University
2016 Summer	Instructor, <i>The Grand Tour: Our Solar System Up Close and Personal</i> , Summer at Brown STEM II Program (age 14-16), Brown University
2015 Summer	Instructor, <i>Exploring the Solar System</i> , STEM I (age 11), Brown University
2015	Reflective Teaching I Certificate, Sheridan Center, Brown University

**OUTREACH**

- Panel discussion, (OSIRIS-REx) Mission Accomplished: Unlocking Earth’s Mysteries from Asteroid Bennu Samples, Smithsonian Institution NMNH, 2024
- Co-host on AirSpace podcast Season 8, Episode 6: These are the Droids We’re Working With, 2023
- Public lecture at the University of Georgia, KILLER ASTEROIDS, 2023
- Interviewed about rubble pile asteroids in Physics Today, 2023
- Interviewed about boulders on asteroids for article in PNAS, 2023
- NASM Family Day focusing on lunar exploration past and future, 2022
- Classroom outreach with NASM “Stem in 30” discussing lunar coring experiments, 2022
- NMNH TechGirls event discussing meteorites and asteroids, 2022
- Discussed OSIRIS-REx and Bennu at SETI outreach event “Bennu: An Asteroid Full of Surprises”, 2022
- Tour guide of NMNH Meteorites Hall for the Second National Conference on Justice in Geosciences, 2022

- Discussed DART mission on NASM Air and Space Live, 2022
- Interviewed on ABC7 WJLA-TV about DART mission, 2022
- Co-organized “Space Club” series at Baltimore-based local business B Willow, gave lecture about asteroid Bennu, 2022
- Featured speaker for career day, Baltimore Polytechnic Institute in partnership with the Ingenuity Project, 2021
- 1 week social media takeover at Smithsonian NMNH about asteroids and meteorites, 2021
- Guest lecture on “Asteroids and the Solar System”, Baltimore Polytechnic Institute in partnership with the Ingenuity Project, 2021
- Presented for NMNH Volunteers, “Bennu and the OSIRIS-REx mission”, 2021
- Q&A Content Expert for NASM “Astro Chat” webinar, “What Mars Reveals about Life in Our Universe”, 2021
- Presented a public webinar for local business B Willow, “All About Mars!”, 2021
- Participated in NASM Exploring Space Lecture “pre-lecture Q&A”, 2021
- Presented in Congressional “Space on the Hill” program to discuss the OSIRIS-REx mission, 2020
- Presented at Smithsonian NMNH Virtual Science Café “Asteroids and OSIRIS-REx”, 2020
- Presented at “The OSIRIS-REx Mission”, Geological Society of Washington, DC, 2020
- Interviewed on “Asteroids: Near Misses”, BBC5 live radio, 2020
- Participated in Smithsonian NMNH “Expert Is In”, “Asteroids: Shattered Fragments”, 2020
- Presented at NMNH Senate of Scientists Lightning Talks, 2020
- Wrote article “Apollo’s Bounty”, Scientific American 50<sup>th</sup> Anniversary of Apollo 11, 2019
- Tour guide of NMNH Geology, Gems and Minerals Hall, “Apollo 11 Camp”, 2019
- Geology instructor for NMNH Q?rius Center “Q?Crew volunteers”, 2019
- Volunteered at Smithsonian NASM “Moon Day”, 2019
- Wrote article “Researchers Find Evidence of Martian Paraglacial Period”, Science Trends, 2018
- Panelist at Challenger Center Annual Conference, “STEM Education through the Lens of Space Exploration”, Framingham State University, Framingham, MA, 2016
- Panelist at International Women’s Day, “Women in STEM”, Lincoln High School, Providence, RI, 2016
- Workshop Leader for Girl Scouts Senior Leadership Conference, “Looking at the Faces of the Earth, Moon, and Mars”, Salve Regina University, March 2015
- Volunteer Science Teacher, Vartan Gregorian Elementary School, AY Spring 2014

### **SERVICE AND ADVOCACY**

- At-Large Member, Lunar Exploration Analysis Group Executive Committee, 2023 – present
- Operations Chair, Lunar Exploration Analysis Group Executive Committee, 2020 – 2023
- Organized LEAG Annual Meeting, 2020 – 2023
- Lunar NextGen Organizing Committee, 2016 – 2023
- NASA review panels including: CDAP, FINESST, LASER, LDAP, MDAP, PDART, SSW, PMSR
- Provided peer review for journals including: EPS, GRL, Icarus, JGR, Nature, PSJ, PSS, Science Advances

- Participated in Unlearning Racism in the Geosciences (URGE), NMNH Geoscience Pod, 2021
- Conference Organizing Committee: LPSC 2021, LEAG 2021, 2022
- Conference session Chair: LPSC 2018, 2019, 2021, 2022; LEAG 2020-2022
- Note-taker and lead author of the workshop summary for the Lunar Science for Landed USRA Lunar Return Planning Committee, 2018
- Lunar Exploration Analysis Group member, 2017 – present
- Board Member and Delegate, Association for Women Geoscientists, 2017 – 2020
- Professional Affiliations: American Geophysical Union (AGU), Geological Society of America (GSA) Planetary Science Division, Association of Women Geoscientists (AWG), Earth Science Women's Network (ESWN)
- Rhode Island Elementary School Science Curriculum Development, 2017-2018
- Student Organizer, Microsymposium Conference, Houston, TX, 2014 – 2018
- Judge, LPI Exploration of the Moon/Asteroids by Secondary Students, 2016 – 2017