

JOSEPH HARRINGTON

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Education

1994 Ph.D., Planetary Science, Massachusetts Institute of Technology
1988 S.B., Physics, Massachusetts Institute of Technology

Current Research Interests

Planetary and exoplanetary atmospheres and the astrophysical search for life.
Astronomical data analysis methodology.
Visible and infrared astronomical observing techniques.
Open science.

Employment

University of Central Florida, Orlando, Florida
2023 – present Interim Associate Vice President for Research and Scholarship
2020 – present Pegasus Professor, Department of Physics, Planetary Sciences Group
2013 – 2020 Professor, Department of Physics, Planetary Sciences Group
2009 – 2013 Associate Professor (tenured), Department of Physics, Planetary Sciences Group
2006 – 2009 Assistant Professor, Department of Physics, Planetary Sciences Group
Cornell University, Ithaca, New York
2003 – 2006 Senior Research Associate, Center for Radiophysics and Space Research
1997 – 2003 Research Associate, Center for Radiophysics and Space Research
National Research Council
1995 – 1997 Research Associate, NASA Goddard Space Flight Center, Greenbelt, Maryland
Massachusetts Institute of Technology, Cambridge, Massachusetts
1988 – 1994 Graduate assistantships
Institute for Astronomy, University of Hawai'i, Honolulu, Hawai'i
Spring 1992 Visiting Graduate Student, Jovian Aurora project

Secondary Joint Appointment

Florida Space Institute, University of Central Florida, Orlando, Florida
2016 – present Scientist

Leadership Experience

University of Central Florida, Orlando, Florida
2020 – 2022 Member, UCF Board of Trustees and Faculty Senate Chair

Visiting Appointments

Max-Planck-Institut für Astronomie, Heidelberg, Germany
2012 – 2013 Sabbatical Visiting Scientist, Star and Planet Formation Division
Cornell University, Ithaca, New York
2010 – 2013 (summers) Visiting Professor, Department of Astronomy

JOSEPH HARRINGTON

External Funding

Period	Role	\$k	Source	Short title
Current/Awarded UCF:			\$0.8M total	
2021–2024	Co-I	30	NASA Exoplanets Res. Prog.	Exoplanet Spectrophotopolarimetry Tools
2019–2022	Adv.	165	NASA Fellowship Activity	Michael Himes
2019–2022	PI	25	NASA Topical Workshops	Exoclimates 2019 US Early-Career Travel
2017–2022	PI	552	NASA Exoplanets Res. Prog.	Atmosph. Retrieval from Exoplanets w/ BART
Past UCF:			\$3.1M total	
2013–2018	PI	589	NASA Astrophys. Data Anal.	Characterizing Exoplanets w/ Spitzer Eclipses
2012–2018	PI	649	NASA Planetary Atmospheres	Exoplanet Eclipses & Bayesian Radiat. Fitting
2011–2017	Co-I*	66.5a	NASA Planetary Atmospheres	Jupiter Impact Modeling
2012–2017	Co-I	105.6	NSF Astronomy & Astrophys.	Jovian Impact Waves, Bubbles, Splashes
2012–2016	Adv.	90	NASA Earth, Space Sci. Fellow.	Jasmina Blečić
2012–2014	Co-I	19.4	Spitzer Space Telescope	Metallicity effects on exoplanets
2010–2013	PI	49.9	Spitzer Space Telescope	ToO: Transiting Exoplanets V, Cycle 7
2009–2012	Co-I	43.5	Spitzer Space Telescope	Phase Curve of Exoplanet WASP-18b
2009–2012	Co-I	10b	Spitzer Space Telescope	Secondary Eclipse of Exoplanet HAT-P-11b
2009–2012	PI	200	Spitzer Space Telescope	ToO: Transiting Exoplanets IV, Warm Spitzer
2009–2011	PI	85	NSF Astronomy & Astrophys.	Realistic SL9 Impact Model
2008–2011	PI	245c	Spitzer Space Telescope	ToO: Transiting Exoplanets III, Legacy
2008–2011	Co-I	34	Spitzer Space Telescope	Hot Stratospheres from the WASP Survey
2006–2011	PI	324	NSF Astronomy & Astrophys.	Learning from SL9: Modeling Phase 2
2007–2010	PI	127	Spitzer Space Telescope	ToO: New Transiting Extrasolar Planets II
2007–2010	PI	116	Spitzer Space Telescope	Intense Photometry of HD 149026b
2007–2010	Co-I	26	Spitzer Space Telescope	Spectroscopy of Exoplanet HD 209458b
2008–2010	Co-I	8	Spitzer Space Telescope	First Atmos. Study of a Young Massive Planet
2008–2009	PI	52	NSF Astronomy & Astrophys.	Transit Spectrum of HD 209458b
2006–2009	PI	115	Spitzer Space Telescope	ToO: New Transiting Extrasolar Planets
2005–2008	PI	19	Spitzer Space Telescope	8- μ m Photometry of HD 149026b
2005–2008	PI	105	Spitzer Space Telescope	Photometry of Extrasolar Planets
Past Cornell:			\$1.3M total	
2004–2007	PI	127	NASA Planetary Atmospheres	Synthesis of SL9 Models and Data
2004–2007	Sci. PI	42	NASA Planetary Atm. E/PO	Center of Excellence in Astronomy Education
2003–2007	PI	178	NSF Astronomy & Astrophys.	Transit Spectrum of HD 209458b
2003–2009	PI	171	NSF Astronomy & Astrophys.	Realistic SL9 Impact Model
2003–2007	PI	396	NASA Origins of Solar Sys.	Composition and Temp. of HD 209458b
2000–2004	Co-I	199	NASA Planetary Atmospheres	Shoemaker-Levy 9 Revisited
1999–2000	PI	74	NASA Planetary Atmospheres	Jovian Planetary Waves
1998–2001	Co-I	97	NASA Planetary Astronomy	Observations of Jovian Thermal Waves
1997–1999	PI	43	Hubble Space Telescope	Jovian Planetary Waves (archival)

* = Co-I and managing PI for remote grantholder, amounts are as credited to me as Co-I.

a = Total \$475k, balance to PI and Co-Is elsewhere.

b = total \$45k, balance to PI and Co-Is elsewhere

c = total \$375k, balance to Co-Is elsewhere

JOSEPH HARRINGTON

Refereed Journal Articles

16,165 citations.

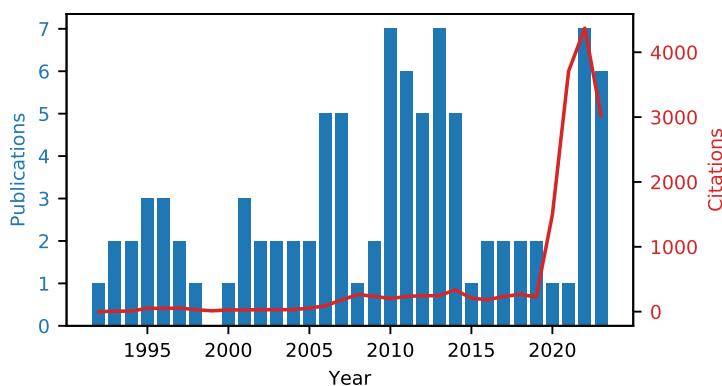
h-index: 38

Italic names indicate my students. See also Submitted for Publication, below.

Sources: webofscience.com,
ads.harvard.edu. **Web of Science
ResearcherID citation report omits
team articles, including Virtanen
et al. (2020).**

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ResearcherID: <https://www.webofscience.com/wos/author/rid/E-6250-2011>



Published in Final Form

Item	Cites	Reference
J83	1	Coulombe, L.-P., B. Benneke, R. Challener, A. A. A. Piette, L. S. Wisner, M. Mansfield, R. J. MacDonald, H. Beltz, A. D. Feinstein, M. Radica, A. B. Savel, L. A. Dos Santos, J. L. Bean, V. Parmentier, I. Wong, E. Rauscher, T. D. Komacek, E. M. R. Kempton, X. Tan, M. Hammond, N. T. Lewis, M. R. Line, E. K. H. Lee, H. Shivkumar, I. J. M. Crossfield, M. C. Nixon, B. V. Rackham, H. R. Wakeford, L. Welbanks, X. Zhang, N. M. Batalha, Z. K. Berta-Thompson, Q. Changeat, J.-M. Désert, N. Espinoza, J. M. Goyal, J. Harrington , H. A. Knutson, L. Kreidberg, M. López-Morales, A. Shporer, D. K. Sing, K. B. Stevenson, K. Aggarwal, E.-M. Ahrer, M. K. Alam, T. J. Bell, J. Blečić, C. Caceres, A. L. Carter, S. L. Casewell, N. Crouzet, P. E. Cubillos, L. Decin, J. J. Fortney, N. P. Gibson, K. Heng, T. Henning, N. Iro, S. Kendrew, P.-O. Lagage, J. Leconte, M. Lendl, J. D. Lothringer, L. Mancini, T. Mikal-Evans, K. Molaverdikhani, N. K. Nikolov, K. Ohno, E. Palle, C. Piaulet, S. Redfield, P.-A. Roy, S.-M. Tsai, O. Venot, and P. J. Wheatley 2023. A broadband thermal emission spectrum of the ultra-hot Jupiter WASP-18b. <i>Nature</i> 620 , 292–298.
J82	0	Himes, M. D., J. Harrington , and A. Güneş Baydin 2023. Towards 3D retrieval of exoplanet atmospheres: Assessing thermochemical equilibrium estimation methods. <i>PSJ</i> 4 , 74.

JOSEPH HARRINGTON

- J81 15 Tsai, S.-M., E. K. H. Lee, D. Powell, P. Gao, X. Zhang, J. Moses, E. Hébrard, O. Venot, V. Parmentier, S. Jordan, R. Hu, M. K. Alam, L. Alderson, N. M. Batalha, J. L. Bean, B. Benneke, C. J. Bierson, R. P. Brady, L. Carone, A. L. Carter, K. L. Chubb, J. Inglis, J. Leconte, M. Line, M. López-Morales, Y. Miguel, K. Molaverdikhani, Z. Rustamkulov, D. K. Sing, K. B. Stevenson, H. R. Wakeford, J. Yang, K. Aggarwal, R. Baeyens, S. Barat, M. de Val-Borro, T. Daylan, J. J. Fortney, K. France, J. M. Goyal, D. Grant, J. Kirk, L. Kreidberg, A. Louca, S. E. Moran, S. Mukherjee, E. Nasedkin, K. Ohno, B. V. Rackham, S. Redfield, J. Taylor, P. Tremblin, C. Visscher, N. L. Wallack, L. Welbanks, A. Youngblood, E.-M. Ahrer, N. E. Batalha, P. Behr, Z. K. Berta-Thompson, J. Blečić, S. L. Casewell, I. J. M. Crossfield, N. Crouzet, P. E. Cubillos, L. Decin, J.-M. Désert, A. D. Feinstein, N. P. Gibson, **J. Harrington**, K. Heng, T. Henning, E. M.-R. Kempton, J. Krick, P.-O. Lagage, M. Lendl, J. D. Lothringer, M. Mansfield, N. J. Mayne, T. Mikal-Evans, E. Palle, E. Schlawin, O. Shorttle, P. J. Wheatley, and S. N. Yurchenko 2023. Photochemically produced SO₂ in the atmosphere of WASP-39b. *Nature* **617**, 483–487.
- J80 23 Feinstein, A. D., M. Radica, L. Welbanks, C. A. Murray, K. Ohno, L.-P. Coulombe, N. Espinoza, J. L. Bean, J. K. Teske, B. Benneke, M. R. Line, Z. Rustamkulov, A. Saba, A. Tsiaras, J. K. Barstow, J. J. Fortney, P. Gao, H. A. Knutson, R. J. MacDonald, T. Mikal-Evans, B. V. Rackham, J. Taylor, V. Parmentier, N. M. Batalha, Z. K. Berta-Thompson, A. L. Carter, Q. Changeat, L. A. dos Santos, N. P. Gibson, J. M. Goyal, L. Kreidberg, M. López-Morales, J. D. Lothringer, Y. Miguel, K. Molaverdikhani, S. E. Moran, G. Morello, S. Mukherjee, D. K. Sing, K. B. Stevenson, H. R. Wakeford, E.-M. Ahrer, M. K. Alam, L. Alderson, N. H. Allen, N. E. Batalha, T. J. Bell, J. Blečić, J. Brande, C. Caceres, S. L. Casewell, K. L. Chubb, I. J. M. Crossfield, N. Crouzet, P. E. Cubillos, L. Decin, J.-M. Désert, **J. Harrington**, K. Heng, T. Henning, N. Iro, E. M. R. Kempton, S. Kendrew, J. Kirk, J. Krick, P.-O. Lagage, M. Lendl, L. Mancini, M. Mansfield, E. M. May, N. J. Mayne, N. K. Nikolov, E. Palle, D. J. M. Petit dit de la Roche, C. Piaulet, D. Powell, S. Redfield, L. K. Rogers, M. T. Roman, P.-A. Roy, M. C. Nixon, E. Schlawin, X. Tan, P. Tremblin, J. D. Turner, O. Venot, W. C. Waalkes, P. J. Wheatley, and X. Zhang 2023. Early Release Science of the exoplanet WASP-39b with JWST NIRISS. *Nature* **614**, 670–675.
- J79 35 Alderson, L., H. R. Wakeford, M. K. Alam, N. E. Batalha, J. D. Lothringer, J. Adams Redai, S. Barat, J. Brande, M. Damiano, T. Daylan, N. Espinoza, L. Flagg, J. M. Goyal, D. Grant, R. Hu, J. Inglis, E. K. H. Lee, T. Mikal-Evans, L. Ramos-Rosado, P.-A. Roy, N. L. Wallack, N. M. Batalha, J. L. Bean, B. Benneke, Z. K. Berta-Thompson, A. L. Carter, Q. Changeat, K. D. Colón, I. J. M. Crossfield, J.-M. Désert, D. Foreman-Mackey, N. P. Gibson, L. Kreidberg, M. R. Line, M. López-Morales, K. Molaverdikhani, S. E. Moran, G. Morello, J. I. Moses, S. Mukherjee, E. Schlawin, D. K. Sing, K. B. Stevenson, J. Taylor, K. Aggarwal, E.-M. Ahrer, N. H. Allen, J. K. Barstow, T. J. Bell, J. Blečić, S. L. Casewell, K. L. Chubb, N. Crouzet, P. E. Cubillos, L. Decin, A. D. Feinstein, J. J. Fortney, **J. Harrington**, K. Heng, N. Iro, E. M. R. Kempton, J. Kirk, H. A. Knutson, J. Krick, J. Leconte, M. Lendl, R. J. MacDonald, L. Mancini, M. Mansfield, E. M. May, N. J. Mayne, Y. Miguel, N. K. Nikolov, K. Ohno, E. Palle, V. Parmentier, D. J. M. Petit dit de la Roche, C. Piaulet, D. Powell, B. V. Rackham, S. Redfield, L. K. Rogers, Z. Rustamkulov, X. Tan, P. Tremblin, S.-M. Tsai, J. D. Turner, M. de Val-Borro, O. Venot, L. Welbanks, P. J. Wheatley, and X. Zhang 2023. Early Release Science of the exoplanet WASP-39b with JWST NIRSpec G395H. *Nature* **614**, 664–669.

JOSEPH HARRINGTON

- J78 36 Rustamkulov, Z., D. K. Sing, S. Mukherjee, E. M. May, J. Kirk, E. Schlawin, M. R. Line, C. Piaulet, A. L. Carter, N. E. Batalha, J. M. Goyal, M. López-Morales, J. D. Lothringer, R. J. MacDonald, S. E. Moran, K. B. Stevenson, H. R. Wakeford, N. Espinoza, J. L. Bean, N. M. Batalha, B. Benneke, Z. K. Berta-Thompson, I. J. M. Crossfield, P. Gao, L. Kreidberg, D. K. Powell, P. E. Cubillos, N. P. Gibson, J. Leconte, K. Molaverdikhani, N. K. Nikolov, V. Parmentier, P. Roy, J. Taylor, J. D. Turner, P. J. Wheatley, K. Aggarwal, E. Ahrer, M. K. Alam, L. Alderson, N. H. Allen, A. Banerjee, S. Barat, D. Barrado, J. K. Barstow, T. J. Bell, J. Blečić, J. Brande, S. Casewell, Q. Changeat, K. L. Chubb, N. Crouzet, T. Daylan, L. Decin, J. Désert, T. Mikal-Evans, A. D. Feinstein, L. Flagg, J. J. Fortney, **J. Harrington**, K. Heng, Y. Hong, R. Hu, N. Iro, T. Kataria, E. M. R. Kempton, J. Krick, M. Lendl, J. Lillo-Box, A. Louca, J. Lustig-Yaeger, L. Mancini, M. Mansfield, N. J. Mayne, Y. Miguel, G. Morello, K. Ohno, E. Palle, D. J. M. Petit dit de la Roche, B. V. Rackham, M. Radica, L. Ramos-Rosado, S. Redfield, L. K. Rogers, E. L. Shkolnik, J. Southworth, J. Teske, P. Tremblin, G. S. Tucker, O. Venot, W. C. Waalkes, L. Welbanks, X. Zhang, and S. Zieba 2023. Early Release Science of the exoplanet WASP-39b with JWST NIRSpec PRISM. *Nature* **614**, 659–663.
- J77 24 Ahrer, E.-M., K. B. Stevenson, M. Mansfield, S. E. Moran, J. Brande, G. Morello, C. A. Murray, N. K. Nikolov, D. J. M. Petit dit de la Roche, E. Schlawin, P. J. Wheatley, S. Zieba, N. E. Batalha, M. Damiano, J. M. Goyal, M. Lendl, J. D. Lothringer, S. Mukherjee, K. Ohno, N. M. Batalha, M. P. Battley, J. L. Bean, T. G. Beatty, B. Benneke, Z. K. Berta-Thompson, A. L. Carter, P. E. Cubillos, T. Daylan, N. Espinoza, P. Gao, N. P. Gibson, S. Gill, **J. Harrington**, R. Hu, L. Kreidberg, N. K. Lewis, M. R. Line, M. López-Morales, V. Parmentier, D. K. Powell, D. K. Sing, S.-M. Tsai, H. R. Wakeford, L. Welbanks, M. K. Alam, L. Alderson, N. H. Allen, D. R. Anderson, J. K. Barstow, D. Bayliss, T. J. Bell, J. Blečić, E. M. Bryant, M. R. Burleigh, L. Carone, S. L. Casewell, Q. Changeat, K. L. Chubb, I. J. M. Crossfield, N. Crouzet, L. Decin, J.-M. Désert, A. D. Feinstein, L. Flagg, J. J. Fortney, J. E. Gizis, K. Heng, N. Iro, E. M. R. Kempton, S. Kendrew, J. Kirk, H. A. Knutson, T. D. Komacek, P.-O. Lagage, J. Leconte, J. Lustig-Yaeger, R. J. MacDonald, L. Mancini, E. M. May, N. J. Mayne, Y. Miguel, T. Mikal-Evans, K. Molaverdikhani, E. Palle, C. Piaulet, B. V. Rackham, S. Redfield, L. K. Rogers, P.-A. Roy, Z. Rustamkulov, E. L. Shkolnik, K. S. Sotzen, J. Taylor, P. Tremblin, G. S. Tucker, J. D. Turner, M. de Val-Borro, O. Venot, and X. Zhang 2023. Early Release Science of the exoplanet WASP-39b with JWST NIRCам. *Nature* **614**, 653–658.

JOSEPH HARRINGTON

- J76 27 JWST Transiting Exoplanet Community Early Release Science Team, E.-M. Ahrer, L. Alderson, N. M. Batalha, N. E. Batalha, J. L. Bean, T. G. Beatty, T. J. Bell, B. Benneke, Z. K. Berta-Thompson, A. L. Carter, I. J. M. Crossfield, N. Espinoza, A. D. Feinstein, J. J. Fortney, N. P. Gibson, J. M. Goyal, E. M. R. Kempton, J. Kirk, L. Kreidberg, M. López-Morales, M. R. Line, J. D. Lothringer, S. E. Moran, S. Mukherjee, K. Ohno, V. Parmentier, C. Piaulet, Z. Rustamkulov, E. Schlawin, D. K. Sing, K. B. Stevenson, H. R. Wakeford, N. H. Allen, S. M. Birkmann, J. Brande, N. Crouzet, P. E. Cubillos, M. Damiano, J.-M. Désert, P. Gao, **J. Harrington**, R. Hu, S. Kendrew, H. A. Knutson, P.-O. Lagage, J. Leconte, M. Lendl, R. J. MacDonald, E. M. May, Y. Miguel, K. Molaverdikhani, J. I. Moses, C. A. Murray, M. Nehring, N. K. Nikolov, D. J. M. Petit dit de la Roche, M. Radica, P.-A. Roy, K. G. Stassun, J. Taylor, W. C. Waalkes, P. Wachiraphan, L. Welbanks, P. J. Wheatley, K. Aggarwal, M. K. Alam, A. Banerjee, J. K. Barstow, J. Blečić, S. L. Casewell, Q. Changeat, K. L. Chubb, K. D. Colón, L.-P. Coulombe, T. Daylan, M. de Val-Borro, L. Decin, L. A. Dos Santos, L. Flagg, K. France, G. Fu, A. García Muñoz, J. E. Gizis, A. Glidden, D. Grant, K. Heng, T. Henning, Y.-C. Hong, J. Inglis, N. Iro, T. Kataria, T. D. Komacek, J. E. Krick, E. K. H. Lee, N. K. Lewis, J. Lillo-Box, J. Lustig-Yaeger, L. Mancini, A. M. Mandell, M. Mansfield, M. S. Marley, T. Mikal-Evans, G. Morello, M. C. Nixon, K. Ortiz Ceballos, A. A. A. Piette, D. Powell, B. V. Rackham, L. Ramos-Rosado, E. Rauscher, S. Redfield, L. K. Rogers, M. T. Roman, G. M. Roudier, N. Scarsdale, E. L. Shkolnik, J. Southworth, J. J. Spake, M. E. Steinrueck, X. Tan, J. K. Teske, P. Tremblin, S.-M. Tsai, G. S. Tucker, J. D. Turner, J. A. Valenti, O. Venot, I. P. Waldmann, N. L. Wallack, X. Zhang, and S. Zieba 2022. Identification of carbon dioxide in an exoplanet atmosphere. *Nature* **614**, 649–652.
- J75 2 *Himes, M. D.*, and **J. Harrington** 2022. On the dayside atmosphere of WASP-12b. *ApJ* **931**, 86.
- J74 9 *Himes, M. D.*, **J. Harrington**, A. D. Cobb, A. Güneş Baydin, F. Soboczenski, M. D. O’Beirne, S. Zorzan, *D. C. Wright*, *Z. M. D. Scheffer*, S. D. Domagal-Goldman, and G. N. Arney 2022. Accurate machine learning atmospheric retrieval via a neural network surrogate model for radiative transfer. *PSJ* **3**, 91.
- J73 0 *Challener, R. C.*, **J. Harrington**, P. E. Cubillos, J. Blečić, and B. Smalley 2022. Spitzer dayside emission of WASP-34b. *PSJ* **3**, 86.
- J72 9 *Blečić, J.*, **J. Harrington**, *P. E. Cubillos*, *M. O. Bowman*, P. Rojo, *M. M. Stemm*, *R. C. Challener*, *A. J. Foster*, I. Dobbs-Dixon, *A. S. D. Foster*, *N. B. Lust*, *S. D. Blumenthal*, *D. Bruce*, and T. J. Loredó 2022. An open-source Bayesian Atmospheric Radiative Transfer (BART) code: III. Initialization, atmospheric profile generator, post-processing routines and application to exoplanet WASP-43b. *PSJ* **3**, 82.
- J71 9 *Cubillos, P. E.*, **J. Harrington**, *J. Blečić*, *M. D. Himes*, P. Rojo, T. J. Loredó, *N. B. Lust*, *R. C. Challener*, *A. J. Foster*, *M. M. Stemm*, *A. S. D. Foster*, and *S. D. Blumenthal* 2022. An open-source Bayesian Atmospheric Radiative Transfer (BART) code: II. TRANSIT radiative-transfer module and retrieval of HAT-P-11b. *PSJ* **3**, 81.
- J70 10 **Harrington, J.**, *M. D. Himes*, *P. E. Cubillos*, *J. Blečić*, P. Rojo, *R. C. Challener*, *N. B. Lust*, *M. O. Bowman*, *S. D. Blumenthal*, I. Dobbs-Dixon, *A. S. D. Foster*, *A. J. Foster*, *M. R. Green*, T. J. Loredó, *K. J. McIntyre*, *M. M. Stemm*, and *D. C. Wright* 2022a. An open-source Bayesian Atmospheric Radiative Transfer (BART) code: I. Design, tests, practicalities, and application to exoplanet HD 189733 b. *PSJ* **3**, 80.

JOSEPH HARRINGTON

- J69 6 *Challener, R. C., J. Harrington, J. S. Jenkins, N. T. Kurtovic, R. Ramirez, K. J. McIntyre, M. D. Himes, E. Rodríguez, G. Anglada-Escudé, S. Dreizler, A. Ofir, P. A. Peña Rojas, I. Ribas, P. Rojo, D. Kipping, R. P. Butler, P. J. Amado, C. Rodríguez-López, E. Palle, and F. Murgas* 2021. Identification and mitigation of a vibrational telescope systematic with application to Spitzer. *PSJ* **2**, 9.
- J68 11070 Virtanen, P., R. Gommers, T. E. Oliphant, M. Haberland, T. Reddy, D. Cournapeau, E. Burovski, P. Peterson, W. Weckesser, J. Bright, S. J. van der Walt, M. Brett, J. Wilson, K. J. Millman, N. Mayorov, A. R. J. Nelson, E. Jones, R. Kern, E. Larson, C. Carey, I. Polat, Y. Feng, E. W. Moore, J. VanderPlas, D. Laxalde, J. Perktold, R. Cimrman, I. Henriksen, E. A. Quintero, C. R. Harris, A. M. Archibald, A. H. Ribeiro, F. Pedregosa, P. van Mulbregt, and SciPy 1.0 Contributors (list includes **J. Harrington**) 2020. SciPy 1.0: Fundamental algorithms for scientific programming in Python. *Nature Methods* **17**, 261–272.
- J67 13 Antuñaño, A., L. N. Fletcher, G. S. Orton, H. Melin, S. Milan, J. Rogers, T. Greathouse, **J. Harrington**, P. T. Donnelly, and R. Giles 2019. Jupiter’s atmospheric variability from long-term ground-based observations at 5 μ m. *AJ* **158**, 130.
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C1	15	Harrington, J. , I. de Pater, S. H. Brecht, D. Deming, V. S. Meadows, K. Zahnle, and P. D. Nicholson 2004. Lessons from Shoemaker-Levy 9 about Jupiter and planetary impacts. In F. Bagenal, T. E. Dowling, and W. McKinnon (Eds.), <i>Jupiter: Planet, Satellites & Magnetosphere</i> , pp. 159–184. Cambridge, UK: Cambridge University Press.

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R1 **Harrington, J.** 2011. Book review: *Transiting Exoplanets* by C. Haswell. *MAPS* **46**, 767–768.

Policy and White Papers

Item	Cites	Reference
W8		Norman, D., K. Cruz, V. Desai, B. Lundgren, E. Bellm, F. Economou, A. Smith, A. Bauer, B. Nord, C. Schafer, G. Narayan, T. Li, E. Tollerud, B. Sipócz, H. Stevance, T. Pickering, M. Sinha, J. Harrington , J. Kartaltepe, D. Vohl, A. Price-Whelan, B. Cherinka, C.-k. Chan, B. Weiner, M. Modjaz, F. Bianco, W. Kerzendorf, I. Laginja, and C. Dong 2019. Astro2020 white paper: The growing importance of a tech savvy astronomy and astrophysics workforce. <i>BAAS</i> 51 , 18.
W7		Tollerud, E., A. Smith, A. Price-Whelan, K. Cruz, D. Norman, G. Narayan, S. Mumford, A. Allen, C.-k. Chan, B. Cherinka, A. Drlica-Wagner, D. Foreman-Mackey, A. Ginsburg, A. Gradwohl, J. Harrington , D. Hogg, J. Kartaltepe, J. Kinney, N. Merchant, I. Momcheva, N. Murphy, J. Peek, M. S. Peeples, T. Pickering, D. Rodriguez, L. Shamir, M. Sinha, B. Sipócz, J. Sobeck, M. Sosey, H. Stevance, P. Teuben, D. Vohl, B. Weiner, T. Aldcroft, A. Allen, M. Alpaslan, L. Anderson, G. Barentsen, D. Bektesevic, J. Benavides, B. Berriman, M. Blanton, J. Bosch, D. Bouquin, L. Bradley, G. Bryan, D. Burke, K. Burns, D. Buzasi, J. B. Cabral, J. V. d. M. Cardoso, B. Chen, W. Clarkson, M. Collins, L. Corrales, M. Craig, S. Crawford, S. Domagal-Goldman, C. Dong, M. Durbin, J. K. Faherty, W. Farr, L. Forschini, V. Z. Golkhou, H. M. Günther, H. Hafok, C. Hahn, N. Hathi, C. Hedges, S. Huang, C. Hummels, E. Hunt, D. Huppenkothen, S. Juneau, M. van Kerkwijk, W. Kerzendorf, I. Laginja, C. Law, J. de Leon, T. Li, P. L. Lim, A. I. Malz, Y.-Y. Mao, P. Melchior, B. Merin, B. Miller, M. Modjaz, T. Morton, S. Mullally, R. Ogando, J. K. Parejko, D. Paz, S. Pearson, K. Pontoppidan, B. Pope, D. Rapetti, M. Rawls, J. Read, T. Robitaille, G. Rudnick, S. Sharma, S. Sharma, D. Shupe, J. Speagle, T. Starkenburg, F. Stasyszyn, O. Streicher, G. Tremblay, F. Villaescusa-Navarro, J. M. Vos, B. A. Weaver, A. Weltman, A. Wetzel, P. K. G. Williams, and B. Winkel 2019. Astro2020 white paper: Sustaining community-driven software for astronomy in the 2020s. <i>BAAS</i> 51 , 180.
W6		Smith, A., D. Norman, K. Cruz, V. Desai, E. Bellm, B. Lundgren, F. Economou, B. D. Nord, C. Schafer, G. Narayan, J. Harrington , E. Tollerud, B. Sipócz, T. Pickering, M. S. Peeples, B. Berriman, P. Teuben, D. Rodriguez, A. Gradwohl, L. Shamir, A. Allen, J. R. Brownstein, A. Ginsburg, M. Sinha, C. Hummels, B. Smith, H. Stevance, A. Price-Whelan, B. Cherinka, C.-k. Chan, J. Kartaltepe, M. Turk, B. Weiner, M. Modjaz, R. J. Nemiroff, W. Kerzendorf, I. Laginja, C. Dong, B. Merín, J. Sobeck, D. Buzasi, J. K. Faherty, I. Momcheva, A. Connolly, V. Z. Golkhou, L. Foschini, A. Wetzel, and T. Aldcroft 2019. Astro2020 white paper: Elevating the role of software as a product of the research enterprise. <i>BAAS</i> 51 , 52.

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- W4 Eikenberry, S., M. Bentz, A. Gonzalez, **J. Harrington**, S. Jeram, N. Law, T. Maccarone, R. Quimby, and A. Townsend 2019. Astro2020 white paper: PolyOculus: Low-cost spectroscopy for the community. *BAAS* **51**, 124.
- W3 **Harrington, J.**, R. Gommers, C. Gentemann, D. Buzasi, K. Stevenson, J. Pepper, P. Greenfield, S. Kanodia, T. Beatty, R. Challener, J. Ninan, J. Christiansen, A. Solmaz, E. Tollerud, N. Earl, P. L. Lim, L. Bradley, E. Newton, R. Akeson, M. Sosey, P. Hodge, P. Miles-Páez, K. Labrie, H. Ngo, S. Ogaz, D. Williams, M. Himes, K. McIntyre, A. Dove, J. Colwell, J. Llama, R. T. Hamilton, G. Barentsen, and R. Terrien 2019. Astro2020 white paper: Support the Python numerical core. *BAAS* **51**, 265.
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- W1 Deming, D., M. Swain, C. Beichman, D. Ciardi, **J. Harrington**, and S. Kilston 2009. Transits. In P. R. Lawson, W. A. Traub, and S. C. Unwin (Eds.), *Exoplanet Community Report*, pp. 205–220. NASA Jet Propulsion Laboratory Publication 09-3.

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- P8 Richardson, L. J., S. Seager, D. Deming, **J. Harrington**, R. K. Barry, J. Rajagopal, and W. C. Danchi 2008. Infrared light curves and the detectability of close-in extrasolar giant planets. In A. Richichi, F. Delplancke, F. Paresce, and A. Chelli (Eds.), *The Power of Optical/IR Interferometry: Recent Scientific Results and 2nd Generation Instrumentation*, pp. 561–562.
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- P6 Rojo, P., **J. Harrington**, D. Deming, and J. Fortney 2007. Transit spectroscopy of the extrasolar planet HD 209458b: The search for water. *Astrobiol.* **7**, 538–539.
- P5 Deming, D., L. J. Richardson, S. Seager, and **J. Harrington** 2006. Infrared radiation from hot Jupiters. In L. Arnold, F. Bouchy, and C. Moutou (Eds.), *Tenth Anniversary of 51 Peg-b: Status of and prospects for hot Jupiter studies*, pp. 218–225.
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- P3 Rojo, P., **J. Harrington**, D. Zeehandelaar, J. Dermody, D. Deming, D. Steyert, L. J. Richardson, and G. Wiedemann 2004. Transit spectroscopy of the extrasolar planet HD 209458b: The search for water. In S. S. Holt and D. Deming (Eds.), *The Search for Other Worlds*, Volume 713 of *AIP Conf. Proc.*, pp. 189–192.
- P2 **Harrington, J.**, D. Deming, C. Goukenleuque, K. Matthews, L. J. Richardson, D. Steyert, G. Wiedemann, and D. Zeehandelaar 2003. Infrared transit spectroscopy of HD 209458b. In D. Deming and S. Seager (Eds.), *Scientific Frontiers in Research on Extrasolar Planets*, Volume 294 of *ASP Conf. Ser.*, pp. 471–474.

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SP1 Soboczenski, F., *M. D. Himes*, M. D. O’Beirne, S. Zorzan, A. G. Baydin, A. D. Cobb, Y. Gal, D. Angerhausen, M. Mascaró, G. N. Arney, and S. D. Domagal-Goldman 2018. Bayesian deep learning for exoplanet atmospheric retrieval. *arXiv e-prints*, arXiv:1811.03390.

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T2 **Harrington, J.** 1994. *Planetary Infrared Observations: The Occultation of 28 Sagittarii by Saturn and the Dynamics of Jupiter’s Atmosphere*. Ph. D. thesis, Massachusetts Institute of Technology.

T1 **Harrington, J.** 1988. *An Upper Magnitude Limit for Additional Neptune-Orbiting Debris Between 3.7 and 7 Neptune Radii*. Bachelor’s thesis in Physics, Massachusetts Institute of Technology.

Draft in Preparation Research complete, paper circulating among co-authors.

D1 *McIntyre, K. J.*, **J. Harrington**, *R. C. Challener*, *M. R. Hardin*, M. Lenius, J. Blečić, P. E. Cubillos, *R. A. Hardy*, J. D. Hartman, and G. A. Bakos 2022. On the daysides of two eccentric hot jupiters. *AJ*, in preparation.

Astronomical Software

The following freely-available software packages implement both original and standard techniques.

To download, visit <http://planets.ucf.edu/resources/open-source-software>.

HOMER: Helper Of My Eternal Retrievals A Bayesian inverse model for atmospheric retrieval accelerated by machine-learning radiative transfer from MARGE. Paper: *Himes et al.* (2022). Code: *Himes, M. D.*, *D. C. Wright*, *Z. M. D. Scheffer*, and **J. Harrington** 2020. HOMER: A Bayesian inverse modeling code.

JOSEPH HARRINGTON

- MARGE: Machine learning Algorithm for Radiative transfer of Generated Exoplanets*: Derives machine-learning surrogate model for radiative transfer from set of spectra and inputs. Paper: *Himes et al. (2022)*. Code: *Himes, M. D., A. D. Cobb, D. C. Wright, Z. M. D. Scheffer, and J. Harrington 2020*. MARGE: Machine Learning Algorithm for Radiative Transfer of Generated Exoplanets.
- BART: Bayesian Atmospheric Radiative Transfer*: A Bayesian inverse model for atmospheric retrieval demonstrating both high fidelity and computational efficiency. Papers: *Harrington et al. (2022a)*, *Cubillos et al. (2022)*, *Blecic et al. (2022)*. Code: <https://github.io/exosports/BART>.
- TEA: Thermochemical Equilibrium Abundances*: Calculates molecular abundances given atomic abundances, temperature, and pressure. Paper: *Blecic et al. (2016)*. Code: *Blecic, J., J. Harrington, and M. O. Bowman 2015*. TEA: Thermal Equilibrium Abundances. Astrophysics Source Code Library.
- Least Asymmetry*: Centering method for point sources. Paper: *Lust et al. (2014)*. Code: *Lust, N. B., D. Britt, J. Harrington, S. Nymeyer, K. B. Stevenson, E. L. Ross, W. Bowman, and J. Fraine 2015*. Least Asymmetry: Centering method. Astrophysics Source Code Library. Original implementation of unpublished method by graduate student N. Lust.
- DefringeFlat: Rojo and Harrington (2006)*. Method to remove fringes from images such as spectral flat fields, in IDL. Original, developed with graduate student P. Rojo.
- JOSE: Joe and John's Optimal Spectrum Extractor*. Optimal spectrum extraction package for Python and IDL. Improved version of standard technique, developed with undergraduates J. Dermody and D. Zeelandaar. See <https://github.io/exosports/JOSE>.
- Synthespec*: Spectrograph output simulator. Generates noisy, optically-distorted spectral frames. Original. Developed with undergraduate J. Dermody.
- Maskinterp*: In IDL Astronomy Library. Mask-based, non-linear, surface-model-driven, 2D pixel interpolator. Original. Developed with undergraduates S. Vatanavigkit and A. Ruane.
- Jiggle: Harrington et al. (1996a)*. Finds mosaic registrations automatically. Original.
- Limbctr: Harrington et al. (1996a)*. Finds planetary limbs and centers automatically. Original.

Reviewed Related Publications

The following publications present analyses of datasets I acquired and shared:

- R9 Christiansen, J. L., S. Ballard, D. Charbonneau, N. Madhusudhan, S. Seager, M. J. Holman, D. D. Wellnitz, D. Deming, M. F. A'Hearn, and the EPOXI Team 2010. Studying the Atmosphere of the Exoplanet HAT-P-7b Via Secondary Eclipse Measurements with EPOXI, Spitzer, and Kepler. *ApJ* **710**, 97–104.
- R8 Demory, B.-O., M. Gillon, T. Barman, X. Bonfils, M. Mayor, T. Mazeh, D. Queloz, S. Udry, F. Bouchy, X. Delfosse, T. Forveille, F. Mallmann, F. Pepe, and C. Perrier 2007. Characterization of the hot Neptune GJ 436 b with Spitzer and ground-based observations. *A&A* **475**, 1125–1129.
- R7 Gillon, M., B.-O. Demory, T. Barman, X. Bonfils, T. Mazeh, F. Pont, S. Udry, M. Mayor, and D. Queloz 2007. Accurate Spitzer infrared radius measurement for the hot Neptune GJ 436b. *A&A* **471**, L51–L54.
- R6 Cooray, A. R., J. L. Elliot, A. S. Bosh, L. A. Young, and M. A. Shure 1998. Stellar occultation observations of Saturn's north-polar temperature structure. *Icarus* **132**, 298–310.
- R5 Satoh, T., J. E. P. Connerney, and R. L. Baron 1996. Emission source model of Jupiter's H₃⁺ aurorae: A generalized inverse analysis of images. *Icarus* **122**, 1–23.
- R4 Connerney, J. E. P., T. Satoh, and R. L. Baron 1996. Interpretation of auroral "lightcurves" with application to Jovian H₃⁺ emissions. *Icarus* **122**, 24–35.
- R3 Bosh, A. S. 1994. *Stellar occultation studies of Saturn's rings with the Hubble Space Telescope*. Ph. D. thesis, Massachusetts Institute of Technology.
- R2 Hubbard, W. B., C. C. Porco, D. M. Hunten, G. H. Rieke, M. J. Rieke, D. W. McCarthy, V. Haemmerle, R. Clark, E. P. Turtle, J. Haller, B. McLeod, L. A. Lebofsky, R. Marcialis, J. B. Holberg, R. Landau, L. Carrasco, J. Elias, M. W. Buie, S. E. Persson, T. Boroson, S. West, and D. J. Mink 1993. The occultation

JOSEPH HARRINGTON

of 28 Sgr by Saturn: Saturn pole position and astrometry. *Icarus* **103**, 215–234.

R1 Connerney, J. E. P., R. Baron, T. Satoh, and T. Owen 1993. Images of excited H₃⁺ at the foot of the Io flux tube in Jupiter’s atmosphere. *Science* **262**, 1035–1038.

Abstracts and Presentations at Scientific Meetings

- Harrington, J.** 2023. MCMC stopping and machine-learning acceleration in free atmospheric retrievals. Presented at the ExoClimes VI Workshop, 26–30 June 2023, Exeter, UK. https://exoclimes.org/posters_1.pdf.
- Moraitis, C., S. Eikenberry, A. Gonzalez, N. Law, R. Quimby, A. Townsend, R. Amezcua-Correa, C. Warner, S. Yerolatsitis, T. Maccarone, M. Bentz, **J. Harrington**, S. Jeram, D. Wright, H. Reale, J. Foran, N. Harmon, A. Akers, J. Rowe, K. Semmen, N. Salem, and V. Pagliuca 2023. OPA! The Original PolyOculus Array. *AAS Meeting Abstracts*, 346.05.
- Moraitis, C. D., S. S. Eikenberry, R. Amezcua-Correa, M. Bentz, A. Gonzalez, **J. Harrington**, S. Jeram, N. Law, T. Maccarone, R. Quimby, J. C. Alvarado Zacarias, and A. Townsend 2022. OPA: The original polyoculus array. In *Ground-based and Airborne Telescopes IX*. SPIE, 17 - 22 July 2022, Montréal, Québec, Canada. <http://spie.org/AS103>.
- Harrington, J.**, M. D. Himes, P. E. Cubillos, J. Blečić, P. Rojo, R. C. Challener, N. B. Lust, M. O. Bowman, S. D. Blumenthal, I. Dobbs-Dixon, A. S. D. Foster, A. J. Foster, M. R. Green, T. J. Loredó, K. J. McIntyre, M. M. Stemm, and D. C. Wright 2022b. Bayesian atmospheric radiative transfer (BART): Exoplanet retrievals flexible enough to resolve controversies. *AAS/Exoplanets IV Conference Abstracts, 1–6 May 2022, Las Vegas, NV*. **54**, 102.04.
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- Himes, M. D., **J. Harrington**, A. D. Cobb, F. Soboczenski, M. D. O’Beirne, S. Zorzan, D. C. Wright, Z. M. D. Scheffer, S. Domagal-Goldman, G. Arney, and A. G. Baydin 2021. Neural network surrogate models for fast Bayesian inference: Application to exoplanet atmospheric retrieval. In *Applications of Statistical Methods and Machine Learning in the Space Sciences*. 17 - 21 May 2021 virtual meeting hosted by Space Science Institute, Boulder, CO, USA. <https://spacescience.org/workshops/mlconference2021.php>.
- Himes, M. D., **J. Harrington**, A. D. Cobb, A. G. Baydin, F. Soboczenski, M. D. O’Beirne, S. Zorzan, D. C. Wright, Z. M. D. Scheffer, S. Domagal-Goldman, and G. Arney 2021. Rapid atmospheric characterization via neural network surrogate models for radiative transfer. In *Towards the Comprehensive Characterization of Exoplanets: Science at the Interface of Multiple Measurement Techniques*, pp. #4–11. 19 - 23 April 2021 virtual meeting hosted by Space Telescope Science Institute, Baltimore, MD, USA. <https://www.stsci.edu/contents/events/stsci/2021/april/towards-the-comprehensive-characterization-of-exoplanets>.
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- Himes, M. D., **J. Harrington**, A. D. Cobb, A. G. Baydin, F. Soboczenski, M. D. O’Beirne, S. Zorzan, D. C. Wright, Z. M. D. Scheffer, S. Domagal-Goldman, and G. Arney 2020. Accelerating Bayesian inference via neural networks: Application to exoplanet retrievals. *AAS/DPS Meeting Abstracts* **52**, 207.07.
- McIntyre, K. J., **J. Harrington**, R. C. Challener, A. M. Brown, C. B. Coll, M. Y. Giacco, C. A. Millwater, R. J. Sirimanne, and D. C. Wright 2020. Realistic simulations of future exoplanet observatories using lessons learned from a re-analysis of all HD 209458 b Spitzer transits and secondary eclipses. *AAS/DPS*

JOSEPH HARRINGTON

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- McIntyre, K. J., **J. Harrington**, and S. S. Eikenberry 2020. Transit spectroscopy with MIRADAS. *AAS Meeting Abstracts*, 116.02.
- Scheffer, Z., **J. Harrington**, R. C. Challener, and K. J. McIntyre 2020. EDGAR: Automating POET for analysis for HD 209458b eclipse light curves. *AAS Meeting Abstracts*, 115.04.
- Green, M. R., R. C. Challener, M. D. Himes, J. Blečić, and P. Cubillos 2020. An analysis of the orbit and atmosphere of WASP-17b as revealed by Spitzer. *AAS Meeting Abstracts*, 122.05.
- Challener, R. C. 2020. Exoplanets: Correlated noise and cautionary tales. *AAS Meeting Abstracts*, 409.05.
- Himes, M. D., A. D. Cobb, F. Soboczenski, S. Zorzan, M. D. O’Beirne, A. G. Baydin, Y. Gal, D. Angerhausen, S. Domagal-Goldman, and G. Arney 2020. Machine learning retrieval of Jovian and terrestrial atmospheres. *AAS Meeting Abstracts*, 343.01.
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- Challener, R. C., and **J. Harrington** 2019a. A comprehensive Spitzer study of GJ 436b. In *AAS/Extreme Solar Systems Abstracts*, Volume 51, pp. 313.09.
- McIntyre, K. J., **J. Harrington**, R. C. Challener, M. A. Reinhard, M. R. Green, Z. Scheffer, C. Jordan, P. Jochum, and C. Millwater 2019a. The current state of Spitzer secondary eclipse analyses: HD 209458 b. In *AAS/Extreme Solar Systems Abstracts*, Volume 51, pp. 313.11.
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- Challener, R. C., **J. Harrington**, J. Jenkins, N. T. Kurtovic, R. Ramirez, J. Peña Zamudio, K. J. McIntyre, M. D. Himes, E. Rodríguez, G. Anglada-Escudé, S. Dreizler, A. Ofir, I. Ribas, P. Rojo, D. Kipping, R. P. Butler, P. J. Amado, C. Rodríguez-López, E. M. Kempton, E. Palle, and F. Murgas 2018. Improved

JOSEPH HARRINGTON

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Himes, M. D., A. Cobb, F. Soboczenski, S. Zorzan, M. O'Beirne, A. G. Baydin, Y. Gal, S. Domagal-Goldman, G. N. Arney, and D. Angerhausen 2019. Exoplanetary atmospheric retrieval via Bayesian machine learning. In *AAS/Extreme Solar Systems Abstracts*, Volume 51, pp. 333.14.

Press Releases and Other Media-Related Activities

"Broad coverage" means appearance of at least hundreds of related stories in the popular press on six continents, in multiple languages and media.

- 2022 JWST exoplanet papers from four instruments, SO₂ photochemistry detected, five *Nature* articles, NASA, STScI press releases, broad coverage
- 2022 First JWST exoplanet spectrum, CO₂ detected, *Nature* article, NASA, STScI, UCF press releases, broad coverage
- 2012 *NBCLearn* educational video on planetary impacts, NBCUniversal LLC 2013. Impacts on Jupiter. <http://www.nbclearn.com/sciencenews/cuecard/63312>
- 2012 Discovery of UCF-1.01 and UCF-1.02, the closest rocky exoplanet candidates, first discoveries by Spitzer or UCF, Spitzer and UCF press releases, TV interview (Stevenson), broad coverage
- 2011 TV news appearance, Fox35 (WOFL), Orlando, FL, Glory Launch Failure, 4 Mar
- 2011 TV news appearance, Fox35 (WOFL), Orlando, FL, Solar Storms, 21 Feb

JOSEPH HARRINGTON

- 2011 TV news appearance, Fox35 (WOFL), Orlando, FL, Kepler's 1000+ planet candidates, 2 Feb
- 2010 TV news appearance, Fox35 (WOFL), Orlando, FL, Arsenic-based bacterium, 2 Dec
- 2010 First carbon-rich planet, *Nature* article, Spitzer, UCF, MIT, WASP press releases, broad coverage
- 2010 Missing methane on a hot Neptune, *Nature* article, NASA, UCF, MIT press rel., broad coverage
- 2007 Detection of the hottest planet ever: HD 149026b, *Nature* article, UCF press rel., broad coverage
- 2007 First detection of molecules in atmosphere of extrasolar planet, *Nature* article, NASA and Spitzer Space Telescope press releases, TV interview, broad coverage
- 2007 *Planetary Radio* interview (Feb 5), syndicated science interview program, <http://planetary.org/radio>
- 2006 First measurement of night and day on extrasolar planet, *Science* cover article, NASA and Spitzer Space Telescope press releases, broad coverage
- 2006 Detection of strong infrared radiation from HD 189733b, NASA Goddard press release
- 2005 Direct detection of an extrasolar planet, *Nature* article
TV interview, NASA Science Update press conference, broad coverage.
- 1995 Observation of atmospheric effects of the Shoemaker-Levy 9 Impacts, *Science* cover article
NASA, *Science*, and institutional press releases, broad coverage
- 1994 Prediction of observable atmospheric effects of the Shoemaker-Levy 9 Impacts, *Nature* cover article
Broad coverage. Prime-time news interviews broadcast on all major US television networks
Personal appearances or coverage of research on several PBS programs, including some recent
Several popular magazine covers
- 1989 World's first failure to reproduce Pons and Fleischmann "cold fusion"
Interview on BBC program *Confusion in a Jar*, aired in UK and US (PBS *Nova* series)
- In addition, I am regularly asked by international reporters to comment on work in my research areas.*

Professional Invited Reviews, Colloquia, and Seminars

Exoplanets: Lessons from the Spitzer Space Telescope

2014 Dec 1 New York University, Abu Dhabi

2014 Sep 23 Invited review, Exoplanets with JWST - MIRI, Heidelberg, Germany

Two Classes of Exoplanets Identified Without Modeling

2014 Mar 13 Southwest Research Institute, Boulder, CO

2014 Mar 11 National Weather Center, University of Oklahoma, Oklahoma City, OK

2013 Aug 28 Florida Space Institute, University of Central Florida, Orlando, FL

2013 Jul 31 Astronomy Department, Cornell University, Ithaca, NY

2013 May 29 Vatican Observatory, Castel Gandolfo, Vatican City

2012 Nov 13 Max-Planck-Institut für Astronomie Planet and Star Form. Retreat, Odenwald, Germany

2012 Jun 26 Invited review, Comparative Climatology of Terrestrial Planets, Boulder, CO

2012 Jun 4 Department of Terrestrial Magnetism, Carnegie Institution of Washington, DC

2012 Apr 23 Max-Planck-Institut für Astronomie, Heidelberg, Germany

Photometry and Spectroscopy of Exoplanetary Atmospheres

2011 Feb 18 Dept. of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL

2010 Apr 2 Department of Physics, University of South Florida, Tampa, FL

2009 Jul 22 Invited review, New Tech. for Probing Divers. of B. Dwarfs and Exopl., Shanghai, China

2009 Feb 17 Invited review, AKARI meeting, University of Tokyo, Tokyo, Japan

2009 Jan 30 UF-UCF Star and Planet Formation Days, Astronomy Dept., U. Florida, Gainesville, FL

2008 Nov 25 Department of Earth, Atmospheric, and Planetary Sciences, MIT, Cambridge, MA

2008 Nov 24 Harvard-Smithsonian Center for Astrophysics, Harvard University, Cambridge, MA

2008 Nov 20 Invited review, Molecules in the Atmospheres of Extrasolar Planets mtg, Paris, France

2008 Oct 12 Invited review, Division for Planetary Sciences meeting, Ithaca, NY

JOSEPH HARRINGTON

- 2008 Sep 24 Colloquium, Physics Department, University of Central Florida, Orlando, FL
- 2008 Sep 7 Planetary Journal Club, Physics Department, University of Central Florida, Orlando, FL
- 2008 Jul 24 Invited review, Cool Stars 15 workshop, St. Andrews, Scotland, UK

Photometry of Extrasolar Planets

- 2008 Feb 19 Institute of Astronomy, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland
- 2008 Feb 18 Department of Astronomy, University of Geneva, Switzerland

The Pioneering Direct Measurements of Extrasolar Planets

- 2007 Jul 7 Physics Department, Ithaca College, Ithaca, NY
- 2007 Jan 24 Department of Astronomy, University of Florida, Gainesville, FL
- 2006 Apr 12 Department of Physics and Astronomy, University of Western Ontario, London, ON
- 2006 Feb 20 Department of Physics and Astronomy, George Mason University, Fairfax, VA
- 2006 Jan 25 Physics Department, University of Central Florida, Orlando, FL
- 2006 Jan 19 Planetary Lunch, Astronomy Department, Cornell University, Ithaca, NY

A Painless (but Quantitative) Introduction to Wavelets, with Planetary Examples

- 2008 Jan 9 Planetary Journal Club, Physics Department, University of Central Florida, Orlando, FL
- 2004 Nov 29 Planetary Lunch, Astronomy Department, Cornell University, Ithaca, NY

How to Increase the S/N of Your Existing Data by 30%

- 2003 Sep 22 Planetary Lunch, Astronomy Department, Cornell University, Ithaca, NY

Measuring Extrasolar Planets with Transit Spectroscopy

- 2003 Dec 16 Physics Department, Notre Dame University, South Bend, IN
- 2003 Nov 5 Physics Department, Ithaca College, Ithaca, NY
- 2002 Nov 7 Astronomy Department, Cornell University, Ithaca, NY

Direct Detection and Characterization of Extrasolar Planets

- 2002 Jul 11 Space Grant Seminar, Cornell University, Ithaca, NY
- 2001 Nov 19 Atacama Telescope Project, Cornell University, Ithaca, NY
- 2001 Oct 11 Planetary Lunch, Astronomy Department, Cornell University, Ithaca, NY

Physics of the Shoemaker-Levy 9 Impacts

- 2002 Aug 6 Department of Astrophysics, American Museum of Natural History, New York, NY
- 2002 Jun 7 Department of Space Studies, Southwest Research Institute, Boulder, CO
- 2001 Mar 21 Department of Earth, Atmospheric, and Planetary Sciences, MIT, Cambridge, MA
- 2001 Mar 19 Astronomy Department, Boston University, Boston, MA
- 2001 Mar 1 Astronomy Department, Cornell University, Ithaca, NY

Physical Phenomenology of SL9 Impact Plumes

- 2000 Feb 14 Planetary Lunch, Astronomy Department, Cornell University, Ithaca, NY

Jovian Planetary Waves

- 1998 Mar 12 Five-College Astronomy Department, University of Massachusetts, Amherst, MA
- 1997 Jun 5 NASA Jet Propulsion Laboratory, Pasadena, CA

Jupiter's Tropospheric Thermal Emission

- 1997 Mar 13 LEP Colloquium, NASA Goddard Space Flight Center, Greenbelt, MD
- 1997 Feb 18 Space Telescope Science Institute, Johns Hopkins University, Baltimore, MD
- 1996 Sep 20 Astronomy Department, Boston University, Boston, MA

Honors, Teams, Fellowships, and Societies

- 2020 Pegasus Professor, highest UCF faculty honor, 2–5 awarded/year
- 2017 Inducted, UCF Scroll and Quill Society (Faculty Excellence honor society)
- 2016 UCF Research Incentive Award (~11 awarded/year/college, eligibility every 5 years)
- 2012 UCF College of Sciences Excellence in Research Award (College's top researcher)

JOSEPH HARRINGTON

- 2011 UCF Research Incentive Award (~5 awarded/year/college, eligibility every 5 years)
- 2002 Science Team Associate, NASA CONTOUR Mission, CRISP IR Spectrometer Calibration
- 1999 Asteroid 5034 named Joe Harrington in my honor
- 1995–7 National Research Council Associateship
- 1994 Science Team Associate, NASA Infrared Telescope Facility, Shoemaker-Levy 9 Impact
- 1994 Science Team Associate, Hubble Space Telescope, Shoemaker-Levy 9 Impact
- 1989– Member, American Astronomical Society, Division for Planetary Sciences
- 1988 Member, Sigma Pi Sigma (physics honor society)

Relevant Consulting (*None since arrival at UCF.*)

- 2004 Division for Planetary Sciences Meeting Conference network services
- 2003–2004 Wellesley College 14 Nov 1998 Saturn Occultation Analysis
- 1999–2000 Wellesley College 14 Nov 1998 Saturn Occultation Analysis
- 1998 Comparative Planetology Lab, U. Louisville, KY Designed and built Beowulf supercomp.
- 1997 Comparative Planetology Lab, U. Louisville, KY Designed and built research computer

Directly Supported Senior Staff *I employed/employ the following non-Co-I/non-Co-PI staff.*

- 2016–2017 Michael Himes, Research Assistant, full time.
- 2016 Kathleen McIntyre, Research Assistant, full time.
- 2015– Austin Foster, System Manager, part time.
- 2014–2016 Sarah Blumenthal, Research Assistant, full time.
- 2013–2014 Madison Stemm, Research Assistant, part time.
- 2012–2013 Matthew Hardin, Research Assistant, part time. Placement: PhD program, Clemson Univ.
- 2010–2011 Sarah Nymeyer, Research Assistant, full time. Placement: PhD program, UCLA
- 2010 William Bowman, Research Assistant, full time.
- 2010– Dr. Thomas Loredo (Cornell), Co-I/Consultant, ~1 mo/year.
- 2009–2010 David Goldsmith, Technical Editor, full time
- 2009 Vladimir Blečić, HPC System Specialist, short-term full time
- 2008–2013 Dr. Carthik Sharma, System Manager, full, then part time
- 2008–2009 Daren Wilson, Computer Research Specialist, full time
- 2008–2010 Teresa Jeffcott, Research Support Specialist, full time
- 2008 Stéfan van der Walt, Documentation Writer (consultant, Stellenbosch, South Africa)
- 2008 Prof. Maria Womack, Visiting Research Scientist (sabbatical from St. Cloud State Univ., MN)

Teaching Experience

University of Central Florida, Orlando, Florida

- Spring 2023* AST 2002 Astronomy
New online video-game course format. Piloted in UCF's online course system.
- Fall 2020* AST 5765 Advanced Astronomical Data Analysis
- Fall 2020* AST 4762 Astronomical Data Analysis
- Spring 2020* AST 6165 Planetary Atmospheres
Enhanced atmospheric spectroscopy for new, higher level.
- Fall 2019* AST 5765 Advanced Astronomical Data Analysis
- Fall 2019* AST 4762 Astronomical Data Analysis
- Spring 2019* PHZ 3150 Introduction to Numerical Computing
- Fall 2018* AST 5765 Advanced Astronomical Data Analysis
- Fall 2018* AST 4762 Astronomical Data Analysis

JOSEPH HARRINGTON

<i>Spring 2018</i>	AST 5165 Planetary Atmospheres
<i>Fall 2017</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2017</i>	AST 4762 Astronomical Data Analysis
<i>Spring 2017</i>	PHY 3930 ST Introduction to Numerical Computing Proposed course (permanent number: PHZ 3150), developed mostly new lectures, assignments, project, based on first year's experience.
<i>Fall 2016</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2016</i>	AST 4762 Astronomical Data Analysis
<i>Spring 2016</i>	AST 5165 Planetary Atmospheres
<i>Fall 2015</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2015</i>	AST 4762 Astronomical Data Analysis
<i>Spring 2015</i>	AST 3905 Introduction to Numerical Computing Pilot for new course. Developed lectures, assignments, course project.
<i>Fall 2014</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2014</i>	AST 4762 Astronomical Data Analysis
<i>Spring 2014</i>	AST 5165 Planetary Atmospheres
<i>Fall 2013</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2013</i>	AST 4762 Astronomical Data Analysis
<i>Spring 2012</i>	AST 5165 Planetary Atmospheres
<i>Fall 2011</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2011</i>	AST 4762 Astronomical Data Analysis
<i>Fall 2010</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2010</i>	AST 4762 Astronomical Data Analysis
<i>Spring 2010</i>	AST 5165 Planetary Atmospheres
<i>Fall 2009</i>	AST 5765 Advanced Astronomical Data Analysis
<i>Fall 2009</i>	AST 4762 Astronomical Data Analysis
<i>Fall 2008</i>	AST 5765 Advanced Astronomical Data Analysis (renumbered) New project, refactored content based on first year's experience. Course satisfies restricted elective in core of Physics PhD and Physics, Planetary Sciences Track PhD.
<i>Fall 2008</i>	AST 4762 Astronomical Data Analysis (renumbered) Shared lecture and 50% content with AST 5765. New project, refactored content based on first year's experience.
<i>Spring 2008</i>	AST 5165 Planetary Atmospheres New course for UCF (was listed in catalog but never taught). Developed lectures, exams, assignments. Included video link to Univ. of Florida Department of Physics.
<i>Fall 2007</i>	AST 5937 Advanced Astronomical Data Analysis New course for UCF. Proposed course. Developed lectures, assignments, course project.
<i>Fall 2007</i>	AST 4932 Astronomical Data Analysis New course for UCF. Proposed course. Developed lectures, assignments, course project. Shared lecture and 70% content with AST 5937.
<i>Spring 2007</i>	AST 2002H Honors Astronomy New course assignment. Developed lectures, assignments, exams.
<i>Fall 2006</i>	AST 2002 Astronomy New course assignment. Developed lectures, assignments, exams.
Cornell University, Ithaca, New York	
<i>2003, 2004</i>	Astronomy 234: Modern Astrophysical Techniques
<i>2000 – 2003</i>	Astronomy 105/107: An Introduction to the Universe (without/with lab option)

JOSEPH HARRINGTON

Massachusetts Institute of Technology, Cambridge, Massachusetts

- Fall 1990, 1991* Teaching Assistant, 12S23 Observing Stars and Planets (Lecturer)
- Fall 1989* Teaching Assistant, 12S23 Observing Stars and Planets (Curriculum Development)
- Spring 1989* Teaching Assistant, 12.400 Introduction to Planetary Sciences (TA, Grader)
- Fall 1988* Teaching Assistant, 12.117J Observational Techniques of Optical Astronomy (TA)

Mentoring: Postdoctoral Scholars and Assistant Scientists

- 2014–2015 Nate Lust, Postdoctoral Associate. Exoplanet Bayesian statistics, scientific programing, system management. Placement: Postdoctoral Associate with Prof. Robert Lupton, Large Synoptic Survey Telescope project, Princeton University.
- 2006–2011 Csaba Palotai, Assistant Scientist. SL9 impact modeling. Was awarded his first two PI grants under my advice and promoted to (independent) Associate Scientist at UCF. Subsequently moved to professorship at Florida Institute of Technology.

Mentoring: Graduate Students

At UCF (all PhD students, I am principal advisor and PhD committee chair, except as noted):

- 2022– Christina Moraitis, Polyoculus (PhD committee member, S. Eikenberry, chair)
- 2021– Maxwell Galloway, Exoplanets and Brown Dwarfs (PhD committee member, T. Karalidi, chair)
- 2021– Peter Braunschweig, Exoplanets and Brown Dwarfs (PhD committee member, T. Karalidi, chair)
- 2019– Kenneth Gordon, Extrasolar planets (PhD committee member, T. Karalidi, chair)
- 2019–2020 M. Raechel Green, Extrasolar planets, UCF Presidential Fellow
Modeling and Simulation PhD program, advising short-term project
- 2017–2022 Michael Himes, Extrasolar Planets. *Atmospheric Retrieval: Bayesian Methods, Machine Learning, and Application to Exoplanets*.
2022 NASA Postdoctoral Fellowship, Goddard Space Flight Center, Greenbelt, MD
2019 NASA Fellowship, Office of STEM Engagement
2019 UCF Doctoral Research Support Award \$4,564 for computer
2018 University Award for Excellence by a Graduate Teaching Assistant
2018 College of Sciences Award for Excellence by a Graduate Teaching Assistant
2018 Department of Physics Award for Graduate Teaching Excellence
2017 UCF Office of Research Fellowship
Placement: NASA Postdoctoral Fellow, NASA Goddard Space Flight Center, Greenbelt, MD.
- 2016–2020 Justin Reyes, Quantum Computing (PhD committee member, E. Mucciolo, chair)
- 2016– Kathleen McIntyre, Extrasolar Planets, UCF Office of Research Fellow
2023 Graduate Dean’s Dissertation Completion Fellowship
2017 Department of Physics Award for Graduate Teaching Excellence
2017 College of Sciences Award for Excellence by a Graduate Teaching Assistant
- 2014–2020 Ryan Challener, Extrasolar Planets. *Exoplanets: Correlated Noise and Cautionary Tales*.
Exoplanet transit and eclipse observations, atmospheric retrievals, space telescope vibration systematics.
2016 Department of Physics Award for Graduate Teaching Excellence
Placement: Postdoctoral Associate with Prof. Emily Rauscher, U. Michigan.
- 2014–2017 Emerson DeLarme, Extrasolar Planets, UCF Presidential Fellow. Left program.
- 2009–2015 Patricio Cubillos, Extrasolar Planets, Fulbright Scholar. *Characterizing Exoplanet Atmospheres: From Light-Curve Observations to Radiative-Transfer Modeling*. Exoplanet eclipse and transit observations, correlated-noise assessment techniques, Bayesian atmospheric characterization. Placement: Postdoctoral Associate with Prof. Luca Fossati,

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- University of Graz, Austria.
- 2009–2015 Jasmina Blečić, Extrasolar Planets, NASA Earth & Space Sciences Fellow, Florida Space Grant Fellowship (declined). *Observations, Thermochemical Calculations, and Modeling of Exoplanetary Atmospheres*. Exoplanet eclipse observations, open-source atmospheric thermochemical equilibrium code, Bayesian atmospheric characterization. Placement: Postdoctoral Associate with Prof. Ian Dobbs-Dixon, New York University Abu Dhabi.
- 2009–2014 Nathaniel Lust, Extrasolar Planets (advised a project in his dissertation with Prof. D. Britt)
- 2009–2013 Jarrad Pond, SL9 Impacts, co-chair with C. Palotai, changed degree tracks
- 2009 Bryce Bolin, SL9 Impacts (1-semester project)
- 2007–2012 Kevin Stevenson, Extrasolar Planets. *Detecting and Characterizing Exoplanets in the GJ 436 and HD 149026 Systems*. Exoplanet eclipse and transit observations, atmospheric characterization, data analysis techniques, small rocky planet discovery. UCF Order of Pegasus (top student honor, given to 6 of ~8500 grad students in 2012). Placement: Postdoctoral Associate with Prof. Jacob Bean, University of Chicago; 2014 Sagan Fellow.
- 2007–2010 Robert Macke, Meteorite Lab Measurements (PhD committee member, D. Britt, chair). Placement: Curator of Meteorites, Vatican Observatory, Castel Gandolfo, Italy
- At Cornell (PhD student):
- 2002–2006 Patricio Rojo, Extrasolar Planets. *Transit Spectroscopy of the Extrasolar Planet HD 209458b: The Search For Water*. Principal advisor and PhD committee chair, co-signed by P. Gierasch. Transit spectroscopy observations, analysis tools, and radiative-transfer model of extrasolar planet HD 209458b. Placement: Assistant Professor of Physics, Universidad de Chile, Santiago, Chile.

Mentoring: Undergraduate Students

At UCF:

- 2021– Sean Peppers '24, Extrasolar planets, research.
- 2020–2022 Joshua Fraustro '21, Extrasolar planets, research.
Placement: Software Developer, Space Telescope Science Institute, Baltimore, MD
- 2019– Alexandra Brown '23, Extrasolar planets, research.
- 2019– Catherine Millwater '23, Extrasolar planets, research.
Astronaut Scholarship.
- 2019– Alexander Cingoranelli, '22, Extrasolar planets, system management and research.
2020 UCF Summer Undergraduate Research Fellowship.
- 2019–2022 Ryan Sirimanne '21, Extrasolar planets, research.
Placement: PhD student, Mechanical Engineering, Pennsylvania State University
- 2019–2022 Milan Giacco '21, Extrasolar planets, research.
- 2019–2021 David Wright '21, Extrasolar planets, research.
UCF Distinguished Undergraduate Research Scholarship, April 2021.
2021 UCF Founder's Day Award winner.
2021 UCF Student Scholar Symposium Judges' Choice Award winner.
2021 Society of Physics Students award
Honors Thesis: *Wright, David C. 2021. Simulating Systematic Errors in Exoplanetary Transits for the James Webb Space Telescope*. Honors Undergraduate Thesis in Physics, University of Central Florida.
Placement: PhD student, Physics, University of Central Florida
- 2019–2020 Sebastian Steele '21, Extrasolar planets, research.
- 2019 Alexander Baekey '20, Extrasolar planets, research.
- 2018–2019 Cody Jordan '19, Extrasolar planets, system management.

JOSEPH HARRINGTON

- Placement: PhD student, Physics, University of Central Florida
- 2017–2019 M. Raechel Green '19, Extrasolar planets, research.
Placement: PhD student, Modeling and Simulation, University of Central Florida
- 2017–2019 Simone Landry '19, Extrasolar planets, research.
- 2016–2020 Zacchaeus Scheffer '19, Extrasolar planets, research.
Placement: PhD student, Computer Science, University of Central Florida
- 2016–2017 Caroline Arteaga '19, Extrasolar planets, research.
- 2016 Michael Himes '16, Extrasolar planets, research, see Sr. Staff, above.
- 2015–2018 Matthew Reinhard '19, Physics, Extrasolar planets, research.
- 2014–2015 Dylan Bruce '18, Physics, Extrasolar planets, research.
- 2014–2015 Austin Foster '15, Mathematics, system management, see Sr. Staff, above.
- 2013–2017 Justin Garland '15, Physics, Extrasolar planets, research.
Placement: PhD student, Planetary Science, Hampton University
- 2013–2014 Sarah Blumenthal '14, Chemistry, Extrasolar planets, research, see Sr. Staff, above.
- 2012–2016 Andrew Foster '16, Physics/Astronomy, Extrasolar planets, research.
Astronaut Scholarship. Placement: PhD student, Cornell University
- 2011–2014 Oliver Bowman '14, Physics/Astronomy, Extrasolar planets, research.
Placement: PhD student, Planetary Sciences, University of California, Los Angeles.
- 2010–2012 Matthew Hardin '12, Physics/Astronomy, Extrasolar planets, research, see Sr. Staff, above.
- 2010–2012 Travis Gabriel '13, Physics/Astronomy, SL9 impacts, research and system management.
Placement: PhD student, Geophysics, Univ. Colorado, Boulder.
- 2010–2012 Noémi Rebeli '13, Physics/Astronomy, SL9 impacts, research.
- 2008–2013 Ryan Hardy '13, Physics/Astronomy, Extrasolar planets, research.
Winning Co-I, 2012 UCF Showcase for Undergraduate Research, Physical Sciences II
Placement: PhD student, Astrodynamics, University of Colorado, Boulder.
- 2008–2012 Christopher Campo '12, Physics/Comp. (Minors: Math, CS), Extrasolar planets, research.
UCF Research and Mentoring Program scholarship.
Winner, 2012 UCF Showcase for Undergraduate Research, Physical Sciences I
Placement: Scientific programmer, Northrup Grumman Corporation.
- 2010–2011 Armando Anzellini '13, Physics/Astronomy, Extrasolar planets, research.
- 2008–2011 Christopher Britt '13, Extrasolar planets, research.
- 2008 Michelle Petty '09, Aerospace Engineering, SL9 impacts, research.
- 2007–2010 Sarah Nymeyer '10, Physics, Extrasolar planets, research, see Senior Staff, above.
- 2007–2010 William Bowman '10, Physics, Extrasolar planets, research, see Senior Staff, above.
- 2007 Karen Horning '08, FIT Astronomy, Extrasolar planets, research.
- 2007 Jason Moore '07, Physics, teaching assistant.
- 2007 Clinton Reece '08, Physics, SL9 impacts, system management and research.
- 2006 Nathaniel Lust '08, Physics, teaching assistant. Placement: PhD student, Physics/Planetary Sciences, University of Central Florida.
- At Cornell:
- 2006–2007 Catherine Elder '08, Astronomy, Extrasolar planets, research. Placement: PhD student, University of Arizona.
- 2005–2006 Nathan Sloat '08, Applied and Engineering Physics, SL9 impacts, programming.
- 2004–2006 Statia Luszcz '06, Astronomy, Extrasolar planets, research. Placement: PhD student, Astronomy, University of California, Berkeley.
- 2004–2006 Matthew Kulick '07, Information Sciences, SL9 impacts, system management.
- 2004–2005 Nicholas Stone '08, Physics, Extrasolar planets, programming.
- 2003–2005 John Dermody '05, Electrical and Computer Eng., Extrasolar planets, programming and

JOSEPH HARRINGTON

- research. Winner, 2005 Cranson W. and Edna B. Shelley Award for Undergraduate Research in Astronomy. Placement: Investment analyst, Putnam Inv., Boston, MA.
- 2002–2003 Dara Zeelandelaar '03, Astronomy, Extrasolar planets, programming. Space Grant Fellow (summer 2002). Placement: PhD student, Astronomy, University of Maryland.
- 1999–2002 Alexander C. Ruane '02, Atmospheric Sciences, Jovian planetary waves, programming and research. Space Grant Fellow (summer 2001). Senior Honors Thesis: *Examining Wave Propagation Patterns in the Jovian Atmosphere Using the EPIC Model*. Placement: PhD student, Atmospheric Sciences, University of California, San Diego.
- 1999 Siree Vatanavikit '01, Electrical and Computer Eng., Jovian planetary waves, programming.

Mentoring: High-School Interns

- 2019 Alexandra Brown, Senior, Lake Mary High School, Exoplanets
Placement: University of Central Florida, Honors College. See Undergraduates, above.
Also admitted to Harvard University, Cambridge, Massachusetts.
- 2018–2019 Catherine Millwater, Senior, Winter Park High School, Exoplanets.
Placement: University of Central Florida, Honors College. See Undergraduates, above.
- 2017–2018 Parker Jochum, Senior, Trinity Preparatory School, Exoplanets.
Placement: Notre Dame University.

Educational Infrastructure Development

SciPy Documentation Project

I formed and led a group of 75+ graduate and PhD-level volunteers worldwide, and paid and supervised one full-time writer, to produce reference documentation to this open-source, numerical programming environment. SciPy can now rapidly be learned by students who have never programmed before, making a modern, free, open-source, numerical programming environment available to them and their instructors for the first time. Its core, NumPy, is on the One Laptop Per Child base release.

Peer-Based Method for Grading a Writing Assignment in Large Classes

I developed a method that allows a writing assignment to be given without creating an impossibly large grading load even in classes of hundreds of students. Each student receives six anonymized papers to evaluate on a rubric via a web site. A paper's score is the sum of the medians of its scores on the rubric questions, which ranks the papers. The instructor reads selected papers to find the grading cutoff levels. The students have thus evaluated the papers but the instructor has assigned the grades. Students participate authentically in the review because their participation and scoring consistency produce their grade in a second assignment, which is participation in the peer review. The method is essentially cheat-proof. Faculty grading effort is manageable, about 25 papers regardless of class size. Students are exposed to peer review, now common in professional life. They study six other responses to the same assignment, giving perspective and ideas for improving their writing. A test in a class of 25 where I read all the papers showed good agreement between my assessment and the peer scoring. I plan a full implementation when I again teach hundreds of students, and then publication of the method and the web software needed to implement it.

Professional Service

- 2018–19 Scientific Organizing Committee, ExoClimes 2019 workshop, exoclimes2019.org
- 2017–18 US National Academies Committee on Best Practices for a Future Open Code Policy for NASA Space Studies
- 2015–16 Scientific Organizing Committee Chair, ExoClimes 2016 workshop, exoclimes.org
- 2015–22 Steering Committee, ExoClimes workshop series, exoclimes.org
- 2014 Scientific Organizing Committee, 2014 AAS DPS Meeting, Tucson, Arizona, dps.aas.org

JOSEPH HARRINGTON

- 2013–15 *Icarus* Editorial Board member (journal of the AAS Division for Planetary Sciences)
- 2012–14 Scientific Organizing Committee, Exoclines 2014 workshop, Davos, Switzerland, exoclines.org
- 2009–10 Program Committee Chair, UCF Winter Workshop 2010: Exoplanets for Planetary Scientists
- 2008–12 Led 75+ volunteers documenting SciPy open-source numerical environment (docs.scipy.org)
- 2007–8 Led successful bylaws amendment including exoplanets in AAS Division for Planetary Sciences
- 2006–7 Local and Program Organizing Committees, 2007 AAS DPS meeting, UCF
- 2004 Conference network services consultant, 2004 AAS DPS meeting, Louisville, KY
- 2002 Candidate, Division for Planetary Sciences Committee
- 1999 Local Organizing Committee, Asteroids, Comets, Meteors conference, Cornell (internet room)

Reviewing

- 2021 Article review, *The Astronomical Journal*
- 2015 Article review, *Astronomy & Astrophysics*
- 2014 Review Panelist, NASA Astrophysics (\$0.5M proposals)
- 2014 5 application reviews, NASA Postdoctoral Program
- 2013 Article review, *Nature*
- 2013 Review Panelist, NSF Astronomy and Astrophysics (\$0.5M proposals)
- 2012 2 proposal reviews, NASA Planetary Science (\$0.5M proposals)
- 2012 Review Panelist, NASA institutes (\$6M proposals)
- 2011 Review Panelist, NASA missions (\$1M proposals)
- 2011 Application review, NASA Postdoctoral Program
- 2011 DPS E/PO slide set review
- 2010 Review Panelist, Spitzer Space Telescope Allocation Committee
- 2010 DPS E/PO slide set review
- 2010 Article review, *Icarus*
- 2010 3 article reviews, *The Astrophysical Journal Letters*
- 2009 Review Panelist, National Optical Astronomy Observatories Time Allocation Committee
- 2009 Article review, *Nature*
- 2008 Review Panelist, Hubble Space Telescope Allocation Committee
- 2008 Article review, *The Astrophysical Journal*
- 2008 3 proposal reviews, NASA Planetary Science
- 2007 Article review, *The Astrophysical Journal*
- 2007 2 proposal reviews, NASA Astrobiology Institute Director's Discretionary Fund
- 2007 Review panelist, NSF Stellar Astronomy and Astrophysics
- 2006 Article review, *Publications of the Astronomical Society of the Pacific*
- 2006 Proposal review, NASA Postdoctoral Fellowship Program
- 2005 Article review, *Icarus*
- 2004 Proposal review, NASA Planetary Atmospheres Program
- 2004 Review Panelist, NASA Outer Planets Research Program
- 2004 Review Panelist, NSF Planetary Astronomy, Outer Planets and Satellites Program
- 2000 Textbook Review, McGraw-Hill Publishing Company Astronomy
- 1999 Review panelist, NASA Planetary Astronomy Program

Public Education and Outreach

- 2018 K-12 presentation, Fall, Trinity Preparatory School, Winter Park, Florida
- 2015 K-12 presentation, 27 May, Jackson Heights Middle School, Oviedo, Florida
- 2014 Student shadow for a day, 20 Feb, Orange County Public Schools, Orlando, Florida

JOSEPH HARRINGTON

- 2013 K-12 presentation, 30 Oct, Lawton Elementary School, Oviedo, Florida
- 2011 Public lecture, *Measuring Exoplanets from Space*, 11 May, Central Florida Astronomical Society, Seminole State College Planetarium, Lake Mary, Florida
- 2011 Extension lecture, *Measuring Exoplanets from Space*, 11 Jan, LIFE@UCF senior alumni lecture series
- 2009 Public lecture, *Measuring Exoplanets from Space*, 6 May, Barcamp, Orlando, FL
- 2009 Public lecture, *Measuring Exoplanets from Space*, 18 Apr, Café Scientifique, Orlando, FL
- 2006 Extension lecture, *Planetary Systems*, 24 Oct, LIFE@UCF senior alumni lecture series
- 2004 K-12 lecture, *Measuring Extrasolar Planets*, 1 Sep, Granada Hills Charter High School, CA
- 2003 Public lecture, *Measuring Extrasolar Planets*, 23 Aug, Syracuse Astronomical Society
- 2002–7 Southern Cayuga Central Schools Observatory Advisory Committee
Advised public school district on design and program for an observatory.
PI on NASA Education/Public Outreach grant that extended program to 900 regional students/year.
- 1998 K-12 lecture, *Planetary Occultations*, 16 Nov, Granada Hills High School, CA

Institutional Service

At UCF:

- 2023 Chair, UCF Faculty Senate Nominating Committee
- 2022–23 Past Chair, UCF Faculty Senate
- 2021–22 UCF Board of Trustees Ad Hoc Strategic Planning Committee
- 2021–22 UCF Board of Trustees Academic Excellence and Student Success Committee
- 2021–22 UCF Board of Trustees Facilities and Infrastructure Committee
- 2020–23 Advisory Council of Faculty Senates, Florida Board of Governors
- 2020–22 Trustee, University of Central Florida
- 2020–22 UCF Board of Trustees Audit and Compliance Committee
- 2020–21 UCF Board of Trustees Educational Programs Committee
- 2020–21 UCF Board of Trustees Governance Committee
- 2020–22 UCF University Budget Committee
- 2020–22 Chair, UCF Faculty Senate
- 2020–22 Chair, UCF Faculty Senate Steering Committee
- 2020–21 Chair, UCF Faculty Senate Ad-Hoc Internal Communications Committee
- 2020 President’s Advisory Staff Council, UCF
- 2020 Research Professor Promotion Standards Committee, UCF Physics
- 2020 Chair, Lecturer Search Committee, UCF Physics
- 2019–21 UCF Faculty Senate Ad-Hoc Committee on Governance
- 2019–20 Parliamentarian, UCF Faculty Senate
- 2018–20 UCF Faculty Senate Committee on Committees
- 2018–23 Bylaws Committee, UCF Physics
- 2018– Lead, Planetary Science PhD and MS program proposals
- 2017–18 Chair, Atmospheric Theorist Search Committee, UCF Physics
- 2017–23 UCF Faculty Senate Information Technology Committee
- 2017–20 College of Sciences Technology Advisory Committee
- 2016–19 UCF Compliance Committee (Office of Research)
- 2016–23 UCF Faculty Senate Steering Committee
- 2016 UCF COACHE Survey Nature of Work Subcommittee
- 2015–16 UCF Academic Leadership Academy
- 2015–16 UCF Faculty Senate Ad-Hoc Bylaws Review Committee

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- 2014–16 Chair, Budget and Administrative Procedures Committee, UCF Faculty Senate
- 2014–23 UCF Faculty Senator, UCF Physics
- 2014–16 Chair, Ad-Hoc Committee on Computational Skills, UCF Physics
- 2014–16 Strategic Planning Committee, UCF Physics
- 2013–21 Chair, Computers and Information Technology Committee, UCF Physics
Supervised system manager, web team, ran IT services; high-level liason to university IT entities.
- 2011–12 UCF Information Technology Resource Advisory Committee, email subcommittee
- 2011–12 Budget and Administrative Procedures Committee, UCF Faculty Senate
- 2011–12 Ad-Hoc ADA Compliance and IT Committee, UCF Faculty Senate
- 2011–12 UCF Faculty Senator, UCF Physics
- 2011–12 Chair, Strategic Planning Committee, UCF Physics
- 2011–12 Convenor, Ad-Hoc Soft-Money Career Track Committee, UCF Physics
- 2011 UCF College of Sciences Dean Search Committee
- 2008–12 Chair, Computers and Information Technology Committee, Department of Physics
Supervised departmental system manager and IT services; high-level liason to university IT entities.
- 2008–11 Colloquium Committee, UCF Physics
- 2007–8 Chair, Networking and Infrastructure Committee, Department of Physics
Collected data for, proposed, and oversaw upgrade of building network to gigabit ethernet. Identified and had fixed two severe network bottlenecks that had persisted many years.
- 2007–8 Graduate Recruiting Committee, UCF Physics
Held recruiting events at 2007 DPS conference and at UCF, resulting in 12 planetary PhD applicants, including 2 from MIT, 2 from Cornell, 1 from Caltech.
- 2007–8 Computers and Information Technology Committee, Department of Physics
Successfully proposed departmental computing policy, defining roles of system manager, committee, chair, and faculty meeting; scope of services run by department; and principles of implementation.
- 2007–8 Outreach Committee, UCF Physics
- 2006–7 Web Committee, UCF Physics
Evaluated departmental website needs, estimated costs, and proposed implementation plan.
- 2006–7 Computers and Information Technology Committee, Department of Physics
- At Cornell (service not a formal job component):
- 2003–4 Computer Committee, Department of Astronomy
- 2003–4 System manager, Hewitt Undergraduate Computing Lab, Department of Astronomy
- 2001 Improvements to Astro 105/107 course structure and catalog descriptions
- 2001–6 Atacama Telescope Project: planetary issues advocate, exoplanet key project presentation
- 1998 Atacama Telescope Project site survey expedition
- 1997–9 Computer Committee, Department of Astronomy
- At NASA GSFC (service not a formal job component):
- 1996–7 Computer Security Committee, Laboratory for Extraterrestrial Physics