Jack H. **Madden**

PH.D. IN ASTROPHYSICS FROM CORNELL, MFA STUDENT AT RISD

Rhode Island School of Design, 2 College St. #2459, Providence, RI 02903

@Astro_Madden | jmadden@risd.edu | jmadden.org | JackHMadden | ORCiD 0000-0002-4701-7833

Education

M.F.A. Rhode Island School of Design [current student] — *Providence, Rhode Island*

DIGITAL+MEDIA — *Sept. 2020 - May 2022*

Ph.D. Cornell University - Thesis: The Color of Habitability — *Ithaca, New York*

ASTROPHYSICS - M.S. AWARDED IN 2017 - ADVISED BY DR. LISA KALTENEGGER — *Sept. 2014 - May 2020*

B.A. Franklin and Marshall College — *Lancaster, Pennsylvania*

ASTRONOMY - ADVISED BY DR. FRONEY CRAWFORD III — *Sept. 2010 - May 2014*

Awards, Fellowships, & Residencies

ART

2021	**RISD Museum Dorner Prize**	*RISD*
2021	**Artist Residency at Wendy.Network**	*Virtual*
2021	**Nature Lab Vis-a-thon Collaborator**	*RISD*
2020	**RISD Tuition Fellowship**	*RISD*

SCIENCE

2019	**Brinson Foundation research funding**	*Cornell*
2018	**Branson and Edna B. Shelley Service Award**	*Cornell*
2017	**Center for Teaching Innovation Graduate Research Teaching Fellowship**	*Cornell*
2016	**Branson and Edna B. Shelley Outstanding Teaching Assistant Award**	*Cornell*
2016	**NY Space Grant Fellowship**	*Cornell*
2014	**Honors Societies: Phi Beta Kappa, Sigma Xi, Sigma Pi Sigma**	*F&M*
2013	**Kershner Scholar**	*F&M*
2013	**Micheal J. Mumma Prize in Physics and Astronomy**	*F&M*
2012	**Hackman Summer Research Scholarship**	*F&M*

In Media

11.1.20	**Bringing Exoplanets to Life**, Christian Fogerty	*StarDate Magazine*
10.25.20	**The Color of Habitable Worlds**, Matthew Cimone	*Universe Today*
8.8.20	**Discussed: What If We Lived on a Super Earth? - with Jack Madden**, What If	*YouTube*
5.23.20	**New Planetary Color Models Will Decode Signs Of Extrasolar Life**, Bruce Dorminey	*Forbes*
5.18.20	**Astronomers develop 'decoder' to gauge exoplanet climate**, Blaine Friedlander	*Cornell Chronicle*
3.25.20	**Video game experience or gender may improve VR learning, study finds**, Melanie Lefkowitz	*Cornell Chronicle*
10.7.19	**Leading Lines Podcast Episode 65: Jack Madden and Swati Pandita**, Derek Bruff	*Leading Lines*
7.31.19	**TESS satellite uncovers 'first nearby super-Earth'**, Blaine Friedlander	*Cornell Chronicle*
2.5.19	**Study probes effect of virtual reality on learning**, Linda Glaser	*Cornell Chronicle*
9.19.18	**One (Solar System) catalog to aid them all**, Amber Hornsby	*Astrobites.org*
7.31.18	**This Solar System Catalog Could Be Key to Finding an Earth-Like Exoplanet**, Ryan Mandelbaum	*Gizmodo.com*
7.26.18	**Exoplanet detectives create catalog of 'light-fingerprints'**, Linda Glaser	*Cornell Chronicle*
3.14.18	**Elevator Art Contest Winners**, Melanie Lefkowitz	*Cornell Library*
9.13.12	**F&M Student Discovers Rare Extragalactic Pulsar**, Chris Karlesky	*F&M News*
10.23.12	**F&M student makes rare scientific discovery**, Jere Gish	*WGAL 8 TV*

Art Exhibitions

Solo

2021 **Dorner Prize: Complete Definitions** *RISD Museum*

Group

2021 **NG-17 ISS Test Flight: The Individual** *MoonGallery*
2020 **Pandemic Publishing: Orthodox Nihilism** *volume.1*
2020 **Code as Medium: Books for Robots (only)** *Places Instead*
2020 **Alone/Together** *IncuArts Gallery*

Science Research Experience

Cornell Astronomy and Space Sciences *Ithaca, NY*

Graduate Research Assistant - Dr. Lisa Kaltenegger *Fall 2014 - Summer 2020*

- Calculated and assembled a catalog of spectra and albedos for 19 Solar System objects to be used as references in exoplanet characterization.
- Updated and optimized 1D climate and photochemistry models, and observation simulations for exoplanet use.
- Modeling of the climate and photochemistry of terrestrial exoplanets to determine suitable conditions for life and detectable biosignatures in regard to the effect of surface albedo.
- Modeled the climate and determined the habitability of the planet Gl 357 d.
- Created a database of habitable exoplanet models and high resolution observations for different surfaces types.

Cornell Physics Education Research Lab *Ithaca, NY*

Graduate Research Assistant - Dr. Natasha Holmes *Fall 2018 - Spring 2019*

- Explored the differences in learning outcomes between virtual reality, computer simulation, and hands-on activities for Moon phases.
- Investigated demographic links to learning outcomes by condition.
- Designed and built a full Moon phase demonstration using the Unity game engine for Oculus Rift.

Goddard Spaceflight Center *Greenbelt, MD*

Summer Internship Program - Dr. Lynn Carter & Dr. Catherine Neish *Summer 2013*

- Scanned the entire Moon for lunar impact melts and cataloged their features.
- Discovered 24 new impact melts and updated the global melt statistics.

Franklin and Marshall College *Lancaster, PA*

Undergraduate Research Assistant - Dr. Froney Crawford III *Fall 2010 - May 2014*

- Investigated pulsar candidates in the Small and Large Magellanic clouds using data from the Parkes Multibeam Pulsar Survey and tested image recognition techniques for pulsar identification.
- Discovered PSR J0456-69, one of only 28 known extragalactic pulsars at the time.

Professional Service

SEI Assistantship *RISD*

Assisted with Digital+Media department social equity and inclusion initiatives. *2021*

Co-chair - Cornell Astronomy Department Climate and Diversity Committee *Cornell*

Founding member - coordinated tasks such as a creating a values statement, trainings, and metrics. *2019-2020*

President - Astronomy Graduate Network *Cornell*

Coordinated seminars, speakers, events, and social programing for the astronomy graduates. *2017-2018*

Scientific Visualizations *Cornell/CSI*

Press release imagery, journal covers, and scientific graphic design workshops. *2016-2021*

Emergency Medical Technician - Basic *NY, and PA*

Volunteer on campus and in the community as an EMT. Approx. 3000 hours since 2011 *2011-2020*

Conference Talks

AAS 235 — *Honolulu, HI*

Revealing the importance of surface color in modeling habitable exoplanet atmospheres — *January 2020*

AAS 235 — *Honolulu, HI*

Ready Student One: Exploring the predictors of student learning in virtual reality — *January 2020*

AbGradCon — *University of Utah*

1D Exoplanet Habitability: Now in Technicolor — *July 2019*

ERES V Symposium — *Cornell University*

Effect of surface type for Earth-like planets orbiting FGKM stars — *June 2019*

Breakthrough Starshot Workshop — *Auckland, NZ*

ChipSat Science Cases for Venus and Titan — *March 2019*

Connecting Teaching and Research Conference — *Cornell University*

Virtual Reality as a Teaching Tool for Moon Phases and Beyond — *May 2018*

ERES IV Symposium — *Penn State University*

Solar System Bodies for Exoplanet Comparison — *June 2018*

American Association of Physics Teachers — *Washington D.C.*

Virtual Reality as a Teaching Tool for Moon Phases and Beyond — *July 2018*

Central Pennsylvania Consortium — *Lancaster, PA*

Image recognition to Find Pulsars — *April 2014*

Teaching Experience

Graduate Research Teaching Fellow — *Ithaca, NY*

Cornell University — *Fall 2017 - Spring 2018*

- 2 semesters of pedagogy and teaching as research courses.
- Conducted original education research on VR for physics labs.
- Designed and taught 4 workshops for graduate students on teaching and course management.

Head Teaching assistant — *Ithaca, NY*

Cornell University — *Spring 2016*

- Head teaching assistant for 1 semester. Extensive course management and leading of TA activities.
- Designed and taught 2 discussion sections per week.
  Wrote lesson plans, designed homeworks, and graded.
- Worked with faculty to revamp the policies and procedures for TAs and Head TAs.
- Created an online archive of course material and guides for TAs.

Teaching Assistant — *Ithaca, NY*

Cornell University — *Fall 2014 - Fall 2015*

- 3 semesters of designing and teaching 2 discussion sections per week.
  Wrote lesson plans, designed homeworks, held office hours, review sessions, and graded.

Undergraduate Teaching Assistant — *Lancaster, PA*

Franklin and Marshall College — *Fall 2013 - Spring 2014*

- Teaching assistant for 2 semesters.
  Helped with lectures, wrote assignments, held office hours, and graded.

Tutor and lab instructor — *Lancaster, PA*

Franklin and Marshall College — *Fall 2010 - May 2014*

- Astronomy and physics tutor for 4 years. Covered 1st and 2nd semester physics, astrophysics, and astronomy.
- Lab assistant for 1st, 2nd, and 3rd semester physics, and observational astronomy.

Peer Reviewed Papers

Accepted	L. Coelho, **J. Madden**, L. Kaltenegger, S. Zinder, W. Philpot, M. G. Esquível, J. Canário, R. Costa, W. Vincent, Z. Martins, Color catalogue of life in ice: Surface biosignatures on icy worlds	*Astrobiology*
2020	**J. Madden**, & L. Kaltenegger, High-resolution Spectra for a Wide Range of Habitable Zone Planets around Sun-like Stars	*ApJL*
2020	**J. Madden**, & L. Kaltenegger, How surfaces shape the climate of habitable exoplanets (ADS)	*MNRAS*
2020	L. Kaltenegger, Z. Lin, & **J. Madden**, High-Resolution Transmission Spectra of Earth through Geological Time (ADS)	*ApJL*
2020	**J. H. Madden**, S. Pandita, B. Kim, J. P. Schuldt, A. S. Won & N. G. Holmes, Ready Student One: Exploring predictors for student learning in virtual reality (ADS)	*PLOS ONE*
2019	L. Kaltenegger, **J. Madden**, Z. Lin, S. Rugheimer, A. Segura, R. Luque, E. Pallé, N. Espinoza , The Habitability of GJ 357 d: Possible Climates and Observability (ADS)	*ApJL*
2019	R. Luque **et al.**, Planetary system around the nearby M dwarf GJ 357 including a transiting, hot, Earth-sized planet optimal for atmospheric characterization (ADS)	*A&A*
2018	**J. Madden**, & L. Kaltenegger , A Catalog of Spectra, Albedos, and Colors of Solar System Bodies for Exoplanet Comparison (ADS)	*Astrobiology*
2018	**J. H. Madden**, A. S. Won, J. P. Schuldt, B. Kim, S. Pandita, Y. Sun, T. J. Stone, & N. G. Holmes, Virtual Reality as a Teaching Tool for Moon Phases and Beyond	*PERC Proceedings*
2014	C. Neish, **J. Madden**, L. Carter, B. Hawke, T. Giguere, V. Bray, G. Osinski, & J. Cahill, Global Distribution of Lunar Impact Melt Flows (ADS)	*Icarus*
2013	J. Ridley, F. Crawford, D. Lorimer, S. Bailey, **J. Madden**, R. Anella, & J. Chennamangalam, Eight New Radio Pulsars in the Large Magellanic Cloud (ADS)	*MNRAS*