

# KEVIN SPENCER McCARTHY

## HOME INSTITUTION

Jet Propulsion Laboratory  
California Institute of Technology  
kevin.s.mccarthy@jpl.nasa.gov

## PERMANENT ADDRESS

Pasadena, CA 91103  
(626) 379-5419

## RESEARCH EXPERIENCE

### **NASA Postdoctoral Program (NPP) Fellow: Euclid/Roman Galaxy Clustering**

*JPL/IPAC; Advisors: Dr. Yun Wang (science) & Dr. Daniel Stern (official)* 2021 – present  
Working on Euclid and Roman galaxy clustering, with focus on simulations and modeling in order to mitigate systematics and optimize cosmological analyses. Member of the Euclid Consortium. Collaborator on a proposed Project Infrastructure Team for the Roman Galaxy Redshift Survey.

### **Research Assistant: Observational Cosmology**

*University of Utah, Advisor: Dr. Zheng Zheng* 2016 – 2021

### **Laboratory Supervisor: Fiber-Fed Student Spectrograph Construction**

*University of North Florida, Advisor: Dr. Jane MacGibbon* Spring 2015

### **Research Assistant: Stellar Evolution**

*University of North Florida, Advisor: Dr. Jane MacGibbon* Summer 2014

### **Research Assistant: Computational Neuroscience**

*University of North Florida, Advisor: Dr. John Anderson* Summer 2013

## TEACHING EXPERIENCE

**Warrior Scholar Project, Caltech STEM Bootcamp**, Instructor, Aug. 8-12 2022

**University of Utah, Department of Physics and Astronomy**, TA, 9 semesters 2015-2021

**Salt Lake Community College, School of Science**, Adjunct Professor, Intro. Astro. Fall 2019

**University of North Florida, Department of Physics**, Grader, 6 semesters 2013-2015

**Douglas Anderson School of the Arts, Science**, Teaching Apprentice, 1 year 2012-2013

## EDUCATION

**University of Utah** 2021

*Doctor of Philosophy, Physics, GPA: 3.95*

*Thesis Title: Improving Cosmological Growth-Rate Constraints with Galaxy Clustering*

*Thesis Advisor: Zheng Zheng*

**University of North Florida** 2015

*Bachelor of Science, Physics, Summa Cum Laude*

**Florida State University** 2008

*Bachelor of Science, Marketing*

## PUBLIC OUTREACH

- SURF Seminar Day, The Gee Family Poster Competition, Judge, October 2023, Caltech, Pasadena, CA
- NASA's Universe of Learning, Science Briefing on 'The Mysterious Dark Universe', August 2023, Virtual
- 240th AAS Meeting IPAC Booth, Pasadena Convention Center, June 2022, Pasadena, CA
- Lunar Eclipse Stargazing Event, South Physics Observatory, January 2019, Salt Lake City, UT
- Astronomy Festival, Bryce Canyon National, June 2017, Bryce, UT
- Science Day at the U., South Physics Observatory Assistant, October 2016, Salt Lake City, UT
- Astronomy Presentation for Girl Scout Troop 660, March 2015, Callahan, FL
- Astronomy Information Table at Durbin Creek Elementary Space Night, February 2015, St. Johns, FL

## COMPUTER SKILLS ☞ @KevinMacAstro

Python. C. TensorFlow. Keras. Data mining techniques such as: Gaussian processes, artificial neural networks, singular-value decomposition and principal component analysis, Monte Carlo Markov Chain, and maximum log-likelihood analysis. Adobe XD. Adobe Dreamweaver. HTML. Microsoft Office. LaTeX.

## CONFERENCE PRESENTATIONS AND POSTERS

### Presentations

IPAC Lunch Seminar, Invited Talk, 2023 October, Pasadena, CA

*Preparing for Euclid and Roman Galaxy Redshift Surveys: Galaxy Clustering Models and Observational Systematics*

Euclid Consortium Annual Meeting, 2023 June, Copenhagen, Denmark

*Flash Talk: Line Misidentification with Red Grism Simulations*

Euclid Galaxy Clustering SWG and OU-SPE/SIR/LE3 Meeting, 2023 February, Milan, Italy

*Grism Simulations and Data Analysis*

Euclid Observational Systematics Focus Week, 2022 September, Trieste, Italy

*Update on Key Project Paper IV: Line Misidentifications*

European Astronomical Society Annual Meeting, Invited Talk, 2022 June, Valencia, Spain

*Galaxy Assembly Bias: Beyond HOD?*

Astrophysics Luncheon Seminar, 2021 November, JPL—Caltech, Pasadena, CA

*Improving Cosmological Growth-Rate Constraints with Galaxy Clustering*

The Galaxy-Halo Connection Across Cosmic Time, 2020 August, KITP UC Santa Barbara, CA

*Flash Talk: On the Constraints of Galaxy Assembly Bias in Velocity Space*

MOCK Cosmology Conference, 2020 March, Innsbruck, Austria

*On the Constraints of Galaxy Assembly Bias in Velocity Space*

Assembly Bias Workshop at Tsung-Dao Lee Institute, 2019 June, Shanghai, China

*Constraining Cosmic Growth Rate with Redshift-Space Distortions in the Face of Galaxy Assembly Bias*

MOCK Cosmology Conference, 2019 April, Cordoba, Argentina

*The Effects of Galaxy Assembly Bias on the Inference of Growth Rate from Redshift-Space Distortions*

Graduate School of Computer Science, 2019 March, Salt Lake City, UT

*Decoding the Nature of the Universe with Observational Cosmology*

Physics and Astronomy Department, 2018 April, Salt Lake City, UT

*Ways to Improve our Graduate Environment*

Group Meeting Talk, 2017 October, Salt Lake City, UT

*A Gravitational-Wave Standard Siren Measurement of the Hubble Constant*

Graduate Student Seminar, 2017 December, Salt Lake City, UT

*Machine Learning with Artificial Neural Networks*

AstroCoffee, 2017 October, Salt Lake City, UT

*Attempting to solve Astrophysical Problems with the help of Artificial Neural Networks*

AstroCoffee, 2017 June, Salt Lake City, UT

*Part III: The Properties of Star-Forming Galaxies*

Graduate Research Seminar, 2016 October, Salt Lake City, UT

*Effects of Galaxy Assembly Bias on Redshift-Space Distortions*

### Posters

JPL Postdoc Research Day, 2022 November, Pasadena, CA

*Nonlinear Power Spectrum models for Roman High Latitude Spectroscopic Survey between  $1.0 < z < 1.2$*

Graduate Research Symposium, 2019 April, Salt Lake City, UT

*Measuring Cosmic Growth Rate in Face of Galaxy Assembly Bias*

Data Mining Course, 1st Place, 2018 May, Salt Lake City, UT

*Searching for the galaxy/dark-matter halo connection*

Graduate Research Symposium, Honorable Mention, 2018 March, Salt Lake City, UT

*The Effects of Galaxy Assembly Bias on Redshift-Space Distortions*  
 Summer Research Symposium, 2014 October, Jacksonville, FL  
*Search for the First Stars of the Universe*  
 Summer Research Symposium, 2013 October, Jacksonville, FL  
*Neurosemantic Dynamics: Computational Test of the Effect of Synaptic Clustering*

## ORGANIZATIONAL ROLES

**Workspace Renovation Coordinator**, *University of Utah* 2018-2020  
 Proposed an open work space renovation of the astronomy undergraduate/graduate/faculty offices to Dept. of Physics/Astronomy Chair and University of Utah building administrators. The plan was brought to university architects and the renovation was completed in the summer of 2020.  
**Astronomy Club President**, *University of North Florida*, Elected Position 2014-2015

## GRANTS AND AWARDS

Senior Astronomy Graduate Student Grant: \$11,500 2019  
 First-Year Astronomy Graduate Research Grant: \$6,000 2016  
 Outstanding Graduate TA Award: \$3,000 2015

## REFEREED PUBLICATIONS

- 4) **McCarthy, K.S.**, Zhai, Z., Wang, Y., 2023, MNRAS, Volume 523, Issue 2, 2498  
*Phenomenological power spectrum models for H $\alpha$  emission line galaxies from the Nancy Grace Roman Space Telescope*
- 3) **McCarthy, K.S.**, Zheng, Z., Guo, H., Luo, W., Lin, Y.T., 2022, MNRAS, 509, 380  
*On the constraints of galaxy assembly bias in velocity space*
- 2) **McCarthy, K.S.**, Zheng, Z., Ramirez-Ruiz, E., 2020, MNRAS, 499, 5220  
*Constraining delay time distribution of binary neutron star mergers from host galaxy properties*
- 1) **McCarthy, K.S.**, Zheng, Z., Guo, H., 2019, MNRAS, 487, 2424  
*The effects of galaxy assembly bias on the inference of growth rate from redshift-space distortions*

## PAPERS IN PREPARATION

**McCarthy, K.S.**, Zhai, Z., Wang, Y.  
*Cosmological forecasts for Roman High Latitude Spectroscopic: power spectrum + bispectrum*  
 Euclid Collaboration: **McCarthy, K.S.**, Walth, G., Wang, Y., Troja, A., Jullo, E., Scodeggio, M.  
*Euclid preparation. TBD. line-of-sight systematic effects I: red grism simulations*