

KEVIN SPENCER McCARTHY

HOME INSTITUTION

University of Tokyo
Kavli Institute for the Physics and Mathematics of the Universe
5 Chome-1-5 Kashiwanoha, Kashiwa, Chiba, 277-8583, Japan
kevin.mccarthy@ipmu.jp
<https://kevinmacastro.github.io/>

PERMANENT ADDRESS

Nagareyama, Chiba
270-0101, Japan
+81-070-3985-3850

EDUCATION

University of Utah <i>Doctor of Philosophy, Physics</i> Thesis Title: Improving Cosmological Growth-Rate Constraints with Galaxy Clustering Thesis Advisor: Zheng Zheng	2021
University of North Florida <i>Bachelor of Science, Physics, Summa Cum Laude</i>	2015
Florida State University <i>Bachelor of Science, Marketing</i>	2008

RESEARCH EXPERIENCE

Postdoctoral Project Researcher: Prime Focus Spectrograph Galaxy Evolution Survey
University of Tokyo, Kavli IPMU; Advisors: Dr. Khee-Gan Lee 2024 – present
Presently constructing the Lyman-Break Galaxy auto-correlation galaxy clustering measurement and modeling pipeline for the Prime Focus Spectrograph Subaru Strategic Program Galaxy Evolution Survey to produce state-of-the-art constraints on galaxy bias and growth-rate of large-scale structure at $z \sim 3$.

NASA Postdoctoral Program (NPP) Fellow: Euclid/Roman Galaxy Clustering
JPL/IPAC; Advisors: Dr. Yun Wang (science) & Dr. Daniel Stern (official) 2021 – 2024
Lead a key preparation paper for the *Euclid* Consortium, performing an end-to-end simulation of the *Euclid* Wide Survey to analysis key observational systematics expected to impact the cosmological clustering analysis performed with slitless grism spectroscopy. Characterized phenomenological nonlinear power spectrum models for the upcoming Roman Galaxy Redshift Survey. Collaborator on the Roman Galaxy Redshift Survey Project Infrastructure Team.

Research Assistant: Observational Cosmology
University of Utah, Advisor: Dr. Zheng Zheng 2016 – 2021
Quantified halo occupation distribution (HOD) modeling systematics associated with extracting cosmological information from small-scales in the face of galaxy assembly bias and searched for an assembly bias signal in the galaxy clustering signal of the SDSS redshift survey.

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

OBSERVING EXPERIENCE

Subaru Telescope – Prime Focus Spectrograph PI: Tanaka
[12 nights (Classical), 2025-Present] Remote observations for the Subaru Strategic Program (Kavli IPMU, NAOJ Mitaka, and Subaru Hilo Basecamp), sometimes serving as Night Observing Manager.

Subaru Telescope – Prime Focus Spectrograph PI: Lee
[1 night (Classical), 2025]

Palomar Observatory – Hale 200-inch Telescope, Double Spectrograph PI: McCarthy/Stern
[6 nights (Classical), 2024] Conducted optical spectroscopy of Euclid NISP-selected galaxies, confirming redshifts for VIS-dropout/high redshift AGN and presence of strong lensing candidates. Responsibilities included observing strategy, instrument setup, slitmask configuration, and real-time quality assessment.

RESEARCH PROPOSALS

Blind to 100,000 Strong Lenses: Spectroscopic Analysis with SLETE, a Strong Lens Extraction Tool for *Euclid* PI: Andreas Faisst, Caltech/IPAC

NASA ROSES; Co-Investigator; Awarded, 2025 – 2027

The Subaru-PFS/Roman (SuPR) Deep Survey: Spectroscopy for Roman Cosmology and Beyond PI: Jeffrey Newman, University of Pittsburgh

Roman-Subaru Synergistic Observations Program; Co-Investigator; Selected, 2026

TEACHING EXPERIENCE

Warrior Scholar Project, Caltech STEM Bootcamp , Instructor, Aug.	2024
Warrior Scholar Project, Caltech STEM Bootcamp , Instructor, Aug.	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

ORGANIZATIONAL ROLES

LOC Logistics Coordinator, 'Beyond 2pt' Workshop, University of Tokyo, Kavli IPMU	2025
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

Aspen Center for Physics Workshop Grant (Simons Foundation): \$1,400	2025
Senior Astronomy Graduate Student Grant: \$11,500	2019
First-Year Astronomy Graduate Research Grant: \$6,000	2016
Outstanding Graduate TA Award: \$3,000	2015

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

RESEARCH TALKS

Euclid Consortium Meeting, Kyoto, Japan, 26/03

Conducting a Cosmological Survey with Slitless Spectroscopy

Extragalactic Seminar, University of Hawai'i, Honolulu, Hawai'i, USA, 25/11

Observational Systematics with Slitless Spectroscopy

Subaru Seminars, Subaru Telescope, Hilo, Hawai'i, USA, 25/11

Observational Systematics and the Spectroscopic View of Large-Scale Structure

Beyond Two-Point Statistics Meets Survey Systematics Workshop, Chiba, Japan, 25/09

Interlopers in the Euclid Wide Survey

Astro Lunch, Kavli IPMU, Chiba, Japan, 25/07

Euclid and the Challenge of Slitless Spectroscopy

Euclid Consortium Annual Meeting (Flash Talk), Rome, Italy, 24/06

Observational Systematics in the Wide Survey

IPAC Lunch Seminar (Invited), IPAC/Caltech, Pasadena, CA, USA, 23/10

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

Greater IPAC Science Symposium, IPAC/Caltech, Pasadena, CA, USA, 23/09

Characterizing Observational Systematics with Euclid Red Grism Simulations

Euclid Consortium Annual Meeting (Flash Talk), Copenhagen, Denmark, 23/06

Line Misidentification with Red Grism Simulations

Euclid US Meeting, Pasadena, CA, USA, 23/05

Phenomenological Power Spectrum Models for H α Emission Line Galaxies, $1.0 < z < 2.0$

Euclid Galaxy Clustering SWG and OU-SPE/SIR/LE3 Meeting, Milan, Italy, 23/02

Grism Simulations and Data Analysis

Euclid Observational Systematics Focus Week, Trieste, Italy, 22/09

Update on Key Project Paper IV: Line Misidentifications

European Astronomical Society Annual Meeting (Invited Talk), Valencia, Spain, 22/06

Galaxy Assembly Bias: Beyond HOD?

Astrophysics Luncheon Seminar, NASA JPL, Pasadena, CA, USA, 21/11

Improving Cosmological Growth-Rate Constraints with Galaxy Clustering

The Galaxy-Halo Connection Across Cosmic Time (Flash Talk), KITP UC, Santa Barbara, CA, USA, 20/08

On the Constraints of Galaxy Assembly Bias in Velocity Space

MOCK Cosmology Conference, Innsbruck, Austria, 20/03

On the Constraints of Galaxy Assembly Bias in Velocity Space

Assembly Bias Workshop, Tsung-Dao Lee Institute, Shanghai, China, 19/06

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

MOCK Cosmology Conference, Cordoba, Argentina, 19/04

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

Graduate School of Computer Science, University of Utah, Salt Lake City, UT, USA, 19/03

Decoding the Nature of the Universe with Observational Cosmology

Physics and Astronomy Department, University of Utah, Salt Lake City, UT, USA, 18/04

Ways to Improve Our Graduate Environment

Graduate Student Seminar, University of Utah, Salt Lake City, UT, USA, 17/12

Machine Learning with Artificial Neural Networks

Group Meeting Talk, University of Utah, Salt Lake City, UT, USA, 17/10

A Gravitational-Wave Standard Siren Measurement of the Hubble Constant

AstroCoffee, University of Utah, Salt Lake City, UT, USA, 17/10

Attempting to Solve Astrophysical Problems with the Help of Artificial Neural Networks

AstroCoffee, University of Utah, Salt Lake City, UT, USA, 17/06

Part III: The Properties of Star-Forming Galaxies

Graduate Research Seminar, University of Utah, Salt Lake City, UT, USA, 16/10

Effects of Galaxy Assembly Bias on Redshift-Space Distortions

POSTERS

- Beyond-two-point Statistics Meet Survey Systematics Workshop, Chiba, Japan, 25/09
Higher Order Statistics with Slitless Spectroscopy
- World Premier International Site-Visit (Invited), Kavli IPMU, Chiba, Japan, 25/07
Actualizing the Prime Focus Spectrograph Subaru Strategic Program
- Workshop on the Physics and the Mathematics of the Universe, Chiba, Japan, 25/07
Euclid and the Challenge of Slitless Spectroscopy
- Postdoc Research Day, NASA JPL, Pasadena, CA, USA, 23/11
Characterizing Observational Systematics for the Euclid Wide Spectroscopic Survey
- Postdoc Research Day, NASA JPL, Pasadena, CA, USA, 22/11
Nonlinear Power Spectrum models for Roman High Latitude Spectroscopic Survey between $1.0 < z < 1.2$
- Graduate Research Symposium, University of Utah, Salt Lake City, UT, USA, 19/04
Measuring Cosmic Growth Rate in Face of Galaxy Assembly Bias
- Data Mining Course Poster Competition (1st Place), University of Utah, Salt Lake City, UT, USA, 18/05
Searching for the galaxy/dark-matter halo connection
- Graduate Research Symposium (Honorable Mention), University of Utah, Salt Lake City, UT, USA, 18/03
The Effects of Galaxy Assembly Bias on Redshift-Space Distortions
- Summer Research Symposium, University of North Florida, Jacksonville, FL, USA, 14/10
Search for the First Stars of the Universe
- Summer Research Symposium, University of North Florida, Jacksonville, FL, USA, 13/10
Neurosemantic Dynamics: Computational Test of the Effect of Synaptic Clustering

REFEREED PUBLICATIONS © 0000-0001-6857-018X

- 16) Euclid Collaboration; **McCarthy, K.S.**, Walth, G., Wang, Y., Stern, D., Monaco, P., Passalacqua, F., ..., 2026, internal review with ECEB
Euclid preparation. Mock Euclid Wide Survey observation with pixel-level simulations: redshift errors, interlopers, and spectral contamination
- 15) Liu, J., ... (and **McCarthy, K.S.**), 2026, pre-print arXiv:2607.25881
AI's Capability in Assisting Scientific Research in Physics, Astrophysics, and Cosmology II: Project Planning and Proposal Evaluation
- 14) Hell, A., ... (and **McCarthy, K.S.**), 2026, pre-print arXiv:2607.25672
AI's Capability in Assisting Scientific Research in Physics, Astrophysics, and Cosmology I: Literature Review
- 13) Euclid Collaboration; Passalacqua, F., ... (and **McCarthy, K.S.**), 2026, pre-print arXiv:2606.24697
Euclid preparation. First investigation of the impact of cross-contamination on spectroscopic redshift measurements with pixel-level simulations
- 12) Euclid Collaboration; Monaco, P., ... (and **McCarthy, K.S.**), 2025, pre-print arXiv:2511.20856
Euclid preparation. XCII. Controlling angular systematics in the Euclid spectroscopic galaxy sample
- 11) Euclid Collaboration; Rojas, K., ... (and **McCarthy, K.S.**), 2026, A&A, Volume 711, A27
Euclid Quick Data Release (Q1): XXVII. The Strong Lensing Discovery Engine B – Early strong lens candidates from visual inspection of high-velocity dispersion galaxies
- 10) Euclid Collaboration; Risso, I., ... (and **McCarthy, K.S.**), 2026, A&A, Volume 707, A233
Euclid preparation. LXXXIII. The impact of redshift interlopers on the two-point correlation function analysis
- 9) Euclid Collaboration; Monaco, P., ... (and **McCarthy, K.S.**), 2025, A&A, Volume 704, A306
Euclid preparation. LXXVI. Simulating thousands of Euclid spectroscopic skies
- 8) Euclid Collaboration; Bañados, E., ... (and **McCarthy, K.S.**), 2025, MNRAS, Volume 542, Issue 2, 1088
Euclid: The potential of slitless infrared spectroscopy: A $z=5.4$ quasar and new ultracool dwarfs
- 7) Euclid Collaboration; Nagam, B. C., ... (and **McCarthy, K.S.**), 2025, A&A, Volume 702, A130
Euclid: Finding strong gravitational lenses in the Early Release Observations using convolutional neural networks

- 6) Euclid Collaboration; Mellier, Y., ... (and **McCarthy, K.S.**), 2025, A&A, Volume 697, A1, 94
Euclid: I. Overview of the Euclid mission
- 5) Li, G., ... (and **McCarthy, K.S.**), 2025, ApJ, Volume 981, Issue 2, 104, 19
Searching for Low-redshift Hot Dust-obscured Galaxies
- 4) **McCarthy, K.S.**, Zhai, Z., Wang, Y., 2023, MNRAS, Volume 523, Issue 2, 2498
Phenomenological power spectrum models for H α 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

COMPUTER SKILLS ☯ @KevinMacAstro

Python, C, Grizli, TensorFlow, PyTorch, Keras, Adobe Dreamweaver (HTML), Microsoft Office, LaTeX, HuggingFace large-language models, Gaussian processes, artificial neural networks, singular-value decomposition and principal component analysis, Monte Carlo Markov Chain, and maximum log-likelihood analysis.