Melodie Kao

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Education

02/2011	SB, Physics	MIT, Concentration: Architecture
06/2013	MS, Astrophysics	Caltech
06/2017	PhD, Astrophysics	Caltech, Advisor: Gregg Hallinan

Appointments

Fall 2022	Invited Programme Visitor	INI: Frontiers in Dynamo Theory
09/2021 - Present	Heising-Simons 51 Pegasi b Fellow	UCSC, Mentor: Jonathan Fortney
08/2018 - 08/2021	NASA Hubble Fellow	ASU, Mentor: Evgenya Shkolnik
10/2017 - 08/2018	Postdoctoral Researcher	ASU, Mentor: Evgenya Shkolnik

Funding & Honors (~$1.78M)

2021	$375k	51 Pegasi b Postdoctoral Fellowship
2021	$300k	NSF Postdoctoral Fellowship (declined)
2021	$300k	ASU Exploration Postdoctoral Fellowship (declined)
(delayed, Covid-19)	£3000	Isaac Newton Institute (INI) Simons Fellowship
2019	$171k	HST General Observer Grant (joint with J. Vos, J. S. Pineda)
2018	$309k	NASA Hubble Postdoctoral Fellowship
2018	$300k	ASU Exploration Postdoctoral Fellowship (declined)
2017	$18.2k	NRAO Grote Reber Doctoral Fellowship
2008	$3000	MIT Program on Human Rights and Justice Grant

Selected Talks

TBD	Invited	Jet Propulsion Laboratory (JPL) Colloquium
01/2022	Invited	McGill Space Institute Seminar
11/2021	Invited	CU Boulder Astrophysical & Planetary Sciences Colloquium
11/2021	Invited	Berkeley Center for Integrative Planetary Science Seminar
4/2021	Invited	MIT Exoplanet Seminar
4/2021	Invited	SOFIA Colloquium
4/2021	Invited	CU Boulder Seminar
2/2021	Invited	Royal Observatory of Edinburgh Colloquium
12/2020	Invited	NYU Seminar
11/2020	Invited	Arizona State University Colloquium
(delayed, Covid-19)	Invited	Lorentz Center Workshop: Life Around a Radio Star
(delayed, Covid-19)	Invited	Cool Stars: Manifestations of Star-Planet Interactions
02/2020	Invited	Haverford College Physics & Astronomy Colloquium
12/2019	Invited	American Geophysical Union Fall Meeting
10/2019	Invited	St. Mary's College of Maryland Colloquium
10/2019	Invited	Boston University, Space Physics Seminar
08/2019	Contributed	Extreme Solar Systems (plenary)
05/2019	Invited	Lowell Observatory Colloquium
04/2019	Invited	American Museum of Natural History Seminar
03/2019	Invited	NRAO Charlottesville Colloquium
03/2018	Invited	Radio Exploration of Planetary Habitability
10/2016	Invited	Harvard CfA Stars and Planets Seminar
10/2016	Invited	MIT Exoplanet Seminar

ngVLA Advocacy

03/2018	Invited	talk: Very Long Baseline Interferometry Futures Meeting
06/2019	Contributed	talk: Radio/mm Frontiers in the Next Decade
03/2019	Co-lead	white paper: Decadal 2020

Selected Awarded Telescope Proposals

VLA 2020B	109	hr	PI
VLBA+VLA 2020A	13.5	hr	PI
VLA 2019B	17.2	hr	PI
HST Cycle 27	16	orbits	Co-I, equal effort (PI J. Vos, Co-I J. S. Pineda)
HSA 2019A	28	hr	PI, coordinated VLA + VLBA + GBT + Effelsberg
VLA 2019A	17	hr	PI
VLA 2018B	10.2	hr	PI
VLA 2018B	27	hr	Co-I (PI J. S. Pineda)
VLA 2018A	76	hr	PI
VLA 2017B	44	hr	PI
VLA 2016A	66	hr	PI

Selected Advising & Mentoring

Research advisor	Tyler Richey-Yowell (ASU, 2nd-year project)
Committee member	Shivam Sadachar (ASU, senior creative project)
Undergrad mentoring	Jarrod McWilliams, Alana Thompson (SMCM)
Graduate mentoring	Anna Ho, Josh Lieber, Marta Bryan, Io Kleiser, Masha Klescheva (Caltech)

Invited Workshops

(Materials available at: www.melodiekao.com/toolkit)

2020 **Navigating Interpersonal Boundaries**
Haverford College

2019, 2021 **Collaborative Conflict Management**
St. Mary's College of Maryland

Setting Personal Boundaries
Dartmouth, Princeton, CUNY, STScI, NRAO Charlottesville & Socorro, CU Boulder, Caltech (volunteer, not invited)

Selected Teaching

2021 – Present **Professional Backpacking Guide** (Andrew Skurka Adventures)
Co-guide — multi-day skills-based backpacking trips

2019 – 2020 **Wilderness Astronomy** (ASU)
Co-Instructor, course co-creator — lecture, flipped classroom, & experiential with 7-day backpacking capstone

2014 – 2016 **Tango Initiative Immersion Program** (Caltech)
Program director & head TA — integrated boundary-setting, dance, music

Fall 2012 **Undergrad Relativistic Physics**
Graduate TA (Prof. Sterl Phinney) — lecture format

Winter 2013 **Basic Astro & the Galaxy** (Caltech)
Head TA (Prof. John Johnson) — flipped classroom format

Selected Academic Service

Ongoing	Nordita Program for Star-Planet Interactions 2023 Co-Organizer
Ongoing	National Radio Astronomy Observatory User Committee
Ongoing	Science Review Panelist (NASA, NRAO, STScI, NSF)
Ongoing	Reviewer (ApJ, ApJL, PASP, A&A, Nature Astronomy, MNRAS)
Ongoing	Co-founder of cross-institutional Magnetism & Equity (MagE) Journal Club
2020	Co-lead for Hubble Fellowship Equitable Application Evaluation Processes
2018	Astro 2020 Decadal Survey Early Career Focus Session
2017	AAS Congressional Visits Day

Selected Professional Development

2022	Cultivating Emotional Balance Teacher Training[1]
Spring 2021	Inquiry-based Teaching
Fall 2020	Followership CONNECT Course (for teaching followership skills)
Nov 2019	NASA Principle Investigator Launchpad
2018, 2019	ASU Exploration Learning Workshops I & II
01/2019	AAS Teaching for Equity Workshop
01/2019	AAS Teaching Science Thought & Practices Weekend Intensive
07/2018 – 11/2018	Brilliance Coaching[2] Academy (450+ hours of practicum training)
Fall 2015	Principles of University Teaching & Learning in STEM (full quarter course)
03/2015 – 06/2016	UCLA Mindful Awareness Research Center classes

Significant Author Publications (^graduate student paper * non-refereed)

1. ^T. Richey-Yowell, **M. Kao**, et al. "On the Correlation between L Dwarf Optical and Infrared Variability and Radio Aurorae." *ApJ*, 903, 74. 2020
2. **M. Kao** & E. Shkolnik. "The Occurrence Rate of Quiescent Radio Emission for Ultracool Dwarfs using a Semi-Analytical Bayesian Framework." Submitted; under revision.
3. **M. Kao** & J.S. Pineda. "Radio Emission from Binary Ultracool Dwarf Systems" Submitted, under revision.
4. **M. Kao** & J.S. Pineda. "Binarity Enhances the Occurrence Rate of Quiescent Radio Emission in Ultracool Dwarfs." Submitted.
5. **M. Kao** & E. Shkolnik. "The Role of Age in Brown Dwarf Magnetism: A Survey of Radio Emission in Young Brown Dwarfs." In draft.
6. ***M. Kao**, J.S. Pineda, et al. "Magnetism in the Brown Dwarf Regime." *BAAS Astro2020 Decadal Survey*, science white papers, 51, 484. 2019.
7. **M. Kao**, et al. "Constraints on Magnetospheric Radio Emission from Y Dwarfs." *MNRAS*, 487, 1994. 2019.
8. **M. Kao**, et al. "The Strongest Magnetic Fields on the Coolest Brown Dwarfs." *ApJS*, 237. 2018.
9. **M. Kao**, et al. "Auroral Radio Emission from Late L and T Dwarfs: A New Constraint on Dynamo Theory in the Substellar Regime." *ApJ*, 818, 24. 2016.
10. K. Cooksey, **M. Kao**, et al. "Precious Metals in SDSS Quasar Spectra I: Tracking the Evolution of Strong, $1.5 < z < 4.5$ C IV Absorbers with Thousands of Systems." *ApJ*, 763, 37. 2013.

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[1] https://cultivating-emotional-balance.org/teacher-training/

[2] see the white paper by Dr. Lucianne Walkowicz (Adler Planetarium), who received coaching as a TED Fellow, to learn more about the efficacy of coaching techniques: https://arxiv.org/abs/1805.09963

Co-Author or Collaborator Publications (* non-refereed)

1. *Osten, R. et al., incl. **M. Kao**. "Advancing Understanding of Star-Planet Ecosystems in the Next Decade: The Radio Wavelength Perspective." *BAAS Astro2020 Decadal Survey*, science white papers, 51, 434. Mar 2019.
2. J. S. Pineda, G. Hallinan & **M. Kao**. "A Panchromatic View of Brown Dwarf Aurorae." *ApJ*, 846, 75. 2017.
3. J. S. Pineda, et al., incl. **M. Kao**. "A Survey for Auroral Hα Emission from Late L and T Dwarfs." *ApJ*, 826, 73. Jul 2016.
4. G. Hallinan, et al. incl. **M. Kao**. "Magnetospherically Driven Optical and Radio Aurorae at the End of the Stellar Main Sequence." *Nature*, 523, 568. 2015.
5. H. Knutson, et al., incl. **M. Kao**. "Friends of Hot Jupiters. I. A Radial Velocity Search for Massive, Long-period Companions to Close-in Gas Giant Planets." *ApJ*, 785, 126. 2014.
6. E. Seyffert, et al., incl. **M. Kao**. "Precious Metals in SDSS Quasar Spectra II: Tracking the Evolution of Strong $0.4 < z < 2.3$ Mg II Absorbers with Thousands of Systems." *ApJ*, 779, 161. 2013.
7. N.K. Lewis, et al., incl. **M. Kao**. "Orbital Phase Variations of the Eccentric Giant Planet Hat-P-2b." *ApJ*, 766, 95. 2013.
8. R. Simcoe, et al., incl. **M. Kao**. "Extremely Metal-Poor Gas at a Redshift of 7." *Nature*, 492, 79. 2012.