

# Melodie Kao

ASU School of Earth & Space Exploration  
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<b>Education</b>	02/2011	SB, Physics	MIT, Concentration: Architecture
	06/2013	MS, Astrophysics	Caltech
	06/2017	PhD, Astrophysics	Caltech, Advisor: Gregg Hallinan

## Appointments

(delayed, Covid-19)	Invited Programme Visitor	INI: Frontiers in Dynamo Theory
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

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
05/2017	Invited	NRAO Wednesday Seminar
10/2016	Invited	Harvard CfA Stars and Planets Seminar
10/2016	Invited	MIT Exoplanet Seminar
10/2015	Contributed	Magnetospheres of Outer Planets

## 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, 2 <sup>nd</sup> -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](http://www.melodiekao.com/toolkit))

2020	<b>Navigating Interpersonal Boundaries</b> <i>Haverford College</i>
2019	<b>Collaborative Conflict Management</b> <i>St. Mary's College of Maryland</i>
	<b>Setting Personal Boundaries</b> <i>Princeton, CUNY, STScI, NRAO Charlottesville, NRAO Socorro</i> <i>Caltech (volunteer, not invited)</i>

## Selected Teaching

Spring 2019 – 2021	<b>Wilderness Astronomy</b> (ASU) <i>Co-Instructor, course co-creator</i> — lecture, flipped classroom, & experiential with 7-day backpacking capstone
2014 – 2016	<b>Tango Initiative Immersion Program</b> (Caltech) <i>Program director &amp; head TA</i> — integrated boundary-setting, dance, music
Fall 2012	<b>Undergrad Relativistic Physics</b> <i>Graduate TA (Prof. Sterl Phinney)</i> — lecture format
Winter 2013	<b>Basic Astro &amp; the Galaxy</b> (Caltech) <i>Head TA (Prof. John Johnson)</i> — flipped classroom format

## Selected Academic Service

Ongoing	Co-lead for Hubble Fellowship Equitable Application Evaluation Processes
Ongoing	Science Review Panelist (NASA, NRAO, STScI, NSF)
Ongoing	Reviewer (ApJ, ApJL, PASP, A&A, Nature Astronomy, MNRAS)
2019	Co-founder of cross-institutional Magnetism & Equity (MagE) Journal Club
2018	Astro 2020 Decadal Survey Early Career Focus Session
2017	AAS Congressional Visits Day

## Selected Professional Development

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 <sup>1</sup> 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 (<sup>^</sup>graduate student paper \* non-refereed)

1. <sup>^</sup>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 to *ApJ*, Jul 2020.
3. **M. Kao** & J.S. Pineda. “Binarity Enhances the Occurrence Rate of Quiescent Radio Emission in Ultracool Dwarfs.” Submitted to *ApJ*, Aug 2020.
4. **M. Kao** & E. Shkolnik. “The Role of Age in Brown Dwarf Magnetism: A Survey of Radio Emission in Young Brown Dwarfs.” In draft, to be submitted Fall 2020.
5. \***M. Kao**, J.S. Pineda, et al. “Magnetism in the Brown Dwarf Regime.” *BAAS Astro2020 Decadal Survey*, science white papers, 51, 484. 2019.
6. **M. Kao**, et al. “Constraints on Magnetospheric Radio Emission from Y Dwarfs.” *MNRAS*, 487, 1994. 2019.
7. **M. Kao**, et al. “The Strongest Magnetic Fields on the Coolest Brown Dwarfs.” *ApJS*, 237. 2018.
8. **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.
9. 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.

## 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 H $\alpha$  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.

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<sup>1</sup> 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>

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.