Melodie Kao

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Education

02/2011	SB, Physics	MIT, Minor Focus: Architecture
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 (~$805k)

(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 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 Talks

04/2021	Invited	MIT Exoplanet Seminar
04/2021	Invited	SOFIA Colloquium
02/2021	Invited	Royal Observatory, 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 Advising & Mentoring

10/2018 – 09/2020	*Research advisor,* Tyler Richey-Yowell (ASU, 2nd-year project)
09/2020 – 05/2021	*Committee member for Senior Creative Project,* Shivam Sadachar (ASU)
07/2019 – 07/2020	*Postdoc mentor,* Joshua Lieber (Caltech)
06/2019 – 07/2020	*Postdoc mentor,* Anna Ho (Caltech)
01/2018 – 05/2018	*Postdoc mentor,* Masha Klescheva (Caltech)
10/2012 – 05/2015	*Peer mentor,* Io Kleiser (Caltech), Marta Bryan (Caltech)

Invited Workshops

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

2020 **Navigating Interpersonal Boundaries**
Haverford College

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

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

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

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[1] 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

Selected Teaching

Spring 2019 – 2021 **Wilderness Astronomy** (ASU)
Co-Instructor, course co-creator — lecture, flipped classroom, & experiential with 7-day backpacking component

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

[1] 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

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 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 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.