

# ERIC W. KOCH

POSTDOCTORAL FELLOW, SMITHSONIAN ASTROPHYSICAL OBSERVATORY

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## EXPERTISE & SKILLS

- **Leadership & Communication**
  - **Expertise in radio interferometry**
  - **Open-source astronomical software development**
    - Co-lead and developer of open-source packages for astronomy: [radio-astro-tools](#), [TurbuStat](#), [FilFinder](#) – widely used in >100 independent publications
    - Processing and archiving for large astronomical data – Data Lead for the Local Group L-band Survey ([lglbs.org](https://lglbs.org))
  - **Novel research on star formation and interstellar medium**
    - Awarded \$650,000 in grants (\$275,000 as research fellowships)
    - Authored 67 peer-reviewed publications with >3,800 citations (as of 09/24)
    - 17 observing programs as PI (>500 h) and >40 as co-I (>3000 h; incl. ALMA, VLA, VLBA, HST, JWST)
  - **22 observing programs as PI (>800 h) and >40 as co-I (>3000 h) awarded through competitive review (ALMA, SMA, GBT, VLA, e-MERLIN, VLT, VLBA, HST, JWST, MeerKAT, NOEMA)**
  - **Co-lead and developer of open-source packages for astronomy: [radio-astro-tools](#), [TurbuStat](#), [FilFinder](#) – widely used in >100 independent publications**
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## RESEARCH POSITIONS

### Center for Astrophysics | Harvard & Smithsonian

Oct 2020 - Present

- Submillimeter Array Postdoctoral Fellow (2020-Present)
    - Independent postdoctoral researcher
    - SMA observatory support (observer; proposal preparation; analysis and calibration software; assistance planning and pursuing external funding)
  - National Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellow (2022-2024)
  - Director, [Seamless Astronomy](#) (2023 - Present)
    - Institute for linking scientific data, publications, and communities
    - Lead community building across data science and software development groups at the Center for Astrophysics: [seamlessastronomy.org](https://seamlessastronomy.org)
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## EDUCATION

### University of Alberta | PhD in Physics

2016-2020

- Advisor: Erik Rosolowsky
  - Thesis: Connecting galactic to local scales in the neutral interstellar medium across the Local Group
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- Advisor: Erik Rosolowsky
- Thesis: The Atomic Interstellar Medium in M33

## FUNDING & GRANTS AWARDED

Awarded 5 grants as PI/co-PI (\$95,000) and 4 as co-I (\$275,000).

### As PI or co-PI:

- Reproducible & Accessible Sub-mm Science Tutorials: Unlocking the vast SMA archive 2024  
 Smithsonian Scholarly Studies Program **\$46,066**  
 ➤ co-PI with G. Keating
- Unmixing the ISM: Identifying Dominant Physical Effects with JWST/MIRI Mapping of M33  
 JWST Cycle 2 GO-3436 **\$65,000** 2024
- Spatio-spectral modeling of ALMA data cubes: Insights and Challenges for ALMA-2030  
 NAASC Workshop Funding **\$24,000** 2024  
 ➤ SOC Chair and lead organizer for a community workshop on open-source software for radio interferometry
- Linking the Resolved Filamentary Molecular ISM to Massive Star Formation across M33  
 NRAO Student Observing Support **\$20,670** 2023-2024  
 ➤ Supported undergraduate researchers C. Carreira and S. Prasad for observations from 2022.1.00403.S
- Molecular Gas in the Milky Way analog NGC 891 2021  
 Smithsonian Scholarly Studies Program **\$27,932**  
 ➤ co-PI with D. Wilner

### As co-I:

- An Operational Cloud-based Prototype of the CfA Nexus: Implementation of Multi-wavelength Use Cases  
 SI Innovation Funds – PI: R. Martinez-Galarza **\$64,905** 2023  
 ➤ Supporting integration of SMA data and science use cases
- The influence of superbubble feedback on molecular gas and star formation across galactic environments  
 Smithsonian Scholarly Studies Program – PI: C. Lada **\$10,635** 2023  
 ➤ (Partially) supported summer research for students A. Medina, T. Sonnenberg, and A. Angress
- Linking CASA to the astropy ecosystem  
 ALMA Development Study - Cycle 7 – PI: A. Ginsburg **\$199,905** 2021  
 ➤ Co-lead of radio-astro-tools project  
 ➤ Created pedagogical, online python tutorials for radio astronomy

## SELECTED AWARDS

- NSERC Postdoctoral Fellowship | Smithsonian Astrophysical Observatory 2022-2024  
 Submillimeter Array Postdoctoral Fellowship | Smithsonian Astrophysical Observatory 2020-  
 Jansky Fellowship | NRAO (*Declined*) 2020  
 Alberta Graduate Excellence Scholarship | University of Alberta 2020  
 Andrew Stewart Memorial Graduate Prize | University of Alberta 2019

NSERC Alexander Graham Bell Canada Graduate Scholarship - Doctorate   University of Alberta	2017-2019
Queen Elizabeth II Graduate Scholarship - Masters   University of Alberta	2015
NSERC Alexander Graham Bell Canada Graduate Scholarship - Masters   University of Alberta	2014
Distinguished Graduate Award - Physics, Math, Statistics & Computer Science   UBC Okanagan	2014
Top Oral Presenter - UBC-O Undergraduate Research Conference   UBC Okanagan	2013
Upper Year Physics Award - Physics, Math, Statistics & Computer Science   UBC Okanagan	2014
Deputy Vice Chancellor Scholarship   UBC Okanagan	2010-2014
President's Entrance Scholarship   UBC Okanagan	2010

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## PUBLICATIONS

Authored 67 refereed publications with >3,800 citations. Full publication library is available on [ADS](#).

- 8 lead author/equal lead contributor (>300 citations)
- 4 papers currently under review

### Publications as Lead Author:

1. **Koch** et al. 2021. *MNRAS*, 504, 1801. [A lack of constraints on the cold opaque H I mass: H I spectra in M31 and M33 prefer multicomponent models over a single cold opaque component](#)
2. **Koch** et al. 2020. *MNRAS*, 492, 2663. [Spatial power spectra of dust across the Local Group: No constraint on disc scale height](#)
3. **Koch** et al. 2019. *AJ*, 158, 1. [TURBUSTAT: Turbulence Statistics in Python](#)
4. **Koch** et al. 2019. *MNRAS*, 485, 2324. [Relationship between the line width of the atomic and molecular ISM in M33](#)
5. **Koch** et al. 2018. *MNRAS*, 480, 3193. [Kinematics of the atomic ISM in M33 on 80 pc scales](#)
6. **Koch** et al. 2017. *MNRAS*, 471, 1506. [Identifying tools for comparing simulations and observations of spectral-line data cubes](#)
7. **Koch** & Rosolowsky 2015. *MNRAS*, 452, 1506. [Filament identification through mathematical morphology](#)
8. **Koch** et al. 2014. *MNRAS*, 442, 372. [The 2013 outburst of a transient very faint X-ray binary, 23 arcsec from Sgr A\\*](#)

### Selected Co-authored Publications:

9. Peltonen et al. 2024. *MNRAS*, in press. [JWST reveals star formation across a spiral arm in M33](#)
  10. Eibensteiner et al. 2023. *A&A*, 675, 37. [Kinematic analysis of the super-extended H I disk of the nearby spiral galaxy M 83](#)
  11. Sandstrom, **Koch** et al. 2023. *ApJL*, 944, L8. [PHANGS-JWST First Results: Tracing the Diffuse Interstellar Medium with JWST Imaging of Polycyclic Aromatic Hydrocarbon Emission in Nearby Galaxies. S](#)
  12. Meidt et al. 2023. *ApJL*, 944, L18. [PHANGS-JWST First Results: Interstellar Medium Structure on the Turbulent Jeans Scale in Four Disk Galaxies Observed by JWST and the Atacama Large Millimeter/submillimeter Array](#)
  13. Lee et al. 2023. *ApJL*, 944, L17. [The PHANGS-JWST Treasury Survey: Star Formation, Feedback, and Dust Physics at High Angular Resolution in Nearby Galaxies](#)
  14. Astropy Collaboration. 2022. *ApJ*, 935, 167. [The Astropy Project: Sustaining and Growing a Community-oriented Open-source Project and the Latest Major Release \(v5.0\) of the Core Package](#)
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15. Leroy et al. 2021. *ApJS*, 257, 43. [PHANGS-ALMA: Arcsecond CO\(2-1\) Imaging of Nearby Star-forming Galaxies](#)
16. Leroy et al. 2021. *ApJS*, 255, 19. [PHANGS-ALMA Data Processing and Pipeline](#)
17. Zucker et al. 2021. *ApJ*, 919, 35. [On the Three-dimensional Structure of Local Molecular Clouds](#)

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## ADVISING

Mentored 1 graduate student and 14 undergraduate students and interns (10 at CfA/SAO; 4 undergraduate research theses).

### Graduate Students:

#### Hailey Moore | Michigan State University

Research Advisor for Masters Research (*Now staff at Epic*), advised with L. Chomiuk  
A Radio to X-ray Census of Stellar Feedback in the giant HII region NGC 604

2021-2023

### Undergraduate Students and Interns:

#### Helena Bouchereau | Northeastern University

Winter 2024 - Present

#### Karl Nicholson | Trinity College

Fall 2023

#### Sirina Prasad | Harvard University

Summer 2023 - Present

- Presented at AAS 243 (Now research student at CERN)

#### Devisree Tallapaneni | Cornell University

Summer 2023 - Present

- Presented at AAS243 (Now PhD student at OSU)

#### Tovi Sonnenberg | Harvard University

Summer 2023

- Presented at Harvard Heidelberg Star formation workshop in Oct. 2023

#### Ramisa Rahman | William & Mary College

Summer 2023

- Presented at AAS243 (Now PhD student at Yale)

#### Courtney Carreira | Johns Hopkins University

Summer 2022 - 2023

- Presented at AAS241 (Now PhD student at UCSD)

#### Kimberly Armas | Harvard University

Summer 2022

#### Noa Choi | Harvard University

Summer 2021

#### Wasiim Ouro-Sama | University of Massachusetts, Lowell

Summer 2021

#### Sam Fielder | University of Alberta

Summer 2020

#### Dewanshu Haswani | University of Alberta

Summer 2018

#### Weizhuo Zhang | University of Alberta

Fall 2018

#### Steffen Senychna | University of Alberta

Fall 2018

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## TEACHING

#### Astronomy 191 | Harvard University

Winter 2023

- Co-led Submillimeter Array and Interferometry lab project for 6 students, incl. lecturing, course material development, and grading written reports and oral presentations.

#### Astronomy 191 | Harvard University

Winter 2022

- Co-led Submillimeter Array and Interferometry lab project for 4 students, incl. lecturing, course material development, and grading written reports and oral presentations.

Teaching Assistant   University of Alberta	2014-2018
➤ Exam supervision, grading for 100-, 200-, and 300- level Astronomy and Physics courses	
➤ Laboratory section lead for 6 100-level Engineering Physics courses	
Teaching Assistant   University of British Columbia, Okanagan	2011-2013
➤ Grader for 100-level Astronomy and Physics courses	
➤ Laboratory section lead for 8 100- and 200-level Physics lab courses	
➤ In-lecture assistant and grader for 100-level “flipped-classroom” Physics lectures	

### Certifications:

Graduate Teaching and Learning Level 1 Certificate   University of Alberta	2017
➤ 14 hr of workshops on teaching practices, mental health and well-being	

## SELECTED PRESENTATIONS

Given 23 invited talks (incl. 6 colloquia, 2 planned) and numerous contributed presentations.

### Invited talks and Colloquia:

Follow the Monarchs: ngVLA Conference   Morelia, Mexico	2024 Nov
Astronomy Seminar   University of Connecticut	2024 Sept
Multiphase Madness   Center for Astrophysics	2024 Aug
2024 Star Formation Workshop   McMaster University	2024 Aug
Star Formation and ISM Seminar   Princeton University	2024 Feb
Galaxy Formation Seminar   Flatiron Institute	2024 Feb
Galaxy Evolution Seminar   Oxford University (remote)	2024 Jan
Astronomy Seminar   University of Wisconsin, Madison	2023 Nov
Alumni talk at Graduate Physics Symposium   University of Alberta (remote)	2023 Sep
Astronomy Seminar   University of Hertfordshire (remote)	2023 Jun
Astronomy Seminar   Tufts University	2023 Feb
ALMA Science in Nearby Galaxies: ALMA Status and Plans for Increased Capability   AAS 241	2023 Jan
Astronomy Seminar   McGill University	2022 Dec
CfA Seminar   Center for Astrophysics	2022 Mar
Science Community Webinar   Green Bank Observatory	2022 Feb
Astronomy Seminar   University of Wisconsin, Madison	2021 Nov
Colloquium   Green Bank Observatory (remote)	2021 Oct
Colloquium   ICRAR/Curtin University (remote)	2021 Oct
Colloquium   NRAO/University of Virginia (remote)	2021 Aug
Colloquium   Tsinghua University (remote)	2021 Apr
Astronomy Seminar   University of Connecticut (remote)	2021 Mar
Colloquium   University of Florida (remote)	2020 Jul
Astronomy Seminar   Michigan State University (remote)	2020 Jul
Colloquium   Green Bank Observatory	2019 Apr
Invited Talk   Big Apple Magnetic Fields Workshop	2019 Jan

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## LEADERSHIP & PROFESSIONAL ACTIVITIES

Referee for MNRAS, A&A, ApJ, PASP	2018-Present
CfA Equity, Diversity, Inclusion and Belonging committee	2023-Present
- Co-lead subcommittee on professional development	
Member of SKA SWGs: HI and extragalactic spectral lines	2023-Present
ngVLA SWG3: Galaxies and Galaxy Evolution Member	2022-Present
JWST Cycle 2 & 3 External panelist - Stellar populations and ISM	2023/2024
VLA Science Review Panel	2024-Present
Submillimeter Array Time Allocation Committee	2022-2024
HST Cycle 30 & 31 external reviewer	2022/2023
SOC Chair – Spatio-spectral modeling of ALMA data cubes: Insights and Challenges for ALMA-2030	2024
SOC & LOC Chair: “Northeastern Star and Planet Formation Meeting”	2023
SOC & LOC: “Harvard-Heidelberg Star formation workshop”	2023, 2024
SOC and LOC: “Seeing the Future – A Conference in Honor of Alyssa Goodman”	2022
SMA Science Seminar Organizer	2021-2023
➤ Co-organized weekly seminar series on radio/sub-mm/mm interferometry and related topics	
Project advisor: “ International Summer School on the Interstellar Medium of Galaxies”	2021
➤ Led a group of 6 students in a 2-week project on turbulence statistics in the interstellar medium	
LOC, Instructor, and Lecturer – SMA Interferometry Schools	2021/2022/2023/2025
➤ Led groups of 4-6 students on tutorials for radio and sub-mm interferometry	
➤ Developed <a href="#">python tutorials for SMA observations</a> used by all participants	
➤ Lectures on error recognition in visibilities	
Seminar and journal club organizer for UAlberta Astronomy Group	2017-2019
➤ Co-led development of student-led weekly talk series	
➤ Organized “soft-skill” development seminars for the Astronomy group (effective presentations, visualization, ...)	
UAlberta representative – Canadian Astronomical Society Graduate Student Committee	2016-2017
➤ Co-organized student workshop at CASCA 2017 on effective paper writing	
Physics representative – Quantitative Sciences Course Union Council, UBC Okanagan	2014
Member of the American Astronomical Society	2021-Present
Student Member of the Canadian Astronomical Society (CASCA)	2017-2020

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## SELECTED OUTREACH

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I have given many public outreach talks, including >100 presentations for visiting school classes and various community groups at the University of Alberta observatory.

Astronomy Research Stories   Cronyn Observatory (remote)	2020 Nov
Observatory Presenter   University of Alberta Observatory	2016-2019
<ul style="list-style-type: none"><li>➤ Public presentations and scheduling for community groups and Grade 3-12 classes, including ~weekly participation in the <a href="#">USchool</a> program to support rural and underprivileged schools</li><li>➤ Developed public outreach material for presentation on meteorites, aurora, and star formation</li><li>➤ Led Solar and night-time public observing</li></ul>	
Panel Member   NASA/CSA Space Apps Challenge, Edmonton, Canada	2019 Oct
Outreach Talk   Pint of Science, Edmonton, Canada	2019 May
Outreach Talk   Royal Astronomical Society of Canada, Edmonton	2018 Dec
Outreach Talk   Northern Alberta Radio Club	2018 May

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## PRESS

<a href="#">Phys.org</a>   JWST sets a new record, sees newly forming stars in the Triangulum galaxy	2023 Dec
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## REFERENCES

Prof. Erik Rosolowsky   University of Alberta	<a href="mailto:rosolowsky@ualberta.ca">rosolowsky@ualberta.ca</a>
Prof. Adam Leroy   The Ohio State University	<a href="mailto:leroy.42@osu.edu">leroy.42@osu.edu</a>
Prof. Alyssa Goodman   Harvard University	<a href="mailto:agoodman@cfa.harvard.edu">agoodman@cfa.harvard.edu</a>