

Eric W. Koch

Curriculum Vitæ

Center for Astrophysics, Harvard & Smithsonian
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Education

- 2016-2020 *University of Alberta*
PhD. (Physics)
Thesis: “Connecting galactic to local scales in the neutral interstellar medium across the Local Group”
Adviser: Prof. Erik Rosolowsky
- 2014-2016 *University of Alberta*
MSc. (Physics)
Thesis: “The Atomic Interstellar Medium in M33”
Adviser: Prof. Erik Rosolowsky
- 2010-2014 *University of British Columbia*
Hon. BSc. (Physics)

Employment

- 2022–present *Center for Astrophysics Harvard & Smithsonian*
Natural Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellow
- 2020–present *Center for Astrophysics Harvard & Smithsonian*
Submillimeter Array Postdoctoral Fellow
- 2014–2020 *University of Alberta*
Graduate Research and Teaching Assistant
- 2013-2014 *University of British Columbia, Okanagan*
Undergraduate Research Assistant with Prof. Jason Loeppky
- 2012 *University of British Columbia, Okanagan*
Undergraduate Work-Study Program with Prof. Erik Rosolowsky
- 2011-2014 *University of British Columbia, Okanagan*
Undergraduate Teaching Assistant

Awards

- 2020 *University of Alberta*
Alberta Graduate Excellence Scholarship
- 2019 *University of Alberta*
Mary Louise Imrie Graduate Student Award
- 2019 *University of Alberta*
Andrew Stewart Memorial Graduate Prize
- 2019 *University of Alberta/The Ohio State University*
Natural Sciences and Engineering Research Council of Canada Michael Smith Foreign Study Supplements with Prof. Adam Leroy
- 2018 *University of Alberta*
Queen Elizabeth II Graduate Scholarship - Doctorate
- 2017-2019 *University of Alberta*
Natural Sciences and Engineering Research Council of Canada Alexander Graham Bell Canada Graduate Scholarship - Doctorate
- 2016 *University of Alberta*
Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship - Doctorate

2015	<i>University of Alberta</i> Queen Elizabeth II Graduate Scholarship - Masters
2010-2014	<i>University of British Columbia, Okanagan</i> Deputy Vice Chancellor Scholarship
2014	<i>University of British Columbia, Okanagan</i> Distinguished Graduate Award - Physics, Math, Statistics & Computer Science
2014	<i>University of Alberta</i> Natural Sciences and Engineering Research Council of Canada Alexander Graham Bell Canada Graduate Scholarship - Masters
2013	<i>University of Alberta</i> Natural Sciences and Engineering Research Council of Canada Undergraduate Summer Research Award with Prof. Craig Heinke
2013	<i>University of British Columbia, Okanagan</i> Top Oral Presenter - UBC-O Undergraduate Research Conference
2013	<i>University of British Columbia, Okanagan</i> Upper Year Physics Award
2012	<i>University of British Columbia, Okanagan</i> Natural Sciences and Engineering Research Council of Canada Undergraduate Summer Research Award with Prof. Erik Rosolowsky
2010	<i>University of British Columbia, Okanagan</i> President's Entrance Scholarship

External Funding

2022	co-I - <i>The influence of superbubble feedback on molecular gas and star formation across galactic environments</i> Smithsonian Scholarly Studies \$10,635 USD
2022	co-PI - <i>Linking the Resolved Filamentary Molecular ISM to Massive Star Formation across M33</i> NRAO Student Observing Support \$20,670 USD
2021	co-PI - <i>Molecular Gas in the Milky Way analog NGC 891</i> SAO Scholarly Studies Program \$27,932 USD
2019	co-I - <i>Link CASA to the astropy ecosystem</i> ALMA Development Study - Cycle 7 (PI: A. Ginsburg) \$199,905 USD

Professional Talks — Invited

2022 Jun	<i>Hertfordshire Astronomy Seminar</i>
2022 Feb	<i>Tufts Astronomy Seminar</i>
2023 Jan	<i>AAS241 - ALMA-2030</i>
2022 Dec	<i>McGill Astronomy Seminar</i>
2022 Mar	<i>CfA Seminar</i>
2022 Feb	<i>Green Bank Observatory Community Talk</i>
2021 Nov	<i>University of Wisconsin Madison Seminar</i>
2021 October	<i>GBO colloquium</i>
2021 October	<i>ICRAR/Curtin Colloquium</i>
2021 August	<i>NRAO/UVirginia Colloquium</i>
2021 April	<i>Tsinghau University Colloquium (remote)</i>
2021 March	<i>University of Connecticut Astronomy Seminar (remote)</i>
2020 July	<i>University of Florida Colloquium (remote)</i>

2020 July *Michigan State University Astronomy Seminar (remote)*
 2019 January *Big Apple Magnetic Fields Workshop, New York*

Professional Talks — Other

2022 Sep *From Cells to Galaxies*
 2022 Jul *With Two Eyes - Interstellar Institute V*
 2022 Mar *CfA ITC Luncheon*
 2021 August *The Past, Present, and Future of the VLA: Celebrating 40 Years*
 2021 July *The Grand Cascade*
 2021 March *A precursor view of the SKA sky*
 2020 December *Harvard-Heidelberg Star Formation Workshop*
 2019 September *So-Star, Paris, France*
 2019 April *Center for Astrophysics, Cambridge, USA*
 2019 April *Green Bank Telescope, Green Bank, USA*
 2019 March *NRAO, Charlottesville, USA*
 2019 March *University of Texas, Austin, USA*
 2018 August *CHANG-ES Team Meeting, Calgary, Canada*
 2018 July *PHAT/M33 Team Meeting, Ringberg, Germany*
 2018 May *Olympian Symposium, Paralia Katerini, Greece*
 2017 June *Canadian Astronomical Society Meeting, Edmonton, Canada*
 2016 August *Lorentz Centre - Apples to Apples Workshop: Comparing Simulations \& Observations*
 2016 February *Max Planck Institute for Extraterrestrial Physics*
 2016 February *Max Planck Institute for Radio Astronomy*
 2015 May *Florence Comparing Simulations \& Observations Workshop*
 2014 April *UBC-O Undergraduate Research Conference*
 2013 November *UBC-O Brown Bag Series*
 2013 April *UBC-O Undergraduate Research Conference*

Research Advising

2022-2023 *Do Spiral Arms Form Molecular Clouds?*
 Courtney Carreira (SAO; advised with Sarah Jeffreson)
 SAO REU Program & NRAO SOS
 Summer 2022 *The resolved molecular gas in a nascent tidal dwarf galaxy*
 Kimberly Armas (Harvard; advised with Qizhou Zhang)
 Harvard Dept. of Astronomy - Summer Research
 2021-Present *Resolving the radio continuum in the giant HII region NGC 604*
 Hailey Moore (MSU; advised with Laura Chomiuk)
 Graduate research project
 Summer 2021 *Resolved molecular filaments in M33*
 Noa Choi (Harvard, advised with Alyssa Goodman & Catherine Zucker)
 Harvard College Research Program
 Summer 2021 *Tracing feedback-driven outflows in Sextans A*
 Wasim Ouro-Sama (UMass)
 CfA Latino Initiative Program
 Summer 2020 *Using multi-dimensional graphs to describe filamentary networks*
 Sam Fielder (UAlberta; advised with Erik Rosolowsky)
 Undergraduate Physics research
 Summer 2018 *Interpreting filaments in three dimensions*
 Dewanshu Haswani (advised with Erik Rosolowsky)
 MITACS Internship at UAlberta

- Fall 2018 *Spiral Arm Propagation in M33 and its Implications on Molecular Cloud Formation*
Steffen Senchyna (UAlberta; advised with Erik Rosolowsky)
Physics Honours Research Project
- Fall 2018 *ISM Properties near Supernova Remnants in M33*
Weizhuo Zhang (UAlberta; advised with Erik Rosolowsky)
Physics Honours Research Project

Observing Experience (as PI)

- 2022 *e-MERLIN observations of the first JWST-detected supernova remnants in M33*
e-MERLIN — 48 hr
- 2022 *Combining the SMA and JWST to confirm a young massive cluster progenitor in M33 (DDT)*
Submillimeter Array — 20 hr
- 2022 *The resolved molecular gas in a nascent tidal dwarf galaxy (DDT)*
Submillimeter Array — 5 hr
- 2022 *A resolved molecular gas survey of the edge-on galaxy NGC 891*
Submillimeter Array — 35 hr
- 2022 *Resolving the molecular gas fuelling IC 10's starburst on 2.5 pc scales*
Submillimeter Array — 35 hr
- 2022 *Linking the Resolved Filamentary Molecular ISM to Massive Star Formation across M33*
ALMA — 40 hr
- 2021 *A Complete Molecular Gas Map of M33 with the ACA*
ALMA — 108 hr
- 2021 *A resolved molecular gas survey of the edge-on galaxy NGC 891*
Submillimeter Array — 41 hr
- 2021 *Resolving the molecular gas fuelling IC 10's starburst on 2.5 pc scales*
Submillimeter Array — 35 hr
- 2021 *Completion of Dense Gas Formation through a Spiral Arm*
Green Bank Telescope — 12 hr
- 2019 *Tracing accretion onto a YMC progenitor candidate in M33*
ALMA — 5 hr
- 2019 *Dense Gas Formation through a Spiral Arm*
Green Bank Telescope — 41 hr
- 2017 *Tracing the CNM and Feedback-driven holes across a Galactic Disk*
Very Large Array — 84 hr
- 2016 *Feedback in a Giant HII Region: Impact on the Atomic and Molecular Medium*
Very Large Array — 48 hr
- 2016 *Tracing the Atomic and Molecular Medium Across a Spiral Arm*
Very Large Array — 48 hr

Observing Experience (as co-I)

- 2022 *Modern 21-cm Observations for Nearby Galaxies with Upcoming JWST Observations*
VLA — PI: Karin Sandstrom — 122 hr
- 2022 *Accreting Massive Black Holes in Young Star Clusters*
VLA — PI: Kristen Dage — 10 hr
- 2022 *Modern 21-cm Observations for Nearby Galaxies with Upcoming JWST Observations*
VLA — PI: Karin Sandstrom — 35 hr
- 2022 *Connecting Gas and Dust: Mapping HI in 7 Herschel Galaxies*
VLA — PI: I-Da Chiang — 28 hr
- 2022 *A Complete Picture of Gas, Dust, and Stars in Ten of the Best-Studied MeerKAT-Visible Galaxies*
MeerKAT — PI: D.J. Pisano — 60 hr
- 2022 *Untangling the molecular gas physics in the center of the starburst galaxy NGC 6946*
Submillimeter Array — PI: Cosima Eibensteiner — 25 hr

2022	<i>Observations of the cold molecular gas in the barred spiral galaxy HE0045-2145</i> Submillimeter Array — PI: Giovanni Fazio — 8 hr
2022	<i>A panoramic study of low-density star formation in XUV disk galaxy NGC 3621: Testing for environmental dependency of clusters, OB associations, and the stellar hierarchy</i> HST — PI: David Thilker — 24 orbits
2021	<i>Quantifying the relation between exquisitely detailed dust extinction features and molecular gas using HST and ALMA</i> HST — PI: David Thilker — None
2021	<i>The Beautiful and Enigmatic Spiral Galaxy NGC 7331</i> Submillimeter Array — PI: Glen Petitpas — 18 hr
2020	<i>A VLA Local Group Legacy Survey - X-Proposal</i> JWST — PI: Adam Leroy — 1820 hr
2020	<i>SOFIA GREAT Mapping of the LMC Northern Molecular Ridge</i> VLT/MUSE — PI: Alberto Bolatto — 12 hr
2020	<i>The First Resolved View of Individual Star Formation Across a Spiral Arm</i> JWST — PI: Erik Rosolowsky — 23 hr
2020	<i>A Complete Picture of Gas, Dust, and Stars in Six of the Best-Studied MeerKAT-Visible Galaxies</i> MeerKAT — PI: Dyas Utomo — 48 hr
2019	<i>Turbulence in Central Molecular Zone clouds</i> Very Large Array — PI: Jonathan Henshaw — 24 hr
2019	<i>Surveying Triangulum with the ACA: A Key Perspective on Molecular Clouds at High Resolution</i> ALMA — PI: Erik Rosolowsky — 17 hr
2019	<i>Testing Accretion-Driven Turbulence in Central Molecular Zone Clouds</i> Green Bank Telescope — PI: Jonathan Henshaw — 2.5 hr
2017	<i>Resolving the Cloud-Cluster Ecosystem in M33</i> ALMA — PI: Erik Rosolowsky — 22 hr
2015	<i>Tracing Cloud Formation in a Spiral Arm</i> NOEMA — PI: Jonathan Braine, Erik Rosolowsky — 16 hr

Professional Service

2022-Present	SMA time allocation committee member
2022-Present	ngVLA SWG3: Galaxies and Galaxy Evolution Member
2022	HST external reviewer
2022	SOC and LOC for Seeing the Future – A Conference in Honor of Alyssa Goodman
2021-Present	SMA Science Seminar Organizer
2021	Project advisor for the International Summer School on the Interstellar Medium of Galaxies
2021-Present	LOC, Instructor, and Lecturer for the 2021, 2022, and 2023 SMA Interferometry Schools
2021-Present	Member of American Astronomical Society
2018-Present	Referee for MNRAS, A&A, ApJ
2017-2019	Seminar and journal club organizer for UAlberta Astronomy Group
2017-2020	Student Member of Canadian Astronomical Society (CASCA)
2017	UAlberta Graduate Teaching and Learning Level 1 Certificate – 14 hr of workshops
2016-2017	UAlberta representative on the Canadian Astronomical Society Graduate Student Committee
2013-2014	UBC-Okanagan Physics representative on Quantitative Sciences Course Union Council

Software

I actively develop several python software packages for astronomical analyses. Below is a selection of my primary projects, and a full list is available on my github profile (github.com/e-koch).

- TurbuStat (<https://turbustat.readthedocs.io>): A common implementation of many observational turbulence statistics. (Koch et al. 2019).
- FilFinder (<https://fil-finder.readthedocs.io>): Morphological-based filament detection algorithm (Koch & Rosolowsky 2015).
- spectral-cube (<https://spectral-cube.readthedocs.io>): A library for operations on radio spectral-line data cubes, including handling for massive data (DOI: [10.5281/zenodo.2573901](https://doi.org/10.5281/zenodo.2573901)).

Teaching

2022-2023	<i>Harvard - Astronomy 191</i> SMA Project co-Instructor
2014-2018	<i>University of Alberta</i> Teaching Assistant for six Engineering Physics labs; Marker for 300 level Astronomy courses
2011-2013	<i>University of British Columbia, Okanagan</i> Teaching Assistant for eight 100 and 200 level Physics labs; Marker for three 100 level Physics & Astronomy courses

Outreach

2020 November	Astronomy Research Stories Cronyn Observatory Virtual Public Night
2019 October	Judge for NASA/CSA Space Apps Challenge Edmonton, Canada
2019 May	Frigid Fuel for Star Formation Pint of Science, Edmonton, Canada
2018 December	Unravelling Star Formation Royal Astronomical Society of Canada (Edmonton Centre)
2018 May	Viewing the Sky with Radio Interferometry Northern Alberta Radio Club (Edmonton)
2017 February	Blowing Bubbles in a Galaxy University of Alberta Observatory Public Observing Night
2016-2019	Over 100 Public Observing and Astronomy presentations for School & Community Groups University of Alberta Observatory