

Steward Observatory
University of Arizona
933 N Cherry Ave
Tucson, AZ 85701

krausee@arizona.edu
Phone: +1-520-621-9516

EDUCATION

June 2012 **PhD in Astrophysics**, California Institute of Technology
Sept 2007 **Diplom in Physics**, University of Bonn, Germany

EMPLOYMENT

2018- **Assistant (2018-22)/ Associate (with tenure, 2022-2025) /Full Professor of Astronomy (75%) & Physics (25%)**, University of Arizona
Oct 2017 - Aug 2018 **Postdoctoral Researcher**, California Institute of Technology
 developed bispectrum modeling & inflation forecasts for SPHEREx
Oct 2014 – Oct 2017 **Kavli Fellow**, KIPAC, Stanford University/SLAC
 developed theoretical modeling & inference for DES-Year 1 cosmology
July 2012 -Aug 2014 **Postdoctoral Researcher**, University of Pennsylvania
 independent research in multi-probe cosmology, developed CosmoLike

AWARDS & HONORS

2025 Simons Visiting Fellow, Galileo Galilei Institute for Theoretical Physics, Florence, Italy
2024 Tinsley Visiting Scholar, University of Texas, Austin
2022 Early Career Award, Universities Research Association
 One award annually, "For developing crucial theoretical tools for multi-probe cosmology analyses and providing scientific leadership to the Dark Energy Survey (DES) collaboration."
2022 Curie Award, University of Arizona
 Up to three awards annually to "junior faculty, whose innovative work is not only advancing science, but also adding to the diversity within the scientific community."
2022 Kavli Frontiers Fellow, National Academy of Science
2021 Sloan Research Fellowship, Alfred P. Sloan Foundation
2020 Packard Fellowship, David and Lucile Packard Foundation
2020 Maria Goeppert-Mayer Award, American Physical Society (APS)
 One award annually, "For contributions to theoretical cosmology and astrophysics, in particular, pioneering approaches to modeling key observables and extracting cosmological constraints from large galaxy surveys."
2019 Early Career Research Award, Department of Energy
2018 Young Scientist Award, International Union of Pure and Applied Physics (IUPAP) – Astrophysics
 One award annually, "For pioneering contributions to the extraction of cosmological insights from large galaxy surveys, including modeling key observables, covariance matrix estimation, and the development of cosmological analysis tools, which have ushered in a new era of multi-probe cosmology and set a new standard for forthcoming experiments."
2003-2007 Studienstiftung (German National Merit Foundation) Scholarship
2005 European Space Agency Student Parabolic Flight Campaign 2005
2002 Junior Prize of the German Astronomical Society
2002 1st prize at German National Science Contest for High-School Students (Jugend forscht)

SCIENCE COLLABORATION LEADERSHIP

Dark Energy Survey (DES)

- **Science Committee Co-Chair**, Sept 2018 - May 2021
scientific co-lead of an international collaboration with > 400 participants, responsibilities include setting of scientific goals, selection of working group coordinators, representation of the collaboration to funding agencies
- **Coordinator**, Theory and Combined Probes Working Group, Sept 2016 - Feb 2020
- Builder with data rights

Nancy Grace Roman Space Telescope

- **PI of Wide Field Science Program** *Kinematic Lensing with Roman*, 2023-2027
- **Project Infrastructure Team co-I** *Maximizing Cosmological Science with the Roman High Latitude Imaging Survey* (PI: O. Doré), 2023-2028
- Science Investigation Team co-I *Cosmology with the High Latitude Survey* (PI: O. Doré), 2016-2022
- Panelist, High Latitude Wide Area Survey Definition Committee (2024)

SPHEREx (NASA 2016 Astrophysics MIDEX, PI: J. Bock)

- **Science Team Member & Co-Investigator**, NASA 2016 Astrophysics MIDEX proposal
- **Co-lead**, Level-4 Inflation Science work packages

Vera Rubin Observatory - Dark Energy Science Collaboration (DESC)

- **Convener**, LSST-DESC Theory and Joint Probes Working Group, July 2015 – Feb 2018
- **Key author**, DESC Science Road Map: developed five-year vision for Theory group
- Project Initiator & Co-Lead, Core Cosmology Library, March 2015 – Feb 2018
- Project Lead, TJPCosmo (Joint Probes Cosmology Likelihood), Feb 2018 – Jan 2020

MENTORING AND ADVISING

PhD students

Alena Casella 2025-current (Arizona, 1st year research project)
 Ian Busby 2025-current (Arizona, 1st year research project)
 Edoardo Fiesoli 2024-current (Arizona, primary PhD adviser)
 Yu-Hsiu Huang 2021-current (Arizona, primary PhD adviser)
 Maria Gabriela Cota 2021-2022 (Arizona, 1st year research project)
 Maggie Smith 2020-2021 (Arizona, 1st year research project)
 Anne Moore 2020-current (Arizona, primary PhD adviser)
 Pranjal RS 2019-2025 (Arizona → JPL/Caltech, primary PhD adviser)
 Paul Rogozenski 2018-2024 (Arizona → CMU, primary PhD adviser)
 Shivam Pandey 2017-2022 (UPenn → Columbia, co-adviser)
 Lucas Secco 2017-2020 (UPenn → KICP Fellow, co-adviser)

Adviser to PhD students on a research project

Kritti Sharma (Caltech, 2 publications)
 Chun-Hao To (Stanford, 2 publications)
 Emmanuel Schaan (Princeton, 1 publication)
 Youngsoo Park (University of Chicago, 1 publication)

Postdoc advisees

Enrique Paillas 2024-current
 Anoma Ganguly 2024-current
 Tomomi Sunayama 2022-2024 (JSPS fellow → junior faculty, ASIAA)
 Yosuke Kobayashi 2021-2024 (Arizona → JSPS Fellow, Kyoto)

Joyce Byun 2020-2022

Xiao Fang 2018-2021 (Arizona → BCCP Fellow, Berkeley)

Vivian Miranda 2018-2021 (Arizona → junior faculty, Stony Brook)

Faculty Mentoring Once-per-term mentoring and long-term priority planning for eight female junior faculty (outside UA)

SERVICE

NATIONAL/INTERNATIONAL

- **Panelist** NASA Roman High Latitude Wide Area Survey Definition Committee (2024)
- **Panelist** Science Flow-Down Committee, LBNL Director's Review of CMB-S4 project (11/2023)
- **Panelist** DOE Cosmic Visions Dark Energy Group (2019-2021)
- **External PhD examiner** Anna Porredon (UA Barcelona, 2019), Matteo Rizzato (Sorbonne, 2019), Emma Aycoberry (Sorbonne, 2024)
- **Jury Member, CNRS Habilitation à Diriger des Recherches** Azadeh Moradinezhad (Annecy, 2025)
- **Reviewer (National Postdoc Fellowships)** NASA *Hubble Fellowship Program*, Brinson Foundation *Brinson Prize Fellowship in Observational Cosmology*
- **Reviewer (Research Grants)** Department of Energy *Comparative Review, Early Career, SCGSR*; NASA *Astrophysics Data Analysis Program, FINEST*; NSF: Astronomy Division *Early Career, AAG*; Austrian Science Foundation; Chilean Science Foundation; Japan Society for the Promotion of Science; Swiss Science Foundation; UK Research Council
- **Collaboration Service (since 2022)** LSST-DESC Spokesperson Nominating Committee (2022/2023), LSST-DESC Speakers Bureau (2024-), DESI Emission Line Systematics Taskforce (2024), DESI Publication Board (2025-)

CONFERENCE ORGANIZATION

- SOC chair, New Cross-Correlation Perspectives on Cosmic Baryons 08/2026, Aspen Center for Physics
- SOC, The Concurrence of Mega-Surveys (summer school) 08/2026 ICTS, Bengaluru, India
- SOC, Gravitational Lensing at the Turning Point: Current Discoveries, New Frontiers 07/2026, Sexten Center for Astrophysics, Italy
- SOC, New Synergies in Multi-Probe Cosmology 02/2026, KITP Santa Barbara
- SOC, Arizona Winter School on Multi-Probe Cosmology in the Roman ST Era 01/2026, Tucson
- SOC, Beyond-two-point Statistics Meet Survey Systematics, 09/2025, IPMU Tokyo, Japan
- Convener, SUSY 2025 – Inflation session 08/2025, UC Santa Cruz
- SOC, Understanding cosmological observations 08/2025, Binasque Science Center, Spain
- SOC, New Strategies for Extracting Cosmology from Galaxy Surveys – 3rd Edition, 07/2025, Sexten Center for Astrophysics, Italy
- SOC chair, ELG Mock Challenge Kick-Off 02/2025, Donostia Center for Physics, Spain
- SOC, Cosmology on the Steep Rise 02/2025, Sexten Center for Astrophysics, Italy
- SOC, 11th KIAS Workshop on Cosmology and Structure Formation 11/2024, Seoul, Korea
- SOC, New Strategies for Extracting Cosmology from Galaxy Surveys - 2nd Edition, 07/2024, Sexten Center for Astrophysics, Italy

- Program co-chair and LOC APS Conference for Undergraduate Women in Physics 2024/2/4, University of Arizona (twice postponed, due to COVID19)
- SOC, Debating the potential of machine learning in astronomical surveys 12/2023, CCA/IAP/zoom, New York/Paris/online
- SOC, Understanding cosmological observations 08/2023, Benasque Science Center, Spain
- SOC, Consensus Cosmic Shear in the 2020s IAU General Assembly Focus Meeting, 07/2022, Busan, South Korea
- SOC, Large scale structure cosmology beyond 2-point statistics 06/2022, Aspen Center for Physics
- SOC co-chair Dark Energy Survey Collaboration meetings 12/2018, 05/2019, 11/2019, 05/2020, 05/2021
- Lead Organizer & SOC chair, “Blind Analysis in High-Stakes Survey Science: When, Why, and How?”workshop held at SLAC, March 13-15, 2017, bringing together interdisciplinary blinding experts and critics; participants from dark matter direct detection, AMO experiment, gravitational waves, survey cosmology and social sciences. www.kipac.github.io/Blinding/

DEPARTMENT SERVICE

Astronomy Graduate Prelim Exam Chair (2023, 2024), Astronomy Undergraduate Advising (2021-2024), Steward Observatory/Dept. of Astronomy Advisory Committee (2022-2024), Physics Diversity & Inclusion Committee (2019-2024), Theoretical Astrophysics Colloquium Committee (2018-2022, Chair 2022-2024), Theory Prize Fellowship Selection Committee (2020/2021), Steward Bok Fellowship Selection Committee (2019), Astronomy Graduate Admissions (2019, 2020), numerous Astronomy Mentoring/Physics Comprehensive Exam/Thesis (Astronomy, Physics) Committees

RESEARCH GRANTS

AS PRINCIPAL INVESTIGATOR

- NASA ATP “Modeling Large-Scale Structure - Interfacing Theory, Simulations, and ML-accelerated Inference”, 2024-2027 (\$750k)
- NASA Roman Wide Field Science Large Program: “Kinematic Lensing with the Roman Space Telescope”, 2023-2027 (\$2M)
- CNRS – University of Arizona International Partnership (co-PIs Elisabeth Krause, Karim Benabed): “A Sharper View of the Late-Time Universe: Joint Analyses of Cosmic Microwave Background and Galaxy Surveys”, 2021-2024 (two full PhD fellowships)
- NASA Contract “SPHEREx L4 Inflation Pipeline Development at UArizona”, 2021-2026 (\$1.7M)
- Sloan Research Fellowship, 2021-2023 (\$75k)
- Packard Foundation Fellowship for Science and Engineering “The multi-probe revolution in cosmology”, 2020-2025 (\$875k)
- Department of Energy Early Career Research Award “Joint analyses of lensing, clustering, and galaxy clusters with DES and LSST”, 2019-2024 (\$750k)

AS CO-INVESTIGATOR

- NASA ATP “Kinematic Lensing: Constraining dark energy in the low-redshift Universe”, 2024-2027 (\$400k)
- NASA Roman Project Infrastructure Team: “Maximizing Cosmological Science with the Roman High Latitude Imaging Survey”, 2023-2028 (\$2.3M to UA)

- Department of Energy AI for HEP “Accelerating cosmological inference for LSST and DESI with neural networks”, 2022-2026 (\$354k)
- NASA ROSES ADAP “Weak Gravitational Lensing with Galaxy Kinematics”, 2021-2024 (\$265k to UA)
- NASA WFIRST Science Investigation Team “Cosmology with the High-Latitude Survey” 2016-2022 (\$549K to UA)

SCIENTIFIC PRESENTATIONS (INVITED ONLY)

INVITED LECTURE SERIES

- 2025 GGI Training Week “New Physics from Galaxy Clustering” – invited lecturer for week-long lecture on cosmological data analysis, Galileo Galilei Institute for Theoretical Physics, Florence, Italy; September 2025
- 2025 Les Houches Summer School “The Dark Universe” – invited lecturer for lectures and tutorial on cross-correlation cosmology, Les Houches School of Physics, France; July 2025
- 2024 ICTP Cosmology Summer School – invited lecturer for week-long lectures on cosmic structure formation, Abdus Salam International Center for Theoretical Physics, Trieste, Italy; June 2024
- 2023 ICTS School “Largest Cosmological Surveys and Big Data Science” – invited lecturer for week-long lectures and hand-on tutorials on machine learning-accelerated cosmology inference, International Center for Theoretical Sciences, Bengaluru, India; May 2023

INVITED CONFERENCE PRESENTATIONS/COLLOQUIA/SEMINARS

more than 140 invited scientific presentations, including

- **plenary talks at major conference series**, incl. ICHEP2016, EPS-HEP2017, TeVPA2017, Dark Matter2018, 234th American Astronomical Society meeting (2019), Phenomenology 2021, Dark Energy Overview at DOE P5 Town Hall (2023), Cosmo’24
- **recent colloquia** Munich Joint Astronomy Colloquium, Center for Computational Astrophysics, CIERA/Northwestern, IPMU Tokyo, UWashington, OSU, UCSC, Yale

PUBLICATION RECORD

>25,000 citations, h-index 78 (statistics from inspirehep.net)

SELECTED SIGNIFICANT PUBLICATIONS (° indicates student/postdoc mentees)

Krause, E. & Eifler, T.: *CosmoLike – cosmological likelihood analyses for photometric surveys*. MNRAS 470, 2100 (2017)

Significance: introduced consistent multi-probe analysis framework. Accompanying codes have been used in DES analyses, and to set LSST-DESC and Roman requirements.

°To, C.-H., **Krause, E.**, et al.: *Dark Energy Survey Year 1 Results: Cosmological Constraints from Cluster Abundances, Weak Lensing, and Galaxy Correlations*. PRL 126, 141301 (2021)

Significance: First joint and consistent analysis of clusters, weak lensing and clustering; featured on physics.aps.org.

The Beyond-2pt Collaboration: **Krause, E.**, °Kobayashi, Y., °Salcedo, A., Ivanov, M.M., Abel, T. et al. *A Parameter-Masked Mock Data Challenge for Beyond-Two-Point Galaxy Clustering Statistics*, The Astrophysical Journal 990, 99 (2025)

Significance: coordinated community-wide effort benchmarking the performance of novel clustering analyses.