Gautham Narayan

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RESEARCH INTERESTS

- Observational Cosmology and Cosmography
- Time-domain Astrophysics, particularly Transient Phenomena
- Wide-field Ultraviolet, Optical and Infrared Surveys
- Multi-messenger Astrophysics & Rapid Follow-up Studies
- Statistics, Data Science and Artificial Intelligence

PROFESSIONAL APPOINTMENTS

Current:	Deputy Director for Astrophysics, NSF-Simons SkAI Institute
Sep 2024–present
	Associate Professor, University of Illinois at Urbana-Champaign
Aug 2024–present
	Deputy Director, Center for AstroPhysical Surveys, UIUC/NCSA
Aug 2020–present
Previous:	Assistant Professor, University of Illinois at Urbana-Champaign
Aug 2019–Aug 2024
	Lasker Data Science Fellow, Space Telescope Science Institute
Jun 2017–Aug 2019
	Postdoctoral Fellow, National Optical Astronomy Observatory
(now NOIRLab) Jul 2013–Jun 2017[1]

EDUCATION

Harvard University	Ph.D. Physics, May 2013
Thesis: "Light Curves of Type Ia Supernovae and Cosmological Constraints from the ESSENCE Survey"
Adviser: Prof. Christopher W. Stubbs
A.M. Physics, May 2007
Illinois Wesleyan University	B.S. (Hons) Physics, Summa Cum Laude, May 2005
Thesis: "Photometry of Outer-belt Objects"
Adviser: Prof. Linda M. French

GRANTS DURING TENURE AT ILLINOIS

- Co-PI, NSF Simons National AI Research Institutes, USD 20,000,000, Sep 2024–present
- PI, NSF Windows on the Universe, USD 2,363,871, Aug 2024–present
- PI, LSST Discovery Alliance LINCC Incubator, USD 22,500, Aug 2024–present
- PI, NSF Cyberinfrastructure for Sustained Scientific Innovation, USD 3,554,724, Aug 2023–present
- PI, NSF CAREER, USD 717,600, Aug 2023–present
- Co-I, US DoE High Energy Theory & Cosmology, USD 2,901,000, Apr 2023–present
- PI, NSF Astronomy and Astrophysics Grant, USD 328,618, Aug 2022–present
- PI, HST GO 16764, USD 274,723, Aug 2022–present
- PI, LSST-Wasabi Enabling Science Award, USD 25,000, Aug 2022–present
- PI, LSST Enabling Science Awards for undergraduates at UIUC, USD 10,000, Fall 2021
- PI, NASA ADAP, USD 334,711, 2020–2
- PI, LSST Enabling Science Award, USD 27,000, 2020–2

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[1]Formally employed by The University of Arizona CS Dept. from Dec 2014–Apr 2016, but located at NOAO

- Co-I, HST GO 17128 USD 82,030, Oct 2022–present
- Co-I, NCSA Internal Award, "ANTARES at NCSA", USD 88,683, 2020–2
- Co-I on two NASA ADAP proposals, USD 66,835 to UIUC (PIs. D. Jones, A. Rest) 2021–present
- Co-I, grant for developing ANTARES, Heising-Simons Foundation, USD 567,000, 2018–21

AWARDS

- Lincoln Excellence for Assistant Professors, 2023
- Selected for the 1st cohort of the Illinois Academic Leadership and Management Institute
- List of Instructors rated Excellent, Spring 2023
- List of Instructors rated Outstanding, Spring 2020
- 2nd ever recipient of the Barry M. Lasker Data Science Fellowship, STScI, 2017–9
- Best-in-Show, Art of Planetary Science, Lunar and Planetary Laboratory, U. Arizona, 2015

RESEARCH HISTORY AND SELECTED PUBLICATIONS

Below are brief descriptions of my work on key topics, together with a related publication.

Cosmology and the Nature of Dark Energy

- **Analysis Coordinator**, LSST Dark Energy Science Collaboration (DESC), previously Deputy Analysis Coordinator (2021-2023) and Supernova Working Group Convener (2019-2021).
- Led analysis using ESSENCE and literature SNIa to derive cosmological constraints on dark energy equation of state w; co-authored analysis on PS1 SNIa Foundation photometric SNIa
- Co-developed BayeSN with K. Mandel — probabilistic model to infer distance moduli, light curve, and dust properties from UV+Optical+NIR data of low-z SNIa; currently evolving into model for SNIa SED inference at cosmological distances for *NGRST*, future surveys
- Leading analysis apply BayeSN-SED to combined Foundation, Pan-STARRS & literature samples — will be the largest dataset of confirmed cosmological SNIa

Narayan et al., '16, "Light Curves of 213 Type Ia Supernovae from the ESSENCE Survey", ApJS

Understanding the Physics of Rare and Unusual Transients

- Led or made major contributions to several projects studying unusual SN, including SN 2020oi, SN 2018oh, SN 2009ku, SN 2008ha, as well as open-source tools to model such events
- Combining work on machine learning with interest in rare & unusual transients by developing novel methods for anomaly detection, incorporating gravitational wave, neutrino and high-energy gamma ray signals into alert-brokers.

Narayan et al., '11, "Displaying the Heterogeneity of the SN 2002cx-like Subclass of Type Ia Supernovae with Observations of the Pan-STARRS-1 Discovered SN 2009ku", ApJL

Machine Learning for Time-Domain Discovery

- Lead developer of deep-learning, traditional ML and active learning algorithms for time-series classification on state-of-the-art alert broker system: ANTARES operating on Zwicky Transient Facility (ZTF) alerts as test bed for Legacy Survey of Space and Time (LSST)
- Lead for Extended LSST Astronomical Time-Series Classification Challenge (ELAsTiCC). (v1) remains the largest simulation of of the entire time-domain sky for statistical studies, and the largest Kaggle challenge in Astronomy.

Narayan et al., '18, "Machine-learning-based Brokers for Real-time Classification of the LSST Alert Stream", ApJS Special Issue "Data: Insights and Challenges in a Time of Abundance"

Operations, Calibration, Infrastructure & Optimization of Wide-field Surveys

- PI of SCiMMA Team, developing real-time system to coordinate LIGO, high-energy particle and neutrino, ground- and space-based facilities
- Extensive involvement in transient pipeline development & validation several current and past astrophysical surveys
- Lead analysis to use *Hubble* imaging and large-aperture spectroscopy to establish faint spectrophotometric standards for LSST and future surveys

Narayan et al., '19, "Sub-percent Photometry: Faint DA WD Spectrophotometric Standards for Astrophysical Observatories", ApJS

PROFESSIONAL AFFILIATIONS

I am an active member of several groups and projects, completed and on-going:

The LSST Dark Energy Science Collaboration (DESC)	The [P/E]LAsTiCC Team
The SCiMMA Team	The Young Supernova Experiment (YSE)
The ANTARES Project	The DECam Alliance for Transients
The Gravity Wave Collective	The *HST* SIRAH & Dust Survey
The *Kepler* & *TESS* Extra Galactic Survey	The DA White Dwarf Calibration Team
The Mosaic z-band Legacy Survey (MzLS)	The SN Lightechoes Team
The LSST Transient & Variable Stars Collaboration (TVS)	The Foundation Supernova Survey
The Pan-STARRS PS1 Science Collaboration	The ESSENCE Collaboration

Member of the American Astronomical Society (2007–present)

OBSERVING EXPERIENCE

I am an observational cosmologist with extensive experience with different facilities:

- PI, *HST* GO-16764, (34 orbits)
- PI, Gemini N (2020A-Q-115, 2021B-Q-310), Gemini S (2021B-Q-317), programs continue but now led by my students
- Co-PI, Young Supernova Experiment, ∼15% of total time on Pan-STARRS PS1 & PS2, 2020–2027
- PI on two NOIRLab Young Supenova Program on DECam with Long-term Status (LTS) for 2x2 years (2x30 nights)
- Co-I on several major *JWST* ToO programs and *HST* programs with *WFC3*, *ACS* and *STIS* including: GO-12967 (18 orbits), 12999 (8 orbits), 13046 (100 orbits), 13711 (60 orbits), 14216 (100 orbits), 14244 (8 orbits) and 15113 (54 orbits), 17128 (105 orbits)
- PI and Co-I on numerous accepted NOIRLab, Las Cumbres Observatory, ESO and *Swift* observing proposals
- MMT Observatory: 15 nights of Blue Channel spectroscopy on site, 2 nights of remote observing
- Magellan Observatory: 7 nights LDSS3 imaging and long-slit spectroscopy
    1 night of IMACS long-slit spectroscopy
- Gemini Observatory: Analysis of GMOS spectroscopy from several nights of queue observing
- Kitt Peak National Observatory: several nights of imaging on the 4 m with MOSAIC 1.1 & 3
- Cerro-Tololo Inter-American Observatory: several nights with 0.9 m & 4 m with DECam
    Analysis of 197 nights of MOSAIC-II imaging for ESSENCE/SuperMacho
- WIYN Observatory: 3 nights of imaging on the WIYN 3.5 m with ODI
- F. L. Whipple Observatory: several nights of long-slit spectroscopy on the 1.5 m with FAST
    and imaging on the 1.2 m with Keplercam, both on-site and remote
- Las Cumbres Observatory: Analysis of 120 hours of 1 m SINISTRO imaging

MENTORING AND TEACHING

Graduate Students

Henna Abunemeh (UIUC Astro), Adviser, Aug. 2024–present

- Working with Narayan on YSE spectroscopic sample, particularly spectroscopic twin supernovae
- Previous REU student in the UIUC IDEAS program with Narayan in Summer 2023

Padmavathi Venkatraman (UIUC Astro), Adviser, Aug. 2024–present

- Working with Narayan and Phil Marshall (SLAC) on strongly lensed quasars in Rubin/LSST
- Working on synthetic source injection of lensed quasars into Rubin Data Preview 2 data to measure efficieny

Aadya Agrawal (UIUC Astro), Adviser, Aug. 2023–present

- Working with Narayan and Dr. Justin Pierel on strongly lensed SNIa
- Leading analysis of lens model consistency paper with SN Hope
- Co-author on one paper on SN Hope (Pierel et al. '24)
- Working on *JWST* data analysis, *HST* supernovae programs

Tanner Murphy (UIUC Astro), Adviser, Aug. 2023–present, Research Collaborator, Aug. 2020-May 2021

- Working with Narayan on YSE DECAM data, and leading YSE Data Release 2
- Previous Masters at SUNY Stonybrook working with Prof. Will Farr on transients
- Published Murphy, Fields, Hogan and Narayan, MNRAS 2021 as an undergraduate at UIUC
- Advised by Prof. Brian Fields and worked with Narayan to study distribution of SNe within our Galaxy [77]

Haille Perkins (UIUC Astro), Adviser, 2023–present

- Working with Narayan on adding AGN afterglow model to KNe
- Assessing detectability of KNe with Rubin and *UVEX*
- Developing model for hierarchical inference of KNe population parameters
- Led paper with Prof. Brian Fields on determining lethality of nearby KNe

Amanda Wasserman (UIUC), Adviser, 2021–present

- Won DOE SCGSR Award to work on RESSPECT at LBNL in Spring 2024
- Working on developing RESSPECT active learning and real-time followup for LSST
- Member of LSST DESC & LSST commissioning team, and member of YSE and DECAT teams
- Working on spectroscopy of YSE SNIa, PI of Gemini N & S programs begun by Narayan

Patrick Aleo (UIUC), Adviser, 2020–2024

- Defended Ph.D., March 2024, began work at US National Security Campus, Kansas City
- Winner of Illinois Survey Science Fellowship (2020, 2021) and the Chu Award, 2023
- Worked on anomaly detection for transients within ZTF and YSE [7, LAISS]
- Led 1ˢᵗ data-release of YSE [14], combining data from three telescopes, using AI classification

Alex Gagliano (UIUC), Adviser, 2019–2023

- Defended Ph.D., April 2023, began as NSF IAIFI Fellow between MIT/Harvard, Fall 2023
- Winner of American Statistical Association Astrophysics Interest Group Paper of the Year, 2021
- Winner of the Simons Fellowship CCA (2021), NSF GRF (2020) and Illinois Survey Science Fellowship (2019)
- Worked on correlations between supernovae and their hosts [21, GHOST], SN 20200i [17], LSST PLAsTiCC, [13, SCOTCH], and other projects.

Daniel Muthukrishna (U. Cambridge), Co-Adviser, 2017–2021

- Now staff at MIT, working on *TESS* with Prof. George Ricker, Fall 2021
- Research with Narayan on deep learning for transient classification [26, RAPID]
- Previously graduate student at University of Cambridge, co-advised by Mandel and Narayan

Other Mentorship of Graduate Students

- Working closely with Ben Boyd (Cambridge, w/ Prof. Kaisey Mandel), Yiqi Xie (UIUC Physics w/ Prof. Nico Yunes) and previously with Dr. Qinan Wang (MIT) and Dr. Stephen Thorp (Stockholm)
- Served/serving on the prelim/thesis committee for Alejandro Cardenas-Avendano, Scott Perkins, Yiqi Xie (UIUC Physics), Aidan Berres, Colin Burke, Nicholas Earl, Margaret Sheperd, Chris Tandoi (Chair), Sunny Tang, Maggie Verrico, David Vizgan, Yujie Wan, Qiaoya Wu (UIUC Astro), Ana Sagues Carracedo (Oskar Klein Center, Stockholm University, Sweden) and Malema Hendrick Ramonyai (University of the Western Cape, S. Africa)
- 2021 summer research advisor for NCSA NRT Summer students Laura Salo (also co-author on ELAsTiCC papers) and Sai Sharan Sundar (together with Eliu Huerta) both from U. Minnesota
- Mentorship of grad students from the U. Arizona Computer Science Dept. on ANTARES, particularly Zhe Wang and Shuo Yang (2015–7)

Undergraduate Students

Gauri Nair (UIUC Astro), Adviser, Oct. 2024-present

- Working with grad student Tanner Murphy on YSE data release 2
- Reducing YSE DECam data with `photpipe` to find young supernovae
- Flagging new supernovae for spectroscopic follow-up

Arjun Chainani (UIUC Astro), Adviser, Aug. 2024-present

- Working with grad students Amanda Wasserman and Haille Perkins on RESSPECT framework for LSST Dark Energy Science Collaboration
- Modified RESSPECT to incorporate new ORACLE hierarchical classifier CITE
- Testing RESSPECT as a framework for rapid spectroscopic follow-up of anomalous transients

Mai Li (UIUC Astro), Adviser, Aug. 2023-May. 2024

- Worked on modeling *HST/STIS* spectroscopy, *HST/WFC3* photometry and ground-based spectroscopy of DA white dwarfs
- Collaborated with graduate students Aidan Berres and Ben Berres (Cambridge) to hierarchically model DA white dwarf sample, testing consistency with previous analysis [1]
- Summer REU at Cornell on gravitational waves

Ved Shah (UIUC CS), Adviser, Jan. 2021–May 2024

- Graduated May 2024, won dept. Wyatt award, now Astronomy Ph.D. at Northwestern, Fall 2024
- Led hierchical real-time classification model for LSST ELAsTiCC [3, ORACLE]
- Led kilonova rate analysis using Bayesian Inference Framework [5, 10]
- Developed M-dwarf flare model with Narayan and postdoc Malanchev; being integrated into PLAsTiCC
- NCSA Summer 2021 Intern; funded by LSST Enabling Science Program (PI Narayan)

Jason Vazquez (UIUC CS+Astro), Adviser, Feb. 2021–present

- Graduated, May 2023, now Physics Ph.D. at UW Milwaukee, Fall 2024
- Finished YSE type IIp sample with Narayan and Kilpatrick
- First-authored paper on SN2019mhm with Kilpatrick and Wong

- Worked on SN2021blg and 2022 YSE supernovae with other survey members
- 2021 Summer REU at Northwestern University with Prof. Wen-fai Fong & C.D. Kilpatrick

Qifeng Cheng (UIUC Astro), Adviser, Feb. 2021–present

- Graduated May 2023, won dept. Wyatt award, now PhD in Astronomy at Duke University in Fall 2023
- Developed new dwarf nova and changing-look AGN model with Narayan and postdocs Soraisam & Malanchev
- Northwestern REU with Patrick Sheehan, Summer 2021, funded by LSST Enabling Science Program (PI Narayan)
- Earned honors with Narayan for work in ASTR 210 by developing viz. of analema for exoplanetary systems

Sammy Sharief (UIUC CS+Astro), Adviser, Feb. 2021–present

- Began Masters in Computer Science at U. Montreal in Fall 2023
- Graduated May 2023, completed senior thesis on work at TAURUS program with Stella Offner (UIUC adviser, Narayan)
- Third author on YSE DR1 with Narayan and Patrick Aleo, and implemented YSE DECam pipeline [14]
- Adapted method to retrieve ZTF forced photometry from IPAC & modeling SNe
- REU on Multi-messenger Astrophysics at RIT, Summer 2021 and at TAURUS program, UT Austin, Summer 2022

Filip Matasic (UIUC CS+Astro), Adviser, Sep. 2021–May 2022

- Graduated May 2022, completed a senior honors thesis with Narayan, now working in InfoSec
- Worked with Aleo on YSE 1st data release [14]
- Analyzed properties of YSE and ZTF observations to generate simulations for ML models

Andrew Engel (UIUC Physics), Adviser, 2019–present

- Beginning Ph.D. at The Ohio State University as Dean's Fellow, Fall 2024
- Graduated May 2020 – went on to position as Sr. data scientist at PNNL
- Working on machine learning for photometric redshifts from galaxies – awarded NASA ADAP for photo-z work, and continuing to work with Narayan & Eileen Beyer
- Algorithm developed being used in both ANTARES and YSE - completing paper on research with Narayan in 2023

Daniel Alcantara (Bard College), Research Collaborator, 2016–9

- Intern with R. Street at Las Cumbres Observatory working on microlensing detection
- Worked with Narayan to dramatically improve performance of prototype classifier
- Published Alcantara, Bachelet, Narayan and Street, 2019
- Algorithm being used with MARS broker to find microlensing candidates with ZTF

Tayeb Zaidi (Macalester College), Honors Thesis Adviser, 2016–7

- Now in PhD Program for Biophysics at Northwestern University, working on MRI devices
- Worked with Narayan on ANTARES as summer REU student at NOAO in 2015
- Continued work on time-series classification for Senior Honors (earned April 2017)
- Published Narayan, Zaidi, Soraisam et al., 2018, adapted for LSST PLAsTiCC

Co-mentorship of Other Undergraduate Students

- Holly Wingren (UIUC Astronomy, '24) - jointly with Prof. Brian Fields and Alex Gagliano. REU at Fermilab & UIUC Statistics, won Layla Ryan Memorial Award from UIUC Astronomy, starting Masters in Education

- Athish Thiruvengadam (UIUC CS+Astronomy, '24) - jointly with Prof. Eliu Huerta
- Kunal Bhatia (UIUC Astronomy, '21) - jointly with Dr. Monika Soraisam. Now pursuing Masters in Physics at Uni. Heidelberg, Astronomisches Rechen-Institut in the Gravitational Lensing Group

Previous REU Students

- Henna Abunemeh (UIUC IDEAS, 2023) graduated May 2024 from UI Chicago, and is beginning her Ph.D. at UIUC, Fall 2024, having completed work on a DOE SULI REU at Argonne National Lab with Dr. Lindsey Bleem
- Marcus Lee (NOAO, 2014) was the first indigenous (Tohono O'odham) student to complete REU program at NOAO
- Linoy Kotler (STScI, 2018) worked on wavelet-based classification of Foundation photometric SNIa sample and is now at Rice University

Postdoctoral Scientists Mentored

Jack O'Brien (UIUC), Aug 2024–present

- Working with Narayan and grad student Amanda Wasserman on modeling supernovae photometry and spectroscopy to understand physical properties and progenitor systems
- Developing Foundation AI model for supernova property inference, anomaly detection and forecasting as part of NSF-Simons SkAI Institute
- Leading YSE analysis of type Iax supernova sample

Ayan Mitra (UIUC), Nov 2023–present

- Illinois Survey Science Postdoctoral Fellowship in 2023, also serves as a Dark Energy Science Collaboration (DESC) Pipeline Scientist
- Working with Narayan on SNe Ia cosmology analysis for the Young Supernova Experiment and DESC
- Leading analysis of photometrically classified SNe Ia sample with photometric redshifts

Konstantin Malanchev (UIUC), 2020–2023

- Now LINCC Research Scientist at Carnegie-Mellon University, Summer 2023–present
- Worked with Narayan and Patrick Aleo on anomaly detection, YSE DR1, developing feature extraction & ELAsTiCC
- Developing large cross-matched, cross-calibrated photometric database for LSST
- Worked with undergrad Qifeng Cheng on changing-look AGN model

Deep Chatterjee (UIUC), 2020–2022

- Second recipient of Illinois Survey Science Postdoctoral Fellowship
- Worked with Narayan on ANTARES on kilonovae detection and integration with SCiMMA
- Worked on using deep-learning for rapid approximation of neutron star EoS and identification of electromagnetic counterpart (El-Cid)
- Advised undergrad Ved Shah Gautam along with Narayan on estimating KN rates
- Now Alerts and Real-time Inference Lead at MIT LIGO Lab

Monika Soraisam (UIUC), 2019–2021

- First recipient of Illinois Survey Science Postdoctoral Fellowship
- Working with Narayan on ANTARES (since 2016), and extreme time-domain phenomena
- PI of NCSA CDDR grant to deploy ANTARES broker system on Radiant (Co-I Narayan)
- Worked with undergrads Qifeng Cheng on dwarf nova model, and Kunal Bhatia on ZTF transients
- Now Research Staff at Gemini Observatory

	ASTR 350, The Big Bang, Black Holes, and the End of the Universe, Fall 2023
	ASTR 310, Computing in Astronomy, UIUC, Fall 2021, Spring 2022, Fall 2022
	ASTR 210, Introduction to Astrophysics, UIUC, Fall 2020
	ASTR 596, Fundamentals of Data Science, UIUC, Spring 2020, Spring 2023
Instructor for:	ZTF Summer School, Pasadena, Aug. 2018
	LSST Data Science Fellowship Program, Session 5, Baltimore, Jan. 2018
	LSST Data Science Fellowship Program, Session 3, Tucson, Apr. 2017
	NOAO Teen Astronomy Cafe, "How Stars Die", Tucson, Nov. 2017
	NOAO Big Data Workshop for Tucson High School Students, Tucson, Jan. 2017
	Python Workshop for NOAO/NSO REU Students, Tucson, Summer 2014 & 2015

I've additionally served as a Teaching Assistant at Harvard, as Teaching Assistant, Lab Assistant and Tutor at Illinois Wesleyan, and as guest lecturer for Astro 102 (Instructors: C. Salyk and K. Garmany) at the Tohono O'odham Community College.

INVITED COLLOQUIA/SEMINARS/CONFERENCES, 2018–PRESENT

University of Wisconsin, Milwaukee, Astrophysics Seminar, Dec. 2024
Invited Speaker, Fast Machine Learning for Science, Purdue University, Oct. 2024
Invited Speaker, Gravitational Wave Physics and Astronomy Workshop, Birmingham, UK, May 2024
Invited Speaker, Hot Wiring the Transient Universe VII, University of Toronto, Canada, May 2024
Invited Speaker, Time-Domain Needles in Rubin's Haystacks, Harvard University, Apr. 2024
Invited Speaker, LSST Information and Statistics Science Collaboration, Harvard University, Apr. 2024
Special Seminar, DARK, Copenhagen, Denmark, Feb. 2024
Invited Speaker, What Was That? ESO in the Era of LSST, Garching, Germany, Jan. 2024
Invited Speaker, Cosmic streams in the era of Rubin, Puerto Varras, Chile, Dec. 2023
University of Pennsylvania, Dept. of Physics and Astronomy, Colloquium, Oct. 2023
Invited Speaker, Windows on the Universe, Tucson, Oct. 2023
Indiana University, Dept. of Astronomy, Colloquium, Sep. 2023
Invited Speaker, LSST Project and Community Workshop, Aug. 2023
Invited Speaker, SuperNova EXplosions: Theory and Observations, Technion, Israel, Aug. 2023
Invited Speaker, MARS Lecture Series, Pacific Northwest National Labs, May 2023
Invited Speaker, Multi-wavelength follow-up of Fast Radio Bursts, Toronto, Apr. 2023
Session Chair, Supporting Computational Science with Rubin LSST, Virtual, Mar. 2023
Panelist, The Future of Astrophysical Data Infrastructure, New York, Feb. 2023
Speaker, Panelist, Session Chair, AAS 241, Seattle, Jan. 2023
Dark Energy Science Collaboration, Plenary Talk, University of Chicago, Jul. 2022
Speaker, Bayesian Deep Learning for Cosmology and Time Domain Astrophysics, Paris, Jun 2022
Pennsylvania State University, LSST Workshop, May. 2022
LSST European Broker Coordination Seminar, Apr. 2022
SCiMMA Public Telecon, "A Data Lake for Multi-messenger Astrophysics", Oct. 2021
Pennsylvania State University, Dept. of Astronomy and Astrophysics Colloquium, Mar. 2022
Invited Speaker, Cherenkov Telescope Array Project, Jun 2021
Invited Speaker, AAS 238, Meeting-in a-meeting (MiM) on Machine Learning, Jun 2021
LSST Photometric Calibration Working Group Workshop, May 2021
LSST Broker Workshop, Apr 2021
DESI Time-domain Meeting, Apr 2021
LSST DESC Virtual Meeting - Jul 2020
SciMMA Virtual Meeting, May 2020
Plenary, Kentucky Area Astronomy Annual Meeting - Louisville, KY, Mar 2020
LSST DESC Annual Meeting - Tucson, AZ, Jan 2020
Kavli Visitor, University of Cambridge, Institute of Astronomy, Dec 2019
Speaker, Session Chair, LSST TVS and SMWLV workshop - Newark, DE, Oct 2019
Speaker, SNIa Cosmology Analysis Meeting - KICP Chicago, IL, Oct 2019
Invited Speaker, Inference for Multi-messenger Astrophysics - Berkeley, CA, May 2019
Invited Speaker, University of Delaware, Astronomy Seminar - Newark, DE, May 2019
Invited Speaker, University of Illinois, LSST Seminar - Urbana-Champaign, IL, Apr. 2019
Iowa State University, Dept. of Physics & Astronomy Colloquium - Ames, IA, Apr. 2019
Louisiana State University, Dept. of Physics & Astronomy Colloquium - Baton Rouge, LA, Mar. 2019
University of Wisconsin, Dept. of Physics Colloquium - Milwaukee, WI, Mar. 2019
University of Alabama, Dept. of Physics & Astronomy Colloquium - Tuscaloosa, AL, Mar. 2019
Michigan Technological University, Dept. of Physics Colloquium - Houghton, MI, Feb. 2019
University of Illinois, Dept. of Astronomy Colloquium - Urbana-Champaign, Feb. 2019

SERVICE & PUBLIC OUTREACH WORK

Service to Scientific Collaborations

Interim Rubin Science Collaboration Coordinator, Rubin Observatory, July 2024–present
Analysis Coordinator, LSST Dark Energy Science Collaboration, 2023–present
Deputy Analysis Coordinator, LSST Dark Energy Science Collaboration, 2021–2023
Executive Committee, Young Supernova Experiment, 2020–present
Member, SN Science Investigation Team, Nancy Grace Roman Space Telescope, 2020–present
Organizer, LSST DESC Hack Week at UIUC, Summer 2022
Co-convener, LSST DESC Supernova Working Group, 2019–2021

Service to the UIUC Astronomy Department

Deputy Director, UIUC/NCSA Center for Astrophysical Surveys, Spring 2021–present
Senator, UIUC Faculty Senate, Fall 2022–present
UIUC AURA Member Representative, 2021–present
Colloquium Chair, UIUC Astronomy, AY 2020, Spring 2023
Member, Faculty Search Committee, UIUC Astronomy, 2020, 2021 & 2023
Reader, Graduate Admissions Committee, UIUC Astronomy, 2023, 2024
Representative, UIUC Astronomy X Data Science Program, 2022–present
Member, UIUC Astronomy Curriculum Committee, AY 2021–present
Member, UIUC Astronomy Computing Committee, AY 2022–present
Member, UIUC Astronomy EDI Committee, 2020–2023

Meetings and Talk Series

Chair, LSST Dark Energy Science Collaboration Meeting, July 2025
Co-Chair, DES-DESC Splinter Meeting at AAS 245, National Harbor, MD, Jan. 2025
SOC, Unveiling the Dynamic Universe: Cosmic Streams in the Era of Rubin, Puerto Varas, Chile, Dec. 2023
SOC & LOC, The Transient and Variable Universe, UIUC, July 2023
Chair, Boom! A Workshop on LSST Transients, UIUC, July 25–9, 2022
SOC, COSMO-2021 meeting, Virtual, Aug 2–6, 2021
SOC, Managing Follow-up Observations in the Era of ZTF and LSST, NSF's NOIRLab, Sep. 30–Oct. 4, 2019
Chair, Enabling Multi Messenger Astrophysics in the Big Data Era, STScI, Apr. 25–26, 2019
SOC, Deep Learning for Multimessenger Astrophysics: Real-time Discovery at Scale, Oct. 2018
LOC, Building the Infrastructure for Time-Domain Alert Science in the LSST Era, May 2017
Organizer, NOAO FLASH Talk Series, 2015–2017
Organizer, NOAO Coffee Hour Series, 2014–5

Service to the Community

Panelist, NASA Review Panel, Jan-Jun 2022 & Jan-Jun 2024
Panelist, NSF Review Panel, Mar 2020
Editorial Board, Astronomy and Computing, to begin Fall 2023
Reviewer for the AAS Journals, MNRAS, ongoing

Public Outreach

Invited Talk and Stargazing, Dark Sky Series, Middle Fork River Forest Preserve, July 2024

Invited Talk, St. Louis Astronomical Society, Washington University, St. Louis, May 2024

Illinois Solar Eclipse, Apr. 2024

Invited Talk, Stargazing and S'mores, Allerton Park & Retreat Center, Sep. 2023

Inivted Talk, UIAS Open Night, May 2023

Invited Talk, Illinois Dark Skies Star Party, Sangamon Astronomical Society, Oct 2022

Stargazing, Family Night Campout, Allerton Park & Retreat Center, Oct 2022

Invited Talk, University of Illinois Astronomical Society, Sep 2022

Kaler Lecture, Starkel Planetarium - Champaign, IL, Oct 2020

Speaker, Astronomy on Tap - Urbana-Champaign, "The Myth and Mythology of the Planets", Feb 2020

Organizer, Astronomy on Tap - Urbana-Champaign, Nov 2019–Aug 2022

Speaker, Astronomy on Tap - Urbana-Champaign, "Making a Movie of the Night Sky", Sep. 2019

Organizer, Astronomy on Tap - Tucson/Space Drafts, 2015-2017

Speaker, Space Telescope Public Lecture Series, Chasing Supernovae with Kepler, Sep. 2018

Guest, Three Body Problems Podcast, Bringing Data Science Into Astronomy, Sept. 2018

Scientist, TED-Ed Original Videos (Pt. 1) (Pt. 2)

Speaker, 365 Days of Astronomy Podcast (Pt. 1) (Pt. 2)

Speaker, Youth for Astronomy and Engineering, Nov. 2018

Speaker, NerdNite Baltimore, Mar. 2018

Panelist, Tucson Comic Con and TUSCon, Nov. 2015 and 2016
   "Robots in Space" and "The Physics of Space Battles"

Speaker, Astronomy on Tap - Tucson with the Tucson Symphony Orchestra, Oct. 2016
   "A Trip through Gustav Holst's Planets"

Speaker, Astronomy on Tap - Tucson, Jan. 2015
   "If You Only Knew The Power of The Dark Side"

Speaker, Green Valley Astronomy Club, Sahuarita, AZ, May 2016

Volunteer, Science Night, Elvira Elementary School, Tucson, AZ, Mar. 2015 and Mar. 2017

Volunteer, Astronomy Night, Arizona Sonoran Desert Museum, Jul. 2015

Volunteer, Kitt Peak National Observatory Open Night for the Tohono O'odham Nation, May 2015

Volunteer, Tucson Festival of Books, Mar. 2015

I've led public stargazing at the Museum of Science in Boston (2011–2), the Table Mountain star party, WA (2006) and throughout my time as an undergraduate at Illinois Wesleyan's Mark Evans Observatory (2001–5).

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LIST OF PUBLICATIONS

h-index: 42, 9072 citations.   (Scopus/Google Scholar)
Publications are listed with 1st author or major contributor first.

Primary Publications

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