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RESEARCH INTERESTS	Experimental cosmology, astrophysical instrumentation, data analysis, polarimetry, cosmic microwave background, interstellar medium, dust, cryogenics, balloon-borne telescopes	
EDUCATION	The University of Pennsylvania , Philadelphia, PA Ph.D., Physics and Astronomy May 2016 <ul style="list-style-type: none"> • <i>Magnetic Fields in Molecular Clouds: The BLASTPol¹ and BLAST-TNG² Experiments</i> • Adviser: Prof. Mark Devlin 	
	California Institute of Technology , Pasadena, CA B.S., Astrophysics June 2008	
RESEARCH EXPERIENCE	University of California San Diego , La Jolla, CA Sept. 2016 - Present <i>Simons Observatory Postdoctoral Scholar</i> <ul style="list-style-type: none"> • Simons Observatory leader for camera design, integration, and testing. • Simons Observatory systematic studies, data acquisition, and analysis. • BLAST-TNG flight preparations and Antarctic deployment. • Simons Array design, field deployment to Chile, and calibration. • Lead for renovation and setup of new highbay laboratory space at UCSD. 	
	University of Pennsylvania , Philadelphia, PA Sept. 2010 - May 2016 <i>Graduate Student</i> <ul style="list-style-type: none"> • BLAST-TNG leader for liquid helium camera design, construction, and testing. • BLASTPol data reduction and analysis. • BLASTPol commissioning, testing, and Antarctic launch. 	
	California Institute of Technology , Pasadena, CA Jun. 2006 - Jun. 2008 <i>Undergraduate Researcher</i> <ul style="list-style-type: none"> • Developed a radio interferometer for atmospheric characterization. 	
	Jet Propulsion Laboratory , Pasadena, CA Jun. 2005 - Sept. 2005 <i>Summer Undergraduate Research Fellowship</i> <ul style="list-style-type: none"> • Developed a lunar based seismometer for the detection of strange quark matter. 	
FELLOWSHIPS AND AWARDS	Fulbright Scholar Program Selected Feb. 2020 <i>Fulbright Postdoctoral Scholar Award</i> <ul style="list-style-type: none"> • Awarded for 2020/2021 grant cycle, scheduled for March to July 2021. • Research will focus on developing a drone-based polarized calibration technique for millimeter telescopes with Prof. Rolando Dünner Paella at Pontificia Universidad Católica de Chile. 	
	University of Pennsylvania , Philadelphia, PA Sept. 2015 - May 2016 <i>School of Arts and Sciences Dissertation Completion Fellowship</i> <ul style="list-style-type: none"> • Fellowship fully funds student for the final year of their dissertation. • One student is nominated from the department each year. 	
	American Astronomical Society (AAS) Jan. 2015 - Present <i>Astronomy Ambassador</i> <ul style="list-style-type: none"> • Awarded in partnership with the Astronomical Society of the Pacific (ASP). • AAS Ambassador status maintained through continued Astronomy outreach work. 	

¹BLASTPol: The Balloon-borne Large Aperture Submillimeter Telescope for Polarimetry

²BLAST-TNG: The Balloon-borne Large Aperture Submillimeter Telescope - The Next Generation

RECENT	Invited, Cornell University LEPP Seminar, Virtual	Jan. 2021
PROFESSIONAL	<i>The Simons, BLAST, and CCAT Observatories: Probing the beginning of the Universe with precision polarimetry experiments</i>	
TALKS	237th Meeting of the American Astronomical Society, Virtual	Jan. 2021
	<i>The Simons Observatory: the Small Aperture Telescopes (SATs)</i>	
	Invited, San Diego Astronomy Association Monthly Meeting, Virtual	Aug. 2020
	<i>The Microwave Telescopes of the Simons Observatory</i>	
	Invited, University of California Riverside Dept. of Physics and Astronomy Seminar, Virtual	May. 2020
	<i>The Simons Observatory and BLAST-TNG: Probing the beginning of the Universe with precision polarimetry experiments</i>	
	Invited, University of Iowa Dept. of Physics and Astronomy Colloquium, Iowa City, IA	Feb. 2020
	<i>The Simons Observatory and BLAST-TNG: Probing the beginning of the Universe with precision polarimetry experiments</i>	
	Invited, Cardiff University Seminar, Cardiff, UK	Sept. 2019
	<i>Forethought for foregrounds: Next steps in precision cosmology with the Simons Observatory and BLAST-TNG</i>	
	Invited, Midwest Magnetic Fields Meeting 2019, Madison, WI	May 2019
	<i>Dust polarimetry of the interstellar medium with the Simons Observatory and BLAST-TNG</i>	
	233rd Meeting of the American Astronomical Society, Seattle, WA	Jan. 2019
	<i>BLAST-TNG: Antarctic pre-flight integration</i>	
	Invited, University of Southern California Colloquium, Los Angeles, CA	Sept. 2018
	<i>Forethought for foregrounds: Next steps in precision cosmology</i>	
	SPIE Astronomical Telescopes + Instrumentation, Austin, TX	Jun. 2018
	<i>The Simons Observatory: Instrument Overview</i>	
PROFESSIONAL	Simons Observatory Collaboration	
SERVICE	Chilean Engagement program leader.	Oct. 2020 - Present
	Equity, Diversity, and Inclusion program member.	May 2020 - Present
	Organizer for the inaugural Simons-NSBP Scholars Program.	Jun. 2020 - Aug. 2020
	Small aperture telescope, work breakdown structure Level 3 leader.	Sept. 2017 - Present
	Education and public engagement committee co-leader.	Sept. 2016 - Oct. 2020
	Local organizing committee member.	Jun. 2017
	Cryogenics working group co-leader.	Sept. 2016 - Sept. 2017
	CMB-S4 Collaboration	
	Education and Public Outreach Committee member.	Aug. 2020 - Present
	Local organizing committee member.	Oct. 2019
	UCSD Physics Department	
	Education and Public Outreach Committee member.	Aug. 2018 - Present
	NASA	
	Review panel member.	Jun. 2017
	Polarbear Collaboration	
	Remote observer for Polarbear-1 Chilean observations.	Sept. 2016 - Jun. 2017
	Internal reviewer for a publication.	Oct. 2016
PROFESSIONAL	National Society of Black Physicists	2020 - Present
MEMBERSHIP	CMB-S4 Collaboration	2018 - Present
	Simons Observatory Collaboration	2016 - Present
	Polarbear Collaboration	2016 - Present
	American Astronomical Society	2015 - Present
	SPIE: The international society for optics and photonics	2014 - Present
	BLAST Collaboration	2012 - Present

MENTORING
EXPERIENCE

University of California San Diego, La Jolla, CA

Graduate Students

Bryce Bixler, <i>UCSD</i>	Jan. 2020 - Present
Kaiwen Zheng, <i>Princeton University</i>	Jan. 2020 - Dec. 2020
• Mentee within the Simons Observatory Mentorship Program.	
Michael Randall, <i>UCSD</i>	June 2019 - Present
Jacob Spisak, <i>UCSD</i>	June 2018 - Present
Ningfeng Zhu, <i>University of Pennsylvania</i>	Jan. 2018 - Present
• Mentee within the Simons Observatory Mentorship Program.	
Tran Tsan, <i>UCSD</i>	Sept. 2017 - Present
Joseph Seibert, <i>UCSD</i>	Sept. 2017 - Present
Maximiliano Silva-feaver, <i>UCSD</i>	Sept. 2016 - Present

Research Assistants

Joseph Rodriguez, <i>UCSD</i>	Nov. 2019 - Mar. 2020
Christopher Ellis, <i>UCSD</i>	June 2019 - June 2020
• Currently a physics graduate student at University of Nevada, Reno.	
Kevin Crowley, <i>UCSD</i>	Sept. 2016 - June 2018
• Currently a physics graduate student at Princeton University.	

Undergraduate Researchers

Hakob Abajian, <i>UCSD</i>	June 2019 - Dec. 2019
Tamar Ervin, <i>University of Southern California</i>	July 2019 - Sept. 2019
Logan Foote, <i>University of California Berkeley</i>	June 2019 - Aug. 2019
• Currently a physics graduate student at Caltech.	

University of Pennsylvania, Philadelphia, PA

Mark Giovinazzi, <i>Undergraduate, Drexel University</i>	Jan. 2015 - May 2016
• Currently a physics and astronomy graduate student at the University of Pennsylvania.	
Timothy McSorley, <i>Undergraduate, Drexel University</i>	Jan. 2015 - May 2016
• Currently a physics and astronomy graduate student at the University of California Irvine.	

TEACHING
EXPERIENCE

The Center for Engaged Teaching, La Jolla, CA

<i>Introduction to College Teaching</i>	Oct. 2017 - Dec. 2017
• Developed expertise in evidence-based teaching practices that support student learning.	
• Developed and presented a lesson plan that included active learning components.	

The Netter Center, Philadelphia, PA

<i>The Netter Center Astronomy Curriculum Chair</i>	Aug. 2015 - May 2016
• Developed a 12 Lesson Astronomy Curriculum for an under-served inner-city high school.	
• Course included organizing lessons and facilitating demonstrations.	
• Mentored undergraduate student volunteers who assisted in teaching the course.	

iPraxis, Philadelphia, PA

<i>iPraxis Afterschool Class Mentor</i>	Jan. 2015 - May 2015
• A reverse engineering class for inner-city middle school students.	
• Created activities to help students understand how basic mechanical/electrical devices worked.	

University of Pennsylvania, Philadelphia, PA

<i>Teaching Assistant</i>	Jan. 2013 - May 2013
• Phys 101: General Physics: Mechanics, Heat, and Sound	
• Responsibilities included leading a weekly recitation section, grading, and office hours.	
• Instructor: Prof. Mark Devlin	

Teaching Assistant **Aug. 2011 - Dec. 2011, Jan. 2012 - May 2012, Aug. 2012 - Dec. 2012, Aug. 2013 - Dec. 2013**

• Astr 001: Survey of the Universe	
• Undergraduate course in basic astronomy for non-science majors.	
• Responsibilities included grading and office hours.	
• Instructor: Prof. Mark Devlin	

Center for Teaching and Learning

Aug. 2012

- Teaching Assistant Training Workshop Leader
 - Developed lessons on teaching methodology in months prior to workshop.
 - Taught lessons and interactive sessions over one week period prior to start of semester.
 - Responsible for training new teaching assistants for the School of Arts and Sciences.

Teaching Assistant

Aug. 2010 - Dec. 2010

- Phys 101 and Phys 102 - Laboratory
 - Lab courses in physics, concentrating on mechanics, electricity, and magnetism.
 - Responsibilities included preparing laboratory lectures and demonstrations, supervising student lab groups, and grading lab reports.
 - Lab supervisor: Dr. Robert Johnson

LABORATORY EXPERIENCE **Software:**

- *SolidWorks*: Extensive experience with design and simulation.
- *COMSOL Multiphysics*: Experience with mechanical and thermal simulation software.
- *GrabCAD*: Organizational and administrative experience with versioning control software within several collaborations.
- *Microsoft Project*: Significant work constructing and managing project Gantt charts.
- *Jira/Confluence*: Utilized to coordinate the research activities of the graduate students I mentor.
- *Zemax*: Experience with optical design and simulation.
- Experience with Excel, MATLAB, and Mathematica.

Instrumentation, Control, Data Acquisition, Test, and Measurement:

- Extensive cryogenic experience with sub-kelvin systems including dilution refrigerators as well as liquid cryogen handling.
- Experience with FARO Laser Trackers for surface accuracy and alignment measurements.
- Significant experience with Fourier transform spectrometers for bandpass measurements.

Data analysis:

- *Python/Jupyter*: Extensive use for data analysis and observatory control software.
- *TOAST*: Experience with map-making software designed for time-ordered data processing used in both SO and BLASTPol.
- *C++ and Perl*: Implemented for instrument control programs and data reduction.
- *UNIX shell scripting*: General experience for a variety of applications.
- *Jython*: Experience for use with the Herschel ESA instrument data reduction tools.

PUBLIC ENGAGEMENT

University of California San Diego

Astronomy on Tap San Diego Co-Lead

Aug. 2017 - Present

- Co-founder of the San Diego branch of Astronomy on Tap.
- Organize public talks with co-lead, Prof. Lisa Will, at local venues for the general public.

Comicon panel member, "Putting more science in your fiction" **July 2017, 2018, 2019, 2020(Remote)**

- Invited by the STEM advocacy group "The League of Extraordinary Scientists and Engineers."
- Fielded questions from members of the public attending the convention.

San Diego Festival of Science and Engineering - Sponsored Booth

March 2017, 2018, 2019, 2020

- Primary organizer for our department's booth.
- Physics demonstrations performed by volunteer faculty, graduate students, and undergraduates.

Skype a Scientist

Jan. 2017 - Jan. 2018

- Classrooms are connected with scientists to ask questions and learn about their research.
- Interacted with over 100 students during active period.

UCSD Cosmology - Lab Tours

Sept. 2016 - Mar. 2020

- Tours occur on average every other month.
- Groups of 5 to 80 students with an age range from middle school to community college.

Fleet Science Center - #2Scientists

Sept. 2016 - Feb. 2020

- An event hosted at local bars that occurs once per quarter.
- Members of the public ask participating scientists a wide range of science questions.

San Diego area public talks **Sept. 2016 - Present**
• Occur once per quarter on average.
• Venues have included bars, science festivals, and local astronomy association functions.

San Diego Astronomy Association - Active member **Sept. 2016 - Present**
• Participate in observing nights open to the public.

Simons Observatory

Education and Public Engagement Committee - Social Media **Oct. 2017 - Present**
• Co-manage the social media accounts and website for the observatory.

Fleet Science Center - Cosmology and Cocktails **June 2017**
• Organized a panel event followed by mingling with the public at the Fleet Science Center.
• Event included over 50 members of the collaboration with over 500 attendees.

Popscope

Public Astronomy Nights **March 2015 - Present**
• Sidewalk astronomy program to bring telescope observing to diverse communities.
• Involves transporting telescopes to public spaces and organizing observations of night sky targets.

University of Pennsylvania

Department of Physics and Astronomy - Public Astronomy Nights **Sept. 2011 - May 2016**
• Open night for the public held each semester with demonstrations, a lecture, and observing.

Philadelphia Science Festival - Science Carnival Sponsored Booth **May 2015, May 2016**
• Organized the Department of Physics and Astronomy's demonstration booth.
• Selected for sponsorship by the University of Pennsylvania.
• Booth had multiple activity stations at the carnival which is attended by thousands of people.

Philadelphia Science Festival - Clark Park Discovery Days **April 2015, April 2016**
• Organizer for the Department of Physics and Astronomy's demonstration booth.
• An event held at a Philadelphia park to provide science outreach to the local community.

Pennsylvania Science Olympiad - Urban Schools Initiative
Philadelphia Regional Science Olympiad Competition **March 2015**
• Volunteered with the Science Olympiad competition for urban underserved schools.
• Assisted in organizational and judging responsibilities.

REFEREED PUBLICATIONS

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- [2] Adachi S. et al., *A Measurement of the CMB E-mode Angular Power Spectrum at Subdegree Scales from 670 Square Degrees of POLARBEAR Data*, 2020, *ApJ*, 904, doi:10.3847/1538-4357/abbacd
- [3] The Polarbear Collaboration et al., *A Measurement of the Degree Scale CMB B-mode Angular Power Spectrum with POLARBEAR*, 2020, *ApJ*, 897, doi:10.3847/1538-4357/ab8f24
- [4] Ali, A. et al., *Small Aperture Telescopes for the Simons Observatory*, 2020, *JLTP*, 169A, doi:10.1007/s10909-020-02430-5
- [5] Gordon, S. et al., *Preflight Detector Characterization of BLAST-TNG*, 2020, *JLTP*, 400G, doi:10.1007/s10909-020-02459-6
- [6] Kaneko, S. et al., *Deployment of uc(Polarbear)-2A*, 2020, *JLTP*, 199.1137K, doi:10.1007/s10909-020-02366-w
- [7] Sathyanarayana Rao, M. et al., *Simons Observatory Microwave SQUID Multiplexing Readout: Cryogenic RF Amplifier and Coaxial Chain Design*, 2020, *JLTP*, 199.807S, doi:10.1007/s10909-020-02429-y
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- [9] Aguilar Faundez, M. et al., *Cross-correlation of POLARBEAR CMB Polarization Lensing with High-z Sub-mm Herschel-ATLAS galaxies*, 2019, *ApJ*, 886, doi:10.3847/1538-4357/ab4a78

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- [12] Shariff, J. A. et al., *Submillimeter Polarization Spectrum of the Carina Nebula*, 2019, *ApJ*, 872, doi:10.3847/1538-4357/aaff5f
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- [16] Soler, J. D. et al., *The relation between the column density structures and the magnetic field orientation in the Vela C molecular complex*, 2017, *A&A*, 603, idA64, doi:10.1051/0004-6361/201730608
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- [20] Gandilo, N. N. et al., *Submillimeter Polarization Spectrum in the Vela C Molecular Cloud*, 2016, *ApJ*, 824, 84 doi:10.3847/0004-637X/824/2/84
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- [23] Chui, T. et al., *Cryogenics for Lunar Exploration*, 2006, *Cryogenics*, Volume 46, Issue 2-3, p. 74-81, doi:10.1016/j.cryogenics.2005.10.006

PUBLICATIONS
IN REVIEW

- [1] Cheng, Y. et al. *Star Formation in a Strongly Magnetized Cloud*, 2021, *Submitted to ApJ*, arXiv:2101.01326
- [2] Tsan, T., Galitzki, N. et al. *The effects of inclination on a two stage pulse tube cryocooler for use with a ground based observatory*, 2021, *Submitted to Cryogenics*
- [3] Abitbol, M. et al., *Simons Observatory: Bandpass and polarization-angle calibration requirements for B-mode searches*, 2020, *Submitted to JCAP*, arXiv:2011.02449
- [4] The CMB-S4 Collaboration et al., *CMB-S4: Forecasting Constraints on Primordial Gravitational Waves*, 2020, *Submitted to ApJ*, arXiv:2008.12619

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- [2] Lowe, I. et al., *Characterization, deployment, and in-flight performance of the BLAST-TNG cryogenic receiver*, 2020, *Proc. of SPIE*, arxiv:2012.01372v1
- [3] Coppi, G. et al., *In-flight performance of the BLAST-TNG telescope platform*, 2020, *Proc. of SPIE*, 11445, doi:10.1117/12.2560849
- [4] Golec, J. E. et al., *Design and fabrication of metamaterial anti-reflection coatings for the Simons Observatory*, 2020, *Proc. of SPIE*, 11451, doi:10.1117/12.2561720
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- [6] Koopman, B. et al., *The Simons Observatory: Overview of data acquisition, control, monitoring, and computer infrastructure*, 2020, *Proc. of SPIE*, arXiv:2012.10345
- [7] Xu, Z. et al., *The Simons Observatory: the Large Aperture Telescope Receiver (LATR) Integration and Validation Results*, 2020, *Proc. of SPIE*, arXiv:2012.07862
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- [9] Abazajian, K. et al., *CMB-S4 Decadal Survey APC White Paper*, 2019, arxiv:1908.01062
- [10] The Simons Observatory Collaboration et al., *The Simons Observatory: Astro2020 Decadal Project Whitepaper*, 2019, arxiv:1907.08284
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- [15] **Galitzki**, N. on behalf of the Simons Observatory Collaboration, *The Simons Observatory: Project Overview*, 2018, *Proc. of CIPANP*, arxiv:1810.02465
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- [17] Hill, C. A. et al. *BoloCalc: a sensitivity calculator for the design of Simons Observatory*, 2018, *Proc. of SPIE*, 10708, doi:10.1117/12.2313916
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- [19] Orłowski-Scherer, J. L. et al. *Simons Observatory large aperture receiver simulation overview*, 2018, *Proc. of SPIE*, 10708, doi:10.1117/12.2312868
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- [21] Zhu, N. et al. *Simons Observatory large aperture telescope receiver design overview*, 2018, *Proc. of SPIE*, 10708, doi:10.1117/12.2312871
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- [30] Dober, B. et al. *Optical Demonstration of THz, Dual-Polarization Sensitive Microwave Kinetic Inductance Detectors*, 2016, *JLTP*, 184, doi:10.1007/s10909-015-1434-3
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