Shubham Kanodia

525 Davey Lab, State College, PA 16802

https://shbhuk.github.io/ shbhuk@gmail.com

EDUCATION

Pennsylvania State University — **Pennsylvania, USA**
Doctor of Philosophy (Ph.D.) Astrophysics — Sept 2017 - Now

Brown University — **Rhode Island, USA**
Master of Science (Sc.M.) Physics — Sept 2015 - Dec 2016

St. Xavier's College — **Mumbai, India**
Bachelor of Science (B.Sc.) Physics — June 2012 - Apr 2015

AWARDS

- Downsbrough Graduate Fellowship in Astrophysics, Penn State, 2021
- Zaccheus Daniel Fellowship, Penn State, 2018, 2020
- Homer F. Braddock / Nellie H. and Oscar L. Roberts Fellowship, Penn State, 2017
- J.N. Tata Endowment Fund for Higher Education, Mumbai, 2015
- INSPIRE Scholarship - Government of India, Mumbai, 2013

SKILLS

- **Software** - Python, Zemax, R, LaTeX, IDL, SolidWorks, Java, Javascript
- **Outreach** -
  - Volunteered for Astrofest - Penn State Department of Astronomy Annual outreach event (July 2017, 2018, 2019)
  - Volunteered with Brown Cubesat Educational Outreach Saturday STEM program at West Broadway Middle School to communicate Science and Physics to students. (Oct 2015 - Apr 2016)
  - Volunteered at Umang Foundation, Mumbai - teaching underprivileged children basic Mathematics and English. (Dec 2012 - Dec 2014)

PUBLICATIONS

1st-3rd AUTHOR

- **Shubham Kanodia**, Gudmundur Stefansson, Caleb I. Canas, and others, "TOI-532b: The Habitable-zone Planet Finder confirms a Large Super Neptune in the Neptune Desert orbiting a metal-rich M dwarf host", *Accepted in the Astronomical Journal, 2021.* [ADS].
- **Shubham Kanodia**, Samuel Halverson, J. P. Ninan, and others, " A Harsh Test of Far-field Scrambling with the Habitable-zone Planet Finder and the Hobby-Eberly Telescope ", *The Astrophysical Journal, 912, 1, 11, (2021).* [ADS].
- **Shubham Kanodia**, J. P. Ninan, A. J. Monson, Suvrath Mahadevan, and others, "Ghosts of NEID's Past", *Proceedings of the SPIE, 11447, 1144740 (2020).* [ADS].
- Christian Schwab, Andrew Monson, **Shubham Kanodia**, "The NEID spectrometer: fibre injection system design", *Proceedings of the SPIE, 11447, 114474L (2020).* [ADS].
- Jason Wright, and **Shubham Kanodia**, "Barycentric Corrections for Precise Radial Velocity Measurements of Sunlight", *The Planetary Science Journal, 1, 2, 38, (2020).* [ADS].

- Caleb I. Cañas, Gudmundur Stefansson, **Shubham Kanodia**, "A warm Jupiter transiting an M dwarf: A TESS single transit event confirmed with the Habitable-zone Planet Finder", *The Astronomical Journal, 160, 3, 147, (2020).* [ADS].
- **Shubham Kanodia**, Caleb I. Canas, Gudmundur Stefansson, and others, "TOI-1728b: The Habitable-zone Planet Finder confirms a warm super Neptune orbiting an M dwarf host", *The Astrophysical Journal, 899, 1, 29, (2020).* [ADS].
- **Shubham Kanodia**, Angie Wolfgang, Gudmundur K. Stefansson, Bo Ning, Suvrath Mahadevan, "Mass-Radius relationship for M dwarf exoplanets: Comparing nonparametric and parametric methods", *The Astrophysical Journal, 882, 1, 38, (2019).* [ADS].
- Jason Wright, **Shubham Kanodia** and Emily Lubar, "How Much SETI Has Been Done? Finding Needles in the n-dimensional Cosmic Haystack", *The Astronomical Journal, 156, 6, 260, (2018).* [ADS].
- **Shubham Kanodia**, Suvrath Mahadevan, Lawrence. W. Ramsey, and others, "Overview of the spectrometer optical fiber feed for the Habitable-zone Planet Finder", *Proceedings of the SPIE, 10702, 107026Q (2018).* [ADS].
- **Shubham Kanodia**, and Jason Wright, "Python Leap Second Management and Implementation of Precise Barycentric Correction (barycorrpy)", *Research Notes of the AAS, 2, 1 (2018).* [ADS].

CO-AUTHOR

- Vigneshwaran Krishnamurthy, Teruyuki Hirano, Gudmundur Stefansson, and others, " Nondetection of Helium in the Upper Atmospheres of TRAPPIST-1b, e, and f", *The Astrophysical Journal, 162, 82 (2021).* [ADS].
- Shreyas Vissapragada, Gudmundur Stefansson, Michael Greklek-McKeon, " A Search for Planetary Metastable Helium Absorption in the V1298 Tau System ", *The Astrophysical Journal - Accepted (2021).* [ADS].
- Jack Lubin, Paul Robertson, Gudmundur Stefansson, and others, " Stellar Activity Manifesting at a One Year Alias Explains Barnard b as a False Positive", *The Astrophysical Journal, 162, 61 (2021).* [ADS].
- Suvrath Mahadevan, Gudmundur Stefansson, Paul Robertson, and others, "The Habitable-zone Planet Finder Detects a Terrestrial-mass Planet Candidate Closely Orbiting Gliese 1151: The Likely Source of Coherent Low-frequency Radio Emission from an Inactive Star", *The Astrophysical Journal Letters - Accepted (2021).* [ADS].
- Arvind Gupta, Jason Wright, Paul Robertson, and others, "Target Prioritization and Observing Strategies for the NEID Earth Twin Survey", *The Astronomical Journal, 161, 30, (2021).* [ADS].
- Gudmundur Stefansson, Ravi Kopparapu, Andrea Lin, and others, "A Mini-Neptune and a Venus-Zone Planet in the Radius Valley Orbiting the Nearby M2-dwarf TOI-1266: Validation with the Habitable-zone Planet Finder", *The Astronomical Journal, 160, 6, 259, (2020).* [ADS].
- Gudmundur Stefansson, Suvrath Mahadevan, Marissa Maney, and others, "The Habitable-zone Planet Finder Reveals A High Mass and a Low Obliquity for the Young Neptune K2-25b", *The Astronomical Journal, 160, 4, 192, (2020).* [ADS].
- Paul Robertson, Gudmundur K. Stefansson, Suvrath Mahadevan, and others, "Persistent starspot signals on M dwarfs: multi-wavelength Doppler observations with the Habitable-zone Planet Finder and Keck/HIRES", *The Astrophysical Journal, 897, 2, 125, (2020).* [ADS].
- J.P. Ninan, Gudmundur K. Stefansson, Suvrath Mahadevan, and others, "Evidence for He I 10830

Å Absorption during the Transit of a Warm Neptune around the M-dwarf GJ 3470 with the Habitable-zone Planet Finder", *The Astrophysical Journal, 894, 2, 97, (2020).* [ADS].

- Arpita Roy, Sam Halverson, Suvrath Mahadevan, and others, "Solar Contamination in Extreme-precision Radial-velocity Measurements: Deleterious Effects and Prospects for Mitigation", *The Astronomical Journal, 159, 4, 161, (2020).* [ADS].
- Gudmundur K. Stefansson, Caleb Canas, John Wisniewski, and others, "A Sub-Neptune-sized Planet Transiting the M2.5 Dwarf G 9-40: Validation with the Habitable-zone Planet Finder", *The Astronomical Journal, 159, 3, 100, (2020).* [ADS].
- Paul Robertson, Tyler Anderson, Gudmundur K. Stefansson, and others, "Ultra-Stable Environment Control for the NEID Spectrometer: Design and Performance Demonstration", *Journal of Astronomical Telescopes, Instruments, and Systems, 5, 015003, (2019).* [ADS].
- Andrew J. Metcalf, Tyler Anderson, Chad F. Bender, and others, "Stellar Spectroscopy in the Near-infrared with a Laser Frequency Comb", *Optica, 6, 2, 233, (2019).* [ADS].
- Edited by Dawn Gelino and Jason Wright; Chapter Leads: Natalie Batalha, Svetlana Berdyugina, Emilio Enriquez, **Shubham Kanodia**, Andrew Siemion, Jason Wright, Shelley Wright, "NASA and the Search for Technosignatures: A Report from the NASA Technosignatures Workshop", *NASA Technosignatures Workshop Participants (2018)* [ADS].
- J.P. Ninan, Chad F. Bender, Suvrath Mahadevan, and others, "The Habitable-Zone Planet Finder: improved flux image generation algorithms for H2RG up-the-ramp data", *Proceedings of the SPIE, 10709, 107092U (2018).* [ADS].
- Gudmundur K. Stefansson, Suvrath Mahadevan, Leslie Hebb and others, "Toward Space-like Photometric Precision from the Ground with Beam-shaping Diffusers", *The Astrophysical Journal, 848, 1, (2017).* [ADS].

POSTER PRESENTATIONS

- **Unearthing the dependence of exoplanet populations on stellar parameters** — **Online**
  Emerging Researchers in Exoplanet Science 2021 — May 2021
- **Combining the power of astrostatistics and precision instrumentation** — **Online**
  STScI symposium — April 2021
- **Exploring flares around the M dwarf VB-10 with high resolution IR spectroscopy** — **Online**
  Cool Stars 20.5 — March 2021
- **Ghosts of NEID's Past** — **Online**
  SPIE Astronomical Telescopes and Instrumentation 2020 — December 2020
- **NEID Fiber feed and barycentric correction system** — **Grindelwald, Switzerland**
  Extreme Precision Radial Velocity IV — March 2019
- **Overview of the spectrometer optical fiber feed for HPF** — **Austin, USA**
  SPIE Astronomical Telescopes and Instrumentation 2018 — June 2018

PROFESSIONAL TALKS

From Pixels to Population: New tools to understand M dwarf exoplanets — **Online**
NASA Goddard Extrasolar Planets Seminar — Sep 2021

Searching for lasers around cool stars — **Online**
Order of the Octopus — July 2021

Next-gen RV instrumentation and M-R relationships — **State College, USA**
PSU Department Lunch Talk — February 2019

Placing Limits in Radio SETI: The Cosmic Haystack — **Houston, USA**
NASA Technosignatures Workshop, USRA — September 2018

Ultra-Stable Input Light for Ultra-Stable Spectrometers: — **USA**
Emerging Researchers in Exoplanet Science symposium (ERES IV), PSU — June 2018

Optical Design for EXoplanet Climate Infrared TElescope (EXCITE) — **State College, USA**
PSU Department Lunch Talk — September 2017

PUBLIC TALKS

Digging through the Cosmic Haystack — **State College, USA**
Astronomy on Tap: State College — October 2019

Searching for other worlds, other life — **State College, USA**
Nerd Nite: Webster's Cafe — June 2019

Finding Earth 2.0 — **Mumbai, India**
Nehru Planetarium — Jan 2018

ACADEMIC SERVICE

Referee
International Journal of Astrobiology

Science Organizing Committee
Emerging Researchers in Exoplanet Sciences IV — June 2018

CO-CURRICULAR ACTIVITIES AND RESEARCH PROJECTS

HPF and NEID spectrograph design and instrument assembly — **Pennsylvania, USA**
Pennsylvania State University — Jan 2017 - Aug 2017
The Habitable Planet Finder (HPF) and NEID are high precision spectrographs for Radial Velocity measurements of exoplanets in NIR and optical respectively. My work involves optical design, simulation and analysis, along with assistance in the assembly and testing of the instrument.(Prof. Suvrath Mahadevan)

Optical design for exoplanet telescope (EXCITE) in Zemax — **Rhode Island, USA**
Brown University — April 2016 - Dec 2016
Master's Thesis - Optical Design and Simulation for EXoplanet Climate Infrared Telescope (EXCITE). Zemax designing includes non-sequential ray tracing to optimize positions, specifications and design of the various optical components of the setup. (Prof. Gregory Tucker)

Muon detection and rate measurement — **Mumbai, India**
St. Xavier's College — Jan 2015
(Undergraduate Semester Project) Performed using a plastic scintillator coupled to photomultiplier tubes, discriminator and then counted using coincidence logic. (Prof. Kajari Mazumdar and Mrs. Mandakini Patil, TIFR, India)

Optical Simulation of Quantum logic — **Mumbai, India**
St. Xavier's College — Sept 2014
(Undergraduate Semester Project) Polarizing photons using a sugar solution in order to simulate qubits and their superposition. (Prof. J.B. Mistry)

Diffuse UV background radiation — **Bangalore, India**
Indian Institute of Astrophysics (IIA) — Apr 2014 - May 2014
Worked on Galex spacecraft data to analyze diffuse background UV radiation scattering due to interstellar dust, particularly at high northern galactic latitudes. (Prof. Jayant Murthy)

FPGA programming **Mumbai, India**
Tata Institute of Fundamental Research (TIFR) Oct 2013 - Nov 2013
Worked on FPGA programming in a Altera FPGA board using VHDL for basic digital logic functions for use in detectors in High Energy Particle Physics. (Prof. Kajari Mazumdar and Mandakini Patil)

Alpha tagged Calibration for CZT-I in ASTROSAT **Mumbai, India**
Tata Institute of Fundamental Research (TIFR) May 2013 - June 2013
Analyzing timing parameters for efficient calibration of CZT-I hard X-ray detector using Alpha particle source for the space telescope ASTROSAT. (Prof. A.R.Rao)

Recreation of Millikan's oil drop experiment **Mumbai, India**
St. Xavier's College May 2013 - June 2013
Recreating Millikan's oil drop experiment and obtaining the charge on an electron using a hard bristle toothbrush for an atomizer. (Prof. J.B. Mistry)

Starting the Physics Circle **Mumbai, India**
St. Xavier's College Nov 2012 - Dec 2014
The Physics Circle was started as a forum for students to discuss concepts and new ideas. Students gave presentations, apart from which there were public lectures by distinguished speakers.

TEACHING

Teaching probabilistic programming **State College, USA**
Pennsylvania State University July 2021 - Aug 2021
Spread across 5 weeks, I developed and taught an informal course on probabilistic programming, and statistical inference using the Hamiltonian Monte Carlo Python code - `PyMC3` and package `exoplanet`.

Teaching Assistant for Astronomy lab **Providence, USA**
Brown University Jan 2016 - Apr 2016
Lab assistant for basic astronomy labs, eg. measuring blue shift of Andromeda, CCD imaging etc. (Prof. Ian Dell'Antonio)

MENTORING

- Emily Lubar (2017 – 2020) - Now a graduate student at University of Texas, Austin
- Helen Baran (2019 – 2020) - Now a graduate student at Paris Observatory
- Marissa Maney (2019 – 2021) - Now a graduate student at Harvard University
- Brody McElwain (2020 –) - Undergraduate student in Engineering Science at Pennsylvania State University

EXTRA - CURRICULAR ACTIVITIES

- Officer in Charge for Public Lectures, Paradigm 2015, St. Xavier's College Science Festival
- Design Head and Editor for 'Celeritas', St. Xavier's College Physics Magazine
- Part of DebSoc – St. Xavier's College Debating society