Guðmundur Kári Stefánsson, PhD — CV

Henry Norris Russell Postdoctoral Fellow
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Education

2013-2019	**Penn State University:** Ph.D., Astronomy & Astrophysics (advisor: Suvrath Mahadevan) — Thesis: *Extreme Precision Photometry and Radial Velocimetry from the Ground*
2012	**Stanford University:** Summer International Honors Program
2010-2013	**University of Iceland:** B.S., Physics (Thesis: *Observational Constraints on Dark Energy*)

Appointments

2019-2022	**Henry Norris Russell Postdoctoral Fellow** Department of Astrophysical Sciences, Princeton University [Advisor: Dr. Joshua Winn]
2016-2019	**NASA Earth and Space Science Fellow** Dept. of Astronomy & Astrophysics, Penn State University [Advisor: Dr. Suvrath Mahadevan]
2015-2016	**Leifur Eiriksson Research Fellow** Dept. of Astronomy & Astrophysics, Penn State University [Advisor: Dr. Suvrath Mahadevan]
2013-2014	**Teaching Assistant in Astrophysics** Dept. of Astronomy & Astrophysics, Penn State University
2013	**CERN Summer Research: ISOLDE Experiment** European Organization for Nuclear Research, CERN [Advisor: Dr. María Borge]
2011-2013	**Undergraduate Researcher in Nanophotonics** Department of Physics, University of Iceland [Advisor: Dr. Kristján Leósson]

Instruments & Collaborations

The Habitable-zone Planet Finder | Deputy Project Scientist

Near-infrared (NIR) spectrograph on the 10m Hobby-Eberly Telescope. I currently lead the HPF 5-year survey. Using my RV extraction pipeline, we have demonstrated some of the highest RV precision in the NIR (1.5m/s). I led and co-led the design and testing of a number of subsystems (e.g., environmental control system, fiber-feed).

NEID | Instrument & Science Team Member

The NASA-NSF precision RV spectrograph on the WIYN 3.5m telescope with a 30-50cm/s RV precision. I led and co-led the design and testing of a number of subsystems, and am currently leading a number of NEID science programs.

KPF | Science Team Member

I am a member of the science team of the Keck Planet Finder, the next-generation RV spectrograph for the Keck-I telescope.

Space-Quality Photometry with Engineered Diffusers | NSF-funded collaboration

I have pioneered the use of Engineered Diffusers to achieve some of the highest precision photometry from the ground.

Select Awards & Honors

2021	**Robert J. Trumpler Award**, for an important PhD Thesis in Astronomy
2016-2019	**NASA Earth and Space Science Fellowhip (NESSF)**
2016,18,19	**Zaccheus Daniel Travel Award**, Penn State
2017	**Downsbrough Graduate Fellowship**, Penn State
2015	**Stephen B. Brumbach Fellowship in Astrophysics**, Penn State
2015	**Leifur Eiríksson Foundation Fellowship**
2014	**TA of the Year**, Penn State
2013	**G. P. Bjarnason Scholarship**, Univ. Iceland
2013	**Braddock-Roberts Fellowship**, Penn State
2013	**Fulbright Fellowship**, PhD program at Penn State

Professional Talks (16 select)

1. "*Characterization of Planets around low-mass Stars with Next Generation Instruments*", University of Oklahoma, **invited colloquium**, September 9, 2021
2. "*Characterization of Planets around low-mass Stars with Next Generation Instruments*", University of Pennsylvania, **invited online seminar**, April 7, 2021
3. "*Characterization of Planets around low-mass Stars with Next Generation Instruments*", NASA Goddard Space Flight Center, **invited online seminar**, October 29th, 2020
4. "*Characterization of Planets around low-mass Stars with Next Generation Instruments*", Princeton University Thunch Talk, **invited online talk**, October 15th, 2020
5. "*Improving Precision Radial Velocities in the NIR*", Center for Computational Astrophysics, New York, USA, March 11th, 2020
6. "*Precision NIR RM Effect Observations with the Habitable-zone Planet Finder*", Extreme Solar Systems IV, Reykjavik, Iceland, August 20th, 2019
7. "*Precision NIR RM Effect Observations with the Habitable-zone Planet Finder*", Extreme Precision Radial Velocities IV, Grindelwald, Switzerland, March 21st, 2019
8. "*Extreme Precision Photometry and Radial Velocimetry for K2, TESS and Beyond*", Exoplanet Lunch Talk, Princeton University, September 17th, 2018
9. "*Extreme Precision Photometry and Radial Velocimetry for K2, TESS and Beyond*", **Invited Seminar**, Space Sciences Lab, Berkeley, September 14th, 2018
10. "*Extreme Precision Photometry and Radial Velocimetry for K2, TESS and Beyond*", **Invited Exoplanet Seminar**, California Institute of Technology, September 12th, 2018
11. "*Extreme Precision Photometry and Radial Velocimetry for K2, TESS and Beyond*", Center for Exoplanets and Habitable Worlds Seminar, Penn State University, September 10th, 2018
12. "*First precision radial velocities in the Near-Infrared with the Habitable-zone Planet Finder Spectrograph*", Emerging Researchers in Exoplanet Science IV, Penn State, June 22nd, 2018
13. "*Instrumentation Challenges in the 10cm/s Era: Precision Environmental Control*", **invited breakout session**, Extreme Precision Radial Velocities III, Penn State, August 15th, 2017
14. "*Breaking the milli-Kelvin Spectrograph Temperature Stability*", **invited talk**, Extreme Precision Radial Velocities IV, Penn State, August 14th, 2017
15. "*Diffuser-assisted Photometry to Achieve Space-Like Precision from the Ground with Telescopes Large and Small*", Emerging Researchers in Exoplanet Science Symposium II, Cornell University, June 12, 2016
16. "*Ultra Precise Environmental Control for High Precision Radial Velocity Measurements*", Emerging Researchers in Exoplanet Science Symposium, Penn State, May 28, 2015

Mentoring

2019+	**Shubham Kanodia** Graduate Student at Penn State. Planet Detection, Instrumentation.
2019+	**Caleb Cañas** Graduate Student at Penn State. Planet Detection & Characterization.
2020+	**Sinclaire Jones** Undergraduate at Princeton. 2x Junior Projects, Senior Thesis advisor.
2018+	**Marissa Maney** Undergraduate at Penn State. Transits & instrumentation. Now at Harvard.
2016-18	**Yiting Li** Undergraduate at Penn State. Transits & instrumentation. Now at UCSB.
2015-17	**David Conrad** Undergraduate at Penn State. Instrumentation. Now at RIT.

Teaching

2013,14	**Instructor of Record**, Astro 11, Penn State
2014	**TA**, Planetarium, Davey Lab Observatory Observing, Penn State
2014	**TA & Guest Lecturer**, Astro 1, Astro 5, Astro 6, Penn State
2013,14	**TA & Guest Lecturer**, Astro 1, 5, 6, 10, Planetarium Shows, Penn State
2012,13	**TA**, Physics 2, Physics-305G, Experimental Physics Lab, Classical Mechanics, Uni. Iceland
2012	**TA**, Classical Mechanics, Uni. Iceland
2012	**Private Tutor**, Physics 1V, Nobel 101

Press Releases

Nov 2020	In the Mysterious Blue Ring Nebula, Scientists See the Fate of Binary Stars — Princeton
Aug 2020	Surprisingly Dense Exoplanet Challenges Planet Formation Theories — NOIRLab
Feb 2020	Sub-Neptune-sized planet validated with the Habitable-zone Planet Finder — Penn State
Jan 2020	A New Tool for 'Weighing' Unseen Planets — NASA/JPL
Oct 2017	Press Release on Engineered Diffuser Technology — Penn State

Select Outreach

Feb 2021	**Amateur Astronomy Association of Princeton:** Talk on Exoplanets and Instrumentation
Jan 2020	**Nobel Prize in Physics: Exoplanets** Public talk, National History Museum of Iceland
Current (2014+)	**HPF & NEID Blogs:** (hpf.psu.edu): 10 articles, and 4 videos
2017,2019, 2021	**Radio Inteviews:** *Morgunútvarpið, Samfélagið*, Icelandic public radio
2017,2019, 2021	**Newspaper Inteviews:** *Vísir*, Icelandic newspaper
2017	**Solar Eclipse Viewing:** Volunteering during solar eclipse on August 21st
2014-2016	**@astrobites**: Wrote $>$ 20 articles, a daily astronomy literature journal
2014, 2015	**Public Observing:** Numerous nights with 10", 12", and 24" telescopes, Penn State
2013, 2014, 2015	**Astro-Fest, Astro-Night:** Public observing, planetarium, make-a-comet, Penn State
2013, 2014, 2015	**Astro-Night:** Public observing, planetarium, Penn State
2014	**Exploration U:** Community Science Night, State College
2012, 2013	**University Day:** Experimental Physics Demonstrations, Uni. Iceland

Select Academic Service

Review Panels	NASA Extreme Precision Radial Velocity Foundation Science Proposals, March 2021
Referee	MNRAS, A&A, ApJL
Membership	American Astronomical Society, Astronomical Society of Iceland, SPIE
Organizer	**Emerging Researchers in Exoplanet Science I, IV, V**, Penn State 2015, 2018, Princeton 2021
	Extreme Solar Systems IV, Reykjavík, Iceland, August, 2019
	Extreme Precision Radial Velocities IV, Penn State, August 14-17, 2017

List of Publications — Gudmundur Stefansson

45 Total, 30 peer reviewed, 1 in Nature.

1st Author (9 Total, 7 Peer Reviewed)

9. **Stefansson**, et al. 2020, AJ, 160, 6,
A Mini-Neptune and a Radius-Valley-Planet Orbiting the Nearby M2 dwarf TOI-1266 in its Venus-Zone: Validation with the Habitable-zone Planet Finder.

8. **Stefansson**, et al. 2020, AJ, 160, 192,
The Habitable-zone Planet Finder Reveals A High Mass and a Low Obliquity for the Young Neptune K2-25b.

7. **Stefansson**, et al. 2020, AJ, 159, 100,
A sub-Neptune sized planet transiting the M2.5-dwarf G 9-40: Validation with the Habitable-zone Planet Finder.

6. **Stefansson**, et al. 2018, AJ, 156, 266,
Diffuser-assisted Photometric Follow-up Observations of the Neptune-sized Planets K2-28b and K2-100b.

5. **Stefansson**, et al. 2018, SPIE Conference Series, Vol. 10702,
Extreme precision photometry from the ground with beam-shaping diffusers for K2, TESS, and beyond.

4. **Stefansson**, et al. 2017, ApJ 848, 9,
Toward Space-like Photometric Precision from the Ground with Beam-shaping Diffusers.

3. **Stefansson**, et al. 2016, ApJ 833, 175,
A Versatile Technique to Enable Sub-milli-Kelvin Instrument Stability for Precise Radial Velocity Measurements: Tests with the Habitable-zone Planet Finder.

2. **Stefansson**, et al. 2016, SPIE Conference Series, 9908, 990871,
Ultra-stable temperature and pressure control for the Habitable-zone Planet Finder spectrograph.

1. **Stefansson**, et al. 2011, Raust, 8, 1,
Samþætting vökvarása og ljósrása á örflögum (English: Fabrication of integrated optical and microfluidic devices).

2nd and 3rd Author (17 Total, 14 Peer Reviewed)

17. Vissapragada, **Stefánsson**, Greklek-McKeon et al. 2021, AJ (accepted),
A Search for Planetary Metastable Helium Absorption in the V1298 Tau System.

16. Kanodia, **Stefánsson**, Cañas et al. 2021, AJ, 162, 135,
TOI-532b: The Habitable-zone Planet Finder confirms a Large Super Neptune in the Neptune Desert orbiting a metal-rich M dwarf host.

15. Krishnamurthy, Hirano, **Stefánsson** et al. 2021, AJ, 162, 82,
Non-detection of Helium in the upper atmospheres of TRAPPIST-1b, e and f.

14. Lubin, Robertson, **Stefansson** et al. 2021, AJ 162, 61,
Stellar Activity Manifesting at a One Year Alias Explains Barnard b as a False Positive.

13. Mahadevan, **Stefánsson**, Robertson et al. 2021, ApJL, 919, 9,
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.

12. Cañas, **Stefansson**, Kanodia, et al. 2020, AJ, 160, 147,
A warm Jupiter transiting an M dwarf: A TESS single transit event confirmed with the Habitable-zone Planet Finder.

11. Kanodia, Cañas, **Stefansson** et al. 2020, ApJ, 899, 29,
TOI-1728b: The Habitable-zone Planet Finder confirms a warm super Neptune orbiting an M dwarf host.

10. Robertson, **Stefansson**, Mahadevan, et al. 2020, ApJ, 897, 125,
Persistent starspot signals on M dwarfs: multi-wavelength Doppler observations with the Habitable-zone Planet Finder and Keck/HIRES.

9. Ninan, **Stefansson**, Mahadevan, et al. 2020, ApJ, 894, 97,
Evidence for He I 10830 A absorption during the transit of a warm Neptune around the M-dwarf GJ 3470 with the Habitable-zone Planet Finder.

8. Ninan, Mahadevan, **Stefansson** et al. 2019, ISPA 2018,
Impact of crosshatch patterns in H2RGs on high precision radial velocity measurements: Exploration of measurement and mitigation paths with HPF.

7. Kanodia, Wolfgang, **Stefansson**, et al. 2019, ApJ 882, 38,
Mass-Radius relationship for M dwarf exoplanets: Comparing nonparametric and parametric methods.

6. von Essen, **Stefansson**, Mallon, et al. 2019, A&A, 628, 11,
First Light of Engineered Diffusers at the Nordic Optical Telescope Reveal Time Variability in the Optical Eclipse Depth of WASP-12b.

5. Cañas, **Stefansson**, Monson, et al. 2019, ApJL 877, 29,
TOI-150: A transiting hot Jupiter in the TESS southern CVZ.

4. Robertson, T. Anderson, **G. Stefansson**, et al. 2019, JATIS, 015003,
Ultrastable environment control for the NEID spectrometer: design and performance demonstration.

3. Li, **Stefansson,** Robertson, et al. 2017, RNAAS, 1, 49,
A Candidate Transit Event around Proxima Centauri.

2. Bender, Robertson, **Stefansson** et al. 2016, SPIE, 9913, 991338,
The instrument control software package for the Habitable-Zone Planet Finder spectrometer.

1. Slovinsky, **Stefansson**, Kossoy et al. 2013, Plasmonics 8.4, 1613,
Propagation Loss of Long-Range Surface Plasmon Polariton Gold Stripe Waveguides in the Thin-Film Limit.

Other Coauthor (19 Total, 9 Peer Reviewed)

19. Terrien (including **Stefansson**) et al. 2021, AJ, 161, 252,
Broadband Stability of the Habitable Zone Planet Finder Fabry-Pérot Etalon Calibration System: Evidence for Chromatic Variation.

18. Seifahrt et al. (including **Stefansson**) et al. 2021, SPIE, 11447,
On-sky commissioning of MAROON-X: A new precision radial velocity spectrograph for Gemini North.

17. Kanodia (including **Stefansson**) et al. 2021, ApJ, 912, 15,
A Harsh Test of Far-field Scrambling with the Habitable-zone Planet Finder and the Hobby-Eberly Telescope.

16. Tran (including **Stefansson**) et al. 2021, AJ, 161, 173,
The Epoch of Giant Planet Migration Planet Search Program. I. Near-Infrared Radial Velocity Jitter of Young Sun-like Stars.

15. Gupta (including **Stefansson**) et al. 2021, AJ, 161, 130,
Target Prioritization and Observing Strategies for the NEID Earth Twin Survey.

14. Schwab (including **Stefansson**) et al. 2020, SPIE, 11447,
The NEID spectrometer: fibre injection system design.

13. Kanodia (including **Stefansson**) et al. 2020, SPIE, 11447,
Ghosts of NEID's past.

12. Hoadley (including **Stefansson**) et al. 2020, **Nature,** 587, 387-391,
A blue ring nebula from a stellar merger several thousand years ago.

11. Obermeier (including **Stefansson**) et al. 2020, A&A, 639, 130,
Following the TraCS of exoplanets with Pan-Planets: Wendelstein-1b and Wendelstein-2.

10. Roy (including **Stefansson**) et al. 2020, AJ, 159, 161,
Solar Contamination in Extreme-precision Radial-velocity Measurements: Deleterious Effects and Prospects for Mitigation.

9. Lam (including **Stefansson**) et al. 2020, AJ, 159, 120,
It takes two planets in resonance to tango around K2-146.

8. Metcalf (including **Stefansson**) et al. 2019, Optica, 6, 233,
Stellar Spectroscopy in the Near-infrared with a Laser Frequency Comb.

7. Kanodia (including **Stefansson**) et al. 2018, SPIE, 10702,
Overview of the spectrometer optical fiber feed for the habitable-zone planet finder.

6. Ninan (including **Stefansson**) et al. 2018, SPIE, 10709,
The Habitable-Zone Planet Finder: improved flux image generation algorithms for H2RG up-the-ramp data.

5. Halverson (including **Stefansson**) et al. 2016, SPIE 9908, 99086,
A comprehensive radial velocity error budget for next generation Doppler spectrometers.

4. Robertson (including **Stefansson**) et al. 2016, SPIE, 9908, 990862,
A system to provide sub-milliKelvin temperature control at T 300K for extreme precision optical radial velocimetry.

3. Schwab (including **Stefansson**) et al. 2016, SPIE, 9912, 991274,
Adaptive optics fed single-mode spectrograph for high-precision Doppler measurements in the near-infrared.

2. Hearty (including **Stefansson**) et al. 2014, SPIE, 9147, 914752,
Environmental control system for Habitable-zone Planet Finder (HPF).

1. Mahadevan (including **Stefansson**) et al. 2014, SPIE, 9147,
The Habitable-zone Planet Finder: A status update on the development of a stabilized fiber-fed near-infrared spectrograph for the for the Hobby-Eberly telescope.