

## Jón E. Gudmundsson

---

Stockholm University and  
the Oskar Klein Centre  
AlbaNova University Centre  
Roslagstullsbacken 21  
106 91, Stockholm  
SWEDEN

jon@fysik.su.se  
jegudmunds@gmail.com  
<http://www.jegudmunds.com>  
+46 073 573 8354  
upd. 2020-05-31

## Education

---

- **Princeton University** — PhD in physics Sep 2014  
Thesis: *Probing Early Universe Cosmologies with SPIDER and Planck HFI*  
Advisor: Prof. William C. Jones
- **Princeton University** — MA in physics Apr 2011
- **University of Iceland** — BSc in physics (*First Class with Distinction, 9.26/10.00*) June 2008

## Academic Positions

---

- **Senior Research Scientist, Stockholm University and the OKC** Aug 2018 – Aug 2022  
Research position funded through a (5.2M SEK) Career Grant from the Swedish Space Agency and a (3.3M SEK) Starting Grant from the Swedish Research Council.
- **Postdoc, Stockholm University and the Oskar Klein Centre (OKC)** Sep 2015 – Apr 2018  
Constraining models of the early universe by continuing analysis of the SPIDER and *Planck* HFI datasets. Contributed to the development of the Simons Observatory optics design.
- **Postdoctoral Research Associate, Princeton University** Sep 2014 – Aug 2015  
Logistical Deployment of the SPIDER payload to Ross Island, Antarctica. Integration of the SPIDER science payload in preparation for flight. Early processing of flight data.

## Student Supervision

---

- [PhD] Alexandre Adler (Stockholm University, SU), main advisor 2019–2023
- [PhD] Konstantina Dachlythra (SU), main advisor 2019–2023
- [BSc] Alexei Molin (ENS Paris-Saclay), host for a 9-month internship program 2020–2021
- [BSc] Elisabeth Ström (SU), independent research project [postponed due to COVID-19] 2020
- [PhD] Matteo Billi (University of Bologna), host for a 3-month internship program 2019
- [PhD] Adri Duivenvoorden (Stockholm University), de facto main advisor 2015–2019
- [MSc] Said Keshavarzi (Stockholm University), thesis advisor 2018–2019
- [BSc] Advised approx. 20 Princeton Univ. students on various instrumentation projects 2009–2014
- [BSc] Elvar Bjarkason (University of Iceland), Rannís summer research project 2011

## Honors, Awards, and Grants

---

- VR Starting Grant **[PI]** (3.3M SEK/310k Euro) 2020–2023  
– *Imaging the Infant Universe with Future Instruments*
- Swedish Space Agency Career Grant **[PI]** (5.2M SEK/490k Euro) 2018–2022  
– *Imaging the Infant Universe with SPIDER, the Simons Observatory, and Future Instruments*
- VR (Swedish Research Council) Research Environment Grant **[co-I]** (1.8M SEK/165k Euro) 2020–2025  
– *Detecting Axion Dark Matter in the Sky and in the Lab* (1.7M Euro total)  
– Program led by Prof. Hiranya Peiris [PI], co-Is: Stefano Bonetti, Jan Conrad, Jon Gudmundsson, David Marsh, and Franck Wilczek
- ESA Technology Development Contract **[co-I]** (16k Euro) 2019–2020  
– *Development of Large Anti-Reflection Coated Lenses for Passive (Sub)Millimetre-Wave Science Instruments* (600k Euro total)

- Program led by Prof. Peter Hargrave (Cardiff) [PI], with co-Is from Cardiff University, University College London, Anglia Ruskin University, and Stockholm University.
- Gruber Prize in Cosmology awarded to the Planck team 2018
- Nordita Scientific Program Grant [**co-I**] (600k SEK/60k Euro) 2017
  - *Advances in Theoretical Cosmology in Light of Data*
- Antarctic Service Medal 2015
- Inaugural recipient of Joseph Taylor Graduate Student Fellowship (50k USD) 2013–2014
- Leifur Eiriksson Scholarship Award (25k USD) 2010–2011
- Thor Thors Special Contribution Award (5k USD) 2009–2010
- G.P. Bjarnason Award for outstanding academic performance (5k USD) 2008

## Pending grant applications

- Horizon 2020 MSCA-RISE [**co-I**] (55k Euro) 2021-2023
  - *CMB-Inflate*, Research and Innovation Staff Exchange program to benefit LiteBIRD research efforts (1.1M Euro total)

## Break in Research

- Paternity leave, 92 days. Apr 2020 – Aug 2020
- Paternity leave, 10 days. Jul 2019
- Paternity leave, 114 days. Apr 2018 – Sep 2018
- Paternity leave, 10 days. Aug 2017

## Teaching

- Course Instructor, Stockholm University Fall 2019  
*Particle and nuclear physics, astrophysics, and cosmology* (FK5024, undergraduate course)  
Seven lectures on astrophysics and cosmology, covering big bang nucleosynthesis, the Friedmann equations, dark matter and dark energy, review of observational cosmology, etc.
- Course Instructor, Stockholm University Spring 2019  
*Physics Colloquium course for PhD students* (FK40001)  
Two lectures on cosmology and the cosmic microwave background.
- Course Instructor, Stockholm University Spring 2017  
*Cosmology & Particle Astrophysics* (FK7007, Masters-level course).  
Four lectures on cosmology for graduate students.
- Teaching Assistant, Princeton University Spring 2014  
*Modern Astrophysics* (AST204), led problem-solving classes and graded homework
- Teaching Assistant, University of Iceland (UI) Spring 2008  
*Experimental Physics* (B.Sc. course), student lab guidance
- Teaching Assistant, University of Iceland Fall 2006  
*Linear Algebra* (B.Sc. course), led problem-solving classes and graded homework

## Research Groups

- SPIDER (NASA), *Member (2008–), Key Personnel (2012–)*:  
The development and full system integration of the SPIDER stratospheric balloon-borne polarimeter which launched from Antarctica on January 1, 2015. Led the design, build, and characterization of instrument sub-systems. Including: interferometers, superfluid capillary assemblies, radiative and magnetic shielding. Responsible for cryogenic operations, receiver testing, and deployment logistics.
- *Planck* HFI (ESA), *HFI Associate (2009–), HFI Core Team Member (2010–), Planck Scientist (2014–), HFI Final Release Core Team Member (2015–)*:  
In-flight characterization of the High Frequency Instrument. Led the development of an analysis infrastructure which generates many hundred days worth of high-fidelity time-domain simulations used to inform pointing, beam, and flux reconstruction. Provided spatial reconstruction calibration and associated errors required for cosmological analysis. Constrained the brightness temperature of the five outer planets spanning 100–857 GHz. Provided consistency checks that verify the absolute calibration of instrument.

- The Simons Observatory, Member (2016–):  
Member of the Optical Design Group which is in charge of validating proposed optical designs for the \$50M Large Aperture Telescope. Leading efforts that project optical systematic effects. Member of the Calibration, Sensitivity, and Systematics Group, which, among other things, is in charge of defining calibration requirements and identifying systematic effects that drive instrument design.
- LiteBIRD (JAXA/ESA/NASA), *European Collaboration member and JAXA External Collaborator* (2018–):  
Swedish representative on the Steering Committee. Member of the LiteBIRD Interim Governance Board. Point of contact for optics design of mid- and high-frequency telescope (MHFT). Co-responsible for RF testing and main beam near field testing. Responsible for MHFT test cryostat. Convener of speaker selection committee. Participating actively in Systematics, Calibration, and High Frequency Telescope Joint Study Groups.
- CMB-S4 (DOE), *Collaboration member* (2018–):  
Worked on the CMB-S4 Technical Book. Contributing to optics working group.

## Academic Activities

- **Occasional reviewing for Cryogenics Journal, Journal of Aerospace Engineering, and Journal of Applied Optics (2015–Present)**
- Internal review of Starting Grant applications for SU early career scientists (2020)
- Review of textbook proposal to Cambridge University Press (2020)
- Budget committee (reserve member), Stockholm University Physics Department (2019–Present)
- **Oskar Klein Centre Steering Group (2019–Present)**
- Oskar Klein Centre Colloquium Committee (2019–Present)
- Review committees for CoPS (Cosmology, Particle astrophysics and Strings) and SU Physic Department general PhD student positions (May 2019)
- **Member of the Interim Governance Board for the LiteBIRD Satellite (2018–Present)**
- **Steering Committee for the European LiteBIRD Satellite Collaboration (2018–Present)**
- Member of International Astronomical Union (2018–Present)
- CoPS (Cosmology, Particle astrophysics and Strings) representative in the committee for Stockholm University Physic Department Technical Division (2017–Present)
- Member of Olof Nebrin’s BSc Thesis Committee, Stockholm University (Sep 2017)
- **Nordita program primary coordinator [[Advances in Theoretical Cosmology in Light of Data](#)] (July 2017)**
- Member of Ernst Otto’s PhD Thesis Committee, Chalmers University of Technology (Apr 2017)
- Organizer of the Oskar Klein Centre’s Cosmology and Gravitation Working Group (2016–2017)
- Internal reviewer for CMB-S4 Technology Book (2016)
- Reviewer honors thesis, University of KwaZulu-Natal (Nov 2015)
- **Internal reviewer for *Planck* HFI (2014–Present)**
- Member of PhD Student Admissions Committee for Princeton University Physics Department (2012)
- Planck Workshop at Princeton University Department of Physics, co-organizer (2011)
- Organizer of student talks for Princeton Cosmology Journal Club (Gravity Group) (2009–2010)

## Talks

Talk titles that are colored in turquoise also function as links to the corresponding talk slides.

- *Optical systematics in next generation CMB experiments — Iterating on instrument design with full-sky beam convolution and time-domain sims*  
McGill University Space Institute, Colloquium Series (November 2020).
- *Challenges in optics for next-generation CMB experiments*  
University of Oslo, Physics Colloquium Series (September 2020).
- *Challenges in RF modeling of optically large telescopes — pros and cons of refractor vs reflector designs*  
LiteBIRD Global Meeting, Garching (December 2019).
- *Review of LiteBIRD MHFT optics design and modeling efforts*  
LiteBIRD Europe Meeting, Toulouse (June 2019).

- *Comparison of physical optics and method of moments models for the proposed LiteBIRD telescopes*  
LiteBIRD Global F2F Meeting, Rome (January 2019).
- *Brief summary of CMB research at Stockholm University*  
SU Physics Department Collegium Meeting, Stockholm (March 2018).
- *Telescopes: Large vs small and design implications*  
Towards the European Coordination of the CMB programme, Florence (September, 2017).
- *Cosmology from the Stratosphere — measurements of primordial gravitational waves and gravitational lensing from near space*  
Nordita, Stockholm, Sweden (July, 2017).
- *Early results from the SPIDER experiment*  
The University of Manchester, Manchester, England (May, 2017).
- *Early results from the SPIDER experiment*  
MPA, Garching, Germany (May, 2017).
- *Early results from the SPIDER experiment*  
INFN, Ferrara, Italy (May, 2017).
- *Probing the calibration of the Planck satellite using Mars and the four outer planets*  
Gravity Group Meeting at Princeton Physics Department. Princeton, New Jersey (March, 2017).
- *Lessons learned from SPIDER's first flight — implications for future ballooning and satellite missions*  
Informal seminar at Cornell Physics Department. Ithaca, New York (March, 2017).
- *Lessons learned from SPIDER's first flight — implications for future ballooning and satellite missions*  
Cosmology on Safari. KwaZulu-Natal, South Africa (February, 2017).
- *SPIDER Detector Performance and the Prospects of Ballooning*  
Cosmo-16. Ann Arbor, Michigan (August, 2016).
- *The angular power spectrum — an introduction to statistics on the sphere [blackboard].*  
Oskar Klein Centre for Cosmoparticle Physics, Stockholm University (June, 2016).
- *Technological Challenges in Balloon-Borne Astrophysics.*  
Oskar Klein Centre for Cosmoparticle Physics, Stockholm University (April, 2016).
- *SPIDER and the Future of CMB Observations.*  
Oskar Klein Colloquium, Stockholm University (March, 2016).
- *The Experiment: Instrument review, flight performance, and preliminary results*  
University of Oslo, Cosmology seminar (Jan 28, 2016).
- *The SPIDER Experiment: Instrument review, flight performance, and preliminary results*  
Niels Bohr Institute, Cosmology (December 3, 2015).
- *Future Directions in CMB Research*  
Oskar Klein Day, Stockholm University (November, 2015).
- *SPIDER and Dark Matter Signatures in the CMB*  
Dark Matter Working Group, Stockholm University (October, 2015).
- *The SPIDER Experiment: Instrument review, flight performance, and preliminary results*  
Cosmo 15, Warsaw (September 8, 2015).
- *Pre-flight Status of the SPIDER Balloon-borne Experiment*  
University of Iceland, The Astrophysics Group Meeting (January 2014).
- *Precision Cosmology and the Search for B-modes*  
University of Iceland, Physics Department (July 16, 2010).
- *Thermal architecture for the SPIDER flight cryostat*  
SPIE Proceedings on Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy V, San Diego (July 2009).
- *Approximately a dozen talks at Princeton University Gravity Group (2009–2015).*

## Popular Talks and Outreach

- *Fyrir hvaða rannsóknir voru Nóbelsverðlaunin í eðlisfræði 2019 veitt?*  
An article on the 2019 Nobel prize in physics for the Web of Science, a forum for people of all ages to pose questions that are then answered by Icelandic scientists.
- *SPIDER och den kosmiska bakgrundsstrålning.*  
Knut Lundmark-dagarna, Stockholm University. AlbaNova University Centre (April 2018).

- **SPIDER og örbylgjukliðurinn**  
Short lecture for the Icelandic Astronomy Society, University of Iceland (December 2017).
- *Observations of the cosmic microwave radiation using a balloon-borne telescope in Antarctica.*  
Lecture at “Rymdforskarskolan,” summer school for junior college students. AlbaNova University Centre (June 2017).
- *Observations of the cosmic microwave radiation using a balloon-borne telescope in Antarctica.*  
Lecture at “Rymdforskarskolan,” summer school for junior college students. AlbaNova University Centre (June 2016).
- *SPIDER och den kosmiska bakgrundsstrålning // SPIDER and the Cosmic Microwave Background*  
Lecture for Astronomisk Ungdom, Uppsala University (Apr 2016).
- *Þyngdarbylgjur benda til óþápenslu*  
An article on the BICEP2 announcement posted on the Icelandic Astronomy Web (March 2014)
- *First Cosmology Results from the Planck Satellite.*  
Princeton Area Alumni Association (May 2013).
- *Fyrstu niðurstöður Planck gervitunglsins birtar*  
An article on the first results from the Planck satellite (March 2013)
- *“Tilraunaglasíð.”*  
A 20-min interview on a radio show on technology and science intended for children and young adults produced by the Icelandic National Broadcasting Service (RÚV) (March 2013).
- *The Cosmic Microwave Background and the Planck Satellite.*  
Cosmology seminar for undergraduate students at Princeton University (July 2011).

## Coverage in Popular Media

- visir.is, Remembering Stephen Hawking: [Hawking glæddi áhuga íslenskra vísindamanna](#), Mar 2018.
- mbl.is, interview on the first LIGO results: [Örstutt flautustef svartholanna](#), Feb 2016.
- Scientific American: [A High-Flying Web May Catch the Beginning of Time](#), Nov 2014.
- The New York Times, Online: [Big Bang to Be Investigated From Balloon in Antarctica](#), Jan 2015.
- Numerous interviews in Icelandic media regarding SPIDER’s first flight, Winter 2014–2015
- A number of articles describing SPIDER and its first successful flight appeared in media worldwide.
- The New York Times, Print: [Universe as an Infant: Fatter Than Expected and Kind of Lumpy](#), appeared on the cover of the New York Times, March 22, 2013.

## References

- **Prof. Katherine Freese**  
Department of Physics  
Stockholm University  
AlbaNova Universitetscentrum  
Roslagstullsbacken 21  
106 91 Stockholm  
Sweden  
katie.freese@fysik.su.se
- **Prof. William Jones**  
Department of Physics  
Princeton University  
Princeton, NJ, 08544  
USA  
wcjones@princeton.edu
- **Dr. Brendan Crill**  
Jet Propulsion Laboratory  
Pasadena, CA, 91109  
USA  
brendan.p.crill@jpl.nasa.gov
- **Prof. Cynthia Chiang**  
Ernest Rutherford Physics Building – 336  
McGill University  
Montréal, QC H3A 2T8  
Canada  
hsin.chiang@mcgill.ca
- **Prof. John Ruhl**  
Department of Physics  
Case Western Reserve University  
Cleveland, OH, 44106  
USA  
ruhl@case.edu
- **Prof. Michael Niemack**  
Department of Physics  
Cornell University  
Ithaca, NY, 14850  
USA  
niemack@cornell.edu
- **Prof. Mark Devlin**  
Department of Physics and Astronomy  
University of Pennsylvania  
Philadelphia, PA, 19104-6396  
USA  
devlin@physics.upenn.edu
- **Prof. Hiranya Peiris**  
Department of Physics and Astronomy  
University College London  
Kathleen Lonsdale Building  
Bloomsbury, London WC1E 6BT  
United Kingdom  
h.peiris@ucl.ac.uk