

Supranta Sarma Boruah

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RESEARCH INTERESTS

Cosmology-Large-scale structures, Statistical inference and machine learning, Gravitational Waves

EDUCATION

University of Waterloo

Master's Candidate, Department of Applied Mathematics *Sept 16-Dec 17*

- Advisors: Ghazal Geshnizjani

Ph.D. Candidate, Department of Applied Mathematics *Dec 17-present*

- Advisors: Ghazal Geshnizjani and Michael J. Hudson

Indian Institute of Technology(IIT) Kanpur

Jul 11-May 16

B.S-M.S dual degree, Department of Physics

- *Master's project:* Anisotropic cosmologies in massive gravity

PUBLICATIONS AND PREPRINTS

1. *Cosmic flows in the Nearby Universe: new methods, validation and implication for cosmology* **S. S. Boruah**, G. Lavaux, M. Hudson and J. Jasche arXiv:1911.xxxx [astro-ph.CO]
2. *Neural physical engines for inferring the halo mass distribution function* T. Charnock, G. Lavaux, B. Wandelt, **S. S. Boruah**, J. Jasche and M. Hudson. arXiv:1909.06379 [astro-ph.CO]
3. *Gravitational Potential from small-scale clustering in action space: Application to Gaia DR2* T. Yang, **S. S. Boruah**, and N. Afshordi. arXiv:1908.02336 [astro-ph.GA]
4. *Cuscuton Bounce*, **S. S. Boruah**, H. J. Kim, M. Rouben and G. Geshnizjani. arXiv:1802.06818 [gr-qc]
5. *Theory of Cosmological Perturbations with Cuscuton* **S. S. Boruah**, H. J. Kim and G. Geshnizjani. arXiv:1704.01131 [hep-th] DOI:10.1088/1475-7516/2017/07/022 JCAP **1707**, no. 07, 022 (2017)

ONGOING PROJECTS

- *Bayesian reconstruction of large-scale structure*
Collaborators: Mike Hudson and Guilhem Lavaux
- *Inferring Hubble constant from gravitational wave standard sirens without optical counterpart*
Collaborators: Ghazal Geshnizjani and Guilhem Lavaux

AWARDS AND ACHIEVEMENTS

- MITACS Globalink Research Award* 2018
Research travel assistantship worth CAD 6000 awarded to conduct research under the guidance of **Dr. Guilhem Lavaux** at **Institut d'Astrophysique de Paris** for 12 weeks
- KVPY Fellowship* 2011
Awarded to approximately 200 top students by Department of Science and Technology, India based on a competitive examination to study basic sciences.
- IIT-JEE* 2011
Ranked 974 among 400000 students in the nationwide IIT-JEE entrance examination
- Olympiads* 2009-2011
Was among the 300 students selected for the Indian National Physics Olympiad (**INPhO**), 2011.
Represented the state of Assam in the Indian National Mathematics Olympiad (**INMO**) in the years 2009-2011

TALKS

- "Cosmological perturbations with Cuscuton"*, Talk at the cosmology group meeting, Perimeter Institute for Theoretical Physics, Waterloo October 2016
- "Cuscuton perturbations and a novel bouncing scenario"*, Poster presentation, Testing Gravity 2017, Simon Fraser University, Vancouver January 2017
- "Cuscuton bounce and perturbations"*, Contributed talk, Theory Canada 12, York University, Toronto May 2017
- "Inferring the Milky Way potential using stellar motion"*, Graduate student colloquium, Department of Applied Mathematics, University of Waterloo July 2017

SUMMER SCHOOLS AND WORKSHOPS

- Summer Institute in Philosophy of Cosmology* June 2018
Rotman Institute of Philosophy, London
- Large-Scale Astrophysics: galaxies and beyond* June 2018
McGill University, Montreal
- Tri-Institute Summer School on Elementary Particles (TRISEP)* July 2018
Perimeter Institute of Theoretical Physics, Waterloo
- Analytics, Inference and Computation in Cosmology* September 2018
Institut d'Etudes Scientifiques de Cargese, Corsica, France

CONFERENCES

- Testing Gravity 2017* January 2017
Simon Fraser University, Vancouver
- Theory Canada 12* May 2017
York University, Toronto
- Bounce Scenarios in Cosmology* June 2017
Perimeter Institute for Theoretical Physics, Waterloo

COMPUTATIONAL
SKILLS

Computer Language and software:

Python, Julia, TensorFlow, MATHEMATICA, C++

TEACHING
EXPERIENCE

Teaching Assistant:

Calculus 2 for Sciences(MATH128)

Winter 2017, 2018

Partial Differential Equations(AMATH353)

Spring 2017

Intro. to Differential Equations(AMATH250)

Spring 2017

Multivariable Calculus(MATH237)

Fall 2017, Winter 2019,

Quantum Theory 1(AMATH373)

Spring 2019, Fall 2019

Ordinary Differential Equations 2(AMATH351)

Winter 2018

Spring 2019