Supranta Sarma Boruah

CONTACT

PhD Candidate
Department of Applied Mathematics
University of Waterloo, Canada
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RESEARCH INTERESTS

Cosmology-Large-scale structures, Peculiar Velocities, Galaxy bias, Bayesian 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. *Predicting peculiar velocities in the local universe with forward-modelled non-linear structure formation* **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(declined) — 2011

Awarded to approximately 200 top students by Department of Science and Technology, India based on a competitive examination to study basic sciences.

DST-INSPIRE Fellowship — 2011-2015

Awarded by the Department of Science and Technology, India to students pursuing basic sciences at selected institutes.

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

PRESENTATIONS

"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

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

Computer Language and software:

Python, Julia, TensorFlow, MATHEMATICA, C++

Teaching Assistant:

Course	Term
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, Spring 2019, Fall 2019*
Quantum Theory 1(AMATH373)	*Winter 2018*
Ordinary Differential Equations 2(AMATH351)	*Spring 2019*