

# Supranta Sarma Boruah

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CONTACT	Steward Observatory, University of Arizona 933 N Cherry Ave, Tucson, AZ 85719 email: <a href="mailto:ssarmabo@email.arizona.edu">ssarmabo@email.arizona.edu</a> Website: <a href="http://supranta.github.io">supranta.github.io</a>
EMPLOYMENT	<b>Steward Observatory, University of Arizona</b> Postdoctoral Research Associate <span style="float: right;"><i>Sep 2020-present</i></span>
EDUCATION	<b>University of Waterloo</b> Ph.D., Department of Applied Mathematics <span style="float: right;"><i>Sep 2016-Aug 2020</i></span>  <b>Indian Institute of Technology (IIT) Kanpur</b> <span style="float: right;"><i>Jul 11-May 16</i></span> B.S-M.S dual degree, Department of Physics
PUBLICATIONS AND PREPRINTS	<ol style="list-style-type: none"><li>1. P. Fiedorowicz, E. Rozo, <b>S. S. Boruah</b>, C. Chang and M. Gatti, <i>KarMMa - Kappa Reconstruction for Mass Mapping</i>. Submitted to MNRAS, [<a href="https://arxiv.org/abs/2105.14699">arXiv:2105.14699</a>]</li><li>2. B. Stahl, T. de Jaeger, <b>S. S. Boruah</b>, W. Zheng, A. Filippenko and M. Hudson, <i>Peculiar-velocity cosmology with Types Ia and II supernovae</i>. Accepted for publication in MNRAS, <a href="https://doi.org/10.1093/mnras/stab1446">https://doi.org/10.1093/mnras/stab1446</a> [<a href="https://arxiv.org/abs/2105.05185">arXiv:2105.05185</a>]</li><li>3. <b>S. S. Boruah</b>, M. Hudson and G. Lavaux, <i>Peculiar velocities in the local Universe: comparison of different models and the implications for <math>H_0</math> and dark matter</i>. Submitted to MNRAS [<a href="https://arxiv.org/abs/2010.01119">arXiv:2010.01119</a>]</li><li>4. <b>S. S. Boruah</b>, M. Hudson and G. Lavaux, <i>Cosmic flows in the nearby Universe: new peculiar velocities from SNe and cosmological constraints</i>. <i>MNRAS</i>, <b>498</b>, 2703, [<a href="https://arxiv.org/abs/1912.09383">arXiv:1912.09383</a>]</li><li>5. T. Charnock, G. Lavaux, B. Wandelt, <b>S. S. Boruah</b>, J. Jasche and M. Hudson, <i>Neural physical engines for inferring the halo mass distribution function</i>. <i>MNRAS</i>, <b>494</b>, 50, [<a href="https://arxiv.org/abs/1909.06379">arXiv:1909.06379</a>]</li><li>6. T. Yang, <b>S. S. Boruah</b>, and N. Afshordi, <i>Gravitational Potential from small-scale clustering in action space: Application to Gaia DR2</i>. <i>MNRAS</i>, <b>493</b>, 3061, [<a href="https://arxiv.org/abs/1908.02336">arXiv:1908.02336</a>]</li><li>7. <b>S. S. Boruah</b>, H. J. Kim, M. Rouben and G. Geshnizjani. <i>Cuscuton Bounce</i>. <i>JCAP</i> <b>08</b>, 031 (2018), [<a href="https://arxiv.org/abs/1802.06818">arXiv:1802.06818</a>]</li><li>8. <b>S. S. Boruah</b>, H. J. Kim and G. Geshnizjani, <i>Theory of Cosmological Perturbations with Cuscuton</i>. <i>JCAP</i> <b>07</b>, 022 (2017), [<a href="https://arxiv.org/abs/1704.01131">arXiv:1704.01131</a>]</li></ol>
TALKS	<ol style="list-style-type: none"><li>1. Invited seminar, TIFR, Mumbai <span style="float: right;"><i>November 2020</i></span></li><li>2. Invited seminar, IAP, Paris <span style="float: right;"><i>Apr 2020</i></span></li><li>3. Invited seminar, Duke University <span style="float: right;"><i>Feb 2020</i></span></li><li>4. Invited seminar, MPA, Garching <span style="float: right;"><i>Jan 2020</i></span></li><li>5. Contributed talk, Theory Canada 12, York University, Toronto <span style="float: right;"><i>May 2017</i></span></li></ol>

6. Graduate student colloquium, Department of Applied Mathematics, University of Waterloo Jul 2017
7. Poster presentation, Testing Gravity 2017, Vancouver Jan 2017
8. Talk, Cosmology group meeting, PITP, Waterloo Oct 2016

SERVICE

Referee for MNRAS

COLLABORATION

Member of the **LSST-DESC** and the **Aquila consortium**

MENTORING

1. Charles Prior, graduate student at Duke University,  
Project: *Impact of Supernovae systematics on peculiar velocity estimates*
2. William Gregory Dallaway, undergraduate student at University of Waterloo  
Project: *Cross-correlation of standard sirens and galaxy surveys to measure  $H_0$*
3. Michelle Xu, summer undergraduate student at Perimeter Institute  
Project: *Iso-curvature modes in reheating*

CONFERENCES /  
SUMMER SCHOOLS  
ATTENDED

*Analytics, Inference and Computation in Cosmology conference, Paris* Sep-Nov 2018

*Analytics, Inference and Computation in Cosmology school, Corsica* Sep 2018

*Summer Institute in Philosophy of Cosmology, London* Jun 2018

*Large-Scale Astrophysics: galaxies and beyond, Montreal* Jun 2018

*TRISEP school, PITP, Waterloo* Jul 2018

*Testing Gravity 2017, Simon Fraser University, Vancouver* Jan 2017

*Theory Canada 12, York University, Toronto* May 2017

*Bounce Scenarios in Cosmology, PITP, Waterloo* Jun 2017

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

COMPUTATIONAL  
SKILLS

*Computer Languages:* Python, Julia, C++

*Packages and Softwares:* MATHEMATICA, JAX, TensorFlow

TEACHING

A lecture series on Markov Chain Monte Carlo (MCMC) methods at University of Waterloo  
May 2020

Teaching Assistant at University of Waterloo for various mathematics and physics courses (a total of 12 terms)

REFERENCES

Guilhem Lavaux email: [guilhem.lavaux@iap.fr](mailto:guilhem.lavaux@iap.fr)  
Institut d'Astrophysique de Paris  
Paris

Michael J. Hudson email: [mike.hudson@uwaterloo.ca](mailto:mike.hudson@uwaterloo.ca)  
Department of Physics and Astronomy  
University of Waterloo

Ghazal Geshnizjani e-mail: [ggeshniz@uwaterloo.ca](mailto:ggeshniz@uwaterloo.ca)  
Department of Applied Mathematics  
University of Waterloo