

## Supranta Sarma Boruah

---

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	<i>Sep 2020-present</i>
EDUCATION	<b>University of Waterloo</b> Ph.D., Department of Applied Mathematics Thesis title: <i>Topics in early and late Universe cosmology</i> Advisors: Ghazal Geshnizjani and Michael Hudson	<i>Sep 2016-Aug 2020</i>
	<b>Indian Institute of Technology (IIT) Kanpur</b> B.S.-M.S dual degree, Department of Physics	<i>Jul 11-May 16</i>
PUBLICATIONS AND PREPRINTS	<ol style="list-style-type: none"><li>1. 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>. Submitted to MNRAS</li><li>2. <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>3. <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>. <b>MNRAS</b>, <b>498</b>, <b>2703</b>, [<a href="https://arxiv.org/abs/1912.09383">arXiv:1912.09383</a>]</li><li>4. 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>. <b>MNRAS</b>, <b>494</b>, <b>50</b>, [<a href="https://arxiv.org/abs/1909.06379">arXiv:1909.06379</a>]</li><li>5. 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>. <b>MNRAS</b>, <b>493</b>, <b>3061</b>, [<a href="https://arxiv.org/abs/1908.02336">arXiv:1908.02336</a>]</li><li>6. <b>S. S. Boruah</b>, H. J. Kim, M. Rouben and G. Geshnizjani, <i>Cuscuton Bounce</i>. <b>JCAP</b> <b>08</b>, <b>031</b> (2018), [<a href="https://arxiv.org/abs/1802.06818">arXiv:1802.06818</a>]</li><li>7. <b>S. S. Boruah</b>, H. J. Kim and G. Geshnizjani, <i>Theory of Cosmological Perturbations with Cuscuton</i>. <b>JCAP</b> <b>07</b>, <b>022</b> (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</li><li>2. Invited seminar, IAP, Paris</li><li>3. Invited seminar, Duke University</li><li>4. Invited seminar, MPA, Garching</li><li>5. Contributed talk, Theory Canada 12, York University, Toronto</li><li>6. Graduate student colloquium, Department of Applied Mathematics, University of Waterloo</li><li>7. Poster presentation, Testing Gravity 2017, Vancouver</li><li>8. Talk, Cosmology group meeting, PITP, Waterloo</li></ol>	<i>November 2020</i> <i>Apr 2020</i> <i>Feb 2020</i> <i>Jan 2020</i> <i>May 2017</i> <i>Jul 2017</i> <i>Jan 2017</i> <i>Oct 2016</i>

## 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

<i>Analytics, Inference and Computation in Cosmology conference, Paris</i>	<i>Sep-Nov 2018</i>
<i>Analytics, Inference and Computation in Cosmology school, Corsica</i>	<i>Sep 2018</i>
<i>Summer Institute in Philosophy of Cosmology, London</i>	<i>Jun 2018</i>
<i>Large-Scale Astrophysics: galaxies and beyond, Montreal</i>	<i>Jun 2018</i>
<i>TRISEP school, PITP, Waterloo</i>	<i>Jul 2018</i>
<i>Testing Gravity 2017, Simon Fraser University, Vancouver</i>	<i>Jan 2017</i>
<i>Theory Canada 12, York University, Toronto</i>	<i>May 2017</i>
<i>Bounce Scenarios in Cosmology, PITP, Waterloo</i>	<i>Jun 2017</i>

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

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

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