

# Arka Banerjee

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CONTACT INFORMATION	<p>Kavli Institute for Particle Astrophysics and Cosmology Physics Astrophysics Building Stanford, CA 94305 USA</p> <p><i>E-mail:</i> arka.2110@gmail.com</p>
RESEARCH POSITIONS	<p><b>Kavli Institute for Particle Astrophysics and Cosmology</b>, Stanford University, Stanford, California USA KIPAC Postdoctoral Fellow, since Sep 2017.</p>
EDUCATION	<p><b>University of Illinois, Urbana-Champaign</b>, Urbana, Illinois USA Ph.D., August 2017</p> <ul style="list-style-type: none"><li>• Dissertation Topic: “Cosmological Signatures of Fundamental Physics”</li><li>• Advisor: Neal Dalal</li></ul> <p><b>Tata Institute of Fundamental Research</b>, Mumbai, India M.Sc., Physics, 2011</p> <ul style="list-style-type: none"><li>• Dissertation Topic: “Onset of nonlinear neutrino oscillations in core collapse supernovae”</li><li>• Advisor: Amol Dighe</li></ul> <p><b>St. Stephen’s College</b>, Delhi, India B.Sc., Physics, 2008</p>
HONORS AND AWARDS	<p>UIUC University Fellowship, Fall 2016. UIUC University Fellowship, Spring 2013. Outstanding Teaching Award, UIUC</p> <ul style="list-style-type: none"><li>• Spring 2016</li><li>• Fall 2012</li><li>• Spring 2012</li></ul> <p>Kamla Bajaj Award for Best Student in Physics Honours, St. Stephen’s College, 2008.</p>
MENTORING EXPERIENCE	<p>Graduate student supervision for research projects:</p> <ul style="list-style-type: none"><li>• Adrian Bayer, UC Berkeley. <i>A fast particle-mesh simulation of non-linear cosmological structure formation with massive neutrinos</i>, arXiv:2007.13394.</li><li>• Ethan Nadler, Stanford University. <i>Signatures of Velocity-Dependent Dark Matter Self-Interactions in Milky Way-mass Halos</i>, Astrophys.J. 896 (2020) 112.</li><li>• Andrew Eberhardt, Stanford University. <i>Investigating the use of field solvers for simulating classical systems</i>, Phys.Rev.D 101 (2020) 4, 043011.</li></ul> <p>Summer supervision for undergraduate students:</p> <ul style="list-style-type: none"><li>• Jacob Stanton, Brown University.</li></ul>
TEACHING EXPERIENCE	<p><b>Senior Teaching Assistant</b> Quantum Mechanics and Statistical Physics, UIUC</p> <ul style="list-style-type: none"><li>• Fall 2016</li></ul>

### Teaching Assistant

Quantum Mechanics and Statistical Physics, UIUC

- Spring 2016
- Spring 2012
- Fall 2011

Special Relativity and Math Applications, UIUC

- Fall 2012

Graduate course in Electromagnetism, TIFR

- Fall 2010

### PROFESSIONAL SERVICE

Referee for JCAP, PRD, ApJ, MNRAS.

Convener of the neutrino group for SLAC's internal Snowmass 2021 process.

### CONFERENCES AND MEETINGS ORGANIZED

KIPAC Postdoctoral Lunch Talks, 2018-present.

KIPAC Hack Day, May 2019.

Local Group Meeting (Stanford, UC Berkeley, UC Davis) on Local Group Science, November 2019.

### COMPUTING SKILLS AND EXPERIENCE

Programming Languages: C, C++, Python, Mathematica, LaTeX.

Extensive experience in cluster computing and parallel computing.

### PUBLICATIONS

Bayer, **Banerjee**, and Feng, *A fast particle-mesh simulation of non-linear cosmological structure formation with massive neutrinos*,  
arXiv:2007.13394.

**Banerjee**, and Abel, *Nearest Neighbor distributions: new statistical measures for cosmological clustering*,  
arXiv:2007.13342.

Aviles, **Banerjee**, *A Lagrangian Perturbation Theory in the presence of massive neutrinos*,  
arXiv:2007.06508.

Fang, **Banerjee**, Charles, Omori, *A Cross-Correlation Study of High-energy Neutrinos and Tracers of Large-Scale Structure*,  
The Astrophysical Journal, Volume 894, Number 2.

Nadler, **Banerjee**, Adhikari, Mao, Wechsler, *Signatures of Velocity-Dependent Dark Matter Self-Interactions in Milky Way-mass Halos*,  
Astrophys.J. 896 (2020) 112.

Eberhardt, **Banerjee**, Kopp, Abel, *Investigating the use of field solvers for simulating classical systems*,  
Phys.Rev.D 101 (2020) 4, 043011.

Uhlemann, Friedrich, Villaescusa-Navarro, **Banerjee**, Codis, *Fisher for complements: Extracting cosmology and neutrino mass from the counts-in-cells PDF*,  
MNRAS, Volume 495, Issue 4, July 2020.

Villaescusa-Navarro, Hahn, Massara, **Banerjee et al.**, *The Quijote simulations*,  
arXiv:1909.05273.

McClintock, Rozo, **Banerjee et al.**, *The Aemulus Project IV: Emulating Halo Bias*,

arXiv:1907.13167.

**Banerjee et al.**, *Weighing neutrinos with the halo environment*, JCAP 06 (2020) 032.

**Banerjee et al.**, *Signatures of Self-Interacting dark matter on cluster density profile and subhalo distributions*, JCAP 02 (2020) 024.

Chuang et al., *UNIT project: Universe N-body simulations for the Investigation of Theoretical models from galaxy surveys*, MNRAS, Volume 487, Issue 1, July 2019.

**Banerjee**, Powell, Abel, and Villaescusa-Navarro, *Reducing Noise in Cosmological N-body Simulations with Neutrinos*, JCAP 1809, no. 09, 028 (2018).

Secco, Farah, Jain, Adhikari, **Banerjee**, and Dalal, *Probing Self-interacting Dark Matter with Disk Galaxies in Cluster Environments*, Astrophys.J. 860 (2018) no.1, 32.

Villaescusa-Navarro, **Banerjee**, Dalal, Castorina, Scoccimaro, Angulo, and Spergel, *The imprint of neutrinos on clustering in redshift-space*, Astrophys.J. 861 (2018) no.1, 53.

**Banerjee**, Jain, Dalal, and Shelton, *Tests of Neutrino and Dark Radiation Models from Galaxy and CMB surveys*, JCAP 1801 (2018) 01, 022.

**Banerjee**, and Dalal, *Simulating nonlinear cosmological structure formation with massive neutrinos*, JCAP (2016) 11 015.

**Banerjee**, Dighe, and Raffelt, *Linearized flavor-stability analysis of dense neutrino streams*, Phys.Rev. D84 (2011) 053013.

Home, Pan, and **Banerjee**, *Larmor precession reexamined: Testable correction and its ramifications*, Eur. Phys. J. D, 67, 72(2013).

Home, Pan, and **Banerjee**, *Quantitative probing of quantum-classical transition for the arrival time distribution*, J. Phys. A: Math. Theor. 42, 165302 (2009).

OTHER  
CONTRIBUTIONS

Drlica-Wagner et al., *Probing the Fundamental Nature of Dark Matter with the Large Synoptic Survey Telescope*, arXiv:1902.01055.

Bechtol et al., *Dark Matter Science in the Era of LSST*, arXiv:1903.04425.

Rhodes et al., *The End of Galaxy Surveys*,  
[HTTP://ADSABS.HARVARD.EDU/ABS/2019BAAS...51C.114R](http://ADSABS.HARVARD.EDU/ABS/2019BAAS...51C.114R)

TALKS AND  
PRESENTATIONS

*Weighing neutrinos with the Large Scale Structure of the Universe*, ICTS, Bangalore, March 2020.

*Weighing neutrinos with the Large Scale Structure of the Universe*, IISC, Bangalore, March 2020.

*Signatures of Dark Matter Self-Interactions in the Milky Way*, Local Group Meeting, Stanford, November, 2019.

*Signatures of Self-Interacting dark matter on cluster density profile and subhalo distributions*, Cosmic Controversies Conference, Chicago, October 2019.

*Signatures of Self-Interacting dark matter on cluster density profile and subhalo distributions*, LSST Dark Matter Workshop, U. Chicago, August 2019.

*Signatures of Self-Interacting dark matter on cluster density profile and subhalo distributions*, New

York University, June 2019.

*Massive neutrinos and environmental scale dependence*, Cosmology Seminar, ICTS Bangalore, January 2019.

*Imprints of massive neutrinos on Large Scale Structure*, IMSC Chennai, January 2019.

*Cosmology with massive neutrinos*, INPA Seminar, Lawrence Berkeley Laboratory, October 2018.

*Massive Neutrinos and the Environmental Scale Dependence of Halo Bias*, Nonlinear Universe Conference, Smartno, July 2018.

*Reducing Noise in Cosmological N-body simulations with neutrinos*, KIPAC Tea, SLAC, January 2018.

*Reducing Noise in Cosmological N-body simulations with neutrinos*, Cosmology Lunch, Princeton University, December 2017.

*Imprints of massive neutrinos on Large Scale Structure*, Cosmology Seminar, UC Davis, October 2017.

*Cosmological effects of massive neutrinos*, IIT Bombay, August 2017.

*Void biasing in the presence of massive neutrinos*, LBL, April 2017.

*Simulating nonlinear structure formation with massive neutrinos*, KIPAC, Stanford University, March 2017.

*Cosmological structure formation with massive neutrinos*, IPMU, Tokyo, February 2017.

*Simulating nonlinear structure formation with massive neutrinos*, CCAPP, Ohio State University, January 2017.

*Large scale biasing of voids in the presence of massive neutrinos*, University of Pennsylvania, August 2016.

*Simulating cosmologies with “fast” particles*, Santa Fe Cosmology Workshop, July 2014.

## REFERENCES

### **Prof. Tom Abel**

Department of Physics  
Stanford University  
Stanford, CA-94305  
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### **Prof. Risa Wechsler**

Department of Physics  
Stanford University  
Stanford, CA-94305  
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### **Prof. Neal Dalal**

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### **Prof. Andrey Kravtsov**

Department of Astronomy and Astrophysics  
The University of Chicago  
Chicago, IL 60637  
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