

Jatan Buch

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EMPLOYMENT	Postdoctoral Research Scientist Lamont-Doherty Earth Observatory, Columbia University	May 2021 – present
	Visiting Assistant Professor Department of Physics, Brown University	January – April 2021
EDUCATION	Ph.D. in Physics, Brown University Advisor: Jiji Fan Thesis: <i>Space Invaders – Astroparticle Searches for Dark Matter Physics</i>	Providence, USA September 2016 – December 2020
	B.Sc. (Honours) and M.Sc. in Physics, IIT Kharagpur Advisor: K.L. Panigrahi Thesis: <i>Dynamics in F-string background</i>	Kharagpur, India July 2010 – May 2015
RESEARCH INTERESTS	My primary research interest is the application of probabilistic modeling, causal inference, and deep learning methods for reducing uncertainty in climate change projections as well as their associated economic and ecological impact assessments.	
PUBLICATIONS	(bold face indicates primary or equivalent contribution; JCAP = Journal of Cosmology and Astroparticle Physics; Phys. Rev. D = Physical Review D)	
	J. Buch , M.A. Buen-Abad, J.S.C. Leung, J. Fan, Dark Matter Substructure Under the Electron Scattering Lamppost, <i>Phys. Rev. D</i> , doi.org/10.1103/PhysRevD.102.083010 , arXiv:2007.13750	
	J. Buch , M.A. Buen-Abad, J.S.C. Leung, J. Fan, Galactic Origin of Relativistic Bosons and the Xenon-1T Excess, <i>JCAP</i> , doi.org/10.1088/1475-7516/2020/10/051 , arXiv:2006.12488	
	J. Buch , J. Fan, J.S.C. Leung, Implications of the Gaia Sausage for Dark Matter Nuclear Interactions, <i>Phys. Rev. D</i> , doi.org/10.1103/PhysRevD.101.063026 , arXiv:1910.06356	
	J. Buch , J. Fan, J.S.C. Leung, Using Gaia DR2 to Constrain Local Dark Matter Density and Thin Dark Disk, <i>JCAP</i> , doi.org/10.1088/1475-7516/2019/04/026 , arXiv:1808.05603	
	J. Buch , P. Ralegankar, V. Rentala, Late decaying 2-component dark matter scenario as an explanation of the AMS-02 positron excess, <i>JCAP</i> , doi.org/10.1088/1475-7516/2017/10/028 , arXiv:1609.04821	
	J. Buch, M. Cirelli, G. Giesen, M. Taoso, PPC 4 DM secondary: A Poor Particle Physicist's Cookbook for secondary radiation from Dark Matter, <i>JCAP</i> , doi.org/10.1088/1475-7516/2015/09/037 , arXiv:1505.01049	
SELECTED TALKS	Cosmology from Home, (Virtual talk)	August 2020
	Division of Particles and Fields Meeting, Boston, USA	July 2019
	In the Balance: Stasis and Disequilibrium in the Milky Way, Santa Barbara, USA	April 2019
	Identification of Dark Matter, Providence, USA	July 2018
	ICTP Summer School on Cosmology, Trieste, Italy	June 2018
	TeV Particle Astrophysics, Columbus, USA	August 2017
FELLOWSHIPS & AWARDS	Deans' Faculty Fellow, Brown University, USA	September 2020 – Present
	PRISMA Fellow, Mainz Institute for Theoretical Physics (MITP), Germany	January – May 2016
	IRCC Fellow, IIT Bombay, India	August – December 2016
	CEA Internship, Institut de Physique Théorique (IPhT) Saclay, France	May – August 2014
	KVPY Fellow, Department of Science and Technology, India	July 2010 – May 2015
TEACHING	Instructor, Statistical Physics of Inference and (Deep) Learning	Spring 2021
	Assistant Instructor, Techniques in Experimental Physics	Fall 2017/ Spring 2018

SKILLS

Statistics: Likelihood-based methods, hypothesis testing, MCMC, graphical models, variational inference, Gaussian processes, supervised and unsupervised learning algorithms.

Deep learning: convolutional neural networks, recurrent neural networks, generative adversarial networks, energy based networks.

Programming: Python, C, C++, high-performance computing, SQL, Git, \LaTeX ; Julia and MATLAB basics; Linear programming.

Libraries: NumPy, SciPy, Matplotlib, scikit-learn, pandas, PyTorch, TensorFlow and CVXPY basics.

Scientific Software: I'm a co-author of the latest [PPPC4DMID](#) module developed in MATHEMATICA.

Languages: English (proficient), Hindi (proficient), Gujarati (proficient), German (elementary).

COMMUNITY
ACTIVITIES

Student organizer, Centre for Fundamental Physics of the Universe (CFPU) seminars Fall 2020

Convenor, Applied Statistics Reading Group, Brown University 2018 – 2019

Graduate peer mentor, Undergraduate Paired Reading Program, Brown University 2017 – 2018

General Secretary, Phi Society, IIT Kharagpur 2013 – 2014

OUTREACH

Dark Matter: Real or Fake News?, Public talk for Summer@Brown 2019

Activity co-ordinator, Providence Big Bang Science Fair 2019

Volunteer, Providence Big Bang Science Fair 2018

REFERENCES

Jiji Fan

Associate Professor, Brown University

Contact: jiji_fan@brown.edu

Savvas Koushiappas

Associate Professor, Brown University

Contact: savvas_koushiappas@brown.edu

Richard Gaitskell

Hazard Professor of Physics, Director of the Center for Fundamental Physics, Brown University

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Vikram Rentala

Assistant Professor, Indian Institute of Technology Bombay (IIT-B)

Contact: rentala@phy.iitb.ac.in