CHIRAG MODI

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Education

University of California, Berkeley — Berkeley, CA *Fall 2014–Present*

Ph.D. student in Physics *GPA: 3.887/4.0*

Master of Arts in Physics May, 2017

Indian Institute of Technology Bombay — Mumbai, India *Fall 2010 – Spring 2014*

Bachelor of Technology (with Honors) in Engineering Physics *CPI: 9.64/10*

Bachelor of Technology (Minor) in Statistics

Silver Medal, Graduated top of the Physics Class

Research Interests

Cosmology: Large Scale Structures, Intensity Mapping, Halo Modeling, Perturbation Theories

Statistics: Machine Learning, Statistical Modeling and Inference, Optimization

Publications

Led/Co-Led

Reconstructing large-scale structure with neutral hydrogen surveys
***Modi C.**, White M., Slosar A., Castorina E. (arXiv:1907.02330)* Submitted to JCAP

Intensity mapping with neutral hydrogen and the Hidden Valley simulations
***Modi C.**, Feng Y., White M., Castorina E. (arXiv:1904.11923)* Submitted to JCAP

Cosmological Reconstruction From Galaxy Light: Neural Network Based Light-Matter Connection
***Modi C.**, Feng Y., Seljak U. (arXiv:1805.02247)* JCAP10(2018)028

Towards Optimal Extraction of Cosmological Information from Non-linear Data
*Seljak U., Aslanyan G., Feng Y., **Modi C.**(arXiv:1706.06645)* JCAP 12(2017)009

Modeling CMB lensing cross correlations with CLEFT
***Modi C.**, White M., Vlah Z. (arXiv:1706.03173)* JCAP 08(2017)009

Halo Bias in Lagrangian Space: Estimators and Theoretical Predictions
***Modi C.**, Castorina E., Seljak U. (arXiv:1612.01621)* MNRAS 472,3959 (2017)

A Fast Algorithm for Identifying Friends-of-Friends Halos
*Feng Y., **Modi C.**(arXiv:1607.03224)* A&C 20(2017)44-51

Local Random Potentials of High Differentiability to Model the Landscape
*Battefeld T., **Modi C.**(arXiv:1409.5135)* JCAP 03(2015)010

Member of Main Science Team

nbodykit: an open-source, massively parallel toolkit for large-scale structure
*Hand N., et al. (including **CM**)(arXiv:1712.05834)* The Astronomical Journal, (Oct, 2018)

The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: Anisotropic galaxy clustering in Fourier-space
*Beutler F., et al. (including **CM**)(arXiv:1607.03150)* MNRAS, 466, 2242 (2016)

The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: Baryon Acoustic Oscillations in Fourier-space
*Beutler F., et al. (including **CM**)(arXiv:1607.03149)* MNRAS, 464, 3409, (2016)

Work in Progress

On the validity of the Born approximation in modeling cross correlations
*Boehm V., **Modi C.**, Castorina E. (arXiv:1909.xxxxx)* To be submitted to JCAP

Generative learning counterfactual analysis for econometrics synthetic control applications
***Modi C.**, Seljak U. (arXiv:1909.xxxxx)* To be submitted to NeurIPS

Talks

(Invited) Machine Learning in the era of large astronomical surveys, KSPA, UC Santa Cruz, CA — July 2019

Paving the way for next generation of cosmological surveys, SCA, Sesto, Italy — July 2018

Cosmology Seminar, MPA, Garching, Germany — July 2018

The Nonlinear Universe 2018, BCCP, Smartno, Slovenia — July 2018

Modeling the Extragalactic Sky, BCCP, Berkeley, CA — Jan 2018

Low Redshift Universe, Nordita, Stockholm, Sweden — July 2017

The Non Linear Universe, BCCP & CCA, Smartno, Slovenia — July 2017

DESI Lunch Talk, Lawrence Berkeley National Lab, Berkeley, CA — December 2016

Posters

Quantifying and Understanding the Galaxy-Halo Connection
Kavli Institute of Theoretical Physics, UC Santa Barbara, Santa Barbara, CA — May 2017

Prospective Graduate Student Open House
Department of Physics, UC Berkeley, Berkeley, CA — March 2017 & 2018

6th Workshop on Algorithms for Modern Massive Data Sets (MMDS)
BIDS & UC Berkeley, Berkeley, CA — June 2016

Teaching Experience

Teaching Assistant, UC Berkeley, Physics — Fall 2017
Assisted in developing course - "Data science and Bayesian statistics for physical sciences"

Graduate Student Instructor, UC Berkeley, Physics — Fall 2014-Fall 2015
Over 3 semesters; Courses- Mechanics and Wave Motion, Honor Sequence Course

Teaching Assistant Instructor, IIT Bombay, Physics — Fall 2011-Spring 2014
Over 6 semesters; Courses- Quantum Mechanics, Modern Physics, Electricity and Magnetism

Olympiad Facilitator, OCSC- International Astronomy Olympiad, HBCSE-TIFR, India — Summer 2010
Academic Training: Selection and Preparation of Indian Team for International Astronomy Olympiads

Instructor, Splash at Berkeley — Fall 2015 - Fall 2017
Outreach Program: Taught courses such as Amateur Astronomy, Card Games from India

Awards and Recognitions

World Rank 2 & Gold Medal — Beijing, China, 2010
International Olympiad of Astronomy and Astrophysics

Gold Medal — Hongzhou, China, 2009
International Astronomy Olympiad

DAAD WISE Scholarship- Deutscher Akademischer Austausch Dienst (DAAD) — Germany, Summer, 2010
German Academic Exchange Service

All India Rank 48- Joint Entrance Examination — India, 2010
Indian Institute of Technology (over 500,000 students take the exam)

KVPY Fellowship- Kishore Vaigyanik Protsahan Yojna — India, 2009-2010
Government of India

NTSE Fellowship- National Talent Search Scholarship — India, 2008-2010
Government of India

Skills

Conversant with **OS**: Windows and UNIX systems, **Tools**: Version Control (Git), Emacs

Extensive experience with Python - databases, scikit-learn, scikit-image, web-frameworks

Extensive experience with TensorFlow, Tensorflow Probability, Keras, PyTorch

Working knowledge of C/C++, Mathematica, Matlab