

Biographical Sketch of Bhuvnesh Jain

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Education:

1989 A.B. (High Honors) Physics Princeton University
1994 Ph.D. Physics M.I.T.
Thesis title: The Evolution of Cosmological Density Fluctuations
Co-supervisors: E. Bertschinger, A. Guth

Professional Appointments:

2021- Co-Director, Data Driven Discovery Initiative, University of Pennsylvania
2016- Walter H. and Leonore C. Annenberg Professor in the Natural Sciences
2011-2015 Edmund J. and Louise W. Kahn Term Professor in the Natural Sciences
2009- Co-Director, Center for Particle-Cosmology, University of Pennsylvania
2001- Professor of Physics & Astronomy (Assistant, Associate and Full), University of Pennsylvania
1999-2000 Associate Research Scientist, Johns Hopkins University
1997-1999 Postdoctoral Fellow, Johns Hopkins University
1994-1997 Postdoctoral Fellow, Max-Planck-Institute for Astrophysics

Positions and Honors:

2020- Co-chair, Advisory Board of the Dark Energy Survey
2017-2020 Scientific Editor, Galaxies and Cosmology, The Astrophysical Journal
2017-2018 Chair, Fundamental Physics with the Hubble Space Telescope Working Group
2017-2019 Cosmic Visions Dark Energy Group, Department of Energy
2015- Fellow, American Physical Society
2015-2017 Science Policy Committee, SLAC Board of Overseers, Stanford University
2012-2015 Spokesperson, Large Synoptic Survey Telescope (LSST) Dark Energy Science Collaboration
2007-2016 Co-coordinator, Dark Energy Survey (DES) Weak Lensing Working Group
2014-2016 Science Advisory Council, LSST
2006-2012 Co-chair, Large Synoptic Survey Telescope (LSST) Weak Lensing Science Collaboration
2004-2009 Cottrell Scholars Award
2007 Editor, Focus Issue on Gravitational Lensing, New Journal of Physics
1989-91 Karl Taylor Compton Fellow, MIT

University and Department Service:

2014- Affiliate Faculty, Warren Center for Network and Data Sciences
2020- Committee on committees, Penn SAS
2020- Data Driven Discovery, Penn SAS strategic planning group

2006-2020 Penn representative on the Management Committee of the DES project
2001- Served on several faculty search, promotion and mentorship committees (seven as chair)
2007-2009 Faculty Senate
2006-2009 Penn representative on the Board of the LSST project

Publications in Refereed Journals:

1. "Density Fluctuations in Extended Inflation," A. H. Guth and B. Jain, 1992, Phys. Rev. **D 45**, 426-432.
2. "Gravitational Instability of Cold Matter," E. Bertschinger and B. Jain, 1994, ApJ, **431**, 486-494.
3. "Second Order Power Spectrum and Nonlinear Evolution at High Redshift," B. Jain and E. Bertschinger, 1994, ApJ, **431**, 495-505.
4. "Nonlinear Evolution of Correlation Functions and Power Spectra," B. Jain, H. J. Mo and S. D. M. White, 1995, MNRAS, **276**, L25-L29.
5. "Self-Similar Evolution of Gravitational Clustering: Is $n = -1$ Special?," B. Jain and E. Bertschinger, 1996, ApJ, **456**, 43-54.
6. "The Nonlinear Correlation Function and Density Profiles of Virialized Halos," R. Sheth and B. Jain, 1997, MNRAS, **285**, 231-238.
7. "Does Gravitational Clustering Stabilize on Small Scales?," B. Jain, 1997, MNRAS, **287**, 687-698.
8. "Cosmological Model Predictions for Weak Lensing: Linear and Nonlinear Regimes," B. Jain and U. Seljak, 1997, ApJ, **484**, 560-573.
9. "Detection of Shear due to Weak Lensing by Large-Scale Structure," P. Schneider, L. van Waerbeke, Y. Mellier, B. Jain, S. Seitz, B. Fort, 1998, A & A, **333**, 767-778.
10. "The Effect of Weak Lensing on the Angular Correlation Function of Faint Galaxies," R. Moessner, B. Jain and J. V. Villumsen, 1998, MNRAS, **294**, 291-298.
11. "A New Measure for Cosmic Shear," P. Schneider, L. van Waerbeke, B. Jain, G. Kruse, 1998, MNRAS, **296**, 873-892.
12. "Angular Cross-Correlation of Galaxies: A Probe of Gravitational Lensing by Large-Scale Structure," R. Moessner and B. Jain, 1998, MNRAS, **294**, L18-24.
13. "Self-Similar Evolution of Gravitational Clustering II: N-Body Simulations of the $n = -2$ Spectrum," B. Jain and E. Bertschinger, 1998, ApJ, **509**, 517-530.
14. "The Formation and Evolution of Clusters of Galaxies in Different Cosmogonies," A. Huss, B. Jain and M. Steinmetz, 1999, MNRAS, **308**, 1011-1031.
15. "How universal are the density profiles of dark halos?," A. Huss, B. Jain and M. Steinmetz, 1999, ApJ, **517**, 64-69.
16. "Cosmic Shear and Halo Abundances: Analytical Versus Numerical Results," K. Reblinsky, G. Kruse, B. Jain and P. Schneider, 1999, A & A, **351**, 815-826.
17. "Ray Tracing Simulations of Weak Lensing by Large-Scale Structure," B. Jain, U. Seljak and S. White, 2000, ApJ, **530**, 547-577.
18. "The Statistics of Weak Lensing at Small Angular Scales: Probability Distribution Function," D. Munshi and B. Jain, 2000, MNRAS, **318**, 109-123.
19. "Weak Lensing with SDSS Commissioning Data: The Galaxy-Mass Correlation Function To 1/h Mpc," P. Fischer et al (SDSS Collaboration), 2000, AJ, **120**, 1198-1208.
20. "Detection of Correlated Galaxy Ellipticities from CFHT Data: First Evidence for

Gravitational Lensing by Large-Scale Structures,” L. van Waerbeke et al, 2000, A & A, **358**, 30-44.

21. “Statistics of Dark Matter Halos from Gravitational Lensing,” B. Jain and L. van Waerbeke, 2000, ApJL, **530**, L1-L4.

22. “Statistics of Weak Lensing at Small Angular Scales: Analytical Predictions for Lower Order Moments,” D. Munshi and B. Jain, 2001, MNRAS, **322**, 107-120.

23. “How Many Galaxies Fit in a Halo? Constraints on Galaxy Formation Efficiency from Spatial Clustering,” R. Scoccimarro, R. Sheth, L. Hui and B. Jain, 2001, ApJ, **546**, 20-34.

24. “The Topology of Weak Lensing Fields,” T. Matsubara and B. Jain, 2001, ApJL, **552**, L89-L92.

25. “Cosmic Shear Analysis in 50 Uncorrelated VLT Fields. Implications for Ω_0 , σ_8 ,” R. Maoli et al, 2001, A & A, **368**, 766-775.

26. “Cosmic Shear Statistics and Cosmology,” L. van Waerbeke et al, 2001, A & A, **374**, 757-769.

27. “Cosmic Shear from STIS Pure Parallels. I. Data,” N. Pirzkal et al, 2001, A & A, **375**, 351-358.

28. “Cosmic Shear from STIS Pure Parallels. II. Analysis,” H. Hammerle et al, 2002, A & A, **385**, 743-760.

29. “The Kurtosis of the Cosmic Shear Field,” M. Takada and B. Jain, 2002, MNRAS, **337**, 875-894.

30. “Magnification Effects as Measures of Large-Scale Structure,” B. Jain, 2002, ApJ, **580**, L3-L6.

31. “The Angular Correlation Function of Galaxies from Early Sloan Digital Sky Survey Data,” A. Connolly, SDSS Collaboration, 2002, ApJ, **579**, 42-47.

32. “Analysis of Systematic Effects and Statistical Uncertainties in Angular Clustering of Galaxies from Early Sloan Digital Sky Survey Data,” R. Scranton, SDSS Collaboration, 2002, ApJ, **579**, 48-75.

33. “The Three-dimensional Power Spectrum from Angular Clustering of Galaxies in Early Sloan Digital Sky Survey Data,” S. Dodelson, SDSS Collaboration, 2002, ApJ, **572**, 140-156.

34. “The Angular Power Spectrum of Galaxies from Early Sloan Digital Sky Survey Data,” M. Tegmark, SDSS Collaboration, 2002, ApJ, **571**, 191-205.

35. “Likelihood Analysis of Cosmic Shear on Simulated and VIRMOS-DESCART Data,” L. van Waerbeke et al, 2002, A & A, **393**, 369-379.

36. “A Conspicuous Tangential Alignment of Galaxies in a STIS Parallel Shear Survey Field: A New Dark-lens Candidate?,” J. -M. Miralles et al, 2002, A & A, **388**, 68-73.

37. “The Three-Point Correlation Function in Cosmology,” M. Takada and B. Jain, 2003, MNRAS, **340**, 580-608.

38. “The Three-Point Correlation Function for Spin-2 Fields,” M. Takada and B. Jain, 2003, ApJL, **583**, L49-L52.

39. “Karhunen-Loève Estimation of the Power Spectrum Parameters from the Angular Distribution of Galaxies in Early Sloan Digital Sky Survey Data,” A. Szalay, B. Jain, T. Matsubara, R. Scranton, M. Vogeley, SDSS collaboration, 2003, ApJ, **591**, 1-11.

40. “Weak-Lensing Results from the 75 Square Degree Cerro Tololo Inter-American Observatory Survey,” M. Jarvis et al, 2003, AJ, **125**, 1014-1032.

41. "Three-Point Correlations in Weak Lensing Surveys: Model Predictions and Applications," M. Takada and B. Jain, 2003, MNRAS, **344**, 857-886.
42. "Quasar-Galaxy and Galaxy-Galaxy Cross-Correlations: Model Predictions with Realistic Galaxies," B. Jain, R. Scranton and R. Sheth, 2003, MNRAS, **345**, 62-70.
43. "Cross-correlation Tomography: Measuring Dark Energy Evolution with Weak Lensing," B. Jain and A. Taylor, 2003, Phys. Rev. Lett. **91**, 141302, (4pp).
44. "Last Stand Before WMAP: Cosmological Parameters from Lensing, CMB, and Galaxy Clustering," X. Wang, M. Tegmark, B. Jain, M. Zaldarriaga, 2003, Phys. Rev. D, **681**, 3001 (12pp).
45. "Dark Energy Constraints from Weak Lensing Cross-Correlation Cosmography," G. Bernstein and B. Jain, 2004, ApJ, **600**, 12-25.
46. "Substructure and the Halo Model of Large-Scale Structure," R. Sheth and B. Jain, 2003, MNRAS, **345**, 529-538.
47. "Cosmological Parameters from Lensing Power Spectrum and Bispectrum Tomography," M. Takada and B. Jain, 2004, MNRAS, **348**, 897-915.
48. "Effects of Halo Substructure on the Power Spectrum and Bispectrum," D. Dolney, B. Jain and M. Takada, 2004, MNRAS, 352, 1019
49. "Joint Galaxy-Lensing Observables and the Dark Energy," W. Hu and B. Jain, 2004, Phys. Rev. D, 70, 43009 (16pp).
50. "The Three-Dimensional Power Spectrum of Galaxies from the Sloan Digital Sky Survey," M. Tegmark et al, 2004, ApJ, 606, 702-740
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52. "Detection of Cosmic Magnification with the Sloan Digital Sky Survey," R. Scranton et al., 2005, ApJ, 633, 589-602
53. "Constraints on dark energy models from galaxy clusters with multiple arcs," 2005, M. Meneghetti, B. Jain, M. Bartelmann, K. Dolag, MNRAS, 362, 1301-1310
54. "PSF anisotropy and systematic errors in weak lensing surveys," B. Jain, M. Jarvis and G. Bernstein, 2006, JCAP, 02, 001 (18pp).
55. "Systematic errors in future weak-lensing surveys: requirements and prospects for self-calibration," D. Huterer, M. Takada, G. Bernstein and B. Jain, 2006, MNRAS, 366, 101-114
56. "Baryon oscillations and dark-energy constraints from imaging surveys," 2006, D. Dolney, B. Jain, M. Takada, MNRAS, 366, 884-898
57. "Dark Energy Constraints from the CTIO Lensing Survey," 2006, M. Jarvis, B. Jain, G. Bernstein and D. Dolney, ApJ, 644, 71-79
58. "Short GRB and binary black hole standard sirens as a probe of dark energy," N. Dalal, D. Holz, S. Hughes and B. Jain, 2006, Phys. Rev. D, 2006, 74, 3006 (9pp).
59. "Cosmological constraints from the SDSS luminous red galaxies," M. Tegmark et al., 2006, Phys. Rev. D, 74, 123507 (34pp).
60. "N-Body Simulations of Alternate Gravity Models," H. Stabenau and B. Jain, 2006, Phys. Rev.

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61. "Color Tomography," B. Jain, A. Connolly and M. Takada, 2007, JCAP, 03, 13 (23pp).
62. "On combining lensing shear information from multiple filters," M. Jarvis and B. Jain, 2008, JCAP, 01, 003 (8pp).
63. "Photometric Redshifts with Surface Brightness Priors," H. Stabenau, A. Connolly, B. Jain, 2007, MNRAS, 387, 1215-1226
64. "Observational Tests of Modified Gravity," B. Jain and P. Zhang, 2007, Phys. Rev. D, 78, 063503, arXiv:0709.2375
65. "Weak Gravitational Lensing and its Cosmological Applications," H. Hoekstra and B. Jain, 2008, Ann. Rev. of Nuc. and Part. Science, 58, 99
66. "Galaxy-CMB and galaxy-galaxy lensing on large scales: Sensitivity to primordial non-Gaussianity," 2009, Jeong, D., Komatsu, E., **Jain, B.**, PRD, 80, 123527
67. "Tests of gravity from imaging and spectroscopic surveys," 2009, Guzik, J., **Jain, B.**, Takada, M., PRD, 81, 023503
68. "Topological defects in gravitational lensing shear fields," 2009, Vitelli, V., **Jain, B.**, Kamien, R., 2009, JCAP, 09, 034
69. "Three-point correlations in $f(R)$ models of gravity," 2009, A. Borisov, B. Jain, PRD, 79, 3506
70. "MgII absorption systems and their neighbouring galaxies from a background-subtraction technique," 2010, M. Caler, R. Sheth and B. Jain, MNRAS, 406, 1269
71. "Lensing magnification: implications for counts of submillimetre galaxies and SZ clusters," 2010, M. Lima, B. Jain, M. Devlin, MNRAS, 406, 2352
72. "Submillimeter Galaxy Number Counts and Magnification by Galaxy Clusters," 2010, M. Lima, B. Jain, Devlin, M., Aguirre, J., ApJ, 717, L31
73. "Cosmological Tests of Gravity," 2010, B. Jain, J. Khoury, Annals of Physics, 325, 1479
74. "Re-capturing Cosmic Information," 2011, H-J. Seo, M. Sato, S. Dodelson, B. Jain, M. Takada, ApJ, 729, L11
75. "Magnification effects on source counts and fluxes," 2011, B. Jain and M. Lima, MNRAS, 411, 2113
76. "Three-dimensional Reconstruction of the Density Field: An SVD Approach to Weak-lensing Tomography," 2011, J. VanderPlas, A. Connolly, B. Jain, M. Jarvis, ApJ, 727, 118
77. "Tests of modified gravity with dwarf galaxies," 2011, B. Jain, J. VanderPlas, JCAP, 10, 032
78. "Microlensing of Kepler Stars as a Method of Detecting Primordial Black Hole Dark Matter," 2011, K. Griest, M. Lehner, A. Cieplak, B. Jain, PRL, 107, 1101
79. "Interpolating Masked Weak Lensing Signal with Karhunen-Loeve Analysis," 2012, J. VanderPlas, A. Connolly, B. Jain, & M. Jarvis, ApJ, 744, 180
80. "Spherical Collapse in $f(R)$ Gravity," 2012, A. Borisov, B. Jain, P. Zhang, PRD, 85, 3581
81. "Halo Scale Predictions of Symmetron Modified Gravity," J. Clampitt, B. Jain, J. Khoury, 2012, JCAP, 01, 030

82. "Astrophysical tests of gravity: a screening map of the nearby universe," 2012, Cabre, A., Vikram, V., Zhao, G., B. Jain, Koyama, K., JCAP, 07, 034
83. "Astrophysical Tests of Modified Gravity: Constraints from Distance Indicators in the Nearby Universe," 2012, B. Jain, V. Vikram, J. Sakstein, ApJ, 779, 39, arXiv:1204.6044
84. "The impact of camera optical alignments on weak lensing measures for the Dark Energy Survey," 2012, M. Antonik, et al, MNRAS, 431, 3291, arXiv:1206.5320
85. "Astrophysical Tests of Modified Gravity: the Morphology and Kinematics of Dwarf Galaxies," 2012, V. Vikram, A. Cabre, B. Jain, J. VanderPlas, JCAP, 08, 020, arXiv:1303.0295
86. "Information content of weak lensing power spectrum and bispectrum: including the non-Gaussian error covariance matrix," 2013, Kayo, I., Takada, M., B. Jain, MNRAS, 429, 344
87. "The effective number density of galaxies for weak lensing measurements in the LSST project," 2013, C. Chang, M. Jarvis, B. Jain, et al, MNRAS, 434, 2121
88. "Detecting modified gravity in the stars," 2014, J. Sakstein, B. Jain, V. Vikram, IJMPD, 23, 12
89. "Delensing galaxy surveys," 2014, C. Chang, B. Jain, MNRAS, 443, 102, arXiv:1405.1432
90. "Growth of cosmic structure: Probing dark energy beyond expansion," 2015, D. Huterer et al, Astroparticle Physics, 63, 23
91. "Beyond the Cosmological Standard Model," A. Joyce, B. Jain, J. Khoury, M. Trodden, 2015, Physics Reports, 568, 1, arXiv:1407.0059
92. "Cosmic discordance: are Planck CMB and CFHTLenS weak lensing measurements out of tune?," N. MacCrann, J. Zuntz, S. Bridle, B. Jain, M. Becker, 2015, MNRAS, 451, 2877
93. "Wide-Field Lensing Mass Maps from Dark Energy Survey Science Verification Data," C. Chang, V. Vikram, B. Jain, et al., Phys. Rev. Letters, 2015, 115, 051301
94. "Wide-field lensing mass maps from Dark Energy Survey science verification data: Methodology and detailed analysis," V. Vikram, C. Chang, B. Jain, et al, PRD, 2015, 92, 022006
95. "Lensing Measurements of the Mass Distribution in SDSS Voids," J. Clampitt, B. Jain, 2015, MNRAS, 454, 3357, arXiv:1404.1834
96. "Weak lensing by galaxy troughs in DES Science Verification data," 2016, D. Gruen et al., MNRAS, 455, 3367,
97. "CMB lensing tomography with the DES Science Verification galaxies," 2016, T. Giannantonio et al., MNRAS, 456, 3213
98. "Clustering and Bias Measurements of SDSS Voids," J. Clampitt, B. Jain, C. Sanchez, 2016, MNRAS, 456, 4425, arXiv:1507.08031
99. "Detection of Stacked Filament Lensing Between SDSS Luminous Red Galaxies," J. Clampitt, H. Miyatake, B. Jain, M. Takada, 2016, MNRAS, 457, 2391, arXiv:1402.3302
100. "Lensing Measurements of the Ellipticity of Luminous Red Galaxies Dark Matter Halos," J. Clampitt, B. Jain, 2016, MNRAS, 457, 4135, arXiv:1506.03536
101. "The DES Science Verification Weak Lensing Shear Catalogs," M. Jarvis et al, 2016, MNRAS, 460, 2245, arXiv:1507.05603
102. "Cosmology from Cosmic Shear with DES Science Verification Data," The Dark Energy

- Survey Collaboration, 2016, *PRD* 94, 022001, arXiv:1507.05552
103. “Joint measurement of lensing-galaxy correlations using SPT and DES SV data,” E. Baxter, J. Clampitt, T. Giannantonio, S. Dodelson, B. Jain, et al, 2016, *MNRAS*, 461, 4099, arXiv:1602.07384
 104. “Constraining the Mass-Richness Relationship of redMaPPer Clusters with Angular Clustering,” E. Baxter, E. Rozo, B. Jain, E. Rykoff, R. Wechsler, 2016, *MNRAS*, 463, 205, arXiv:1604.00048
 105. “Tidal stripping as a test of satellite quenching in redMaPPer clusters,” Y. Fang, J. Clampitt, N. Dalal, B. Jain et al, 2016, *MNRAS*, 463, 1907, arXiv:1604.08611
 106. “Cosmic shear measurements with Dark Energy Survey Science Verification data,” M. Becker et al, 2016, *PRD*, 94, 022002
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 108. “Detection of the kinematic Sunyaev-Zel’dovich effect with DES Year 1 and SPT,” B. Soergel et al, 2016, *MNRAS*, 461, 3172
 109. “Joint analysis of galaxy-galaxy lensing and galaxy clustering: Methodology and forecasts for Dark Energy Survey,” Y. Park, E. Krause, S. Dodelson, B. Jain et al, 2016, *PRD*, 94, 3533
 110. “Cosmic voids and void lensing in the Dark Energy Survey Science Verification data,” C. Sanchez, J. Clampitt, A. Kovacs, B. Jain et al, 2017, *MNRAS*, 465, 746
 111. “Galaxy-galaxy lensing in the Dark Energy Survey Science Verification data,” J. Clampitt et al, 2017, *MNRAS*, 465, 4204
 112. “Imprint of DES superstructures on the cosmic microwave background,” A. Kovacs et al, 2017, *MNRAS*, 465, 4166, arXiv:1610.00637
 113. “A Measurement of the Galaxy Group-Thermal Sunyaev-Zel’dovich Effect Cross-Correlation Function,” V. Vikram, A. Lidz, B. Jain, 2017, *MNRAS*, 467, 2315
 114. “The Halo Boundary of Galaxy Clusters in the SDSS,” E. Baxter, C. Chang, B. Jain et al, 2017, *ApJ*, 841, 18, arXiv:1702.01722
 115. “Tests of Gravity Theories Using Supermassive Black Holes,” J. Sakstein, B. Jain, J. S. Heyl, L. Hui, 2017, *ApJL*, 844, L14, arXiv:1704.02425
 116. “Implications of the Neutron Star Merger GW170817 for Cosmological Scalar-Tensor Theories,” J. Sakstein, B. Jain, 2017, *PRL*, 119, 1303, arXiv:1710.05893
 117. “A gravitational-wave standard siren measurement of the Hubble constant,” B. P. Abbott et al, 2017, *Nature*, 551, 85, arXiv:1710.05835
 118. “Tests of Neutrino and Dark Radiation Models from Galaxy and CMB surveys,” A. Banerjee, B. Jain, N. Dalal, J. Shelton, 2018, *JCAP*, 01, 022, arXiv:1612.07126
 119. “Dark Energy Survey Year 1 Results: Curved-Sky Weak Lensing Mass Map,” C. Chang et al., *MNRAS*, 2018, 475, 3165, arXiv:1708.01535
 120. “The ellipticity of galaxy cluster haloes from satellite galaxies and weak lensing,” T. Shin, J. Clampitt, B. Jain et al, 2018, *MNRAS*, 475, 2421, arXiv:1705.11167

121. "A measurement of CMB cluster lensing with SPT and DES year 1 data," E. Baxter et al, 2018, *MNRAS*, 476, 2674, arXiv:1708.01360
123. "The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. I. Discovery of the Optical Counterpart Using the Dark Energy Camera," M. Soares-Santos, 2018, *ApJ*, 848, 16, arXiv:1710.05459
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125. "The Splashback Feature around DES Galaxy Clusters: Galaxy Density and Weak Lensing Profiles," C. Chang, E. Baxter, B. Jain et al, 2017, *ApJ*, 864, 83, arXiv:1710.06808
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Collaboration, 2019, PRL, 122, 171301, arXiv:1811.02375

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141. “Dark Energy Survey year 1 results: the relationship between mass and light around cosmic voids,” Y. Fang, N. Hamaus, B. Jain et al, 2019, MNRAS, 490, 3573

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- weak lensing,” 2022, Abbott, T.M.C., Aguena, M., Alarcon, A., Allam, S., and 167 colleagues, Physical Review D, 105, 023520
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205. “Detection of the significant impact of source clustering on higher order statistics with DES Year 3 weak gravitational lensing data,” 2024, Gatti, M et al, MNRAS, 527, L115
206. “Late time modification of structure growth and the S_8 tension,” 2024, Lin, M.-X., Jain, B. et al, PRD, 109, 063523

Preprints and Other Publications:

1. “Principal Component Analysis of PSF Variation in Weak Lensing Surveys,” M. Jarvis, B. Jain, 2004; arXiv:astro-ph/0412234
2. “Lensing Systematics from Space: Modeling PSF effects in the SNAP survey,” H. Stabenau, B. Jain, G. Bernstein, M. Lampton, 2007; arXiv:0710.3355
3. “Editorial: Focus on Gravitational Lensing,” B. Jain, 2008, NJP, Vol. 9, Issue 12
4. “Telescope Optics and Weak Lensing: PSF Patterns due to Low Order Aberrations,” M. Jarvis, P. Schechter, B. Jain, 2008; arXiv:0810.0027
5. “Weak Gravitational Lensing with LSST,” 2009, D. Wittman, B. Jain, Chapter for LSST Science Book; arXiv:0912.0201
6. “Designing Surveys for Tests of Gravity,” 2011, B. Jain, Phil. Trans. R. Soc. A, 369, 5081; arXiv:1104.0415
7. “Novel Probes of Gravity and Dark Energy, Snowmass Report,” B. Jain et al, arXiv:1309.5389
8. “The Whole is Greater than the Sum of the Parts: Optimizing the Joint Science Return from LSST, Euclid and WFIRST,” B. Jain, D. Spergel et al, 2015, White Paper, arXiv:1501.07897
10. “Fundamental Physics with the Hubble Space Telescope,” N. Dalal et al, 2018, Report of the HST and Fundamental Physics Working Group, arXiv:1712.04928
11. “Cosmic Visions Dark Energy: Small Projects Portfolio,” K. Dawson et al, Report of the Cosmic Visions Dark Energy Panel for the US DOE, arXiv:1802.07216
12. “Planet X in CMB and Optical Galaxy Surveys,” E. Baxter, B. Jain et al, 2018, arXiv:1812.08701

13. “Transformers for scientific data: a pedagogical review for astronomers,” 2023, Tanoglidis, D., Jain, B., Qu, H., eprint arXiv:2310.12069

Selected Recent Presentations:

- 2023 Perimeter Institute, Cosmology seminar, November 2023
- 2023 Boston University, Astrophysics seminar, Boston, November 2023
- 2023 University of Arizona, Physics colloquium, Tucson, October 2023
- 2023 Dark Energy Survey collaboration meeting, Urbana-Champaign, October 2023
- 2023 Euclid collaboration meeting, Copenhagen, June 2023
- 2023 LineA seminar (online, Brazil, May 2023
- 2023 Cosmology workshop, PDT New York, May 2023
- 2023 University of Washington, Astronomy colloquium, April 2023
- 2023 The Less Traveled Path to the Dark Universe (remote), Bangalore, India, March 2023
- 2023 Arizona State University, Cosmology seminar, March 2023
- 2023 Black holes, Talk at Astronomy on Tap, Philadelphia, March 2023
- 2023 Moderator, Panel discussion on generative AI, U Penn, February 2023
- 2022 Delhi University, Physics seminar, December 2022
- 2022 Growth of structure in the universe, Sesto, Italy, July 2022
- 2022 Key Challenges in Gravitational Lensing, Cambridge, July 2022
- 2022 Cosmology with weak lensing: Beyond two-point statistics (virtual), April 2022
- 2022 Stellar Tests of Gravity Workshop, CMU, March 2022
- 2021 Cosmology seminar (virtual), Perimeter Institute, November 2021
- 2021 Astronomy colloquium, Columbia University, October 2021
- 2021 Machine Learning in Astronomical Surveys (virtual), IAP Paris, October 2021
- 2021 IUCAA colloquium (virtual), IUCAA Pune, June 2021
- 2021 The Impact of Machine Learning in Cosmology (virtual), ML Club, April 2021
- 2021 IISc colloquium (virtual), IISc Bangalore, February 2021
- 2021 Department colloquium (virtual), U Penn, February 2021
- 2021 PennIDEAS panel on Big Data, U Penn, February 2021
- 2020 Dark Energy Survey collaboration meeting, May 2020
- 2020 JPL colloquium, Pasadena, February 2020
- 2020 IUCAA cosmology seminar, Pune, January 2020
- 2020 Public lecture, IUCAA (Pune University), Pune, January 2020
- 2020 TIFR Theory seminar, Mumbai, January 2020
- 2019 CITA cosmology seminar, Toronto, November 2019
- 2019 Dark Energy Survey collaboration meeting, Session organizer, Sussex, November 2019
- 2019 Cosmic Controversies conference, Invited panelist, Chicago, October 2019
- 2019 Astrophysics colloquium, Institute d’Astrophysique, Paris, September 2019
- 2019 Astronomy on Tap, Public talk, Philadelphia, August 2019
- 2019 IGC@25: Multimessenger Universe, Invited panelist, Penn State, June 2019
- 2019 Particle Cosmology Workshop, Co-organizer, New York City, June 2019
- 2019 Dark Energy Survey collaboration meeting, Co-organizer, Philadelphia, June 2019
- 2019 Splashback in Galaxy Clusters, April 2019, Stanford University, May 2019
- 2019 Planetary science with CMB and optical surveys, Co-organizer, Philadelphia, April 2019
- 2019 Testing Gravity 2019, Invited talk, Vancouver, January 2019

- 2019 Lensing in the era of precision cosmology, Invited talk, Berkeley, January 2019
- 2018 CMB in High Definition, Invited talk, CCA, New York, December 2018
- 2018 WFIRST workshop, Co-organizer, Princeton University, December 2018
- 2018 Cosmology with Voids, Invited review talk, CCA, New York, September 2018
- 2018 LSST Dark Energy Science Collaboration, CMU, July 2018
- 2018 The Nonlinear Universe, Invited talk, Smartno, Slovenia, July 2018
- 2018 DES Collaboration meeting, College Station, Texas, May 2018
- 2018 DES Key Project Workshop, OSU, April 2018

Recent courses taught:

- Undergraduate: Astronomy 212: Introduction to Astrophysics II: Stars, Galaxies and the Universe
 Astronomy 006: The Solar System, Exoplanets, and Life
 Physics 360: Statistics, Data Science and Machine Learning
 Physics 359: Data Analysis for the Natural Sciences II: Machine Learning
- Graduate: Physics 533: Topics in Cosmology

Recent Undergraduate Students:

- 2023- Sam Charney (thesis), Michael Jacob, Sarah Kane, Sanjit Kobla, Kyle Miller, Lily Noyes
- 2022-2023 Sam Charney, Matthew Currie, Nicholas Liu, Kyle Miller
- 2021-2022 Michelle (Yiwei) Chai (thesis co-supervisor), Tara Dacunha (thesis), Sarah Kane, Eli Wiston (thesis)
- 2020-2021 Matt Belyakov (thesis), Tara Dacunha, Sarah Kane, Sam Goldstein (thesis), Jacob Nibauer (thesis), Eli Wiston
- 2019-2020 Tara Dacunha, Sebastian Gonzalez, Jacob Nibauer, Sam Goldstein
- 2017-2018 Jules Almazar, Amanda Farah (thesis)

Ph.D. Students:

- 2028 Kunhao Zhong
- 2027 Shubh Agrawal (co-supervisor)
- 2026 Rafael Gomes
- 2025 Minsu Park (co-supervisor)
- 2022 Shivam Pandey; postdoctoral fellow, Columbia University
- 2020 Lucas Secco; Kavli postdoctoral fellow, University of Chicago
- 2020 Tae-Hyeon Shin; postdoctoral fellow, Stonybrook University
- 2018 Yuedong Fang; research fellow, LMU, Munich
- 2014 Joseph Clampitt; currently in finance
- 2010 Alex Borisov; faculty at Cleveland State University
- 2008 Hans Stabenau; Cardiology Fellow, Beth Israel
- 2006 Greg Dobler (research supervisor: Charles Keeton); Associate Professor, University of Delaware
- 2005 Derek Dolney; Medical Physicist, Radiation Oncology at Penn

Postdocs:

2020- Meng-Xiang Lin (co-supervised)
2020- Marco Gatti (co-supervised)
2020- Dimitrios Tanoglidis; currently in industry
2019-2023 Tanvi Karwal (co-supervised); currently at U Chicago
2019-2022 Marco Raveri (co-supervised); currently faculty at University of Genoa
2018-2021 Cyrille Doux; currently Research Scientist at CNRS, Grenoble, France
2014-2019 Eric Baxter; currently faculty at U Hawaii
2017-2019 Jeremy Sakstein (co-supervised); currently faculty at U Hawaii
2016-2018 Vivian Miranda (co-supervised); currently faculty at Stonybrook University
2014-2016 Juliana Kwan; currently research staff at Liverpool John Moores University
2012-2014 Elisabeth Krause; currently faculty at U Arizona
2012-2014 Tim Eifler; currently faculty at U Arizona
2010-2014 Vinu Vikram; currently faculty at Central University of Kerala, India
2009-2012 Anna Cabre; currently Marie Curie Fellow at the Institute of Marine Sciences (Barcelona)

2008-2010 Marcos Lima; currently faculty, U. Sao Paolo, Brazil
2006-2009 Jacek Guzik; currently faculty at Jagiellonian University, Krakow, Poland
2002-2007 Mike Jarvis; currently research staff at U Penn
2001-2002 Hanadi Abdelsalam; currently faculty at PMU, Saudi Arabia
2001-2004 Masahiro Takada; currently faculty, IPMU and University of Tokyo