

## 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:

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:

2017-            Scientific Editor, Galaxies and Cosmology, The Astrophysical Journal  
2017-2018      Chair, Fundamental Physics with the Hubble Space Telescope Working Group  
2017-            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  
2006-            Penn representative on the Management Committee of the DES project  
2001-            Served on several faculty search/promotion committees (six 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  $\Omega_0$ ,  $\sigma_8$ ,” 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
51. "Cosmological parameters from SDSS and WMAP," M. Tegmark et al, 2004, Phys. Rev. D, **69**, 103501 (26pp).
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.

D, 74, 084007 (13pp).

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

107. “The Dark Energy Survey: more than dark energy - an overview,” The Dark Energy Survey Collaboration, 2016, *MNRAS*, 460, 1270

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
124. "The Two-Halo Term in Stacked Thermal Sunyaev-Zel'dovich Measurements: Implications for Self-Similarity," C. Hill, E. Baxter, A. Lidz, J. Grecco, B. Jain, 2018, PRD, 97, 083501, arXiv:1706.03753
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
126. "Void Lensing as a Test of Gravity," T. Baker, J. Clampitt, B. Jain, M. Trodden, 2018, PRD, 98, 3511, arXiv:1803.07533
127. "Probing Self-interacting Dark Matter with Disk Galaxies in Cluster Environments," L. Secco, A. Farah, B. Jain, S. Adhikari, A. Banerjee, N. Dalal, 2017, ApJ, 860, 32, arXiv:1712.04841
128. "Density split statistics: joint model of counts and lensing in cells," O. Friedrich et al, 2018, PRD, 98, 023508, arXiv:1710.05162
129. "Density split statistics: Cosmological constraints from counts and lensing in cells in DES Y1 and SDSS data," D. Gruen et al, 2018, PRD, 98, 98, 023507; arXiv:1710.05045
130. "Dark Energy Survey Year 1 Results: Cosmological Constraints from Cosmic Shear," M. Troxel et al, 2018, PRD, 98, 043528, arXiv:1708.01538
131. "Dark Energy Survey Year 1 Results: A Precise H0 Measurement from DES Y1, BAO, and D/H Data," DES Collaboration, 2018, MNRAS, 480, 3879; arXiv:1711.00403
132. "DES Y1 Results: Validating cosmological parameter estimation using simulated Dark Energy Surveys," N. MacCrann et al, 2018, MNRAS, 480, 4614; arXiv:1803.09795
133. "Splashback in galaxy clusters as a probe of cosmic expansion and gravity," S. Adhikari, J. Sakstein, B. Jain et al, 2018, JCAP, 11, 033; arXiv:1806.04302
134. "Probing Oort Clouds around Milky Way Stars with CMB Surveys," E. Baxter, C. Blake, B. Jain, 2018, AJ, 156, 243; arXiv:1808.00415
135. "Dark Energy Survey Year 1 Results: Methodology and Projections for Joint Analysis of Galaxy Clustering, Galaxy Lensing, and CMB Lensing Two-point Functions," E. Baxter et al, 2019, PRD, 99, 023508; arXiv:1802.05257

### **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
9. "Dark Energy Survey Year 1 Results: Cosmological Constraints from Galaxy Clustering and Weak Lensing," DES Collaboration, *PRD*, submitted, arXiv:1708.01530
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. "Dark Energy Survey Year 1 Results: Joint Analysis of Galaxy Clustering, Galaxy Lensing, and CMB Lensing Two-point Functions," DES Collaboration, 2018, arXiv:1810.02322
13. "Dark Energy Survey Year 1 Results: Constraints on Extended Cosmological Models from Galaxy Clustering and Weak Lensing," DES Collaboration, 2018; arXiv:1810.02499
14. "Cosmological Constraints from Multiple Probes in the Dark Energy Survey," DES Collaboration, 2018, arXiv:1811.02375
15. "Measurement of the Splashback Feature around SZ-selected Galaxy Clusters with DES, SPT and ACT," T. Shin, S. Adhikari, E. Baxter, C. Chang, B. Jain et al, 2018, arXiv:1811.06081
16. "Planet X in CMB and Optical Galaxy Surveys," E. Baxter, B. Jain et al, 2018, arXiv:1812.08701
18. "Controlling and leveraging small-scale information in tomographic galaxy-galaxy lensing," N. MacCrann, J. Blazek, B. Jain, E. Krause, 2019, arXiv:1903.07101

**Selected Recent Presentations:**

- 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
- 2017 Cosmic Visions: Dark Energy Workshop, session chair, LBL, Berkeley, November 2017
- 2017 CITA, seminar, Toronto, September 2017
- 2017 The Low Redshift Universe, Invited talk, Nordita, Stockholm, July 2017
- 2017 The Nonlinear Universe, Invited talk, Smartno, Slovenia, July 2017

- 2017 WFIRST science team collaboration meeting, Baltimore, June 2017
- 2017 Dark Energy Survey Collaboration meeting, Chicago, June 2017
- 2017 Quantifying and Understanding the Galaxy Halo Connection, panelist, Santa Barbara, May 2017
- 2017 LSST-DESC collaboration meeting, SLAC, February 2017
- 2017 Testing Gravity 2017, Invited talk, Vancouver, January 2017
- 2016 Simons Observatory inaugural meeting, Princeton, October 2016
- 2016 Dark Interactions Workshop, Invited talk, Brookhaven, October 2016
- 2016 Physics Colloquium, Yale University, October 2016
- 2016 WFIRST-LSST joint workshop, Pasadena, September 2016
- 2016 Neutrinos in Cosmology, Invited talk, Berkeley, June 2016
- 2016 Aspen Summer Workshop, Testing the laws of gravity with cosmological surveys, June 2016
- 2016 Perimeter Institute, Cosmology seminar, Waterloo Canada, May 2016
- 2016 Dark Energy Survey, Collaboration meeting, SLAC, May 2016
- 2016 Carnegie Mellon University, Astronomy seminar, Pittsburgh PA, April 2016
- 2016 Penn State University, Astronomy colloquium, State College PA, March 2016
- 2016 Dark Energy Science Collaboration meeting, SLAC, February 2016
- 2016 McGill University, Physical Society colloquium, Montreal Canada, February 2016
- 2016 Stonybrook University, Cosmology seminar, Stonybrook NY, February 2016
- 2016 Essential Cosmology for the Next Generation, plenary talk, Playa del Carmen Mexico, January 2016
- 2015 Dark Energy Science Collaboration meeting, Argonne National Lab, November 2015
- 2015 Dark Energy Survey Collaboration meeting, Madrid Spain, October 2015
- 2015 Princeton University, Gravity Group Seminar, Princeton NJ, September 2015
- 2015 Unbiased constraints on cosmology, IAS workshop, Invited talk, NJ September 2015
- 2015 ICTP Advanced School on Cosmology, Lecturer, Trieste Italy, May 2015
- 2015 University of Arizona, Astronomy Colloquium, Tucson AZ, April 2015
- 2015 Dark Energy Survey Cosmology Workshop, Organizer, U Penn, March 2015
- 2015 Cosmology on the slopes, Invited talk, Aspen Workshop, March 2015
- 2015 Dark Energy Science Collaboration meeting, SLAC, February 2015

**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
- Graduate: Physics 533: Topics in Cosmology

**Undergraduate Students:**

- 2019- Tara Dacunha, Sebastian Gonzalez
- 2018 Summer research by Jules Almazar
- 2016-2018 Research and undergraduate thesis by Amanda Farah
- 2013-2015 Summer research by Charles Davis and Andrew Neil

2007-8           Advised undergraduate thesis by Juliette Alimena  
2004-6           Advised research and undergraduate thesis by Harrison Prentice-Mott  
2001              Advised summer research project by Spencer Szczesny

**Ph.D. Students:**

2021           Shivam Pandey  
2020           Lucas Secco, Tae-Hyeon Shin  
2018           Yuedong Fang  
2014           Joseph Clampitt; currently in finance  
2010           Alex Borisov; faculty at Cleveland State University  
2010           Michelle Caler (co-supervisor with R. Sheth); faculty at West Chester University  
2008           Hans Stabenau; Resident Physician, Brigham and Women's Hospital  
2006           Greg Dobler (research supervisor: Charles Keeton); Research Scientist, CUSP and  
                  Research Assistant Professor of Physics at New York University  
2005           Derek Dolney; Medical Physicist, Radiation Oncology at Penn

**Postdocs:**

2018-           Cyrille Doux  
2014-           Eric Baxter  
2014-2016      Juliana Kwan, currently postdoc at Liverpool John Moores University  
2012-2014      Elisabeth Krause; currently faculty at U Arizona  
2010-2014      Vinu Vikram; currently postdoc at Argonne/U Chicago  
2012-2014      Tim Eifler; currently faculty at U Arizona  
2009-2012      Anna Cabre; currently postdoc in Earth and Environmental Science at Barcelona  
2008-2010      Marcos Lima; currently faculty, U. Sao Paulo, Brazil  
2006-2009      Jacek Guzik; currently faculty, Krakow, Poland  
2002-2007      Mike Jarvis; currently research staff at U Penn  
2001-2004      Masahiro Takada; currently faculty, IPMU, University of Tokyo