

# CURRICULUM VITAE

## Personal Information

Name : Biswajit Pandey

Contact Address : Department of Physics  
Institute of Science  
Visva-Bharati University  
Santiniketan, 731235, India  
email:biswap@visva-bharati.ac.in  
Mobile: 07602198961

Date of Birth : 29th December, 1976

Nationality : Indian

Sex : Male

## Current Position

Assistant Professor  
Department of Physics  
Institute of Science  
Visva-Bharati University  
Santiniketan, 731235, India

## Educational qualification

Ph.D. in Cosmology

## Research Interests

1. Large scale structure of the Universe
2. Galaxy formation and evolution
3. Dark energy
4. Information theory
5. Astrostatistics

## Published papers

**Total papers: 52**

**Single author papers: 14**

**First author/Corresponding author papers: 41**

1. The roles of environment and interactions on the evolution of red and blue galaxies in the EAGLE simulation,  
Apashanka Das, **Biswajit Pandey**, 2024, **JCAP**, 08, 060  
<https://iopscience.iop.org/article/10.1088/1475-7516/2024/08/060>
2. Probing the spatial and velocity anisotropies in stellar halos from the Aquarius simulations,  
Amit Mondal, **Biswajit Pandey**, 2024, Accepted in **MNRAS**, in press  
<https://doi.org/10.1093/mnras/stae2027>
3. The size and shape dependence of the SDSS galaxy bispectrum,  
Anindita Nandi, Sukhdeep Singh Gill, Debanjan Sarkar, Abinash Kumar Shaw, **Biswajit Pandey**, Somnath Bharadwaj  
2024, **New Astronomy**, 113, 102292  
<https://doi.org/10.1016/j.newast.2024.102292>
4. Tracing the green valley with entropic thresholding,  
**Biswajit Pandey**, 2024, **MNRAS**, 530, 4550  
<https://doi.org/10.1093/mnras/stae1147>
5. The correlations between galaxy properties in different environments of the cosmic web ,  
Anindita Nandi, **Biswajit Pandey**, Prakash Sarkar , 2024, **Journal of Cosmology and Astroparticle Physics**, 02, 012  
<https://iopscience.iop.org/article/10.1088/1475-7516/2024/02/012>
6. Separating the blue cloud and the red sequence using Otsu's method for image segmentation,  
**Biswajit Pandey**, 2023, **Astronomy and Computing**, 44, 100725  
<https://doi.org/10.1016/j.ascom.2023.100725>
7. Time evolution of the mutual information between disjoint regions in the Universe,  
**Biswajit Pandey**, 2023, **Entropy**, 25, 1094  
<https://doi.org/10.3390/e25071094>
8. Do minor interactions trigger star formation in galaxy pairs?,  
Apashanka Das, **Biswajit Pandey**, Suman Sarkar, 2023, **Research in Astronomy and Astrophysics**, 23, 095026  
<https://iopscience.iop.org/article/10.1088/1674-4527/aceccb>
9. Galaxy interactions in filaments and sheets: insights from EAGLE simulations ,  
Apashanka Das, **Biswajit Pandey**, Suman Sarkar, 2023, **Research in Astronomy and Astrophysics**, 23, 115018  
<https://iopscience.iop.org/article/10.1088/1674-4527/acf6f5>

10. Galaxy interactions in filaments and sheets: effects of the large-scale structures versus the local density,  
Apashanka Das, **Biswajit Pandey**, Suman Sarkar, 2023, **Research in Astronomy and Astrophysics**, 23, 025016  
<https://iopscience.iop.org/article/10.1088/1674-4527/acab44>
11. A Study of Holographic Dark Energy Models with Configuration Entropy Biswajit Das,  
**Biswajit Pandey**, 2023, **RAA**, 23, 065003  
<https://iopscience.iop.org/article/10.1088/1674-4527/accb77>
12. Tomography of stellar halos: what does anisotropy in a stellar halo tell us?,  
**Biswajit Pandey**, 2022, **Journal of Cosmology and Astroparticle Physics**, 10, 058  
<https://iopscience.iop.org/article/10.1088/1475-7516/2022/10/058>
13. The maximum extent of the filaments and sheets in the cosmic web: an analysis of the SDSS DR17,  
Prakash Sarkar, **Biswajit Pandey**, Suman Sarkar, 2022, **Monthly Notices of the Royal Astronomical Society**, 519, 3227  
<https://doi.org/10.1093/mnras/stac3722>
14. On the origin of red spirals: Does assembly bias play a role?,  
Suman Sarkar, **Biswajit Pandey**, Apashanka Das , 2022, **Journal of Cosmology and Astroparticle Physics**, 03, 024  
<https://iopscience.iop.org/article/10.1088/1475-7516/2022/03/024>
15. Green valley galaxies in the cosmic web: internal versus environmental quenching  
Apashanka Das, **Biswajit Pandey**, Suman Sarkar, 2021, **Journal of Cosmology and Astroparticle Physics**, 06, 045  
<https://iopscience.iop.org/article/10.1088/1475-7516/2021/06/045>
16. Testing homogeneity of the galaxy distribution in the SDSS using Renyi entropy  
**Biswajit Pandey**, Suman Sarkar, 2021, **Journal of Cosmology and Astroparticle Physics**, 07, 019  
<https://iopscience.iop.org/article/10.1088/1475-7516/2021/07/019>
17. Renyi entropy as a measure of cosmic homogeneity,  
**Biswajit Pandey**, 2021, **Journal of Cosmology and Astroparticle Physics**, 02, 023  
<https://iopscience.iop.org/article/10.1088/1475-7516/2021/02/023>
18. Do galactic bars depend on environment?:An information theoretic analysis of Galaxy Zoo 2,  
Suman Sarkar, **Biswajit Pandey**, Snehasish Bhattacharjee, 2021, **Monthly Notices of the Royal Astronomical Society**, 501, 994  
<https://doi.org/10.1093/mnras/staa3665>
19. Can we constrain the evolution of HI bias using configuration entropy?,  
Biswajit Das, **Biswajit Pandey**, 2021, **Research in Astronomy and Astrophysics**, 21, 35  
<https://iopscience.iop.org/article/10.1088/1674-4527/21/2/35>

20. A method for classification of red, blue and green galaxies using fuzzy set theory,  
**Biswajit Pandey**, 2020, **Monthly Notices of the Royal Astronomical Society Letters**, 499, L31  
<https://doi.org/10.1093/mnrasl/sl1aa152>
21. Can a conditioning on stellar mass explain the mutual information between morphology and environment?,  
Snehasish Bhattacharjee, **Biswajit Pandey**, Suman Sarkar, 2020, **Journal of Cosmology and Astroparticle Physics**, 09, 039  
<https://iopscience.iop.org/article/10.1088/1475-7516/2020/09/039>
22. A study on the statistical significance of mutual information between morphology of a galaxy and its large-scale environment,  
Suman Sarkar, **Biswajit Pandey**, 2020, **Monthly Notices of the Royal Astronomical Society**, 497, 4077  
<https://doi.org/10.1093/mnras/staa2236>
23. Exploring galaxy colour in different environments of the cosmic web with SDSS,  
**Biswajit Pandey**, Suman Sarkar, 2020, **Monthly Notices of the Royal Astronomical Society**, 498, 6069  
<https://doi.org/10.1093/mnras/staa2772>
24. Can we constrain the dark energy equation of state parameters using configuration entropy?  
Biswajit Das, **Biswajit Pandey**, 2020, **Monthly Notices of the Royal Astronomical Society**, 492, 3928  
<https://doi.org/10.1093/mnras/stz3538>
25. Configuration entropy of the Cosmic Web: Can voids mimic the dark energy?,  
**Biswajit Pandey**, 2019, **Monthly Notices of the Royal Astronomical Society Letters**, 485, L73  
<https://doi.org/10.1093/mnrasl/slz037>
26. A new method to probe the mass density and the cosmological constant using configuration entropy,  
**Biswajit Pandey**, Biswajit Das, 2019, **Monthly Notices of the Royal Astronomical Society Letters**, 485, L43  
<https://doi.org/10.1093/mnrasl/slz029>
27. Unravelling the Cosmic Web: An analysis of the SDSS DR14 with the Local Dimension,  
Suman Sarkar, **Biswajit Pandey**, 2019, **Monthly Notices of the Royal Astronomical Society**, 485, 4743  
<https://doi.org/10.1093/mnras/stz499>
28. Configuration entropy in the Lambda CDM and the dynamical dark energy models: Can we distinguish one from the other?,  
Biswajit Das, **Biswajit Pandey**, 2019, **Monthly Notices of the Royal Astronomical Society**, 482, 3219  
<https://doi.org/10.1093/mnras/sty2873>

29. Testing isotropy in the Universe using photometric and spectroscopic data from the SDSS, Suman Sarkar, **Biswajit Pandey**, Rishi Khatri, 2019, **Monthly Notices of the Royal Astronomical Society**, 483, 2453  
<https://doi.org/10.1093/mnras/sty3272>
30. Does information entropy play a role in the expansion and acceleration of the Universe?, **Biswajit Pandey**, 2017, **Monthly Notices of the Royal Astronomical Society Letters**, 471, L77  
<https://doi.org/10.1093/mnrasl/slx109>
31. Can anisotropy in the galaxy distribution tell the bias?, **Biswajit Pandey** 2017, **Monthly Notices of the Royal Astronomical Society**, 469, 1861  
<https://doi.org/10.1093/mnras/stx912>
32. Testing isotropy in the Two Micron All-Sky redshift survey with information entropy, **Biswajit Pandey** 2017, **Monthly Notices of the Royal Astronomical Society**, 468, 1953  
<https://doi.org/10.1093/mnras/stx573>
33. How much a galaxy knows about its large-scale environment?: An information theoretic perspective, **Biswajit Pandey**, Suman Sarkar, 2017, **Monthly Notices of the Royal Astronomical Society Letters**, 467, L6  
<https://doi.org/10.1093/mnrasl/slw250>
34. An information theory based search for homogeneity on the largest accessible scale, Suman Sarkar, **Biswajit Pandey**, 2016, **Monthly Notices of the Royal Astronomical Society Letters**, 463, L12  
<https://doi.org/10.1093/mnrasl/slw145>
35. Relating information entropy and mass variance to measure bias and non-Gaussianity, **Biswajit Pandey**, 2016, **Monthly Notices of the Royal Astronomical Society**, 463, 4239  
<https://doi.org/10.1093/mnras/stw2356>
36. A new method for testing isotropy with Shannon entropy, **Biswajit Pandey**, 2016, **Monthly Notices of the Royal Astronomical Society**, 462, 1630  
<https://doi.org/10.1093/mnras/stw1788>
37. Probing large scale homogeneity and periodicity in the LRG distribution using Shannon entropy, **Biswajit Pandey**, Suman Sarkar, 2016, **Monthly Notices of the Royal Astronomical Society**, 460, 1519  
<https://doi.org/10.1093/mnras/stw1075>

38. Testing homogeneity in the Sloan Digital Sky Survey Data Release Twelve with Shannon entropy,  
**Biswajit Pandey**, Suman Sarkar, 2015, **Monthly Notices of the Royal Astronomical Society**, 454, 2647  
<https://doi.org/10.1093/mnras/stv2166>
39. A method for testing cosmic homogeneity with Shannon entropy,  
**Biswajit Pandey**, 2013, **Monthly Notices of the Royal Astronomical Society**, 430, 3376  
<https://doi.org/10.1093/mnras/stt134>
40. Exploring the non-linear density field in the Millennium simulations with tessellations - I. The probability distribution function,  
**Biswajit Pandey**, Simon White, Volker Springel, Raul Angulo, 2013, **Monthly Notices of the Royal Astronomical Society**, 435, 2968  
<https://doi.org/10.1093/mnras/stt1490>
41. Exploring the cosmic web in the Sloan Digital Sky Survey Data Release Seven using the Local dimension,  
Prakash Sarkar, **Biswajit Pandey**, Somnath Bharadwaj, 2012, **Monthly Notices of the Royal Astronomical Society**, 423, 955  
<https://doi.org/10.1111/j.1365-2966.2012.20932.x>
42. The size of the longest filament in the Luminous Red Galaxy distribution,  
**Biswajit Pandey**, Gauri Kulkarni, Somnath Bharadwaj, Tarun Souradeep, 2010, **Monthly Notices of the Royal Astronomical Society**, 411, 332  
<https://doi.org/10.1111/j.1365-2966.2010.17686.x>
43. Statistically significant length scale of filaments as a robust measure of galaxy distribution,  
**Biswajit Pandey**, 2010, **Monthly Notices of the Royal Astronomical Society**, 401, 2687  
<https://doi.org/10.1111/j.1365-2966.2009.15852.x>
44. The scale of homogeneity of the galaxy distribution in SDSS DR6,  
Prakash Sarkar, Jaswant Yadav, **Biswajit Pandey** & Somnath Bharadwaj, 2009, **Monthly Notices of the Royal Astronomical Society Letters**, 399, L128  
<https://doi.org/10.1111/j.1745-3933.2009.00738.x>
45. Exploring star formation using the filaments in the SDSS DR5,  
**Biswajit Pandey** and Somnath Bharadwaj, 2008, **Monthly Notices of the Royal Astronomical Society**, 387, 767  
<https://doi.org/10.1111/j.1365-2966.2008.13262.x>
46. The luminosity bias relation from filaments in the SDSS DR4,  
**Biswajit Pandey** and Somnath Bharadwaj, 2007, **Monthly Notices of the Royal Astronomical Society Letters**, 377, L15  
<https://doi.org/10.1111/j.1745-3933.2007.00294.x>

47. The Luminosity, color and morphology dependence of the galaxy filaments in the Sloan Digital Sky Survey Data Release Four,  
**Biswajit Pandey** and Somnath Bharadwaj, 2006, **Monthly Notices of the Royal Astronomical Society**, 372, 827  
<https://doi.org/10.1111/j.1365-2966.2006.10894.x>
48. Testing homogeneity on large scales in the Sloan Digital Sky Survey Data Release One, Jaswant Yadav, Somnath Bharadwaj, **Biswajit Pandey** and T.R. Shesadri, 2005, **Monthly Notices of the Royal Astronomical Society**, 364, 601  
<https://doi.org/10.1111/j.1365-2966.2005.09578.x>
49. What will anisotropies in the clustering pattern in the redshifted 21 cm maps tell us ?, Sk. Saiyad Ali, Somnath Bharadwaj and **Biswajit Pandey**, 2005, **Monthly Notices of the Royal Astronomical Society**, 363, 251  
<https://doi.org/10.1111/j.1365-2966.2005.09444.x>
50. Modelling non-linear effects in the redshift-space two-point correlation function and its implications for the pairwise velocity dispersion,  
**Biswajit Pandey** and Somnath Bharadwaj, 2005, **Monthly Notices of the Royal Astronomical Society**, 358, 939  
<https://doi.org/10.1111/j.1365-2966.2005.08835.x>
51. A two dimensional analysis of percolation and filamentarity in the Sloan Digital Sky Survey Data Release One,  
**Biswajit Pandey** and Somnath Bharadwaj, 2005, **Monthly Notices of the Royal Astronomical Society**, 357, 1068  
<https://doi.org/10.1111/j.1365-2966.2005.08726.x>
52. Using the Filaments in the Las Campanas Redshift Survey to test the Lambda CDM model, Somnath Bharadwaj and **Biswajit Pandey**, 2004, **The Astrophysical Journal**, 615, 1  
<https://iopscience.iop.org/article/10.1086/424476>

### Awards and Fellowships

1. Awarded a Research Associateship from IUCAA, Pune for the following periods: 2024-2027, 2021-2024, 2018-2021, 2015-2018.
2. Awarded an Alexander von Humboldt Fellowship for 2 years (2011-2013) to work with Prof. Simon White at the Max-Planck Institute for Astrophysics, Garching, Germany (carried out).
3. Awarded a Research Associateship for 3 years to work with Prof. Asantha Cooray at University of California, Irvine, USA in 2009 (declined).
4. Awarded a Postdoctoral Fellowship at Inter University Center for Astronomy and Astrophysics (IUCAA), Pune for 3 years (2006-2009). (carried out)
5. Awarded a Junior Research Fellowship from Council of Scientific and Industrial Research (CSIR), India. Secured a position among top 20% in National Eligibility Test (NET) examination, 2002.

6. Silver medal in M.Sc. for securing 1st class second position in 2000 from Vidyasagar University, West Bengal.

### **Grants**

1. Awarded a SERB DST Core Research Grant (INR 2000000) in 2020, Project code - CRG/2019/001110
2. Awarded a SERB DST Extramural Research Project (INR 2500000) in 2016, Project code - EMR/2015/001037
3. Awarded a DST young scientist project (INR 1200000) under DST Fast Track Scheme in 2008 from Department of Science and Technology, Government of India. Project No. - SR/FTP/PS-19/2008

### **Member**

- International Astronomical Union (IAU)
- International Astrostatistics Association (IAA)

### **Reviewer in Journals**

- Monthly Notices of the Royal Astronomical Society (MNRAS)
- Astrophysical Journal (ApJ)
- Astronomy & Astrophysics (A&A)
- Journal of Cosmology and Astroparticle Physics (JCAP)
- Journal of Astrophysics and Astronomy (JAA)
- Astrophysics & Space Science (Astrophys. Space Sci.)
- Publications of the Astronomical Society of Australia (PASA)
- Universe

### **Supervision of Ph.D. thesis**

- Suman Sarkar, Thesis title: An information theory based study of galaxy clustering in redshift surveys, Degree awarded: 2020
- Biswajit Das, Thesis title: A study of the accelerated expansion of the Universe using configuration entropy, Degree awarded in 2022
- Apashanka Das, Thesis title: A study of galaxy formation and evolution in the Cosmic Web using galaxy redshift surveys, Thesis submitted in 2024
- Anindita Nandi, Thesis title: Probing the large-scale structures of the Universe with Galaxy Surveys, Joined in 2021



- Amit Mondal, Thesis title: Probing the structure and the assembly history of the Galactic stellar halo, Joined in 2022
- Tanmoy Ghosh, Joined in 2023

### **Supervision of Masters thesis**

Supervised 22 students for their Masters thesis since 2009.

### **Organizational activity**

- I as the convener organized an International Workshop on ‘Galaxy Formation and Evolution Across the Cosmic Time’ (GFEACT-2022) at Visva-Bharati during December 13-14, 2022. <https://sites.google.com/view/gfeact-2022/home>
- I jointly as a convenor (with Dr. Swarup Majee) organized ‘International Conference on the Emerging Issues in Cosmology and Particle Physics (EICP2)’ at Visva-Bharati, during January 12-14, 2020. <https://indico.cern.ch/event/849205/>
- I jointly as a co-convenor (with Dr. Sudipta Das) organized an IUCAA sponsored workshop on ‘Observational aspects of Astrophysics and Cosmology’ during November 3-4, 2014 in Visva-Bharati.

### **Talks delivered at different institutes since 2015**

1. Delivered an invited talk “Do galaxies know about their large-scale environment?” in international workshop on “Largest Cosmological Surveys and Big Data Science” organized by International Centre for Theoretical Sciences (ICTS), Bengaluru during 9-12 May, 2023
2. Delivered an invited online talk titled “Galaxy interactions in filaments and sheets: effects of the large scale structures versus the local density” at the Astronomy Department, Universidad Nacional de Cordoba, Argentina on October 24, 2022.
3. Delivered a seminar titled “How much does a galaxy know about its large-scale environment?” at Centre of Theoretical Studies, IIT, Kharagpur on October 4, 2017.
4. Delivered a colloquium titled “How much does a galaxy know about its large-scale environment?” at TIFR, Mumbai on August 29, 2017.
5. Delivered a plenary talk titled “An information theory based search for homogeneity and isotropy in the Univers” in the 35<sup>th</sup> Meeting of the Astronomical Society of India held at Jaipur, Rajasthan during March 6-10, 2017.
6. Delivered a seminar titled “Measuring bias and non-Gaussianity with information entropy” on October 20, 2016 at the Centre of Theoretical Studies, IIT, Kharagpur.
7. Delivered a seminar titled “An information theory based search for the scale of cosmic homogeneity” on January 13, 2016 at the Department of Theoretical Physics, TIFR, Mumbai.
8. Delivered a seminar titled “Surfing the cosmic web with tessellations” on January 19, 2016 at the Department of Theoretical Physics, TIFR, Mumbai.

9. Delivered a seminar entitled “Exploring the non-linear cosmic density field with tessellations” on January 18 , 2016 in the Department of Physics, IIT, Mumbai.
10. Delivered a seminar titled “An information theory based search for the scale of cosmic homogeneity” on 4 th November, 2015 in the Centre for Theoretical Studies, IIT, Kharagpur.
11. Delivered an invited lecture titled “Exploring the non-linear cosmic density field with tessellations” on 19 th March, 2016 in the Topical Conference on Gravity, Cosmology, Astronomy and Astrophysics Eastern Region-5 held at the Indian Statistical Institute, Kolkata.

### **Other roles since 2015**

1. Invited as a plenary speaker in the XXXV Meeting of the Astronomical Society of India held during 6 - 10 March, 2017 at Jaipur, Rajasthan.
2. Chaired a session on General Relativity and Cosmology in the XXXV Meeting of Astronomical Society of India held during 6-10 March, 2017 at Jaipur, Rajasthan.
3. Invited as an external expert for the evaluation of research proposals submitted for the ERC Consolidator grant 2019 of the European Research Council.
4. Examiner of Ph.D. thesis submitted by Shishir Sankhyayan, IISER, Pune in 2019.
5. Examiner of Ph.D. thesis submitted by Avinanda Chakraborty, Presidency University, Kolkata in 2024.

### **References**

#### **Prof. Somnath Bharadwaj**

Department of Physics and Centre for Theoretical Studies  
 Indian Institute of Technology  
 Kharagpur, 721302, India  
 Email: somnathb@iitkgp.ac.in  
 Tel: +91-3222-283806

#### **Prof. Volker Springel**

Director  
 Max-Planck-Institute for Astrophysics  
 P.O. Box 1317, 85741 Garching, Germany  
 E-Mail: vspringel@mpa-garching.mpg.de  
 Tel:+49-89-30000-2201

#### **Prof. Subhabrata Majumdar**

Department of Theoretical Physics  
 Tata Institute of Fundamental Research  
 1 Homi Bhabha Road, Colaba, Mumbai 400005  
 Maharashtra, India  
 Email: subha@tifr.res.in  
 Tel: +91 022 2278 2203