

Curriculum Vitae - Sunil Mukhi

May 2022

1. General Information

Name: Sunil Mukhi.

Date of birth: November 20, 1956.

Present position: **Raja Ramanna Chair,**
Indian Institute of Science Education and Research (IISER), Pune, India
(November 2023-October 2026).

Previous faculty positions:

- **Fellow** (1985-1990).
- **Reader** (1990-1995).
- **Associate Professor** (1995-2001).
- **Professor** (2001-2007).
- **Senior Professor** (2007-2012).

All the above at TIFR, Mumbai.

- **Professor, HAG Scale** (2012-2022), IISER Pune.

Administrative Roles:

- **Dean, Graduate Studies** (2002-2005), TIFR Mumbai.
- **Chair, Academic Ethics Committee** (2006-2012) TIFR.
- **Chair, Dept of Theoretical Physics** (2010-2012), TIFR Mumbai.
- **Chair, Dept of Physics** (2012-2018), IISER Pune.
- **Dean, Student Activities** (2013-2016), IISER Pune.
- **Chair, Endowment and Investments Committee** (2015-2020), IISER Pune.
- **Chair, Panel on Scientific Values**, (2016- 2022) Indian Academy of Sciences.
- **Chair, Academic Ethics Committee** (2014-2019) IISER Pune.
- **Dean, Faculty** (2019-2021), IISER Pune.

Education:

- **B.Sc.** (1976, Physics and Mathematics), St Xavier's College, University of Bombay, India.
- **Ph.D.** (1981, Physics), State University of New York at Stony Brook, New York, USA.

Postdoctoral positions:

- **International Centre for Theoretical Physics**, Trieste (1981-84).
- **Tata Institute of Fundamental Research**, Mumbai (1984-85).

Research areas: **String Theory, Quantum Field Theory, Particle Physics.**
Topics of interest include: Gravitation, Quantum Field Theory, String Theory, Conformal Field Theory, AdS/CFT Correspondence, String Dualities, Supersymmetric Field Theory, Quantum Entanglement.

Academy fellowships:	<ul style="list-style-type: none"> • Fellow, Indian Academy of Sciences (IAS), Bangalore. • Fellow, Indian National Science Academy (INSA), New Delhi. • Fellow, The World Academy of Sciences (TWAS), Trieste.
Major awards and adjunct positions:	<ul style="list-style-type: none"> • Raja Ramanna Chair, Department of Atomic Energy (2023-2026) • Adjunct Professor, International Centre for Theoretical Sciences, Bengaluru (2022-2025). • Adjunct Professor, Tata Institute of Fundamental Research (2018-2021). • J.C. Bose Fellowship, Government of India (2008-2018). • Adjunct Professor, Harish-Chandra Institute, Allahabad (2003-2008). • Shanti Swarup Bhatnagar Award, Physical Sciences (1999).
Journal editorships:	<ul style="list-style-type: none"> • Editor, Journal of High Energy Physics (JHEP) (since 1997). • Editorial Board Member, Current Science (2015-2018). • Editorial Board Member, Pramana (until 2006).
Long-term academic visits:	<ul style="list-style-type: none"> • CERN, Geneva (sabbatical, 1990-1991). • École Normale Supérieure, Paris (May-July 1994). • University of Amsterdam (May-July 1997). • Institute for Advanced Study, Princeton (sabbatical, 2001-2002). • Visiting Fellow Commoner, Trinity College, Cambridge (Lent term, 2012). • Isaac Newton Institute for Mathematical Sciences (January-May 2012). • Institute for Advanced Study, Princeton (Sept-Dec 2022). • CERN, Geneva (Feb-July 2023).
Conferences organised:	<ul style="list-style-type: none"> • Indian Strings Meeting (virtual), IIT Roorkee, December 2021. • CERN Th-Institute on Recent Developments in M-theory, (2016). • 2nd Workshop on Developments in M-theory, with Korea Institute of Advanced Studies, Gangwon-do, Korea (2015). • Modern Developments in M-theory, Banff International Research Station (2014). • Programme on Mathematics and Applications of Branes in String and M-theory, Isaac Newton Institute of Mathematical Sciences, Cambridge (Jan-May 2012). • Bhabha Centenary Symposium, TIFR (2009). • PASCOS 2003, TIFR Mumbai (2003). • Strings 2001, TIFR Mumbai (2001). • International Conference on Modern Quantum Field Theory II, TIFR Mumbai (1994). • International Conference on Modern Quantum Field Theory, TIFR Mumbai (1990).

2. Research experience

(i) Ph.D. Students guided

- **Keshav Dasgupta** (1995-1998), presently a faculty member at McGill University, Montreal, Canada.
- **Nemani V. Suryanarayana** (1998-2001), presently a faculty member at the Institute of Mathematical Sciences, Chennai, India.
- **Bahniman Ghosh** (1997-2001), presently a faculty member at the Indian Institute of Technology, Kanpur, India.
- **Anindya Mukherjee** (2003-2007), presently employed with Fincad, a financial analytics software company, Vancouver, Canada.
- **Rahul Nigam** (2004-2008), presently a faculty member at the Birla Institute of Technology and Science, Hyderabad, India.
- **Turmoli Neogi** (2013-2018), presently a postdoctoral fellow at Brussels University.

(ii) Master's students guided

- **K. Sri Haritej**, 2013-14.
- **Sagar Lokhande**, 2014-15 (joined University of Amsterdam).
- **Harsha Hampapura**, 2015-16 (joined Brandeis University).
- **Girish Muralidhara**, 2016-17 (presently at University of Kentucky).
- **Saikat Bera**, 2016-17 (joined University of Virginia).
- **Rugved Pund**, 2017-18 (joined Stony Brook University).
- **Lakshya Agarwal**, 2017-18 (joined Texas A&M University).
- **A. Ramesh Chandra**, 2018-19 (joined University of Amsterdam).
- **Palash Singh**, 2019-20 (joined Oxford University).
- **Rahul Poddar**, 2019-20 (joined University of Iceland).
- **Viraj Meruliya**, 2020-2021 (joined McGill University).
- **J.P. Sabarenath**, 2021-22 (joined University of Michigan).
- **Ritwick Kumar Ghosh**, 2021-22 (joined ICTS Bengaluru).
- **Sayan Neogi**, 2024-25 (joining Penn State University).

(iii) Publications

(a) Research Papers

(Note that author names are in alphabetical order in this field).

1. **Holomorphic bootstrap for RCFT: signs and bounds for quasi-characters**, Arpit Das, Sunil Mukhi, arXiv: 2507.07170.
2. **Modular Differential Equations with Movable Poles and Admissible RCFT Characters**, Arpit Das, Chethan N. Gowdigere, Sunil Mukhi, Jagannath Santara, JHEP 12 (2023) 143, arXiv: 2308.00069.
3. **Meromorphic Cosets and the Classification of Three-Character CFT**, Arpit Das, Chethan N. Gowdigere, Sunil Mukhi, JHEP 03 (2023) 023, arXiv: 2212.03136.
4. **Classification of Unitary CFTs with Two Primaries and Central Charge Less Than 25**, Sunil Mukhi, Brandon Rayhaun. Commun. Math. Phys. 401 (2023) 2, 1899-1949, arXiv: 2208.05486.
5. **New meromorphic CFTs from cosets**, JHEP 07 (2022), 152, Arpit Das, Chethan N. Gowdigere, Sunil Mukhi, JHEP 07 (2022) 152, arXiv:2207.04061.
6. **AdS3 Gravity and RCFT Ensembles with Multiple Invariants**, JHEP 2021 (2021), 98, Viraj Meruliya, Sunil Mukhi. arXiv:2104.10178.
7. **Poincaré Series, 3d Gravity and Averages of Rational CFT**, JHEP 2104 (2021), 267, Viraj Meruliya, Sunil Mukhi, Palash Singh. arXiv:2102.03136.
8. **Universal correlators and novel cosets in 2d RCFT**, Sunil Mukhi, Rahul Poddar. JHEP 2102 (2021), 158, arXiv:2011.09487.
9. **Rational CFT with three characters: the quasi-character approach**, Sunil Mukhi, Rahul Poddar, Palash Singh. JHEP 2005 (2020), 003, arXiv:2002.01949.
10. **Contour integrals and the modular S-matrix**, Sunil Mukhi, Rahul Poddar, Palash Singh. JHEP 2007 (2020), 045, arXiv:1912.04298.
11. **Curiosities above $c = 24$** , A. Ramesh Chandra, Sunil Mukhi. SciPost Phys. 6 (2019) 053, arXiv:1812.05109.
12. **Towards a Classification of Two-Character Rational Conformal Field Theories**, A. Ramesh Chandra, Sunil Mukhi. JHEP 1904 (2019) 153, arXiv:1810.09472.
13. **Fermions on replica geometries and the Θ - θ relation**, Sunil Mukhi, Sameer Murthy. Commun. Num. Theor. Phys. 13 (2019) 225, arXiv:1805.11114.
14. **Universal RCFT Correlators from the Holomorphic Bootstrap**. Sunil Mukhi, Girish Muralidhara. JHEP 1802 (2018) 028, arXiv:1708.06772.
15. **Entanglement, Replicas, and Thetas**. Sunil Mukhi, Sameer Murthy, Jie-Qiang Wu. JHEP 1801 (2018) 005, arXiv:1706.09426.
16. **Extended Supersymmetric BMS3 algebras and Their Free Field Realisations**. Nabamita Banerjee, Dileep P. Jatkar, Ivano Lodato, Sunil Mukhi, Turmoli Neogi. JHEP 1611 (2016) 059, arXiv:1609.09210.
17. **Two-dimensional RCFT's without Kac-Moody symmetry**. Harsha R. Hampapura, Sunil Mukhi. JHEP 1607 (2016) 138, arXiv:1605.03314.
18. **Cosets of Meromorphic CFTs and Modular Differential Equations**. Matthias R. Gaberdiel, Harsha R. Hampapura, Sunil Mukhi. JHEP 1604 (2016) 156, arXiv:1602.01022.
19. **Free-field realisations of the BMS3 algebra and its extensions**. Nabamita Banerjee, Dileep P. Jatkar, Sunil Mukhi, Turmoli Neogi. JHEP 1606 (2016) 024, arXiv:1512.06240.
20. **On 2d Conformal Field Theories with Two Characters**. Harsha R. Hampapura, Sunil Mukhi. JHEP 1601 (2016) 005, arXiv:1510.04478.
21. **Modular invariance and entanglement entropy**. Sagar F. Lokhande, Sunil Mukhi. JHEP 1506 (2015) 106, arXiv:1504.01921.
22. **Unravelling the novel Higgs mechanism in (2+1)d Chern-Simons theories**. Sunil Mukhi. JHEP 1112:083 (2011), arXiv:1110.3048.
23. **The power of the Higgs mechanism: higher-derivative BLG theories**. Bobby Ezhuthachan, Sunil Mukhi, Costis Papageorgakis. JHEP 0904:101, (2009), arXiv:0903.0003.
24. **Constraints on 'rare' dyon decays**. Sunil Mukhi, Rahul Nigam. JHEP 0812:056, (2008), arXiv:0809.1157.

25. **Higher-derivative 3-algebras.** Mohsen Alishahiha, Sunil Mukhi. JHEP 0810:032, (2008), arXiv:0808.3067.
26. **D2 to D2.** Bobby Ezhuthachan, Sunil Mukhi, Costis Papageorgakis. JHEP 0807:041, (2008), arXiv:0806.1639.
27. **M2-branes on M-folds.** Jacques Distler, Sunil Mukhi, Costis Papageorgakis, Mark van Raamsdonk. JHEP 0805:038 (2008), arXiv:0804.1256.
28. **M2 to D2.** Sunil Mukhi, Costis Papageorgakis. JHEP 0805:085 (2008), arXiv:0803.3218.
29. **Kinematical analogy for marginal dyon decay.** Anindya Mukherjee, Sunil Mukhi, Rahul Nigam. Mod.Phys.Lett. A24 (2009) 1507. arXiv:0710.4533.
30. **Dyon death eaters.** Anindya Mukherjee, Sunil Mukhi, Rahul Nigam. JHEP 0710:037,2007, arXiv:0707.3035.
31. **Noncritical-topological correspondence: Disc amplitudes and noncompact branes.** Anindya Mukherjee, Sunil Mukhi, Rahul Nigam. JHEP 0704:019,2007, hep-th/0612054.
32. **FZZ Algebra.** Anindya Mukherjee, Sunil Mukhi, Ari Pakman. JHEP 0701:025, 2007, hep-th/0606037.
33. **Noncritical string correlators, finite-N matrix models and the vortex condensate.** Anindya Mukherjee, Sunil Mukhi. JHEP 0607:017, 2006, hep-th/0602119.
34. **Bubbling orientifolds.** Sunil Mukhi, Mikael Smedback. JHEP 0508:005, 2005, hep-th/0506059.
35. **$c = 1$ matrix models: Equivalences and open-closed string duality.** Anindya Mukherjee, Sunil Mukhi. JHEP 0510:099, 2005, hep-th/0505180.
36. **Liouville D-branes in two-dimensional strings and open string field theory.** Debashis Ghoshal, Sunil Mukhi, Sameer Murthy. JHEP 0411:027, 2004, hep-th/0406106.
37. **Open string actions and noncommutativity beyond the large B limit.** Sunil Mukhi, Neman V. Suryanarayana. JHEP 0211:002, 2002, hep-th/0208203.
38. **Strings from quivers, membranes from moose.** Sunil Mukhi, Mukund Rangamani, Erik P. Verlinde. JHEP 0205:023, 2002, hep-th/0204147.
39. **PP wave limit and enhanced supersymmetry in gauge theories.** N. Itzhaki, Igor R. Klebanov, Sunil Mukhi. JHEP 0203:048, 2002, hep-th/0202153.
40. **Star products from commutative string theory.** Sunil Mukhi. Pramana 58:21-26, 2002, hep-th/0108072.
41. **Derivative corrections from noncommutativity.** Sumit R. Das, Sunil Mukhi, Neman V. Suryanarayana. JHEP 0108:039,2001, hep-th/0106024.
42. **Gauge invariant couplings of noncommutative branes to Ramond-Ramond backgrounds.** Sunil Mukhi, Neman V. Suryanarayana. JHEP 0105:023, 2001, hep-th/0104045.
43. **Chern-Simons terms on noncommutative branes.** Sunil Mukhi, Neman V. Suryanarayana. JHEP 0011:006, 2000, hep-th/0009101.
44. **Noncommutative tachyons.** Keshav Dasgupta, Sunil Mukhi, Govindan Rajesh. JHEP 0006:022, 2000, hep-th/0005006.
45. **A stable non-BPS configuration from intersecting branes and anti-branes.** Sunil Mukhi, Neman V. Suryanarayana. JHEP 0006:001, 2000, hep-th/0003219.
46. **Brane - anti-brane constructions.** Sunil Mukhi, Neman V. Suryanarayana, David Tong. JHEP 0003:015, 2000, hep-th/0001066.
47. **Killing spinors and supersymmetric AdS orbifolds.** Bahniman Ghosh, Sunil Mukhi. JHEP 9910:021, 1999, hep-th/9908192.
48. **Gravitational couplings, orientifolds and M planes.** Sunil Mukhi, Neman V. Suryanarayana. JHEP 9909:017, 1999, hep-th/9907215.
49. **Brane constructions, fractional branes and Anti-de Sitter domain walls.** Keshav Dasgupta, Sunil Mukhi. JHEP 9907:008, 1999, hep-th/9904131.
50. **Brane constructions, conifolds and M theory.** Keshav Dasgupta, Sunil Mukhi. Nucl.Phys. B551:204-228, 1999, hep-th/9811139.
51. **Dualities and the $SL(2,Z)$ anomaly.** Sunil Mukhi. JHEP 9812:006, 1998, hep-th/9810213.
52. **BPS nature of three string junctions.** Keshav Dasgupta, Sunil Mukhi. Phys.Lett. B423:261-264, 1998,

hep-th/9711094.

53. **Anomaly inflow on orientifold planes.** Keshav Dasgupta, Sunil Mukhi. JHEP 9803:004, 1998, hep-th/9709219.
54. **Gravitational couplings and $Z(2)$ orientifolds.** Keshav Dasgupta, Dileep P. Jatkar, Sunil Mukhi. Nucl.Phys. B523:465-484, 1998, hep-th/9707224.
55. **A note on low dimensional string compactifications.** Keshav Dasgupta, Sunil Mukhi. Phys.Lett. B398:285-290, 1997, hep-th/9612188.
56. **Orbifold and orientifold compactifications of F-theory and M-theory to six dimensions and four dimensions.** Rajesh Gopakumar, Sunil Mukhi. Nucl.Phys. B479:260-284, 1996, hep-th/9607057.
57. **F theory at constant coupling.** Keshav Dasgupta, Sunil Mukhi. Phys.Lett. B385:125-131, 1996, hep-th/9606044.
58. **Orbifolds of M theory.** Keshav Dasgupta, Sunil Mukhi. Nucl.Phys. B465:399-412, 1996, hep-th/9512196.
59. **The topological matrix model of $c = 1$ string.** Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B449:553-568, 1995, hep-th/9505127.
60. **Topological 2-D string theory: Higher genus amplitudes and W_∞ identities.** Debashis Ghoshal, Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B440:355-372, 1995, hep-th/9410034.
61. **Topological Landau-Ginzburg model of two-dimensional string theory.** Debashis Ghoshal, Sunil Mukhi. Nucl.Phys. B425:173-190, 1994, hep-th/9312189.
62. **Perturbation of the ground varieties of $c = 1$ string theory.** Debashis Ghoshal, Porus Lakdawala, Sunil Mukhi. Mod.Phys.Lett. A8:3187-3200, 1993, hep-th/9308062.
63. **Two-dimensional black hole as a topological coset model of $c = 1$ string theory.** Sunil Mukhi, Cumrun Vafa. Nucl.Phys. B407:667-705, 1993, hep-th/9301083.
64. **Kleinian singularities and the ground ring of $c=1$ string theory.** Debashis Ghoshal, Dileep P. Jatkar, Sunil Mukhi. Nucl.Phys. B395:144-166, 1993, hep-th/9206080.
65. **Construction of physical states of nontrivial ghost number in $c < 1$ string theory.** Camillo Imbimbo, Swapna Mahapatra, Sunil Mukhi. Nucl.Phys. B375:399-420, 1992.
66. **Black hole solution and its infinite parameter generalizations in $c = 1$ string field theory.** Sudipta Mukherji, Sunil Mukhi, Ashoke Sen. Phys.Lett. B275:39-46, 1992.
67. **Null vectors and extra states in $c = 1$ string theory.** Sudipta Mukherji, Sunil Mukhi, Ashoke Sen. Phys.Lett. B266:337-344, 1991.
68. **String field theory in minimal model backgrounds and nonperturbative two-dimensional gravity.** Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B364:662-680, 1991.
69. **Fractional level current algebras and the classification of characters.** Sunil Mukhi, Sudhakar Panda. Nucl.Phys. B338:263-282, 1990.
70. **Contour integral representations for the characters of rational conformal field theories.** Sunil Mukhi, Sudhakar Panda, Ashoke Sen. Nucl.Phys. B326:351, 1989.
71. **Reconstruction of conformal field theories from modular geometry on the torus.** Samir D. Mathur, Sunil Mukhi, Ashoke Sen. Nucl.Phys. B318:483, 1989.
72. **On the classification of rational conformal field theories.** Samir D. Mathur, Sunil Mukhi, Ashoke Sen. Phys.Lett. B213:303, 1988.
73. **Differential equations for correlators and characters in arbitrary rational conformal field theories.** Samir D. Mathur, Sunil Mukhi, Ashoke Sen. Nucl.Phys. B312:15, 1989.
74. **Correlators of primary fields in the $SU(2)$ WZW theory on Riemann surfaces.** Samir D. Mathur, Sunil Mukhi, Ashoke Sen. Nucl.Phys. B305:219, 1988.
75. **Correlation functions of current algebra theories on the torus.** Samir D. Mathur, Sunil Mukhi. Phys.Lett. B210:133, 1988.
76. **Multiloop correlators and bosonic string amplitudes in the operator formalism.** Sunil Mukhi, Sudhakar Panda. Phys.Lett. B203:387, 1988.
77. **The $N=2$ fermionic string: path integral, spin structures and supermoduli on the torus.** Samir D. Mathur, Sunil Mukhi. Nucl.Phys. B302:130, 1988.

78. **BRST quantization of twisted extended fermionic strings.** Samir D. Mathur, Sunil Mukhi. Phys.Rev. D36:465, 1987.
79. **Chiral fermions and the Witten index for the compactified heterotic string.** Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B263:629, 1986.
80. **Finiteness of nonlinear σ -models with parallelizing torsion.** Sunil Mukhi. Phys.Lett. B162:345,1985.
81. **The geometric background field method, renormalization and the Wess-Zumino term in nonlinear σ -models.** Sunil Mukhi. Nucl.Phys. B264:640, 1986.
82. **Index theorems and supersymmetry in the soliton sector. 2. Magnetic monopoles in (3+1) dimensions.** Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B249:143, 1985.
83. **Index theorems and supersymmetry in the soliton sector.** Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B247:471, 1984. 63. Topological invariance in supersymmetric theories with a continuous spectrum. Camillo Imbimbo, Sunil Mukhi. Nucl.Phys. B242:81, 1984.
84. **On constant configurations and the evaluation of the Witten index.** Luciano Girardello, Camillo Imbimbo, Sunil Mukhi. Phys.Lett. B132:69, 1982.
85. **QCD jets to all logarithmic orders.** Sunil Mukhi, George Sterman. Nucl.Phys. B206:221, 1982.
86. **The background field method and the ultraviolet structure of the super-symmetric nonlinear σ model.** Luis Alvarez-Gaume, Daniel Z. Freedman, Sunil Mukhi. Ann.Phys. 134:85, 1981.
87. **Massive vector multiplet coupled to supergravity.** Sunil Mukhi. Phys.Rev. D20:1839, 1979.

(b) Review articles and conference proceedings.

1. **The Pollica perspective on the (super) conformal world,** Fernando Alday, Philip Argyres, Madalena Lemos, Mario Martone, Leonardo Rastelli, Massimo Taronna, Sunil Mukhi, Lucía Córdova, Yifei He, Martin Kruczenski, Pedro Vieira, Elli Pomoni, Antoine Bourget, Amihay Hanany, Marco Fazzi, Simone Giacomelli, Masahito Yamazaki, Charlotte Kristjansen, Cyril Closset, Xinan Zhou, Agnese Bissi, Charlotte Sleight. J.Phys.A 54 (2021), 30, 303001.
2. **Membranes in M-theory.** Jonathan Bagger, Neil Lambert, Sunil Mukhi, Constantinos Papageorgakis. Physics Reports 527:1, (2013), arXiv:1203.3546.
3. **The predictive power of symmetries: Lie algebras, super-algebras and 3-algebras in physics.** Sunil Mukhi. "Symmetry - A Multidisciplinary Perspective", Ed. Inder Bir Passi, Ramanujan Mathematical Society Lecture Notes Series in Mathematics, Vol 16 (March 2012).
4. **The reciprocal interaction between mathematics and natural law.** Sunil Mukhi. "Math Unlimited: Essays in Mathematics", Ed. R. Sujatha, H.N. Ramaswamy, C.S. Yogananda, Science Publishers, CRC Press (2012).
5. **String theory: a perspective over the last 25 years.** Sunil Mukhi. Class. Quant. Grav. 28 (2011) 153001, arXiv:1110.2569 [physics.pop-ph].
6. **Gauge symmetry, unification and strings.** Sunil Mukhi. "Flavors of research in physics", Utpal Sarkar (Ed.), 125-136 (2010).
7. **Developments in high energy theory.** Sunil Mukhi and Probir Roy, in Pramana 73 (2009) 3, arXiv:0905.1793.
8. **Matrix models of moduli space.** Sunil Mukhi. Proceedings of the NATO Advanced Study Institute on "Applications of Random Matrices in Physics", Les Houches, June 2004, Ed. E. Brezin et al (Springer).
9. **Ramond-Ramond couplings of noncommutative branes.** Sunil Mukhi and Nemani V. Suryanarayana. Invited talk at Strings 2001, Mumbai, India, 5-10 Jan 2001, hep-th/0107087.
10. **Stable non-BPS states and their holographic duals.** Sunil Mukhi and Nemani V. Suryanarayana. Invited talk at Strings 2000, Ann Arbor, Michigan, 10-15 Jul 2000. Int. J. Mod. Phys. A16:966-975,2001, hep-th/0011185.
11. **Understanding fields using strings: A review for particle physicists.** Sunil Mukhi. Invited talk at

- the XIII DAE Symposium on High Energy Physics, Guwahati, India, Dec 1998, *Pramana* 54:543-559,2000, hep-ph/0002005.
12. **W_∞ identities from topological 2-D string theory.** Sunil Mukhi. 11th International Conference on Mathematical Physics (ICMP-11) (Satellite colloquia: New Problems in the General Theory of Fields and Particles, Paris, France, 25-28 Jul 1994). In "Paris 1994, Mathematical physics" 736-739.
 13. **Dualities in theories with 32 supersymmetries: A beginner's guide.** Sunil Mukhi. Prepared for ICTP Summer School in High-Energy Physics and Cosmology, Trieste, Italy, 2 Jun - 11 Jul 1997. In "Trieste 1997, High energy physics and cosmology" 1-28.
 14. **Recent developments in string theory: A brief review for particle physicists.** Sunil Mukhi. Based on an invited talk at 12th DAE - HEP Symposium on High-Energy Physics, Gauhati, India, 26 Dec-1 Jan 1997. hep-ph/9710470.
 15. **Orientifolds: the unique personality of each space-time dimension.** Sunil Mukhi. Based on talks given at Workshop on Frontiers in Field Theory, Quantum Gravity and String Theory, Puri, India, 12-21 Dec 1996, and at the Joint Paris-Rome-Utrecht-Heraklion-Copenhagen Meeting, Paris, France, Aug 1997. Published in "Puri 1996, Frontiers of field theory, quantum gravity and strings", 167-175, hep-th/9710004.
 16. **Matrix models, quantum Penner action and two-dimensional string theory.** Camillo Imbimbo, Sunil Mukhi. Talk given at Institut d'Etudes Scientifiques de Cargese: Nato Advanced Summer Institute: "Low Dimensional Applications of Quantum Field Theory", Cargese, France, 11-29 Jul 1995. In "Cargese 1995, Low-dimensional applications of quantum field theory" 219-225, hep-th/9511127.
 17. **Topological models of noncritical strings.** Sunil Mukhi. In "Trieste 1993, Proceedings, High energy physics and cosmology", 277-300.
 18. **Recent developments in mathematics and quantum field theory.** Sunil Mukhi. *Pramana J. Phys.* 41 (1993) Suppl. 517-523.
 19. **An introduction to continuum noncritical strings.** Sunil Mukhi. In "Trieste 1991, Proceedings, High energy physics and cosmology", vol.2 917-954.
 20. **The two-dimensional string as a topological field theory.** Sunil Mukhi. Presented at NATO Advanced Research Workshop on New Developments in String Theory, Conformal Models and Topological Field Theory, Cargese, France, 12-21 May 1993, hep-th/9312190.
 21. **Extra states in $c < 1$ string theory.** Sunil Mukhi. Talk given at Cargese Summer School, Cargese, France, Jul 16-27, 1991. Published in NATO ASI: Cargese 1991:0483-492 (QC174.45:N2:1991), hep-th/9111013.
 22. **Feigin-Fuchs integrals and Rogers-Ramanujam identities in rational conformal field theory.** Sunil Mukhi. "Trieste 1989, Proceedings, Recent developments in conformal field theories" 70-80.
 23. **$SL(2, \mathbb{R})$ conformal field theory, minimal models and two-dimensional gravity.** Sunil Mukhi. Presented at the International Colloquium on Modern Quantum Field Theory, Bombay, India, Jan 8-14, 1990. Published in "Bombay Quantum Field Theory" 1990:0077-84 (QC174.45:I61:1990).
 24. **Modular geometry and the classification of rational conformal field theories.** Sunil Mukhi. TIFR/TH/89-33, 3rd Regional Conf. on Mathematical Physics, Islamabad, Pakistan, Feb 18-24, 1989. In "Islamabad 1989, Proceedings, Mathematical physics" 258-282.
 25. **Classical and quantum theory of supersymmetric σ -models.** Sunil Mukhi. "Trieste 1986, Proceedings, Superstrings, Unified Theories And Cosmology", 53-70.
 26. **An introduction to Riemann surfaces for physicists.** Sunil Mukhi. In "Kanpur 1987, Proceedings, Particle Physics - Superstring Theory" 56-73.
 27. **Nonlinear σ -models, scale invariance and string theories: A pedagogical review.** Sunil Mukhi. Based on a series of lectures given at TIFR Winter School in Theoretical Particle Physics, Panchgani, India, Jan 25 - Feb 7, 1986. Published in *Indian Winter School* 1986:0111 (QCD161:W55:1986).
 28. **Topological properties of supersymmetric quantum field theories.** Sunil Mukhi. In *Jammu* 1984, Proceedings, High Energy Physics, Vol. 2, 29-39.

(c) Books written/edited.

1. **Advanced General Relativity**, Sunil Mukhi and Suneeta Vardarajan (nearing completion).
2. **Lectures on Advanced Mathematical Methods for Physicists**. Sunil Mukhi and N. Mukunda, World Scientific (Singapore) and Hindustan Book Agency (India), 2010.
3. **From Strings to LHC, Proceedings of workshop, Goa, India, January 2-10, 2007**. Rohini Godbole, Sunil Mukhi, K. Sridhar, Sandip Trivedi, editors. (Trieste, Italy: SISSA (2007)).
4. **Strings 2001**. Atish Dabholkar, Sunil Mukhi and Spenta R. Wadia, editors. Proceedings of the Strings 2001 Conference, Tata Institute of Fundamental Research, Mumbai, 5-10 Jan 2001. Published by the American Mathematical Society.
5. **Frontiers of field theory, quantum gravity and strings**. Romesh Kaul, Jnan Maharana, Sunil Mukhi, S. Kalyana Rama, editors. Proceedings, Workshop on Frontiers in Field Theory, Quantum Gravity and String Theory, Puri, India, 12-21 Dec 1996. Commack, USA: Nova Sci. Publ. (1999).
6. **Modern quantum field theory 2**. Sumit R. Das, Gautam Mandal, Sunil Mukhi, Spenta R. Wadia, editors. Proceedings, 2nd International Colloquium on Modern Quantum Field Theory, Bombay, India, Jan 5-11, 1994. Singapore: World Scientific (1995), 327 p.
7. **Modern quantum field theory**. Sumit Das, Avinash Dhar, Sunil Mukhi, Ashok Raina, Ashoke Sen, editors. Proceedings, International Colloquium on Modern Quantum Field Theory, Bombay, India, Jan 8-14 1990. Singapore: World Scientific (1991), 567 p.

3. Teaching experience (listed from Jan 2001)

- **Graduate courses at the Tata Institute of Fundamental Research:**
 - **Advanced General Relativity** (February-June 2025).
 - **Quantum mechanics II** (January-May 2011).
 - **General relativity** (August-December 2009).
 - **Particle physics** (August-December 2007).
 - **LHC for string theorists** (August-December 2006).
 - **Quantum field theory** (August-December 2005).
 - **Quantum mechanics** (January-May 2003).
- **Undergraduate courses at the Indian Institute of Science Education and Research, Pune:**
 - **Gravitation** (August 2025).
 - **Introductory Quantum Physics** (August 2024).
 - **Quantum Field Theory II** (January 2024).
 - **Quantum Field Theory II** (January 2022).
 - **Conformal Field Theory** (Ph.D. level modular course, August 2021).
 - **Mathematical Methods for Physics** (August 2021).
 - **The World of Physics II: Quantum Mechanics** (Fall 2020).
 - **Nuclear and Particle Physics** (Spring 2020).
 - **Quantum Field Theory II** (Spring 2019).
 - **The World of Physics III: Electricity and Magnetism** (Fall 2018).
 - **Quantum Field Theory II** (Spring 2018).
 - **The World of Physics III: Electricity and Magnetism** (Fall 2017).
 - **The World of Physics I: Waves and Matter** (Spring 2016).
 - **Mathematical Methods** (Spring 2015).
 - **The World of Physics III: Electricity and Magnetism** (Fall 2014).
 - **The World of Physics II: Quantum Mechanics** (Spring 2014).
 - **The Practice of Science: Ethics, Safety and Science Communication** (Spring 2014).

- **Nuclear and Particle Physics** (Spring 2013).
- **Quantum Mechanics** (Spring 2010, as a guest faculty).
- **Invited short courses:**
 - **Advanced General Relativity**, ICTS Bengaluru (online), March-April 2023.
 - **Topology and Differential Geometry for Physicists**, IIT Gandhinagar, July-August 2021.
 - **Renormalisation in Quantum Field Theory**, SERC School on Theoretical High Energy Physics, Kalyani University, January 2017.
 - **Introductory Lectures on Supersymmetry**, Pre-SUSY School, TIFR Mumbai, December 2017.
 - **Conformal Symmetry and Modular Forms**, NISER Bhubaneswar, January 2017.
 - **Renormalisation**. SERB Advanced School, Kalyani University, January 2017.
 - **Gauge fields**. Workshop on Ultracold Atoms, IISER Pune, December 2013.
 - **M-theory and Membranes**. Advanced String School, Puri, October 2010.
 - **Quantum Field Theory**. SERC Preparatory School in High Energy Physics, BITS Pilani Goa, October 2010.
 - **A Practical Guide to String Theory**. 22nd Taiwan Spring School on Particles and Fields, April 2009.
 - **String Theory**. SERC School, Guwahati, March 2009.
 - **M-theory and Membranes**. 3rd Asian School on String Theory, Beijing, January 2009.
 - **Introduction to Supersymmetry and Supergravity**. “From Strings to LHC II”, Bangalore, December 2007.
 - **String Theory Basics**. “From Strings to LHC” Workshop, Goa, Jan 2007.
 - **Supersymmetry**. Vietnam School of Physics, Nha Trang, Vietnam, Dec 2006.
 - **Topological String Theory**. Harish-Chandra Research Institute, Allahabad, October 2006.
 - **Introduction to String Theory**. Inter-University Centre for Astronomy and Astrophysics, Pune, Dec 2005.
 - **Noncritical String Theory**. Harish-Chandra Research Institute, Allahabad, Feb 2005.
 - **Matrix Models of Moduli Space**. Les Houches School on Random Matrices, June 2004.
 - **Introduction to String Theory**. British Universities Summer School in Theoretical Elementary Particle Physics (BUSSTEPP) 2004, University of Plymouth, August 2004.
 - **Topological Matrix Models, Liouville Matrix Model and $c = 1$ String Theory**. IPM String School and Workshop 2003, Iran, September 2003.
 - **String Theory**, British Universities Summer School in Theoretical Elementary Particle Physics (BUSSTEPP) 2003, Queen Mary College, London, August 2003.
 - **Closed Strings on pp-wave Background**, 7th KIAS-APCTP Winter School on Strings, Seoul and Phoenix Park, Korea, Feb 11-19, 2003.
 - **Noncommutativity in String Theory**, Summer School on Prospects in Theoretical Physics, Institute for Advanced Study, Princeton, July 2002.

4. Outreach: Public/popular lectures (listed from Jan 2010)

- **“Thoughts on Interdisciplinarity”**, Center for Indisciplinary Studies, S.P. Pune University, July 2025.
- **“Quantum mechanics, relativistic quantum theory and quantum fields: a century of evolution”**, Assam University, Silchar, May 2025.
- **“Geodesic Yatra: The work of A.K. Raychaudhuri”**, Ashoka University, March 2025, TIFR Hyderabad (October 2024), JNU, May 2024, IISc Bengaluru, February 2024.
- **“String theory: Model and framework”**, IIT Indore, October 2024.
- **“Darkness glowing softly: The incredible story of black holes”**, IISER Pune, August 2024, IISER

Bhopal, October 2024.

- **“Some perspectives on academic ethics in India”**, ICTS Bengaluru, June 2024.
- **“Remarkable outcomes of mathematical physics”**, IISER Pune, March 2024.
- **“The Gravity of Gravity”**, IIT Gandhinagar, January 2024.
- **“String Theory: Status Report on a Model and a Framework”**, Utkal University, January 2023.
- **“The Social Relevance of Basic Science”**, Science Day talk at IIT Hyderabad, February 28, 2022.
- **“Scientific Writing Skills and Ethics in Research”**, IPA Young Scientists’ Meet, January 2022.
- **“Fundamentals and Finality: The Life and Work of Steven Weinberg”**, Breakthrough Science Society, Kerala, August 22, 2021; Mathematical Sciences Institute, Belagavi, September 11, 2021; IISER Pune, September 25, 2021, NISER Jatni, February 25, 2022.
- **“The Social Relevance of Basic Science”**, Krea University Informal Lecture Series, July 12, 2021.
- **“Remarkable Outcomes of Mathematical Physics”**, Science Academies Online Lecture Workshop, March 2021; Pune Knowledge Cluster, July 2021; ICFAI University Tripura, September 27, 2021, IISER Bhopal, April 18 2022.
- **“The Hows and Whys of Scientific Research”**, Science Day, IISER Pune (online), February 2021.
- **“Mathematical Physics and Reality: Two Worlds or One?”**, Coherence Talk, IISc Bengaluru (online), December 2020; IISER Thiruvananthapuram Physics Society (online), January 2021; Assam University, Silchar (online), March 2021.
- **“Publication Ethics, Authorship and Predatory Journals”**, India BioScience Webinar (online), October 2020.
- **“The Particles Predicted by Theory”**, INO Lecture Series (online), July 2020.
- **“Spin and the Quantum World”**, Jidnyasa Virtual Learning Programme, Praj Matrix R&D Centre (online), April 2020.
- **“What Are We Made Of?”**, Muktagan Exploratory, Pune, December 2019.
- **“String Theory and Its Origins in Particle Physics”**, DAE Centre for Basic Science, Mumbai, October 2019.
- **“Gravity and the Universe”**, Presidency University, August 2019.
- **“Let’s Not Lose Our Temper! The Value of Science”**, Science Day, BITS Pilani Hyderabad, February 2019.
- **“String Theory and the Experiments That Led To It”**, NISER Bhubaneswar, IISER Pune, October 2018; Ashoka University, January 2019
- **“A Brief History of Stephen Hawking”**, IISER Pune, March 2018.
- **“The Social Relevance of Basic Science”**, 12th Chandigarh Science Congress, Panjab University, February 2018.
- **“Large Projects in High Energy Physics”**, INSA Anniversary Meeting, December 2017.
- **“A Survey of Academic Ethics”**, Indian Academy of Sciences, June 2017.
- **“Topology Matters”**, IUCAA Pune, Science Day, February 2017.
- **“String Theory as a Framework”**, Kalyani University, January 2017.
- **“The Nobel Prize in Physics”**, IISER Pune and National Centre for Cell Science, October 2016.
- **“From Basic Science to Social Benefit”**, programme organised at IISER Pune on Science Day, February 28 2016.
- **“The Relevance of Irrelevant Science”**, IIT-BHU, Varanasi and Fergusson College, Pune, January 2016.
- **“The Changing Face of Gravitation”**, Utkal University, March 2015.
- **“A World of Magnets and Miracles”**, Professor-X Science Festival, St Xavier's College Mumbai, January 10, 2015.
- **“String Theory and Quantum Gravity”**, Indian National Science Congress, January 6, 2015.

- **“Scientific Temper”**, Science Day, IISER Pune, February 28, 2014; Science Day, National Centre for Cell Science, February 28, 2015.
- **“Windows Onto Nature”**: Public Lecture, Homi Bhabha Centre for Science Education, April 20, 2013; Institute of Physics Bhubaneswar Foundation Day Lecture, September 4, 2013; “Singularity” Student Festival, IISER Bhopal, February 2, 2014.
- **“Consistent and Symmetric: The evolution of fundamental theory from gauge fields to strings”**: IISER Pune Colloquium, August 21, 2013; NISER Bhubaneswar Colloquium, September 6, 2013.
- **“2013 Nobel Prize in Physics: The Higgs Mechanism”**, IISER Pune, November 8, 2013.
- **Mentor’s talk** at Conclave of Ramanujan Fellows, Pune, December 14, 2013.
- **“The Higgs particle”**, IISER Pune (INSPIRE camp), Pune, December 11, 2012; Somaiya College, Mumbai, July 20, 2012; KIIT Bhubaneswar (INSPIRE camp), July 8, 2012.

I organised a programme of public lectures with the theme “From Basic Science to Social Benefit” at IISER Pune on February 28, 2016. The programme highlighted the way in which fundamental science, pursued without specific applications in mind, has impacted society through radically new applications in the areas of diagnostics, medicine, communications and informatics.

5. Articles in popular media/policy journals (listed from Jan 2001)

- **“A Crisis of Academic Ethics in India”**, The Hindu, July 2023.
- **“A Singularity in Space-Time”**, A Scientific Obituary of Stephen Hawking, Frontline, March 2018.
- **“The Ethics of Excellence”**, Op-ed article, The Hindu, January 2018.
- **“Back to Basics”**, Op-ed article, The Hindu, February 2017.
- **“Ethics and Indian science”** (Guest Editorial), Current Science, 25 March 2016, 110 (06).
- **“Goals, models, frameworks and the scientific method”** (Opinion), Current Science, 10 September 2015, 109 (05).
- **“Diversity of the science ecosystem”** (Opinion), Current Science, 10 October 2013, 105 (07).
- **“Higgs don't lie”**, BBC Knowledge, October 2012.
- **“Neutrinos: Back to the future?”**, BBC Knowledge, December 2011.
- **“Neutrinos: The law breakers”**, Times of India Crest, October 3, 2011.
- **“The moment of creation”**, The Last Word, BBC Knowledge, May/June 2011.
- **“What about the living particles?”**, The Last Word, BBC Knowledge, Jan/Feb 2011.
- **“Thinking new thoughts”**, Prayas Students' Journal of Physics (Indian Association of Physics Teachers), Vol. 4, No. 1, Jan. - Mar. 2010.
- **“Let's Get Physical”**, a series of 8 articles in Times of India, 2007.
- **“Dirac's Conception of the Magnetic Monopole and its Modern Avatars”**, Resonance, December 2005.
- **“Nobel for a Minus Sign”**, (with Rohini Godbole), Resonance, February 2005.

6. Administrative Experience and Institution Building

I have actively participated in academic administration activities since the early 1990's, first at the Tata Institute of Fundamental Research (TIFR) where I worked from 1985-2012 and then at the Indian Institute of Science Education and Research (IISER) to which I moved in 2012 and where I contributed significantly to building the Institute's academic and administrative activities.

Graduate Course Programme (TIFR): I was the Graduate Course Coordinator for Physics at TIFR during the 1990's and subsequently became Chair of the Graduate Committee for Physics. In 2003, I was appointed the first Dean of Graduate Studies of TIFR. At the time, the Institute had newly become a "Deemed University" and was able to grant its own doctoral degrees (previously these were granted through the University of Bombay). The position of Dean entailed working out the entire apparatus for administering the doctoral programme, right from the design of the degree certificate to the Graduate Course Guidelines which prescribed the procedures to be followed. The Dean reported to the Director and made regular presentations to the Academic Committee. I placed a strong emphasis on modernisation of the procedures.

Endowment (TIFR): From 2000-2005, I was a member of the Endowment Committee of TIFR. This committee had some success in raising contributions from two prominent industrialists in the field of Information Technology. One was a career development grant for Ph.D. students (which augmented the stipends granted by the Institute for a certain number of years) while the other was a more general travel endowment that could either be allocated to TIFR members for their own international travel, or used to invite distinguished visitors to the Institute.

Department Chair (TIFR): In 2009, I was appointed Chair of the Department of Theoretical Physics at TIFR. This is a prestigious theoretical physics department with a global reputation. The Chair's role was to conduct the search and evaluation process to recruit outstanding faculty members, to oversee the recruitment and mentoring of students and postdoctoral fellows, to allocate funds for research, to present the Department's views and requirements at Natural Science Faculty meetings, and to interface with the Dean of Faculty and the Director regarding institutional matters. Supporting and stimulating research, collaborations and conferences was also an important part of the daily activity.

Ethics Committee (TIFR, IISER, Indian Academy of Sciences): In 2006, partly in response to increased awareness nationwide, TIFR instituted an Academic Ethics Committee of which I was made the first Chair. The Committee drafted the first set of Ethics Guidelines, which are still available on the Institute's website, and over the years conducted enquiries into a few cases of alleged misconduct. From 2014-2019 I was Chair of the Academic Ethics Committee of IISER Pune, and from 2016-2022 I chaired the Panel on Scientific Values of the Indian Academy of Sciences, Bangalore. At both TIFR and IISER as well as a few other Institutes, I have conducted sessions to sensitise the academic community about various aspects of academic ethics.

Chair, Physics Department (IISER):

In November 2012, I moved from the Tata Institute to take up the challenge of chairing the Physics Programme at the relatively young Indian Institute of Science Education and Research in Pune. This institute has the goal of unifying undergraduate teaching and high-quality research in a single institution (in contrast to research institutions). The Physics Programme at IISER covers a wide canvas of experimental and theoretical areas of Physics, including condensed matter, atomic and molecular physics, optics and photonics, quantum information, nanoscience and nanomaterials, high energy physics, nonlinear dynamics, astronomy and astrophysics, and gravitation and string theory.

At IISER the Chair's responsibilities are similar to those listed above for TIFR, but here experimental research becomes a major priority. The mentoring of undergraduate students is another important priority. The Chair's role at IISER is (among other things) to conduct the search and recruitment process for outstanding faculty members, to oversee the recruitment and mentoring of students and postdoctoral fellows, to assign and oversee teaching responsibilities, and to allocate funds for research. I remained the Chair until 2018.

Dean, Students Activities (IISER):

During 2013-16, I initiated the creation of the first faculty body to oversee student activities at IISER Pune, handling matters such as hostels, housing and dining facilities, discipline, complaints etc. and chaired this Committee in the capacity of Dean.

Chair, Endowment and Investments Committee (IISER):

In 2015 I initiated the formation of this Committee which has successfully attracted Endowments to IISER Pune for research, teaching and scholarship. The Committee has conducted joint Industry-Academia conclaves, and has introduced the first funded Chair Professorships at IISER Pune. I Chaired this Committee until 2020.

Dean, Faculty (IISER):

I was Dean, Faculty at IISER Pune from 2019-2021. During this period my office conducted all faculty recruitments and promotions at IISER. Transparent and efficient procedures were put in place for these activities, from the initial application stage to the final Selection Committee. I was a member of the IISER Pune Board of Governors during this period.