

Curriculum Vitae

Santanu Dey

(1) Educational Background

Degree	Institute /University	Year
Habilitation	E-M-A-Universität Greifswald, Germany	August 2009
Ph.D.	Indian Statistical Institute Bangalore	Submitted: May 2004, Awarded: March 2005

(2) Areas of Interest

Operator Algebras, Noncommutative Probability, Quantum Information Theory

(3) Publications

- Standard noncommuting and commuting dilations of commuting tuples- (with B. V. Rajarama Bhat, T. Bhattacharyya), Trans. American Math. Soc. 356 (2004), 1551-1568.
- Minimal Cuntz-Krieger dilations and representations of Cuntz-Krieger algebras- (with B. V. Rajarama Bhat and J. Zacharias), Proc. Indian Acad. Sci. Math. Sci. 116 (2006), 193-220.
- Standard dilations of q -commuting tuples, Colloquium Math. 107 (2007), 141-165.
- Characteristic functions for ergodic tuples- (with R. Gohm), Integral Equations and Operator Theory, 58 (2007), 43-63.
- Liftings of covariant representations of W^* -correspondences, Infin. Dimens. Anal. Quantum Probab. Relat. Top. 13 (2010), 511-523.
- Characteristic functions of liftings- (with R. Gohm), Journal of Operator Theory 65 (2011), 17-45.
- Standard commuting dilations and liftings, Colloquium Math. 126 (2012), 87-94.
- Invariants for liftings of row contractions- (with K. J. Haria), Jour. of Analysis 20 (2012), 79-89.
- Generalized repeated interaction model and transfer functions- (with K. J. Haria), Oper. Theory Adv. Appl., Vol 240 (2014), 111-135.
- Functional model and minimal contractive liftings- (with R. Gohm and K. J. Haria), Complex Analysis and Operator Theory, 9 (2015), 933-955.
- \mathcal{K} -families and CPD-H-extendable families- (with H. Trivedi), Rocky Mountain Journal of Mathematics 47 (2017), 789-816.
- KSGNS construction for τ -maps on S -modules and \mathfrak{K} -families- (with H. Trivedi), Operators and Matrices 11 (2017), 679-696.
- Characteristic functions of liftings-II- (with R. Gohm and K. J. Haria), Operators and Matrices, 12 (2018), 579-601.
- Bures distance and transition probability for α -CPD-kernels- (with H. Trivedi), Complex Anal. Oper. Theory 13 (2019), 2171-2190.
- Comparing geometric discord and negativity for $2 \otimes 3$ states- (with P. Bag and H. Osaka), Phys. Lett. A 383, no. 33 (2019), 125973.
- The order- n minors of certain special $(n+k) \times n$ matrices- (with P. Bag, M. Nagisa and H. Osaka), Linear Algebra Appl. 603 (2020), 368-389.

- The Rokhlin property for group actions on Hilbert C^* -Modules- (with H. Osaka and H. Trivedi), Southeast Asian Bull. Math. 46 (2022), 151-171.
- t -Frobenius negacyclic codes- (with P. Bag), J. Ramanujan Math. Soc. 37 (2022), 49-61.
- Factorizations of Characteristic functions of iterated liftings (with N. Bala, M. N. Reshmi), to appear in Complex Anal. Oper. Theory.

(4) **Ph.D. students guided**

- (a) Dr. Kalpesh J. Haria (Title: Repeated Interaction Model, Transfer Function and Characteristic Function of Lifting, completed in 2014; Currently Assistant Professor IIT Goa)
- (b) Dr. Harsh C. Trivedi (Title: Maps Between Hilbert C^* -modules and Certain Group Actions, completed in 2016; Currently Assistant Professor LNMIIT Jaipur)
- (c) Dr. Priyabrata Bag (Title: Quantum Information Theory and Error Correcting Codes, completed in 2018, Currently Assistant Professor at NMIMS, Mumbai)

(5) **Experience**

- Professor at IIT Bombay from 25th May 2021 to till date.
- Associate Professor at IIT Bombay from 1st September 2014 to 24th May 2021.
- Assistant Professor at IIT Bombay from 1st September 2009 to 31st August 2014.
- Wissenschaftlicher Assistant (equivalent to Assistant Professor) in the research group of Prof. M. Schürmann at E-M-A-Universität, Greifswald from February 2006 till August 2009.
- Visiting research fellow at the Fields Institute, Toronto from 13th July to 11th October 2007.
- Post-doctoral Research fellow of E-M-A-Universität, Greifswald form October 2005 till January 2006.
- Post-doctoral Research fellow of German Academic Exchange Service (DAAD) fellowship for one year four months for research in Mathematics at E-M-A-Universität, Greifswald form June 2004 till September 2005.
- JRF/ SRF fellow at ISI Bangalore during my PhD studies.
- Worked as a “Quantitative Financial Analyst” in “First Global” for eight months during 1998-1999.

(6) **Conferences and Workshops**

1. Workshop on “Algebraic Number Theory” held at Hyderabad University (central), from 1st to 21st December 1999.
2. International conference on “Spectral and Inverse Spectral Problems for Schrodinger Operator” held at Goa, from 14th to 20th December 2000.
3. “International Workshop on Linear Algebra, Numerical Functional Analysis and Wavelet Analysis” held at Cochin University from 6th to 15th August 2001.
4. Workshop on “Advances in Operator Theory and Operator Algebras-II” from 24th December 2001 to 4th January 2002 at ISI Bangalore.
5. Short School on “Quantum Independent and Increment Processes” from 9th to 22nd March 2003 at Greifswald.
6. “Joint India-American Math. Soc. Meeting” from 17th to 20th December 2003 at Bangalore. *I had an article “ q -Commuting Dilations” in the poster section.*
7. “25th QP Conference- Quantum Probability and Related Topics” from 20th to 26th June 2004 at Bedlewo, Poland.

8. Workshop on “Quantum Coding” from 7th to 9th September 2004 at E-M-A-Universität, Greifswald.
9. “26th QP Conference- Quantum Probability and Infinite Dimensional Analysis” from 22nd to 24th February 2005 at Levico, Italy.
10. Conference on “Operator Algebras and Applications” at National University of Ireland, Cork from 1st to 4th June 2005.
11. Fields institute summer school in “Operator Algebras” from June 7th to 17th June 2005 at the University of Ottawa, Ontario Canada.
12. “International Conference on Quantum Probability and Its Applications” from 27th to 31st March 2006 in Greifswald.
13. “Quantum Probability: Analysis and Applications- QP 27” from 17th to 22nd July 2006 in Nottingham, UK.
14. “Quantum Potential Theory” from 27th February to 9th March 2007 in Greifswald.
15. “Thematic Program on Operator Algebras” from 13th July to 11th October 2007 in Fields Institute, Canada.
16. “Operator Theory Satellite Conference” from 9th to 13th August 2010 in IMSc Chennai.
17. “31th Conference on Quantum Probability and Related Topics” from 14th to 17th August 2010 in JNCASR Bangalore.
18. “Conference on Analysis” from 23rd to 25th December, 2011 in ISI Delhi.
19. “International Workshop on Operator Theory and Applications (IWOTA),” July 16 - 20, 2012 in University of New South Wales, Sydney, Australia.
20. “15th workshop: Non-Commutative Harmonic Analysis,” September 23 - 29, 2012 in Bedlewo, Poland.
21. “Quantum Probabilities and Related Fields (QP33),” October 1 - 5, 2012 in CIRM, Luminy, France.
22. “Operator Algebras in Non-equilibrium Statistical Mechanics,” December 17 - 21, 2012 in Bambolim Beach Resort, Goa.
23. “Recent advances in Operator Theory and Operator Algebras,” December 31, 2012 - January 11, 2013 in ISI Bangalore.
24. “International Workshop on Operator Theory and Applications (IWOTA),” December 16 -20, 2013 in IISc Bangalore.
25. “Master-Class in Modular Theory of von Neumann algebras,” November 24-December 05, 2014 in IMSc Chennai.
26. “Complex Geometry and Operator Theory,” December 01-03, 2015 in ISI Bangalore.
27. “International Workshop on Operator Theory and Applications (IWOTA),” July 18 - 22, 2016 in Washington University in St. Louis, USA.
28. “Operator Theory and Operator Algebras,” December 13-22, 2016 in ISI Bangalore.
29. “Quantum Probability: Past, Present and Future,” August 10-12, 2017 in ISI Bangalore.
30. National Conference on “Algebra, Analysis and Number Theory,” January 13-14, 2018 in NM University, Jalgaon.
31. “A meeting on operator theory, topology and combinatorics-celebration of Bhaskar Bagchi’s career” ISI, Bangalore, January 29, 2019.
32. ”43rd International Conference on Quantum Probability and Infinite Dimensional Analysis (QP-43),” January 8-14, 2023 in Utop Marina, Yeosu, Korea.

33. "Conference on Functional Analysis and Related Topics," February 21-25, 2023 in IIT Bombay.

(7) **Online Conferences and Workshops**

1. International Workshop Hilbert C^* -Modules, Online Weekend December 5-6, 2020.
2. Ramanujan Mathematical Society Pre-Conference Symposiums- Functional Analysis, December 27, 2020.
3. 41th International Conference on Quantum Probability and Related Topics, 28 March to 1 April 2021.
4. Ramanujan Mathematical Society Pre-Conference Symposiums- Functional Analysis, August 4, 2021.

(8) **Research visits**

1. ISI Delhi from December 2002 till February 2003.
2. E-M-A-Universität Greifswald from 23rd March till 6th April 2003.
3. University of Nottingham, UK from 5th to 11th January 2007.
4. ISI Bangalore from 19th to 21st February 2007.
5. University of Wroclaw, Poland from 26th to 30th March 2007.
6. Ritsumeikan University, Kyoto from 1st to 21st September 2008.
7. Aberystwyth University, UK from 10th to 18th July 2011.
8. ISI Bangalore from 27th January to 2nd February 2019.
9. IISER Trivandrum from 24th to 27th May 2023.

(9) **Projects**

1. Seed grant project funded by IRCC, IIT Bombay.
2. Project under "Matrices" scheme, funded by SERB, DST.

(10) **Talks**

- "Two types of standard dilations", workshop on Operator Theory et al., Bangalore- Dec 2001/ Jan 2002.
- Three talks on "Dilation of tuples", in E-M-A-Universität, Greifswald, March 2003 (visit).
- "Minimal Cuntz-Krieger dilation", QP Conference Bedlewo- June 2004.
- "Characteristic functions and dilations", Operator Algebras and Applications, Cork- 2nd June 2005.
- "Characteristic functions of ergodic tuples", QP Conference Greifswald, 31st March 2006.
- "Characteristic functions of coisometric liftings", QP Conference Nottingham, 18th July 2006
- "Liftings and cp maps", University of Nottingham- 8th January 2007 (visit).
- "Liftings and cp maps", ISI Bangalore- 20th February 2007 (visit).
- "Standard q-dilations", University of Wroclaw- 28th March 2007 (visit).
- "Constrained liftings", Fields Institute- 18th July 2007.
- "Characteristic functions of liftings", Ritsumeikan University- 16th September 2008.
- "Liftings of covariant representations of W^* -correspondences", QP Conference Bangalore- 14th August 2010.

- “Generalized repeated interaction model and transfer functions”, Aberystwyth University, 13th July 2011 (visit).
- “Generalized repeated interaction model and transfer functions”, IWOTA Sydney, 17th July 2012.
- “Repeated interaction model for a quantum system with a subprocess”, workshop in Bedlewo, 27th September 2012.
- “Outgoing Cuntz scattering system for a coisometric lifting”, QP Conference Luminy, 2nd October 2012.
- “Characteristic functions for liftings”, Oper. Alg. et al., Goa 2012.
- “Characteristic functions for liftings (with solution to the converse problem)”, IWOTA Bangalore, 16th December 2013.
- “Functional models for contractive multi-analytic operators”, IWOTA Bangalore, 17th December 2013.
- “KSGNS construction for τ -maps on S-modules and \mathfrak{K} -families”, IWOTA St. Louis, MO, 19th July 2016.
- “t-Frobenius negacyclic codes”, AANT, Jalgaon, 13th January 2018.
- “The Order-n Minors of Certain $(n+k) \times n$ Matrices”, RMS, Chennai, 4th August 2021.
- “Quantum Computing- The Order-n Minors of Certain $(n+k) \times n$ Matrices”, NMIMS, Mumbai, 11th September 2021.
- “Characteristic function of row contractions and colligations”, Yeosu, 10th January 2023.
- “Characteristic function of row contractions and colligations”, Trivandrum, 24th May 2023.

(11) **Other academic activities**

- Twice examiner of M.Phil. thesis of University of Pune.
- Refereed papers for journals: Integral Equations and Operator Theory, Operators and Matrices, Proceedings of Indian Acad. of Sciences- Math. Sciences, Indian Journal of Pure and Applied Mathematics, Journal of Analysis and Journal of Ramanujan Math. Soc.
- Internal examiner for five Ph.D. theses at IIT Bombay.
- Instructor for Functional Analysis in AFS-II, held in Bhaskaracharya Pratisthana, Pune from 31 May to 5 June 2016.
- Instructor in the workshop on “Linear Algebra and Multivariate Calculus for Science and Engineering Teachers” at VNIT Nagpur, Jan 1-5, 2018.
- Organised (along with three co-organisers) “Conference on Functional Analysis” in IIT Bombay on October 12-15, 2017.
- External member of faculty selection/promotion committee at several Institutes.
- Reviewed papers for Mathscinet.