Soumyashant Nayak

Stat-Math Unit, Indian Statistical Institute, 8th Mile, Mysore Road, RVCE Post, Bangalore - 560 059
soumyashant@isibang.ac.in

Present Position *Assistant Professor* in the Theoretical Statistics and Mathematics Unit, Indian Statistical Institute, Bangalore Centre. (July 2020 - present)

Postdoctoral Affiliation *Postdoctoral Researcher in Bioinformatics* at ITMAT, Smilow Center for Translational Research in the **Perelman School of Medicine, University of Pennsylvania**. (September 2016 - June 2020)
Mentored by **Gregory Grant**.

Education *Philosophiae Doctorate in Mathematics*,
awarded by the **University of Pennsylvania**, Philadelphia in August 2016.
Thesis - *On the Diagonals of Projections in Matrix Algebras over von Neumann Algebras*
Advisor - **Richard V. Kadison**

Bachelor of Mathematics (Hons.), Mathematics (2008-2011)
Indian Statistical Institute, Bangalore Centre

Research Interests Operator Algebras, Quantum Information Theory, Statistical Methods in Bioinformatics, Systems Biology

Publications *Mathematics :*

1. **S. Nayak**; *A framework for rank identities - With a view towards operator algebras*, 39 pp. (revision submitted to Journal of Operator Theory, 2021). [arXiv:1801.08072]
2. **S. Nayak**; *The Douglas lemma for von Neumann algebras and some applications*, Adv. Oper. Theory **6**, 47 (2021). [DOI:10.1007/s43036-021-00143-4], [arXiv:1707.04378]
3. **S. Nayak**; *On Murray-von Neumann algebras - I: topological, order-theoretic and analytical aspects*, Banach J. Math. Anal. **15**, 45 (2021). [DOI:10.1007/s43037-021-00129-7], [arXiv:1911.01978]
4. **S. Nayak**; *A constructive proof of the derivation theorem*, Math. Student 88 (2019), Nos. 3–4, 119–124. [Online Version]
5. **S. Nayak**; *Jensen's inequality in finite subdiagonal algebras*, Bull. Lond. Math. Soc. 50 (2018), no. 6, 1102–1112. [DOI:10.1112/blms.12208], [arXiv:1807.11652]
6. **S. Nayak**; *Matrix algebras over algebras of unbounded operators*, Banach J. Math. Anal. 14 (2020), 1055–1079. [DOI:10.1007/s43037-019-00052-y], [arXiv:1812.06872]
7. M. Gaál, **S. Nayak**; *On a class of determinant preserving maps for finite von Neumann algebras*, J. Math. Anal. Appl. 464 (2018), no. 1, 317–327. [DOI:10.1016/j.jmaa.2018.04.006], [arXiv:1711.08786]

8. **S. Nayak;** *The Hadamard determinant inequality - Extensions to operators on a Hilbert space*, J. Funct. Anal. 274 (2018), no. 10, 2978–3002. [DOI:10.1016/j.jfa.2017.10.009], [arXiv:1704.05421]

Bioinformatics :

1. Arjun Sengupta, Seth D Rhoades, Eun Ji Kim, **Soumyashant Nayak**, Gregory R Grant, Peter Meerlo, Aalim M Weljie; *Sleep restriction induced energy, methylation and lipogenesis metabolic switches in rat liver*, The International Journal of Biochemistry and Cell Biology, Vol. 93 (2017), 129-135 pp.

2. Preetika Gupta, Ogul E Uner, **Soumyashant Nayak**, Gregory R Grant, Robert G Kalb; *SAP97 regulates behavior and expression of schizophrenia risk enriched gene sets in mouse hippocampus*, PLoS ONE 13(7): e0200477. [DOI:10.1371/journal.pone.0200477]
3. Iryna Shakhmantsir, **Soumyashant Nayak**, Gregory R. Grant, Amita Sehgal; *Spliceosome factors target timeless (tim) mRNA to control clock protein accumulation and circadian behavior in Drosophila*, eLife 2018;7:e39821. [DOI:10.7554/eLife.39821]
4. Shaon Sengupta, Soon Yew Tang, Jill Devine, **Soumyashant Nayak**, Shirley Zhang, Alex Valenzuela, Carolina B Lopez, Gregory R. Grant, Garret A. FitzGerald; *Circadian control of lung inflammation in influenza infection*, Nature Communications volume 10, Article number: 4107 (2019) . [DOI:10.1038/s41467-019-11400-9], [bioRXiv preprint:doi:10.1101/381814]
5. **Soumyashant Nayak**, Nicholas Lahens, Eun Ji Kim, Emanuela Ricciotti, George Paschos, Sarah Tiskoff, Dimitra Sarantopoulou, Shaon Sengupta, Barry Cooperman, Tilo Grosser, Gregory R. Grant; *Iso-relevance functions - A systematic approach to ranking genomic features by differential effect size* (submitted). [bioRXiv preprint:doi:10.1101/381814v2]
6. Dimitra Sarantopoulou*, **Soumyashant Nayak***, Thomas G. Brooks, Nicholas F. Lahens, Gregory R. Grant; *Comparative evaluation of full-length isoform quantification from RNA-Seq* (submitted). $*$ - equal contribution.
7. Nicholas Lahens, Thomas G. Brooks, Dimitra Sarantopoulou, **Soumyashant Nayak**, Cris Lawrence, Anand Srinivasan, Jonathan Schug, John B Hogenesch, Yoseph Barash, Gregory R. Grant; *CAMPAREE: A robust and configurable RNA expression simulator* (submitted).
8. **Soumyashant Nayak**, Eric McGivney, Thomas G. Brooks, Nicholas Lahens, Gregory R. Grant; *TEQILA: A tool for gene-set differential feature distribution analysis* (in preparation).

Awards and Honors

Fellowships :

- Selected for **Ramanujan Fellowship**, Science and Engineering Research Board (SERB), Dept. of Science and Techology (DST), Govt. of India, 2019. SB/S2/RJN-035/2019.
  (declined due to acceptance of regular faculty position at Indian Statistical Institute, Bangalore Centre).
- **Benjamin Franklin Fellowship** - University of Pennsylvania, Philadelphia 2011 - 2016.
- **Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship** by Dept. of Science and Technology, Govt. of India, 2006-2011.

- Selected for the **Summer Research Fellowship Programme (SRFP)** for 2 consecutive years (2010, 2011) by Indian Academy of Sciences.
  (Hosted in the years 2010, 2011, respectively, by V. S. Sunder, Partha Sarathi Chakraborty, respectively, at the Institute of Mathematical Sciences, Chennai).
- **National Talent Search Examination (NTSE) Scholarship** by National Council of Educational Research and Training (NCERT), 2006.
  (declined due to acceptance of KVPY Fellowship).

Others :

- Selected among top 30 students in India in the **Indian National Mathematical Olympiad** (INMO) for 3 consecutive years, 2006-2008.
- Gold Medal in **International Olympiad on Astronomy and Astrophysics** (IOAA) 2007 held in Chiang Mai, Thailand.
- Bronze Medal in **International Astronomy Olympiad** (IAO) 2006 held in Mumbai, India.
- Silver Medal in **International Astronomy Olympiad** (IAO) 2005 held in Beijing, China.
- Placed among top 1% in National Standard Examination in Physics 2007.

Teaching Experience

Instructor, University of Pennsylvania

- Math 241, Calculus IV, Introduction to Partial Differential Equations (Summer Session II, 2016)
- Math 170, Ideas in Mathematics (Full Summer Session 2016)
- Official Math Help Tutor, All Undergraduate Courses (Summer Session II, 2015)
- Math 114, Introduction to Multivariable Calculus (Summer Session II, 2013)

Teaching Assistant, University of Pennsylvania

- Math 608, Complex Analysis, Fall 2014
- Math 509, Advanced Analysis, Spring 2014
- Math 180, Analytical Methods in Economics, Law and Medicine, Fall 2013
- Math 425, Partial Differential Equations, Spring 2013
- Math 312, Linear Algebra, Fall 2012

Conferences Attended

- RECOMB - 2019 at George Washington University, Washington, DC. 5–8 May, 2019.
- NEAM - 2018 at SUNY, New Paltz. 19–21 October, 2018.
- ITMAT 2018 Symposium - A Sense of Momentum; Translational Science Comes of Age at Smilow Research Center, University of Pennsylvania, Philadelphia. 15–16 October, 2018.
- ECOAS - 2018 at Texas Christian University. 13–14 October, 2018.
- Conference on Intelligent Systems for Molecular Biology (ISMB) - 2018 at Hyatt Regency, Chicago. 6–10 July, 2018.
- Pacific Symposium for Biocomputing - 2018 at Fairmont Orchid, the Big Island of Hawaii. 3–7 January, 2018.
- ITMAT 2017 Symposium : Structures, Technologies and Discoveries in Translational Science at Smilow Research Center, University of Pennsylvania, Philadelphia. 16–17 October, 2017.

- AMS Fall Southeastern Sectional Meeting, University of Central Florida, Orlando. 23–24 September, 2017.
- COSy - 2017 at Lakehead University. 29 May – 1 June, 2017.
- Penn Symposium on Mathematical and Computational Biology at University of Pennsylvania, Philadelphia. 22–23 May, 2017.
- Noncommutative Geometry and Operator Algebras (NCGOA) Spring Institute at University of Bonn. 17–25 May, 2016.
- CBMS conference at University of Wyoming, Laramie. 8–12 June, 2015.
- RMMC Summer School at University of Wyoming, Laramie. 1–5 June, 2015.
- Great Plains Operator Theory Symposium (GPOTS) - 2015 at Purdue University, West Lafayette. 26–30 May, 2015.
- Classification Of C*-Algebras, Flow Equivalence of Shift Spaces, And Graph and Leavitt Path Algebras at University of Louisiana, Lafayette. 11–15 May, 2015.
- Lecture Series on Quantum Groups by Dr. Moritz Weber at the Institute of Mathematical Sciences, Chennai. 5–24 Jan, 2015.
- 2013 CNA Summer School: Topics in Nonlinear PDEs and Calculus of Variations, and Applications in Materials Science, at CMU, Pittsburgh. 29 May – 7 June, 2013.
- NCGOA - 2013 at Vanderbilt University, Nashville. 3–9 May, 2013.
- Riviere-Fabes Symposium at University of Minnesota, Twin Cities. 19–21 April, 2013.
- 3rd Ohio River Analysis Meeting at University of Cincinnati. 9–10 March, 2013.

Talks

Contributed Talks

- *Northeastern Analysis Meeting* (20 October, 2018), SUNY, New Paltz.
- *AMS Fall Southeastern Sectional Meeting* (23 September, 2017), University of Central Florida, Orlando.
- *Canadian Operator Algebras Symposium* (30 May, 2017), Lakehead University, Thunder Bay.
- *RMMC Summer School* (2 June, 2015), University of Wyoming, Laramie.
- *Great Plains Operator Theory Symposium* (27 May, 2015), Purdue University, West Lafayette.

Colloquia and Seminar Talks

- *Inverse Problems and Analysis Seminar* (12 November, 2019) University of Delaware, Newark.
- (29 June, 2018) Chennai Mathematical Institute, Chennai.
- (28 June, 2018) Indian Statistical Institute, Bangalore Centre.
- (27 June, 2018) Indian Institute of Science, Bangalore.
- *Analysis Seminar* (7 June, 2018) Indian Statistical Institute, Kolkata.
- *SOPM - 2017* (24 June, 2017) NISER, Jatni, Bhubaneswar.
- *Analysis Seminar* (14 April, 2017) Drexel University, Philadelphia.