

## Soumyashant Nayak

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**Postdoctoral Affiliation** *Postdoctoral Researcher in Bioinformatics* at ITMAT, Smilow Center for Translational Research in the **Perelman School of Medicine, University of Pennsylvania**. (September 2016 - present)  
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, Representation Theory, Statistical Methods in Bioinformatics, Systems Biology

**Awards and Honors**

- Benjamin Franklin Fellowship - University of Pennsylvania, 2011 - 2016.
- KVPY fellowship , 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
- 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 at Chiang Mai, Thailand
- Bronze Medal in International Astronomy Olympiad (IAO) 2006 held at Mumbai, India
- Silver Medal in International Astronomy Olympiad (IAO) 2005 held at Beijing, China
- NTSE scholarship, NCERT, 2006 (declined).
- Placed among top 1% in National Standard Examination in Physics 2007

**Publications and Preprints** *Mathematics :*

1. **S. Nayak**; *The Hadamard Determinant Inequality - Extensions to Operators on a Hilbert Space*, J. Funct. Anal., Vol. 274, Issue 10 (May 2018), pp 2978–3002.  
[DOI:10.1016/j.jfa.2017.10.009], [arXiv:1704.05421]
2. M. Gaál, **S. Nayak**; *On a class of determinant preserving maps for finite von Neumann algebras*, J. Math. Anal. Appl, Vol. 464, Issue 1 (August 2018), pp 317–327.  
[DOI:10.1016/j.jmaa.2018.04.006] [arXiv:1711.08786]

3. **S. Nayak**; *Jensen's inequality in finite subdiagonal algebras*, Bulletin of the London Mathematical Society (published online - September 2018).  
[DOI:10.1112/blms.12208], [arXiv:1807.11652]
4. **S. Nayak**; *The Douglas Lemma for von Neumann Algebras and Some Applications* (submitted, 16 pp).  
[arXiv:1707.04378]
5. **S. Nayak**; *A framework for rank identities - With a view towards operator algebras* (submitted, 32 pp).  
[arXiv:1801.08072]
6. **S. Nayak**; *Matrix algebras over algebras of unbounded operators* (in preparation).

*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.  
[DOI:10.1016/j.biocel.2017.08.014]
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) to maintain clock function and circadian behavior in Drosophila*, eLife 2018;7:e39821.  
[DOI:10.7554/eLife.39821]
4. **Soumyashant Nayak**, Nicholas Lahens, Eun Ji Kim, Emanuela Ricciotti, George Paschos, Sarah Tiskoff, Dimitra Sarantopoulou, Shaon Sengupta, Barry Cooperman, Tilo Grosser, Gregory Grant; *Iso-relevance functions - A systematic approach to ranking genomic features by differential effect size* (submitted).  
[bioRxiv preprint:doi:10.1101/381814 ]
5. Shaon Sengupta, Soon Yew Tang, Jill Devine, **Soumyashant Nayak**, Shirley Zhang, Alex Valenzuela, Carolina B Lopez, Gregory Grant, Garret A FitzGerald; *Circadian control of lung inflammation in influenza infection* (submitted).  
[bioRxiv preprint:doi:10.1101/381814 ]
6. A tool enabling queries for investigation of latent associations - **Soumyashant Nayak**, Gregory Grant (in preparation).

**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

- NEAM - 2018 at SUNY, New Paltz. 19–21 October, 2018.
- ITMAT 2017 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*

- (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.