

Nithin Nagaraj

CONTACT INFORMATION	#203-A, 2nd Floor Divya MSR Gateway Apts. Near Mathikere Flyover Gokula, Bengaluru 560054	Phone (mobile): 09663861742 E-mail: nithin.nagaraj@gmail.com nithin@alum.rpi.edu URL: https://sites.google.com/site/nithinnagaraj2/
PERSONAL INFO.	Age: 37 years (Date of Birth: 16 Nov. 1977). Nationality: INDIA.	
OBJECTIVE	A career oriented towards inter-disciplinary research where I can utilize my mathematical abilities & creativity to address challenging problems in the areas of Consciousness Studies, Cognition & Complex systems.	
CURRENT AFFILIATION	Assistant Professor , Consciousness Studies Programme, School of Humanities, National Institute of Advanced Studies (NIAS), Indian Institute of Science Campus, Bengaluru.	Oct'15–Current
EDUCATION	Ph. D. (January 2010) National Institute of Advanced Studies (NIAS) , IISc Campus, Bangalore, INDIA Thesis – “ Novel applications of Chaos Theory to Coding and Cryptography ”. Thesis Advisor: Prof. Prabhakar G. Vaidya (Email: pgvaidya@nias.iisc.ernet.in).	Jan'05–July'08
	Master of Science (Electrical Engineering, 2001) Rensselaer Polytechnic Institute , Troy, NY, USA Thesis – “ Motion-SPECK: A Set Partitioned Embedded Moving Color Picture Coder ”. Thesis Advisor: Prof. William A. Pearlman (Email: pearlman@ecse.rpi.edu).	Aug'99–May'01
	Bachelor of Engineering (Electrical and Electronics Engineering, 1999) National Institute of Technology, Karnataka (NITK) , INDIA Undergraduate Project: “ Spectral Analysis on the TI- TMS320C50 Digital Signal Processor ”. Project Guide: Dr. A. R. Beig.	July'95–July'99
ACADEMIC POSITIONS HELD	Assistant Professor , Dept. of Electronics and Communications, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Amritapuri Campus, Clappana P.O., Kollam, Kerala - 690525.	Dec'08–Aug'13
	Adjunct Faculty , School of Natural Sciences and Engg., National Institute of Advanced Studies, Indian Institute of Science Campus, Bangalore.	Aug'12–Aug'13
	(Visiting) Post-doctoral Fellow , City University of Hong Kong, HK	June'11–August'11
	Visiting Faculty (Mathematics) , IISER, Pune	August'08 – Nov'08
	Visiting Scholar , Institute of Mathematical Sciences, Chennai	May'08 – July'08
	Research Assistant , Center for Image Processing Research lab, RPI, NY, USA	Sep'99 – May'00
	Teaching Assistant , Department of ECSE, RPI, NY, USA	Sep'99 – May'01
INDUSTRY RESEARCH EXPERIENCE	Lead Scientist , Biomedical Signal Analysis Lab, Diagnostics Imaging & Biomedical Technologies, GE Global Research, Bengaluru	Sep'13–Sep'15
	Research Scientist , Imaging Technologies lab, GE Global Research, Bengaluru	July'01 – Dec'04

RESEARCH
ACHIEVEMENTS

Published in international journals such as CHAOS-AIP (impact factor = 2.051), CNSNS-Elsevier (2.806), IEEE Trans. on Cir. & Sys. for Video Tech. (1.649), EPJ-ST (1.562), IJBC etc. with **total citations exceeding 500** and **h-index=9**. Papers in 30+ national and international conferences, 30+ invited talks at various forums. Co-inventor of **7 U.S. patents (2 granted)** while working at GE Global Research, Bangalore.

COURSES
TAUGHT

Signals and Systems, Digital Signal Processing, Wavelet-based Signal Processing and Applications, Linear Algebra and Probability, Cryptography, Information Theory and Coding Techniques. Consistently scored > 95% in teaching evaluations (both Bachelors and Masters level).

JOURNAL
PUBLICATIONS

1. Karthi Balasubramanian, Silpa S Nair, **Nithin Nagaraj**, *Classification of periodic, chaotic and random sequences using approximate entropy and Lempel-Ziv complexity measures*, Pramana - Journal of Physics, Indian Academy of Sciences, Vol. 84, Issue 3, pp. 365–372, Feb. 2015.
2. **Nithin Nagaraj**, Karthi Balasubramanian, Sutirth Dey, *A New Complexity Measure For Time Series Analysis and Classification*, European Physics Journal - Special Topics, 222, pp. 847 – 860, 2013.
3. **Nithin Nagaraj**, *One-Time Pad as a Nonlinear Dynamical System*, Communications in Nonlinear Science and Numerical Simulation, Vol. 17, No. 11, pp. 4029 – 4036, Nov. 2012.
4. **Nithin Nagaraj**, *Huffman Coding as a Nonlinear Dynamical System*, International Journal of Bifurcation and Chaos, Vol. 21, No. 6, pp. 1727 – 1736, 2011.
5. Sahasranand K. R., **Nithin Nagaraj**, Rajan S, *How not to share a set of secrets*, International Journal of Computer Science and Information Security, Vol. 8, No. 1, pp. 234 – 237, Apr. 2010.
6. Prabhakar G. Vaidya, Sajini Anand P. S., **Nithin Nagaraj**, *A Nonlinear Generalization of Singular Value Decomposition and Its Application to Mathematical Modeling and Chaotic Cryptanalysis*, Acta Applicandae Mathematicae, Vol. 112, No. 2, pp. 205 – 221 (Published Online on 23 Jan. 2010).
7. **Nithin Nagaraj**, Prabhakar G. Vaidya, *Multiplexing of Discrete Chaotic Signals in Presence of Noise*, Chaos: An Interdisciplinary Journal of Nonlinear Science, Vol. 19, pp. 033102, Jul. 2009.
8. **Nithin Nagaraj**, *A Dynamical Systems Proof of Kraft-McMillan Inequality and Its Converse for Prefix-free Codes*, Chaos: An Interdisciplinary Journal of Non-linear Science, Vol. 19, pp. 013136, Mar. 2009. (This published paper was also selected for online publication by Virtual Journal of Quantum Information, Vol. 9, No. 4, Apr. 2009).
9. **Nithin Nagaraj**, Prabhakar G. Vaidya, Kishor G. Bhat, *Arithmetic Coding as a Non-linear Dynamical System*, Communications in Non-linear Science and Numerical Simulation, Vol. 14, No. 4, pp. 1013 – 1020, Apr. 2009.
10. **Nithin Nagaraj**, Mahesh C. Shastry, Prabhakar G. Vaidya, *Increasing Average Period Lengths by Switching of Robust Chaos Maps in Finite Precision*, European Physics Journal Special Topics, Vol. 165, pp. 73 – 83, 2008.
11. **Nithin Nagaraj**, Vivek Vaidya, and Prabhakar G. Vaidya, *Re-visiting the One-Time Pad*, International Journal of Network Security, Vol. 6, No. 1, pp. 94 – 102, Jan. 2008.
12. William A. Pearlman, Asad Islam, **Nithin Nagaraj**, and Amir Said, *Efficient, Low-Complexity Image Coding with a Set-Partitioning Embedded Block Coder*, IEEE Trans. Circuits and Systems for Video Technology, Vol. 14, pp. 1219 – 1235, Nov. 2004.

CITATIONS

500+ h-index = 9.

US PATENTS
(GRANTED)

1. **Nithin Nagaraj**, Srikanth Suryanarayanan, *Graph extraction labelling and visualization*, US PAT# 7,719,533, issued on 18 May 2010.
2. Srikanth Suryanarayanan, Rakesh Mullick, Yogisha Mallya, Vidya P Kamath, **Nithin Nagaraj**, *Method and apparatus for segmenting structure in CT angiography*, US PAT# 7,676,257, issued on 9 March 2010.

HONORS /
AWARDS /
FELLOWSHIPS /
GRANTS

- DST Young Scientist Grant for 3 years (offered in 2013 with a total amount of Rs. 21 Lakhs, declined owing to personal reasons).
- Rapid Grant for Young Investigators (RGYI), Dept. of Biotechnology (DBT), Ministry of Science and Tech., Govt. of India (2010–2013) Amount = 26 Lakhs (approx.).
- Certificate of Appreciation for contribution to research at Amrita University for four consecutive years (2009 - 2013).
- NIAS PhD fellowship sponsored by Department of Science & Technology (DST), Govt. of India, Jan. 2005 - July 2008.
- Invited by Department of Mathematics, University of Sains Malaysia (USM) to deliver a short course “**Chaos and Cryptography**” jointly with Prof. Prabhakar G. Vaidya, April 13-15, 2011.
- Department of Science & Technology, Govt. of India **foreign travel grant** (2007).
- Council of Scientific and Industrial Research, Govt. of India **foreign travel grant** (2007).
- **Team Excellence award**, GE Global Research (2002).
- **Bronze patent medal**, GE Global Research (2002).
- **Six Sigma Green Belt certification**, GE Global Research (2001).
- **Graduate Assistantship**, Department of ECSE, Rensselaer Polytechnic Institute (1999–2001).
- NITK (formerly KREC, Surathkal) **Merit Scholarship** for academic excellence for all years of undergraduate study (1995 - 1999).

PROFESSIONAL
ACTIVITIES
& MISC.

- Reviewer for the following International Journals: IEEE Transactions on Image Processing, CHAOS (AIP), European Physics Journal (EPJ), CNSNS (Elsevier), Acta Applicandae Mathematicae, Intl. Journal of Imaging (IJI), EURASIP Journal of Information Security, Journal of Information Sciences (Elsevier), International Journal of Bifurcations and Chaos (IJBC), IEEE Transactions on Information Forensics & Security, Computers and Mathematics with Applications (Elsevier), The Journal of Franklin Institute, Mathematical Problems in Engineering (MPE), Journal of Theoretical Biology (JTB).
- 30+ invited talks at various national/international forums.

ERDÖS NUMBER

3

(Erdős → K. Ramachandra → Prabhakar G. Vaidya → Nithin Nagaraj).

CONFERENCE
PROCEEDINGS,
PRESENTATIONS,
POSTERS

1. Karthi Balasubramanian, **Nithin Nagaraj**, *Automatic Identification of Devanagari Script Texts using Complexity based Measures*, oral presentation at Conf. on Nonlinear Sys. and Dynamics (CNSD), IISER Mohali, March 13-15 2015.
2. **Nithin Nagaraj**, KW Wong, KN Sriram, *Master-Slave Coupled Chaotic Synchronization based Robust Source Coding*, poster presented at International Conference on Perspectives in Non-Linear Dynamics (PNLD 2013), Univ. of Hyderabad, July 15-18, 2013.
3. Karthi Balasubramanian, **Nithin Nagaraj**, *Comparative Analysis of Lempel-Ziv and ETC Complexity Measures*, International Conference on Perspectives in Non-Linear Dynamics (PNLD 2013), Univ. of Hyderabad, July 15-18, 2013.

4. **Nithin Nagaraj**, *When Information Meets Chaos: Applications of Symbolic Dynamics*, invited talk at Mini-Symposia on Time Series Analysis and Fractals, National Conference on Nonlinear Systems and Dynamics (NCNSD 2012), IISER Pune, 14 July, 2012.
5. Karthi Balasubramanian, Gayathri R Prabhu, Lakshmipriya VK, Maneesha Krishnan, Praveena R, **Nithin Nagaraj**, *Classification of Periodic, Chaotic and Random Sequences using NSRPS Complexity Measure*, National Conference on Nonlinear Systems and Dynamics (NCNSD 2012), 12 - 15 July, 2012.
6. Remya Ajai A.S., **Nithin Nagaraj**, *A Novel Methodology for Memory Reduction in Distributed Arithmetic Based Discrete Wavelet Transform*, *Procedia Engineering* Vol. 30 (2012) 226 – 233. This paper was presented at Intl. Conf. on Comm. Tech. and System Design (ICCSTD 2011), Amrita Vishwa Vidyapeetham, Ettimadai Campus, Coimbatore, December 7-9, 2011.
7. **Nithin Nagaraj**, Mathew Shaji Kavalekalam, Arjun Venugopal T., Nithin Krishnan, *Lossless Compression and Complexity of Chaotic Sequences*, National Conference on Nonlinear Systems and Dynamics (NCNSD-2011), Bharathidasan University, Tiruchirapalli, Tamil Nadu, January 27-30, 2011.
8. **Nithin Nagaraj**, *Exchange Chaotic Synchronization and its Applications to Secure Cryptographic Key Exchange on an Insecure Channel*, International Conference on Perspectives in Non-Linear Dynamics (PNLD), IISc., Bangalore, July 26-29, 2010.
9. **Nithin Nagaraj**, Prabhakar G. Vaidya, *Multiplexing of Discrete Chaotic Signals in the Presence of Noise*, National Conference on Non-linear Systems and Dynamics, Saha Institute of Nuclear Physics, Kolkata, March 5, 2009.
10. **Nithin Nagaraj**, Prabhakar G. Vaidya, *Perfect Secrecy Systems, Lossless Compression and Logic Gates: An unifying theme using Nonlinear Dynamical Systems*, International Conference on Nonlinear Dynamical Systems and Turbulence, IISc., Bangalore, July 17-22 2008.
11. Sajini Anand P.S., **Nithin Nagaraj**, Prabhakar G. Vaidya, *Imprecise Synchronization: A Study*, International Conference on Nonlinear Dynamical Systems and Turbulence, IISc., Bangalore, July 17-22, 2008.
12. **Nithin Nagaraj**, Prabhakar G. Vaidya, *Joint Source Coding, Channel Coding, and Encryption using Nonlinear Dynamical Systems Approach*, Proceedings (Narosa Publishers, New Delhi [2009]) of the Intl. Conf. on Recent Developments in Nonlinear Dynamics, held at the Bharathidasan University, Tiruchirapalli, India during 7-9 , February 2008.
13. **Nithin Nagaraj**, Prabhakar G. Vaidya, *A Non-linear Dynamical Systems Approach to Source Coding*, National Conference on Nonlinear Systems and Dynamics, Jan 3-5, 2008.
14. **Nithin Nagaraj**, Prabhakar G. Vaidya, Rajesh Sundaresan, *A Dynamical Systems Approach to Source Compression for Constrained Sources*, Non-linear Dynamics and Chaos: Advances and Perspectives, 17-21 September 2007, Aberdeen, UK.
15. **Nithin Nagaraj**, Mahesh C. Shastry, Prabhakar G. Vaidya, *Switching of non-linear dynamical systems and its effect on round-off induced periodicity with applications to pseudo-random number generation*, Non-linear Dynamics and Chaos: Advances and Perspectives, 17-21 September 2007, Aberdeen, UK.
16. Nikhil Balaji, **Nithin Nagaraj**, *Cryptanalysis of a Chaotic Encryption Algorithm*, National Conference on Nonlinear Systems and Dynamics, Jan 3-5, 2008.
17. Pavan Tallapragada, **Nithin Nagaraj**, Prabhakar G. Vaidya, *Coding and Decoding Programs using Chaotic Dynamical Systems*, Natl. Conf. on Nonlinear Systems and Dynamics, Jan 3-5, 2008.
18. **Nithin Nagaraj**, Mahesh C. Shastry, Prabhakar G. Vaidya, *Stochastic switching of deterministic chaotic systems on a finite precision computer: Implications to chaos and randomness*, International Conference on Stochastic Applications, IISc., Bangalore, July 2007.
19. Prabhakar G. Vaidya, Sajini Anand P.S., **Nithin Nagaraj**, *A Non-linear Generalization of Singular Value Decomposition and its Application to Cryptanalysis*, International Instructional workshop / conference on Applied Multi-variate data Analysis with Applications to Life, Social and Environmental Science, Hyderabad, Jan 16-20, 2008.

20. Prabhakar G. Vaidya, **Nithin Nagaraj**, *Foundational issues of Chaos and Randomness: God or Devil, Do We Have a Choice?*, In: Proceedings of Foundations of Sciences. Project of History of Indian Science, Philosophy and Culture (PHISPC), editor BV Sreekantan, New Delhi, pp. 1 – 17, 2006.
21. **Nithin Nagaraj**, Prabhakar G. Vaidya, Kishor G. Bhat, *Joint Arithmetic Coding and Encryption using Chaotic Maps*, National Conference on Mathematical Foundations of Coding, Complexity, Computation and Cryptography, IISc., Bangalore, July 20-22, 2006.
22. Mahesh C. Shastry, **Nithin Nagaraj**, Prabhakar G. Vaidya, *A Generalization of the Logistic Map and its Applications in Generating Pseudo-Random Numbers*, International Conf. on Mathematical Modelling and Computer Simulation, LNMIIT, Jaipur, December 12-15, 2006.
23. **Nithin Nagaraj**, Shekhar Dwivedi, *CxCx: Compressed Connected Components Labeling Algorithm*, Proceedings Proceedings of SPIE Medical Imaging 2007: Image Processing, vol. 6512, pp. 65123M, March 2007.
24. Prabhakar G. Vaidya, **Nithin Nagaraj**, Sajini Anand, *Topological Derivatives and other Embeddings for Ocean Floor Tsunami Data*, poster presented at International Conference on Tsunami & Non-linear Waves, Saha Institute of Nuclear Physics, Salt Lake, Calcutta, India, March 6-10, 2006.
25. **Nithin Nagaraj**, Yogisha Mallya, *On the Use of Lossless Integer Wavelet Transforms in Medical Image Segmentation*, Proceedings of SPIE Medical Imaging 2005: Image Processing, vol. 5747, pp. 1913 – 1924, April 2005.
26. Girish Gopalakrishnan, Tim Poston, **Nithin Nagaraj**, Rakesh Mullick, Jerome Knoploch, *Implicit Function-based Phantoms for Evaluation of Registration Algorithms*, Proceedings of SPIE Medical Imaging 2005: Image Processing, vol. 5747, pp. 1310 – 1316, April 2005.
27. Srikanth Suryanarayanan, Rakesh Mullick, Yogish Mallya, Vidya Kamath, **Nithin Nagaraj**, *Automatic Partitioning of Head CTA for Enabling Segmentation*, Proceedings of SPIE Medical Imaging 2004: Image Processing, vol. 5370, pp. 410 – 419, May 2004.
28. **Nithin Nagaraj**, William A. Pearlman, Asad Islam, *Block Based Embedded Color Image and Video Coding*, Proceedings of SPIE Visual Communications and Image Processing: Multimedia Technologies for Embedded Systems, vol. 5308, pp. 264 – 275, January 2004.
29. **Nithin Nagaraj**, Sudipta Mukhopadhyay, Frederick Wheeler, Ricardo. S. Avila, *Region of Interest and Windowing Based Progressive Image Transmission Using JPEG2000*, Proceedings of SPIE Medical Imaging 2003: PACS and Integrated Medical Information Systems, vol. 5747, pp. 382 – 391, May 2003.
30. **Nithin Nagaraj**, *A Very Low-Complexity Multi-resolution Prediction-based Wavelet Transform Method for Medical Image Compression*, proceedings of the IEEE: TENCON Conference on Convergent Technologies for Asia-Pacific Region, vol. 2, pp. 525 – 528, October 2003.
31. **Nithin Nagaraj**, Rakesh Mullick, *Zero-Distortion Lossless Data Embedding*, Proceedings of SPIE Medical Imaging 2004: Image Processing, vol. 5370, pp. 1906 – 1913, April 2004.
32. S. V. Bharath Kumar, **Nithin Nagaraj**, Sudipta Mukhopadhyay, Xiaofeng Xu, *Block-based Conditional Entropy Coding for Medical Image Compression*, Proceedings of SPIE Medical Imaging 2003: Image Processing, vol. 5033, pp. 375 – 381, May 2003.
33. Sudipta Mukhopadhyay, **Nithin Nagaraj**, Xiaofeng Xu, Frederick W. Wheeler, Saad Sirohey, Robert Sigal, *TruRez: A FastWavelet-based Multi-resolution Image Compression Scheme for Medical Images*, in-foRAD presentation, Radiological Society of North America (RSNA) 2002, Illinois, USA.