Satyadev Nandakumar

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CURRENT POSITION

Assistant Professor, Department of Computer Science, IIT Kanpur. June 2010 – Present.

EDUCATION

- Ph.D. in Computer Science, Iowa State University, Ames, IA, USA, December 2009. Title of Dissertation: *Dynamics, Measure and Dimension in the Theory of Computing.* GPA – 4.0/4.0 (Advisor – Dr. Jack Lutz)
- M.S. in Computer Science, Iowa State University, Ames, IA, USA, December 2003. GPA –4.0/4.0 (Advisor – Dr. Suresh C. Kothari)
- B.Tech (Bachelor of Technology) in Computer Science and Engineering from Regional Engineering College, Calicut, India, June 2000, first class with distinction.

RESEARCH AREAS

- Algorithmic Information Theory, Kolmogorov complexity, and effective fractal dimension.
- Effective symbolic measure-theoretic and topological dynamical systems
- Normal numbers, continued fractions, finite-state dimension.
- Computability and complexity in analysis
- Computational complexity theory, pseudorandomness.

RESEARCH FUNDING

- DST SERB Young Scientist, 2014-2017.
- Initiation grant from IIT Kanpur, 2010-2012.

INVITED LECTURES

- Aspects of Computation, Institute of Mathematical Sciences, National University of Singapore, August 2017.
- Banff International Research Centre-Casa Mátematica Oaxaca. Workshop on Effective Symbolic Dynamics, Oaxaca, Mexico, December 2016.
- Conference on Computability, Complexity and Randomness, Honolulu, Hawaii, USA, January 2016.
- Asian Logic Conference, Mumbai, January 2015.
- NII Shonan workshop on Algorithmic Information Theory, Shonan, Japan, September 2014.
- ARA workshop on Algorithmic Randomness and Analysis, Gotemba, Japan, September 2014.

INVITED WORKSHOPS

- MFO, Computability Theory, Oberwolfach, January 2018.
- Erwin Schrödinger Institute workshop on Normal Numbers, Vienna, November 2016.
- Dagstuhl workshop on Algorithmic Information Theory, Schloss Dagstuhl, January 2012.

SPONSORED RESEARCH VISITS

- Nanyang Technological University, Singapore, June 2016. (Host: Dr. Keng-Meng Ng, Department of Mathematics, NTU)
- Victoria University Wellington and University of Auckland, New Zealand, January-April 2015. (Hosts: Dr. Rod Downey, Department of Mathematics, VUW and Dr. André Nies, Department of Computer Science, University of Auckland)
- IMS Singapore, National University of Singapore, June 2014. (Host: Dr. Yang Yue, Department of Mathematics, NUS).

Ph. D DEGREES SUPERVISED

- Diptarka Chakraborty (co-supervised with Manindra Agrawal, 2012-2016), now Postdoctoral Fellow, Charles University, Prague, Czech Republic.

POSTGRADUATE (M.Tech/M.S.) THESES SUPERVISED

- 24 students supervised (2 co-supervised) in the Department of Computer Science and Engineering, and 1 M.S. student co-supervised in the Department of Mathematics, IIT Kanpur.

UNDERGRADUATE RESEARCH SUPERVISION

- 12 undergraduate B. Tech theses supervised, 3 SURGE projects, including two best SURGE project winners.

CONFERENCE PROGRAM COMMITTEES AND EDITORSHIPS

- Program Committee Co-chair: Conference on Computability, Complexity and Randomness (CCR) , 2017
- Guest Editor, Theory of Computing Systems, Special Issue for CCR 2017.
- Program Committee Member for Indian Conference on Logic and its Applications (ICLA) 2017.

TEACHING

- New Courses developed:
  - CS 687: Algorithmic Information Theory
  - CS 698D: Special Topics in Data Compression.
- Other Postgraduate courses taught:
  - CS 744: Pseudorandom Generators
- Computer Science Undergraduate Core Courses taught:
  - Esc101 : Fundamentals of Computing. 2013 (instructor), Summer 2014 (co-instructor), Summer 2015 (co-instructor).
  - CS 350: Principles of Programming Languages (2011, 2012, 2014, 2015)
  - CS 202A: Computer Science Laboratory II (2016)
  - CS 330: Operating Systems (Summer 2012)
- Courses taught in other departments:
  - Math 404A: Analysis II (2017)

PROFESSIONAL HONORS

- Department of CSE, IIT Kanpur ACA Best Faculty Award by the graduating batch of 2014.

OUTREACH

- Taught the NPTEL MOOC on "Introduction to Programming in C" in
  - 2014 (Enrolment: about 39,000 students) and
  - in 2015 (co-taught with Prof. Amey Karkare. Enrolment: about 20,000 students).
- Organization of the National Programming Aptitude Test (NPAT), with NPTEL and Google

India.

OTHER PROFESSIONAL SERVICE

- Journals Refereed – Theoretical Computer Science, Information and Computation.
- Conferences Refereed – ICALP, FSTTCS, STOC, STACS.

INSTITUTE SERVICE

- Warden of Hall 2 (May 2014-present)
- Admissions-in-charge, Department of Computer Science and Engineering, 2012-2014.

INDUSTRY EXPERIENCE

- Source Allies Inc., Des Moines, Iowa, USA, January 2010 to March 2010 as Software Engineering apprentice.
- Sasken Communications Technologies Ltd., Bangalore, India, July 2000 to August 2001 as Software Engineer

ACADEMIC HONORS

- Teaching Excellence Award, Sp. 2004, Iowa State University.
- Stood second overall in class for the undergraduate course in Computer Science, Regional Engineering College, Calicut.
- National Talent Search Examination Scholarship, 1994, awarded to less than 1000 students annually, all over India
- Ranked eighth in the Secondary School Leaving Exam (conducted by the Govt. of Kerala State, India), 1994. More than half a million students appeared for this examination.

PUBLICATIONS

CONFERENCE PUBLICATIONS

1. On Resource-Bounded van Lambalgen's Theorems (joint work with Diptarka Chakraborty and Himanshu Shukla), *14th Annual Conference on Theory and Applications of Models of Computation*, Bern 2017.

2. Dimension, Pseudorandomness and Extraction of Pseudorandomness (joint work with Manindra Agrawal, Diptarka Chakraborty and Debarati Das), *35th Foundations of Software Technology and Theoretical Computer Science,* Bangalore 2015.
3. Multiple Recurrence and Algorithmic Randomness (joint work with Rodney G. Downey and André Nies), *10th International Conference on Computability and Randomness,* Heidelberg, Germany, 2015.
4. Ornstein Isomorphism and Algorithmic Randomness (joint work with Mrinalkanti Ghosh and Atanu Pal), *9th International Conference on Computability and Randomness, Singapore, 2014.*
5. Normality and Finite State Dimension (with Santosh Vangapelli), *8thInternational Conference on Computability, Complexity and Randomness (CCR),*(Moscow, Russia, 2013)
6. Predictive Complexity and Generalized Entropy of Stationary Ergodic Games (with Mrinalkanti Ghosh), *23rd International Conference on Algorithmic Learning Theory (ALT)*, (Lyons, France, 2012).
7. Axiomatizing Resource Bounded Measure (with Xiaoyang Gu, Jack Lutz and James S. Royer), *7th Annual Conference on Computabilty in Europe (CiE)*, (Sofia, Bulgaria, 2011).

8. An Effective Ergodic Theorem and Some Applications, *40th ACM Annual Symposium on Theory of Computing*, (Victoria, Canada, May 2008).
9. A Characterization of Constructive Dimension, *Computability and Complexity in Analysis*, (Siena, Italy, July 2007).
10. Finite State Dimension and Real Arithmetic (with David Doty and Jack Lutz), *Proceedings of the Thirty-Third International Colloquium on Automata, Languages, and Programming* (Venice, Italy, July 9-16, 2006), Springer-Verlag, 2006, pp. 537-547.

JOURNAL PUBLICATIONS

1. Martin-Löf randomness implies multiple recurrence in effectively closed sets, (joint work with Rod Downey and André Nies), *Notre Dame of Formal Logic*, (accepted for publication.)
2. Dimension, Pseudorandomness and Extraction of Pseudorandomness (joint work with Manindra Agrawal, Diptarka Chakraborty and Debarati Das), *Computability (preprint 2016).*
3. Normality and Finite-State Dimension of Liouville Numbers (joint work with Santosh Kumar Vangepalli.) *Special Issue for CCR 2013, Theory of Computing Systems, 58 (3) 392-402, 2015.*
4. Finite State Dimension and Real Arithmetic (with David Doty and Jack Lutz), *Information and Computation*, 205 (207), pp. 1640-1651, 2007.
5. A New Characterization of Constructive Dimension, *Mathematical Logic Quarterly*, 55(3), 271-286, 2009.

WORKSHOP PUBLICATIONS

1. Axiomitizing Resource-Bounded Measure, (with Xiaoyang Gu, Jack Lutz and Jim Royer), *Logic in Computational Complexity*, Los Angeles, CA, August 2009.

ARTICLES UNDER REVIEW

1. A weak-2 generic which bounds a minimal degree, (joint work with Rod Downey)
2. On Resource-Bounded van Lambalgen's Theorems (joint work with Diptarka Chakraborty and Himanshu Shukla)

REFERENCES

Available upon request.