

Swaprava Nath

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Academic Employment

- Lecturer-cum-Post Doctoral Fellow 2013 - till date
Indian Statistical Institute, New Delhi, India
Research: *Mechanism Design Theory*

Education

- Doctor of Philosophy (Ph.D.) in Computer Science 2013
Indian Institute of Science, Bangalore, India
Research: *Mechanism Design for Strategic Crowdsourcing*
Thesis Supervisor: Prof. Y. Narahari
- Master of Engineering (M.E.) in Telecommunication 2008
Indian Institute of Science, Bangalore, India
CGPA: 7.2 out of 8.0
Research: *Self Organization in Wireless Sensor Networks*
Research Supervisor: Prof. Anurag Kumar
- Bachelor of Engineering (B.E.) in Electronics & Telecommunication 2006
Jadavpur University, Kolkata, India
CGPA: 9.34 out of 10
Final year project: *Analysis of Time Modulated Linear Antenna Array*

Awards and Achievements

- Received **Fulbright-Nehru Postdoctoral Fellowship** for research in Internet Economics, 2015. I will be working with **Dr. Ariel Procaccia** at the **Carnegie Mellon University**.
- Received **Honorable Mention Award** in Yahoo! Key Scientific Challenges Program, 2012.
- Selected for a research internship at *Harvard School of Engineering and Applied Sciences* during Fall 2011. I worked with **Prof. David C. Parkes**.
- Received the **Tata Consultancy Services PhD Fellowship** for 2010.
- Awarded **Intern Day Prize** for the presentation on Intern Day, August 30, 2010, at Xerox Research Centre Europe, Grenoble, France.
- Graduate Aptitude Test in Engineering (GATE, Entrance test for graduate studies in Engineering) 2006: **All India Rank 34** out of approximately 40,000 candidates in Electronics and Communication stream.
- **Bronze medal** for securing the second highest aggregate of marks among all the courses of the Bachelor of Engineering Examination 2006, Jadavpur University, Kolkata, India, out of approximately 800 students in 13 departments.
- State Level Joint Entrance Examination (WBJEE, Entrance test for undergraduate studies in Engineering) 2002: **Rank 25 (Engineering)** out of approximately 80,000 candidates.
- 10+2 Level School Leaving Examination (WBHS, Combined Test on Physics, Chemistry, Mathematics, Biology, and Languages) 2002: **Rank 28** out of approximately 1,20,000 candidates.

Research Focus

My research interest is in the broad area of *Internet economics*. In particular, I work on the theory and applications of microeconomics that actively involve computational science and the World Wide Web as a method of implementation. My research provides solutions to combat the strategic behavior of the individuals in these applications, and uses game theory and mechanism design as the solution tools. My Ph.D. thesis has considered one such application, namely *crowdsourcing*, and provided solutions to several important questions in different aspects of crowdsourcing. Apart from this, my research interest includes theoretical mechanism design, social network analysis, learning theory, and data-driven social behavior understanding.

Publications

Working Paper(s):

W1: "Mechanism Design with Quasi-linear Preferences on Additively Separable Domains", with Debasis Mishra and Souvik Roy. Technical Report, 2015.

Journal:

- J1: "Dynamic Mechanism Design with Interdependent Valuations", with Onno Zoeter, Y. Narahari, and Chris Dance. To appear, in **Review of Economic Design**.
- J2: "Affine Maximizers in Domains with Selfish Valuations", with Arunava Sen. To appear, in **ACM Transactions on Economics and Computation**.
- J3: "A Strict Ex-post Incentive Compatible Mechanism for Interdependent Valuations", with Onno Zoeter. **Economics Letters**, Volume 121, Issue 2, November 2013, Pages 321-325.
- J4: "Theory and Algorithms for Hop-Count-Based Localization with Random Geometric Graph Models of Dense Sensor Networks", with Venkatesan N. E., Anurag Kumar, and P. Vijay Kumar. In **ACM Transactions on Sensor Networks (TOSN)**, Volume 8, Issue 4, September 2012.

Conference:

- C1: "Productive Output in Hierarchical Crowdsourcing", with Balakrishnan Narayanaswamy. In Proceedings, **Autonomous Agents and Multi-Agent Systems (AAMAS)**, May 5-9, 2014, Paris, France.
- C2: "A Quality Assuring Mechanism for Crowdsourcing with Strategic Agents", with Satyanath Bhat, Onno Zoeter, Sujit Gujar, Y. Narahari, and Chris Dance. In Proceedings, **Autonomous Agents and Multi-Agent Systems (AAMAS)**, May 5-9, 2014, Paris, France.
- C3: "Mechanism Design for Time Critical and Cost Critical Task Execution via Crowdsourcing", with Pankaj Dayama, Dinesh Garg, Y. Narahari, and James Zou. In Proceedings, **Workshop on Internet and Network Economics (WINE)**, December 9-12, 2012, Liverpool, UK.
An early version of this paper has been presented in:
11th Meeting of Society for Social Choice and Welfare (SSCW), August 17-20, 2012, New Delhi, India.
- C4: "Threats and Trade-offs in Resource Critical Crowdsourcing Tasks over Networks", with Pankaj Dayama, Dinesh Garg, Y. Narahari, and James Zou. Student abstract, in Proceedings, **Conference of the Association for Advancement Artificial Intelligence (AAAI)**, July 22-26, 2012, Toronto, Canada.
- C5: "Dynamic Mechanism Design for Markets with Strategic Resources", with Onno Zoeter, Y. Narahari, and Chris Dance. In Proceedings, **Conference on Uncertainty in Artificial Intelligence (UAI)**, July 14-17, 2011, Barcelona, SPAIN.
- C6: "Dynamic Learning-based Mechanism Design for Dependent Valued Exchange Economies". PhD proposal, in Proceedings, **World Wide Web (WWW), PhD Symposium Track**, ACM, March 28 - April 1, 2011, Hyderabad, INDIA.
- C7: "Performance Evaluation of Distance-Hop Proportionality on Geometric Graph Models of Dense Sensor Networks", with Anurag Kumar. In Proceedings, **International Conference on Performance EVALUATION METHODOLOGIES and TOOLS (VALUETOOLS)**, ACM, October 21-23, 2008, Athens, GREECE.

C8: “Linear Antenna Array with Suppressed Sidelobe and Sideband Levels using Time Modulation”, with Subrata Mitra. In International Conference On Computers And Devices For Communication (CODEC), December 2006, Kolkata, INDIA.

Dissertations

D1: “Mechanism Design for Strategic Crowdsourcing”, PhD Thesis, Indian Institute of Science, Bangalore, December 2013.

Advisor: Y. Narahari

D2: “Self Organisation in Random Geometric Graph models of Wireless Sensor Networks”, Masters Thesis, Indian Institute of Science, Bangalore, June 2008.

Advisor: Anurag Kumar

Unpublished

U1: “Improving Productive Output in Influencer-Influencee Networks”, with Balakrishnan Narayanaswamy. Technical Report, 2013.

U2: “On Profit Sharing and Hierarchies in Organizations”, with Balakrishnan Narayanaswamy, Kundan Kandhway, Bhushan Kotnis, David C. Parkes. Technical Report, 2013.

Presented in the **Asian Meeting of the Econometric Society (AMES)**, Dec 20-22, 2012, New Delhi, India.

Teaching

- **Scientific Computing using Python**, July - November, 2014, at Indian Statistical Institute, Delhi.
- **Mathematical Programming with Applications to Economics**, January - April, 2014, at Indian Statistical Institute, Delhi. (co-taught with Debasis Mishra)

Talks

- ‘Affine Maximizers in Domain with Selfish Valuations’
 - at Indian Statistical Institute, Kolkata, June 17, 2014.
 - at Xerox Research Centre Europe, Meylan, France, May 13, 2014.
 - at ISI-Warwick Workshop in Economics, New Delhi, February 28, 2014.
- ‘Productive Output in Hierarchical Crowdsourcing’
 - at the International conference on AAMAS, Paris, May 7, 2014.
 - at Xerox Research Centre Europe, Meylan, France, May 12, 2014.
- ‘Social Algorithms and Internet Economics’
 - at Department of CSA, Indian Institute of Science, Bangalore, April 25, 2014.
 - at Department of IEOR, Indian Institute of Technology, Bombay, April 21, 2014.
 - at School of TCS, Tata Institute of Fundamental Research, Bombay, April 18, 2014.
- ‘Mechanism Design for Time Critical and Cost Critical Task Execution via Crowdsourcing’
 - at the Workshop on Internet and Network Economics (WINE), University of Liverpool, UK, December 12, 2012.
 - at the meeting of the Society for Social Choice and Welfare, New Delhi, August 20, 2012.
- ‘Stackelberg Voting Games: Computational Aspects and Paradoxes’, class presentation, in Harvard CS 286r, Cambridge, MA, September 28, 2011.
- ‘Learning True Labels from Strategic Labelers’, at Xerox Research Centre Europe, Grenoble, France, August 30, 2010.

Professional Activities

Academic

- Additional reviewer of the *Workshop on Internet and Network Economics (WINE)*, 2012
- Student coordinator of the *Electrical Sciences Divisional Symposium (ESDS) 2013*, an annual symposium for the graduating PhD students of the Electrical Sciences Division of **Indian Institute of Science**.
- Underwent an internship at EconCS, **School of Engineering and Applied Sciences, Harvard University**, September - November, 2011.
Worked on *Incentivizing Mechanisms on Social and Professional Networks*.
- Completed summer internship at **Xerox Research Centre Europe**, Grenoble, France, June - August, 2010. Worked on *Incentive Compatible Learning*.
- Attended Summer School on *Algorithmic Game Theory* in **Max Planck Institut für Informatik**, Saarbrücken, Germany, August 2 - 6, 2010.

Teaching Assistantship

- **Algorithms and Programming** (Undergraduate level, Instructors: Y. Narahari and T. Matthew Jacob)
Indian Institute of Science, Bangalore, August - December, 2012.
- **Game Theory** (Graduate level, Instructor: Y. Narahari)
Indian Institute of Science, Bangalore, January - April, 2010, 2011, 2012, 2013.
- **Linear Algebra** (Graduate level, Instructor: R. Vittal Rao)
Indian Institute of Science, Bangalore, August - December, 2010.
- **Mathematical Foundations for Modern Computing** (Graduate level, Instructor: Ravi Kannan)
Indian Institute of Science, Bangalore, January - April, 2011.

Industry Experience

- Worked as summer intern at **Xerox Research Centre Europe**, Grenoble, France. *June - August, 2010*
- Worked as Software Engineer in **Cisco Systems (India) Private Limited**. *August 2008 - July 2009*

Computer Knowledge

Programming	Python, MATLAB, C
Operating Systems	Linux (Ubuntu, Fedora, Debian, FreeBSD, Solaris), Windows
Typesetting	L ^A T _E X (This CV has been prepared using L ^A T _E X!)
Webhosting	HTML, PHP, Apache

Personal Information

Born:	December 14, 1984	Permanent Address:
Nationality:	Indian	P 28, Basunagar, PO: Madhyamgram Kolkata 700 129, WB, INDIA

References

Y. Narahari

Professor, Department of Computer Science and Automation, Indian Institute of Science, Bangalore.
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Arunava Sen

Professor, Economics and Planning Unit, Indian Statistical Institute, New Delhi.
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David C. Parkes

Harvard College Professor and George F. Colony Professor of Computer Science, School of Engineering and Applied Science, Harvard University.
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