

Debasis Mandal

B23 Atanasoff Hall
Information and Complexity Lab
Department of Computer Science
Iowa State University, Ames, IA 50011, USA

Phone: +1 (515) 520-2918
E-mail: debasis@iastate.edu
<http://www.cs.iastate.edu/~debasis/>

Education

- **Ph.D., Computer Science** Aug '08–June '15
Iowa State University, Ames, Iowa
Thesis: “Randomness in Completeness and Space-Bounded Computations”
Advisor: [Prof. Pavan Aduri](#)

Relevant Courses: Algorithms, Advanced algorithms, Distributed algorithms, Randomized algorithms, Algorithms for stochastic models, Big data-set algorithms, Machine learning, Game theory, Extremal graph theory, Complexity theory. (**GPA: 3.8**)
- **Bachelor of Technology, Computer Science & Engineering** Aug '01–June '05
West Bengal University of Technology, Kolkata, India
Thesis: “Survivable Topology Design for Optical WDM Mesh Networks”
Advisor: [Prof. Bivas Mitra](#)

Selected Awards

- Multiple **Travel grants** from *ISU Professional Development Grants (PAG)*, Computer Science department, and workshops.
- **Teaching Excellence Award** for Fall 2013 by the Iowa State University.
- **First prize** (lab poster) in the GAC Poster Day Contest in the Department of Computer Science, Iowa State University, in 2013.
- **Dr. Robert Stewart Early Research Recognition Award** by the Department of Computer Science, Iowa State University for working on a *high-risk project*, in 2010.

Research Experience

- **Graduate Research Assistant**, *Iowa State University* Feb '08–May '14
Advisor: [Prof. Pavan Aduri](#)
 - Proved the first result that separates completeness notions for the complexity class NP using a worst-case hardness hypothesis.
 - Provided the first evidence in favor of an important conjecture about disjoint-NP pairs (ESY conjecture) that was open for 30 years.
 - Initiated an approach to derandomize time-bounded probabilistic complexity classes for Turing machines (say, BPP) using the derandomization of space-bounded probabilistic complexity classes (say, BPL).

- **Project Engineer**, *Indian Institute of Technology, Kharagpur, India* April '07–July '08
 Advisor: [Prof. Sudeshna Sarkar](#)
 - Worked in a team from 12 institutes to develop a *Cross-Language Information Retrieval (CLIR)* system for 5 Indian languages for the health and tourism domains.
 - First project of this scale about multilingual search, funded by the Govt. of India.
 - Hosted on *Govt. of India website*: <http://www.tdil-dc.in/sandhan/>
 - Modified the source code of crawling, indexing, and ranking modules and created new language-specific plugins in *Apache Lucene* based search engine *Apache Nutch* to cater to our specifications.
 - Led the submission of early evaluation for the Bengali language from IIT Kharagpur to the evaluation conference CLEF 2007, Budapest, Hungary.
- **Undergraduate Researcher**, *Haldia Institute of Technology, India* July '04–May '05
 Advisor: [Prof. Bivas Mitra](#)
 - Designed two RWA heuristics to address survivability in optical WDM networks under one edge failure. The problem is known to be NP-hard.

Teaching Experience

- **Graduate Teaching Assistant**, *Iowa State University* Aug '12–present
 Taught recitations, held office hours, designed homework, quizzes, and exams.
 - COMS 511: Algorithms (Graduate): *Fall 2012*
 - COMS 331: Theory of Computing (Undergrad): *Spring 2013*
 - COMS 311: Algorithms (Undergrad): *Summer 2013, 2014, Fall 2014, Spring 2015*
 - COMS 531: Theory of Computation (Graduate): *Spring 2015*
- **Guest Lecturer**, *Iowa State University*
 Taught 4–5 lectures of each.
 - COMS 207: Fundamentals of Computer Programming (Undergrad)
 - COMS 227: Introduction to Object-oriented Programming (Undergrad)
 - COMS 311: Algorithms (Undergrad)
 - COMS 531: Theory of Computation (Graduate)

Professional Experience

- **Software Engineer**, [Infosys Technologies Ltd.](#), India Nov '05–April '07
 Client: Microsoft (SDET)
 - Debugged and tested the Network Driver Interface Specification (NDIS) layer for Windows XP and Windows Server 2003 and reported bugs to Microsoft.
 - Received *client appreciations* for testing priority 1 level critical fixes on one-day deadlines.
 - Designed a *System Performance Monitor* for all processes in Windows XP in C++/MFC.
- **Software Engineer**, [Ushacomm India Private Ltd.](#), India July '05–Sept '05
 - Trained in the telecom billing software Unicorn 6.0.

Refereed Publications

- [On Probabilistic Space-Bounded Machines with Multiple Access to Random Tape](#)
Debasis Mandal, A. Pavan, N. V. Vinodchandran
Proc. of the 40th International Symposium on Mathematical Foundations of Computer Science (MFCS), 2015.
- [Separating Cook Completeness from Karp-Levin Completeness under a Worst-Case Hardness Hypothesis](#)
Debasis Mandal, A. Pavan, Rajeswari Venugopalan
Proc. of the 34th Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2014.
- [A Thirty Year Old Conjecture about Promise Problems](#)
Andrew Hughes, Debasis Mandal, A. Pavan, Nathan Russell, Alan L. Selman
(To appear) Computational Complexity, Springer, 2015.
- [Bengali and Hindi to English CLIR evaluation](#)
Debasis Mandal, Mayank Gupta, Sandipan Dandapat, Pratyush Banerjee, Sudeshna Sarkar
Advances in Multilingual and Multi-modal Information Retrieval, Selected Proc. of the Cross-Language Evaluation Forum (CLEF), Vol. 5152/2008, pp. 95–102, LNCS, 2008.
- [Survivable Routing in WDM Weighted Networks](#)
Debasis Mandal, Satyajit Nath, Bivas Mitra
Proc. of the 2nd IEEE International conference on COMMunication System softWARE and MiddlewaRE (IEEE/ICST COMSWARE), 2007.
- [Shared Path Protection in DWDM Mesh Networks](#)
Debasis Mandal, Bivas Mitra
Proc. of the 8th International Conference on Information Technology (CIT, currently IEEE ICIT), 2005.

Conference Talks

- Title: “Separating Cook Completeness from Karp-Levin Completeness in NP under a Worst-Case Hardness Hypothesis”
34th Foundations of Software Technology and Theoretical Computer Science (FSTTCS), Dec. 2014.
- Title: “Separation of NP-completeness Notions”
The Mathematical Association of America (MAA), Iowa Section, Oct. 2014.
- Title: “Bengali and Hindi to English CLIR Evaluation”
2nd International Workshop on Cross Lingual Information Access (CLIA), The 3rd International Joint Conference on Natural Language Processing (IJCNLP), Jan. 2008 .

Seminar Talks

- Title: “Bounded-depth Polynomial Identity Testing (PIT) over Integers is in co-2wayRL”
Theory seminar, Department of Computer Science, Iowa State University, July 2014.
- Title: “Bilingual Dictionary Creation Task”
Machine Translation workshop, Indian Institute of Technology (IIT), Bombay, Dec. 2008.

Technical Skills

Programming Languages	C, JAVA, Python, R, Unix shell script
Open-source Software	Apache Lucene, Nutch, Ant, Tomcat
Operating Systems	Linux, Unix, Macintosh, Windows
IDEs	Eclipse, Xcode, Vim, Microsoft Visual studio

Professional Society

- Student member of the *Special Interest Group on Algorithms and Computation Theory* (SIGACT) of the *Association of Computing Machinery* (ACM).

References

Prof. Pavan Aduri
(*Doctoral advisor*)

Department of Computer Science
Iowa State University, Ames, IA 50011
Phone: (515) 294-7902
Email: pavan@cs.iastate.edu

Prof. Jack H. Lutz
(*Graduate instructor and
Doctoral committee member*)

Department of Computer Science
Department of Mathematics
Iowa State University, Ames, IA 50011
Phone: (515) 294-9941
Email: lutz@iastate.edu

Prof. Alan L. Selman
(*Research collaborator*)

Department of Computer Science & Engineering
University at Buffalo, Buffalo, NY 14260
Phone: (716) 645-4742
Email: selman@buffalo.edu

Prof. Vinodchandran N. Variyam
(*Research collaborator*)

Department of Computer Science & Engineering
University of Nebraska-Lincoln, Lincoln, NE 68588
Phone: (402) 472-5002
Email: vinod@cse.unl.edu