

# Chetan S Rao

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## Education

- **National Institute of Technology (NIT)** Calicut, Kerala  
*B.Tech., Computer Science & Engineering* 2007 - Present
  - Cumulative GPA: 9.25/10 ; Major (CS) GPA: 9.67/10 ; **Dept. rank: 1/105**
  - Areas of Interest: Algorithms & Complexity, Game Theory & Mechanism Design, Combinatorial Optimization, Graph Theory, Machine Learning & Cryptography
  - Relevant courses: Program Design, Data Structures & Algorithms, Design & Analysis of Algorithms, Advanced Topics in Algorithms, Theory of Computation, Computational Complexity, Number Theory & Cryptography, Computer Networks, Discrete Computational Structures, Computational Combinatorics, Probability & Statistics

## Manuscripts

- **Improved approximation bounds for Vector Bin Packing** June 2010  
*Chetan S Rao, Jeffrey John Geevarghese, Karthik Rajan*
  - Submitted. ([arXiv:1007.1345v1](https://arxiv.org/abs/1007.1345v1) [cs.DS])
- **Optimal Placement Algorithms for Virtual Machines** August 2010  
*Umesh Bellur, Chetan S Rao, Madhu Kumar S.D.*
  - Submitted. ([arXiv:1011.5064v1](https://arxiv.org/abs/1011.5064v1) [cs.DC])

## Research Experience

- **Algorithms & Complexity of Matching in Graphs** NIT, Calicut  
*Research Project (Supervisor : Prof. K. Murali Krishnan)* Jul 2010 - Present
  - Currently working on the complexity class of Matching problem.
  - Assigned the complexity class of DECISION-MAXMATCH to **L**.
- **Mechanisms for Prediction Markets** IISc, Bangalore  
*Research Project (Supervisor : Prof. Y. Narahari)* May 2010 - Jul 2010
  - Worked on different mechanisms for prediction markets and proposed an improvised mechanism for the same.
- **Placement Algorithm for Virtual Machines** IIT, Bombay  
*Research Project (Supervisor : Prof. Umesh Bellur)* Feb 2010 - Nov 2010
  - Worked on the placement algorithm; for a set of input configurations of VMs on Physical Machines (a multi-dimensional bin packing problem).
- **Approximation Algorithm for Dynamic Flows** NIT, Calicut  
*Research Project (Supervisor : Prof. Priya Chandran)* Dec 2009 - Apr 2010
  - A literature survey on the various dynamic flow algorithms for evacuation problems, routing & traffic management problems.

- **Acyclic Edge Coloring of Graphs** IISc, Bangalore  
*Summer Intern (Supervisor : Prof. L. Sunil Chandran)* May 2009 - Jun 2009
  - A literature survey on acyclic & adjacent-vertex edge graph colorings.
  - Implemented a program to determine acyclic edge colorings in degree-bounded graphs.
- **Cloud Computing for Mobile World** NIT, Calicut  
*Term Paper (Supervisor : Prof. Madhu Kumar S.D.)* Aug 2010 - Oct 2010
  - Explored the various architectures for Mobile Cloud Computing and their shortcomings.
- **Deterministic Encryption** NIT, Calicut  
*Term paper (Supervisor : Prof. M.P. Sebastian)* Jul 2009 - Oct 2009
  - A literature survey on deterministic encryption and its use in outsourced databases.

## Course Projects

- **NACHOS : Toy Operating System** NIT, Calicut  
*Class Project, Operating Systems* Dec 2009 - Apr 2010
  - Build a nascent operating system with the limited functionalities of a real OS. The project was based on NACHOS source code, a familiar experimental OS by UC Berkeley.
- **LED Counter** NIT, Calicut  
*Class Project, Operating Systems* Dec 2009 - Apr 2010
  - Wrote a Linux device driver module for tweaking the keyboard LED's in the form of a counter.
- **Simple Integer Language (SIL) Compiler** NIT, Calicut  
*Class Project, Compiler Design* Jul 2009 - Nov 2009
  - Engineered a compiler for a simple & strongly typed language (SIL) running on a hypothetical machine based on the MIPS machine architecture.
- **Private & Public key Encryption and Digital Signatures** NIT, Calicut  
*Class Project, Number Theory & Cryptography* Jul 2009 - Nov 2009
  - Implemented the AES (Rijndael) block cipher (counter mode), ElGamal-192, RSA-2048 & ECC-192 schemes and DSA algorithm using SHA-1 hash function.
- **GNS3 Network Simulation** NIT, Calicut  
*Class Project, Computer Networks* Oct 2009 - Nov 2009
  - Simulated complex networks (Cisco routers) using GNS3, a graphical network simulator.
- **E-books: a website for books** NIT, Calicut  
*Class Project, DBMS* Dec 2008 - Apr 2009
  - Created the prototype of a PHP-MySQL based website which could be used to sell & buy books online.
- **Simple Database Management System** NIT, Calicut  
*Class Project, DBMS* Dec 2008 - Apr 2009
  - Created modules of a simple database management system based of UW Madison's Minirel.

## Workshops attended

- **The 2011 School in Approximability** Microsoft Research, Bangalore  
*Invited* Jan 2011

- **Indo-US Symposium on Machine Learning, Game Theory & Optimization** IISc, Bang.  
*Participant* *Nov 2010*
- **Yahoo! Summer School on Machine Learning** IISc, Bangalore  
*Participant* *Jun 2010*
- **Third Annual Microsoft Research India Theory Day** IIT, Madras  
*Participant* *Jan 2010*
- **International workshop on Graph & Geometric Algorithms** IISc, Bangalore  
*Participant* *Jul 2009*

## Awards

Awardee, Indian Academy of Science (IAS) Fellowship	2010
Academic Proficiency Award - Topper in 4th, 5th & 6th semesters of B.Tech	2008 - 2010
Awardee, AOL Code Dash - 50th best coder in India	2010
Awardee, Physics Olympiad (NSEP) - Top 1% in the country	2007
Awardee, Mathematics Olympiad (AMTI)	2007
Awardee, National Talent Search Examination (NTSE) - Rank 19	2005
Academic Proficiency Award - Scored 96 % in SSLC - Rank 20	2005
Awardee, "Young Inventors" award - General Electric (GE)	2005
Winner of many athletic, basketball & chess tournaments	2003 - 2005

## Skills

**Languages:** C/C++,  $\LaTeX$ , Java, OCaml, Python, Shell script, HTML/CSS, PHP, SQL, Promela, MIPS Assembly

**Operating Systems:** Linux/Unix, MS Windows

**Applications:** Eclipse, Lex, Yacc, SPIN, MySQL

## References

1. **Dr. Y. Narahari**  
Professor & Chair, Department of Computer Science & Automation, IISc Bangalore
2. **Dr. K. Murali Krishnan**  
Assistant Professor, Department of Computer Science & Engineering, NIT Calicut
3. **Dr. Madhu Kumar S.D.**  
Associate Professor, Department of Computer Science & Engineering, NIT Calicut
4. **Dr. M.P. Sebastian**  
Professor, Department of Information Technology & Systems, IIM Kozhikode