Vishvajeet A Nagargoje

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Education

Indian Institute of Technology Madras. **2012 - Present**

- Dual Degree in Mechanical Engineering (specialisation : Product Design). Minor: Systems Engineering.
- Cumulative Grade Point Average: 7.1/10 after 8^{th} semester.

M.I.T Junior College, Pune **2009 - 2011**

- 12^{th} standard (Maharashtra State Board of Secondary and Higher Secondary Education).
- Aggregate: 78%.

The Bishop's School, Camp **2009**

- 10^{th} standard (Indian Certificate of Secondary Education, India).
- Aggregate: 85.14%.

Scholastic Achievements

- Secured an All India Rank of 2896 in IIT Joint Entrance Examination 2012 among 506,000 students.
- Among the top 25 students selected from all over India for admission into Rashtriya Indian Military College, Dehradun (2005).
- Ranked 13^{th} in the state in Abacus Maths Olympiad 2005.
- Secured a branch change for strong academic performance(among the top 10 percent of the class) in the first year.

Relevant Courses

Mathematics, Computer Science and Optimization

- Calculus of One Variable
- Calculus of Multiple Variables
- Probability, Statistics and Stochastic Processes
- Introduction to Programming in C
- Probability Foundations (Measure Theoretic)[1]
- Process Optimization
- Multivariate Data Analysis
- Foundations of Cryptography[2]
- Algorithmic Algebra
- Advanced Theory of Computation
- Advanced Complexity Theory
- Advanced Algorithms
- Advanced Topics in Communications
- PCPs and Limits of Approximation Algorithms[3]
- Communication Complexity
- Distributed Network Algorithms : Foundations and Future Directions[2]

Projects and Research Experience

Internship at Microsoft Research India **May 2016 onwards**

- I am working with *Dr. Satya Lokam*[4] on the sensitivity conjecture. A robust version of the conjecture relating the higher moments of sensitivity and degree seems to be a promising direction following recent results by Gopalan et al. I am working on extending their approach to Friedgut's junta theorem to get low depth decision trees.

The Sum-of-Squares Hierarchy and its Connections to Approximation Algorithms **Aug 2015 - present**

- The sum-of-squares hierarchy of relaxations is a promising candidate as a meta algorithm which would give optimal gurantees for a variety of problems. In this reading project, I am studying the SoS method applied to problems like MAXCUT, sparsest cut, sparse vector recovery, tensor decompositions, etc. under the guidance of *Prof. Prahladh Harsha*[5].

A Brief Study of Codes that Achieve Capacity on Symmetric Channels **May - Oct 2015**

- Efficiently decodable deterministic coding schemes had been elusive until 2008, when Arikan came up with his landmark polar coding scheme. Following this line of work, Urbanke et al showed that Reed Muller codes achieve capacity on erasure channels in the constant rate regime. A survey of the area focussing on the aforementioned results was done, as part of the Visiting Students Research Program, TIFR, under the guidance of *Prof. Prahladh Harsha*[5]. ArXiv link of technical report : `http://arxiv.org/abs/1510.01439`

Development of Distributed Algorithms for Dispersion of Robots **May 2014- present**

- Working on problems concerning dispersion of agents with minimal capabilities in arbitrary graphs, in a completely autonomous and distributed sense, under the guidance of *Prof. John Augustine*[6]. Results would be submitted to FSTTCS 2016.

Lower Bounds for Property Testing via Communication Complexity **Jan - May 2016**

- Studied property testing lower bounds in the light of communication complexity and gave a talk on it, as part of the Communication Complexity course, *Prof. Jayalal Sarma*[7].

A Brief Survey of Zero Knowledge Protocols **Apr - May 2015**

- Studied zero knowledge proofs for the coloring problem and gave a talk on it,as part of the Advanced Complexity Theory course under the guidance of *Prof. Jayalal Sarma*[7].

Development of Online Algorithm for Testing Connectivity in Dynamic Networks **Dec 2013 - Jan 2014**

- Contributed to the development of an online algorithm for testing connectivity in edge dynamic networks which used the clustering technique to get better worst case bounds, under the guidance of *Dr. John Augustine*[6].

Skills

- **Familiarity with *Elementary Number Theory.***
- **Computer languages:**
  - Proficient at coding in C and MATLAB.
  - Knowledge of C++.
  - Working knowledge of computer algebra system *Macaulay2*
- **Computer tools and platforms:**
  - Proficient at Microsoft Office and LaTeX.
  - Working knowledge of AutoCAD, PTC Creo.
- **Operating systems:** Mac OS X, Microsoft Windows, Linux.

Extra-Curricular Activities

- **Member of the IIT Madras Institute Aquatics Team, won silver medal** in Inter IIT sports meet 2015.
- **Winner of 5 gold, 2 silver and 2 bronze medals** in individual swimming events. Also **led the hostel as captain in securing a bronze medal in Water Polo** in Schroeter[8].
- An **active participant in Western Classical Music events**, plays the **Piano**.
- **Finalist at Puzzle Champ**, Shaastra[9] 2013 , a competition based on math and logic.
- **Dean's trophy triathlon captain for the hostel** for the current year. **Led the hostel in securing first position and winning Dean's trophy**.
- **Guided 8 first year students** in academics and co-curricular activities as part of MiTr.[10]

References

Prof. Prahladh Harsha
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Prof. John Augustine
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[1]Audited course
[2]Ongoing course
[3]Offered by Prof. Prahladh Harsha at TIFR, Mumbai in May-June 2015.
[4]Researcher, Cryptography, Security, and Applied Mathematics (CSAM) group, Microsoft Research India. Contact : +91 80 6658 6000, satya@microsoft.com
[5]School of Technology and Computer Science, Tata Institute of Fundamental Research, Mumbai. Contact : +91-22-2278 2129, prahladh@tifr.res.in
[6]Dept. of Computer Science and Engineering, IIT Madras. Contact : +91 44 22574383, augustine@cse.iitm.ac.in
[7]Dept. of Computer Science and Engineering, IIT Madras. contact : +91-44-2257 4357, email: jayalal@cse.iitm.ac.in
[8]The annual intra-mural sports championship at IIT Madras.
[9]Annual Technical Festival of IIT Madras.
[10]Mentoring and Transformation wing of IIT Madras.