Nihar Prakash Gargava nihargargava@gmail.com http://nihargargava.com

Education

École Polytechnique Fédérale de Lausanne, Switzerland Sept 2017 - Present
Masters of Science in Mathematics

Indian Institute of Technology, Kanpur, India July 2013 - May 2017
Bachelor of Science (Hons.) in Mathematics and Scientific Computing
Cumulative Performance Index (CPI), during graduation: 9.0/10

Scholastic Achievement

- Qualified and secured an All India Rank of 871 out of over 123 thousand candidates in the second round, in Joint Engineering Exam (Advanced), a two-phase exam where over 1.26 million candidates appeared.
- Secured a rank of All India Rank 5 in National Entrance Screening Test 2013, an entrance exam where over 70 thousand candidates appeared.
- Selected for Charpak Research Internship Program 2016, a French scientific initiative.
- Recipient of INSPIRE scholarship, granted by the Department of Science and Technology, India.
- Recieved Academic Excellence award, 2017 at IIT Kanpur.
- Recipient of the J.N.Tata Scholarship for Higher Education.

Background and Skills

Programming
I have experience in Python, C, C++, openCV, openGL, sage and R. I work independently to develop openGL-based math visuals. I also know HTML, php and webGL. Here is my github.

Mathematics
I have a thorough background in all major areas of theoretical mathematics. I am also interested in Probability theory and applications. I maintain this blog. A list of my full coursework is here.

Projects

Polylogarithms and Symbolic Computation Summer, 2016
Supervised by Prof. Gérard H E Duchamp, Prof. H N Minh
Laboratoire d'Informatique de Paris-Nord, Université Paris-Nord

- This project continued the existing line of work of Prof. Duchamp and Prof. Minh that concerned with understanding polylogarithms with the aid of tools from combinatorics of words. This is an ongoing project and more details can be given on request.

Representation theory and Algebraic Combinatorics May-December, 2015
Supervised by Prof. A K Lal, IITK and Prof. B. Sury, ISI, Bangalore

- Read *Enumerative Combinatorics, Vol 2 (Richard Stanley), Young Tableaux (William Fulton)* to understood the Representation Theory of S_n. Details are documented.
- Studied and applied Polya Theory to count the number of hexaflexagons structures, and derive the series A000207 from A000108. Details are in this report.

Background Subtraction and Object Tracking Summer, 2014
Guided by Programming Club, IITK

- Developed an open source software to remove mobile objects from a video feed and extract the background image and various statistical models were tested and perfected to achieve the desired accuracy and efficiency. Haar-like feature cascading was implemented using openCV.

KNOT (a 3D visualization tool for Mathematical Knots) Summer, 2014
Guided by Prof. Aparna Dar, IITK

- Implemented Knot Theory on openGL to compute invariants like Dowker-Thistlethwaite codes, crossing numbers, writhe, Fox-N-Colorability of any knot using concepts in Computational Geometry like the Bentley-Ottmann sweep line algorithm.

ISAAC (a 2D openGL-based physics simulation engine) First semester, 2013
Course project under Prof. Subhajit Roy, IITK

- Worked upon an interface where user-drawn 2D solids could collide and interact. The physics algorithm was designed from scratch. I achieved a distinction in the course.

ABU Robocon 2014 (International robotics competition) Winter, 2013
Supervised by Mechatronics Lab, IITK

- Worked to program a pole-to-pole, laterally traversing robot for the institute team. It won **Best Innovative Design** at **National Robocon '14** & **Most Innovative Implementation** at **Student Research Convention '14, IITK**.

Positions of Responsibility

Senior Executive, Research Cell	2016-2017
Organizer, CoNTRA (Combinatorics, Number Th., Representations and Algebra)	2016-17
Hobby Group Leader, Science Coffeehouse (a science discussion group)	2015-2016
Coordinator, Card and Board Games Club	2015-2016
Coordinator, English Literature Society	2015-2016
Academic Mentor for Mathematics, Counseling Service	2014-2015

Others

I play flute and solve mathematics problems in my free time. I have won a state-level dancing competition at the age of 11.