PRANAV BISHT | Curriculum Vitae

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RESEARCH INTERESTS

I have worked in the area of computational complexity theory and broadly in theoretical computer science. I am currently also exploring Large Language Models (LLMs), Responsible AI and Learning Theory.

CURRENT POSITION

ASSISTANT PROFESSOR   September 2023 - Present
Department of Computer Science & Engineering, IIT(ISM) Dhanbad

EDUCATION

POST-DOCTORAL RESEARCHER   September 2022 - August 2023
Department of Computer Science, Boston College
Supervisor: Prof. Ilya Volkovich

DOCTOR OF PHILOSOPHY   July 2017 - August 2022
Department of Computer Science & Engineering, IIT Kanpur
Thesis: Structural results on sparse factoring and identity testing
Thesis Supervisor: Prof. Nitin Saxena
CPI: 9/10

MASTER OF TECHNOLOGY   July 2015 - June 2017
Department of Computer Science & Engineering, IIT Kanpur
Thesis: On Hitting Sets for Special Depth-4 Circuits
Thesis Supervisor: Prof. Nitin Saxena
CPI: 8/10

BACHELOR OF ENGINEERING   July 2011 - May 2015
Department of Information Technology, PEC University of Technology
CPI: 8.34/10

PUBLICATIONS

Generative AI for Finance: Applications, Case Studies, and Challenges
Siva Sai, Keya Arunakar, Vinay Chamola, Amir Hussain, **Pranav Bisht**, Sanjeev Kumar.
In communication with a peer-reviewed journal.

Towards identity testing for sums of products of read-once and multilinear bounded-read formulae
Pranav Bisht, Nikhil Gupta, Ilya Volkovich.
43rd IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2023.
Also in communication with a peer-reviewed journal.

On Solving Sparse Polynomial Factorization Related Problems
Pranav Bisht, Ilya Volkovich.
42nd IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2022.
Also in communication with a peer-reviewed journal.

Derandomization via symmetric polytopes: Poly-time factorization of certain sparse polynomials
Pranav Bisht, Nitin Saxena.
42nd IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2022.
Also in communication with a peer-reviewed journal.

Blackbox identity testing for sum of special ROABPs and its border class
Pranav Bisht, Nitin Saxena.
Journal: Computational Complexity, 2021.

High-Level Support Activities of Simulation Laboratory E&A Particles
G. Poghosyan, S. Sharma, A. Kaur, V. Jindal, **P. Bisht**, A. Streit, M. Bejger, A. Królak, T. Klaehn, S. Typel, J. Oehlschläger, T. Pierog, R. Engel.
High Performance Computing in Science and Engineering'14 - Transactions of the High Performance Computing Center, Stuttgart, HLRS 2014.

TEACHING EXPERIENCE

GRAPH THEORY   Winter 2024-25
CSE202, IIT(ISM) Dhanbad

OBJECT ORIENTED PROGRAMMING   Winter 2024-25, Winter 2023-24
CSE202, IIT(ISM) Dhanbad

COMPUTER PROGRAMMING   Monsoon 2024-25
NCSV101, IIT(ISM) Dhanbad

COMPUTING TECHNIQUES AND MATHEMATICAL TOOLS   Monsoon 2024-25
NCSC502 (Executive MTech.), IIT(ISM) Dhanbad

DATA STRUCTURES   Summer 2023-24
CSC201, IIT(ISM) Dhanbad

COMBINATORICS & GRAPH THEORY   Winter 23-24
CSD403, IIT(ISM) Dhanbad

LABS: 2023-Present
CSC210, NCSV102, CSC508, IIT(ISM) Dhanbad

I also worked as a **Teaching Assistant (TA)** for the following **NPTEL** courses.

PROBABILITY FOR COMPUTER SCIENCE   August - October 2021
Instructor: Prof. Nitin Saxena
IIT Kanpur

COMPUTATIONAL NUMBER THEORY & ALGEBRA   September - December 2020
Instructor: Prof. Nitin Saxena
IIT Kanpur

MODERN ALGEBRA   May - August 2016
Instructor: Prof. Manindra Agrawal
IIT Kanpur

Talks

Conference talk   FSTTCS, IIT Madras, December 2022
Title: On Solving Sparse Polynomial Factorization Related Problems
Conference talk   FSTTCS, IIT Madras, December 2022
Title: Derandomization via symmetric polytopes: Poly-time factorization of certain sparse polynomials.

I had been an active member of the theory group at IIT Kanpur, called **SIGTACS** (Special Interest Group on Theoretical Aspects of Computer Science). I gave the following talks in SIGTACS:

Sparse polynomial factorization via symmetric polytopes   May 2022
Poly-time blackbox identity testing for sum of log-variate, constant-width ROABPs   May 2020
Lower and Upper bounds for Read once oblivious ABPs   November 2019
PIT: State of the Art (Lecture series in PIT Bootcamp)   October 2018
PIT and Lower Bounds   November 2017
Equivalence of PIT and Polynomial Factorization   April 2017

Funding (R&D)

PI - Faculty Research Scheme (FRS), IIT(ISM) Dhanbad, $\sim$ Rs. 12 Lacs.

Professional activities

(Outside institute)

• Reviewed papers for the following international conferences: **STOC 23, CCC 2022, STACS 2022, SODA 2020, FOCS 2019, FSTTCS 2018, CCC 2018**.

(Institute Level)

• M.Tech Admission scrutiny 2024.

• B.Tech Admission scrutiny 2024.

• Paper setter, Invigilator and Evaluator for multiple JT and JTS Computer Practical exams 2023.

(Department Level)

• Lab Incharge, Lab-II, CSE.

• DUGC member, CSE.

• DGRC member, CSE.

• co-FIC, Buffered Reader Magazine (CSE departmental magazine), since 2024.

• Indentor for multiple departmental purchases: PCs, ACs, UPS.

Students guided

Ph.D. (Full-time) : Dipnarayan Das (2023-Present, as co-guide).
M.Tech. :

- Arun Panwar (2024-26)

- Ankit Belvanshi (2024-2026)

- Chandradev Yaduraj (2023-25)

- Saima Nasreen (2023-25)

- Priyanshu Maurya (2023-25)

- Arijit Ghosh (Hybrid Architecture for Scalable and Efficient Fuzzy Keyword Search, 2023-24)

ACADEMIC ACHIEVEMENTS

AIR - 108 in Computer Science, GATE 2015
Secured an all India rank of 108 in Computer Science division of GATE (Graduate Aptitude Test in Engineering) from among 115,000 students in 2015.

.1% merit certificate, 2009
Received .1% merit certificate in Science Class X, for being among the top 0.1% students of India.

REFERENCES

Dr. Nitin Saxena
N. Rama Rao Chair Professor
IIT Kanpur
nitin@cse.iitk.ac.in

Dr. Ilya Volkovich
Assistant Professor
Boston College
ilya.volkovich@bc.edu

Dr. Rajat Mittal
Assistant Professor
IIT Kanpur
rmittal@iitk.ac.in

Dr. Gevorg Poghosyan
Information Security Officer, PTKA
Karlsruhe Institute of Technology (KIT), Germany
gevorg.poghosyan@kit.edu