

Sai Anurudh Reddy Peduri

✉ anurudh.peduri@rub.de | 🏠 anurudhp.github.io | 📞 Anurudh Peduri | 📧 anurudhp

Education

Ruhr-Universität Bochum

DOCTOR OF PHILOSOPHY (PHD) IN COMPUTER SCIENCE

Supervised by Prof. Dr. Michael Walter

Research Interests: Quantum Algorithms, Formal Verification (Automated Theorem Proving), Programming Languages and Type Theory

International Institute of Information Technology, Hyderabad (IIIT-H)

MASTER OF SCIENCE (MS) BY RESEARCH IN COMPUTER SCIENCE

Supervised by Dr. Kannan Srinathan and Prof. Tobias Grosser (UoE)

CGPA: 9.75/10.00

Thesis: SSA-based Compilation and Optimization of Hybrid Quantum-Classical Programs

International Institute of Information Technology Hyderabad (IIIT-H)

BACHELORS IN TECHNOLOGY (WITH HONORS) IN COMPUTER SCIENCE AND ENGINEERING (B.TECH IN CSE)

CGPA - 7.94/10 (In-major - **8.66/10**)

Relevant Courses : Advanced Algorithms, Compilers, Complexity Theory, Graph Theory, Linear Algebra, Principles of Information Security, Principles of Programming Languages, Quantum Information and Computation

Bochum, Germany

Aug 2022 - Present

Hyderabad, India

Aug 2019 - Apr 2022

Hyderabad, India

Aug 2015 - July 2019

Experience

Research Assistant, IIIT-H

July 2021 - July 2022

- Working on Quantum Algorithms Research, supervised by [Dr. Shantanav Chakraborty](#).
- Efficient Quantum Algorithms for Linear Regression problems and Analysis of mixing times of Quantum Walks.

Research Intern, University of Edinburgh

June 2020 - April 2022

- At the Compilers and Runtime Systems Lab at UoE, supervised by [Prof. Tobias Grosser](#).
- Worked on compilation techniques for hybrid quantum-classical programs for master's thesis. [\[arxiv\]](#) [\[github\]](#)

Teaching Assistant, IIIT-H

Aug 2017 - Dec 2019

- Teaching Assistant for *Discrete Mathematics* (Monsoon 2017), *Data Structures* (Spring 2018), *Linear Algebra* (Monsoon 2018), *Principles of Information Security* (Spring 2019), *Algorithms* (Monsoon 2019)
- The role involves conducting tutorials and labs for undergraduate students. Was also involved in setting and evaluating assignments and exams.

Club Coordinator, IIIT-H

Monsoon 2016 - Spring 2020

- Programming Club: Organized programming contests. Gave talks on topics such as Graph Theory, Computational Geometry, Flows and Fourier Analysis.
- Theory Reading Group (Co-founder): Hosted a reading group for Quantum Field Theory, and one for Quantum Computing. Gave talks on Quantum Algorithms and Complexity Theory. We had weekly meets to discuss the topics.
- Chess Club: Hosted online and on-the-board intra-college tournaments.

Competitive Programming

- Co-organizing WINOI - an initiative started in 2020 to get more school girls interested in programming, and preparing them for the Informatics Olympiad. Conducted lectures and discussion sessions.
- [Problem tester](#) for the Indian IOITC 2021 Team Selection Test. The IOITC selects the team representing India at the International Olympiad for Informatics.
- Helped in problem setting and testing for [CodeCraft '18](#). Tasks involved writing and verifying solutions, generating strong test-data, and overseeing the contest (answering clarifications etc.). CodeCraft is IIIT-H's annual algorithmic programming competition.

Publications and Manuscripts

Quantum Regularized Least Squares

Arxiv 2022

Shantanav Chakraborty, Aditya Morolia and Anurudh Peduri. Under Review. [\[preprint\]](#)

QSSA: An SSA-based IR for Quantum Computing

CC 2022

Anurudh Peduri, Siddharth Bhat and Tobias Grosser. Accepted at ACM SIGPLAN 2022 International Conference on Compiler Construction [\[preprint\]](#) [\[github\]](#)

Achievements

International Collegiate Programming Contest (ICPC)

2017 - 2021

- ICPC 2020: Member of team **tesla_protocol** which placed **46th** at the **44th Annual ICPC World Finals**, held at Moscow, Russia. Qualified for the finals by placing **7th** at the **Asia West Continent Finals**. Also placed 6th in the Asia Amritapuri Onsite Round and 4th in the Asia Kanpur Onsite Round
- ICPC 2019: Member of team tesla_protocol which placed **3rd** in the **Asia Gwalior-Pune Onsite Round** and **5th** in the **Asia Amritapuri Onsite Round**.
- ICPC 2018: Member of team Tesla which placed **3rd** in the **Asia Kharagpur Onsite Round** and **4th** in the **Asia Amritapuri Onsite Round**.
- ICPC 2017: Member of team tesla_protocol which placed **8th** in the **Asia-Amritapuri Onsite Round**.
- The ICPC (previously ACM ICPC) is the most prestigious programming competition at the college level.

Microsoft Q# Coding Contest

Summer 2018

- Placed **18th** out of 400 participants in the **Microsoft Q Coding Contest**, held on Codeforces.
- The contest featured problems on quantum algorithms and protocols.

Codechef Snackdown 2016

Summer 2016

- Member of team lamecoders which was **6th among Indian teams** and was **ranked 24th internationally** in the final round.
- Ranked 21st among Indian teams in the online elimination round out of 1000+ Indian teams.

Codeforces

2015 - Present

- Handle: **codelegend**. Peak rating: **2475** (Title: Grandmaster). **Top 5 in India** out of 17000+ users, and Top 400 in the world out of 70000+ users.
- Codeforces is a platform that regularly hosts algorithmic programming contests. Rating is based on performance in these contests.

IOI Training Camp

2013, 2015

- Selected for the **International Olympiad in Informatics Training Camp 2015 (IOITC-2015)**, held in Bangalore, India. 30 out of 1000+ students were selected.
- Selected for the **International Olympiad in Informatics Training Camp 2013 (IOITC-2013)**, held in Bangalore, India. 22 out of 5000+ students were selected.
- The IOI is the most prestigious programming competition at the school level. The IOITC is a 10 day training camp on programming and algorithms.

Dean's List

IIT-H Monsoon 2015

Received the Dean's Merit List Award for Distinction in first class for the Monsoon 2015 semester.

Projects

Software Foundations

Spring 2020

Solved the first three volumes in the **Software Foundations** series, a textbook series introducing the Coq theorem prover and concepts on formal verification.

Shor's Algorithm

Spring 2019

Implemented an algorithm for efficient Integer Factorization (Shor's Algorithm) in Microsoft Q#. [\[github\]](#)

Decaf Compiler

Monsoon 2018

Implemented a compiler for a simplified C-like language, using GNU (Flex/Bison) and LLVM tools. Has loops, functions, and recursion. Supports strict typechecking, and runtime error checks. Implemented in C++. [\[github\]](#)

Sentiment Analysis

Monsoon 2017

Implemented a Convolutional Neural Network (CNN) for binary sentiment analysis of reviews. Used word-2-vec to map the text to vectors, and compared accuracies of different CNN architectures, as described in [this paper](#). Implemented in Python, using the Pytorch library. [\[github\]](#)

Skills

Programming Languages C/C++, Haskell, Python, Q#, Bash, Lisp/Racket (basic), Rust (basic)

Theorem Provers Coq, Lean

Libraries/Frameworks Flex/Bison, LLVM, LLVM-MLIR