

# AMATYA SHARMA

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Department Of Computer Science and Engineering

Indian Institute of Technology, Kharagpur

## EDUCATION

**Indian Institute of Technology (IIT), Kharagpur**

5<sup>th</sup> Year Dual Degree (B.Tech + M.Tech)

Computer Science and Engineering Department

*August 2017 - Present*

GPA 9.61/10

Rank 5

## WORK EXPERIENCE

**CSE, IIT Kharagpur | TA of [Algorithmic Game Theory](#) Course**

Aug 2021 - present

**Computer Science Department, IIT Delhi | Summer Research Intern**

Apr 2021 - present

**ExaCC, Oracle R&D | Summer Intern**

May - Jul 2021

**Computer Science and Automation, IISc Bangalore | Winter Research Intern**

Dec 2019

**Computer Science and Automation, IISc Bangalore | Summer Research Intern**

May - Jul 2019

## PUBLICATIONS & RESEARCH

**On Guillotine Separable Packings for the Two-dimensional Geometric Knapsack Problem**

*Published at [SoCG'21](#) || Contributed Talk by me at [HALG'21](#)*

*May 2019 - Mar 2020*

*Coauthors: Arindam Khan (IISc), Arnab Maiti (IIT Kgp), Andreas Wiese (U of Chile)*

- Designed an Approximation Algorithm (PPTAS) for 2-Dimensional Guillotine Geometric Knapsack.
- Improved previous best approximation factor for both weighted and cardinality cases of the problem.

**On Parameterized Complexity of Liquid Democracy**

*Jul 2019 - Dec 2019*

*Published at [CALDAM'21](#)*

*Coauthors: Palash Dey (IIT Kgp), Arnab Maiti (IIT Kgp)*

- Devised Parameterized Algorithms for Computational Social Choice Theory problem of Liquid Democracy.
- Established results on para-NP-Hardness, FPT Algorithms and LP formulation w.r.t different parameters.

**Weighted k-server problem**

*May 2021 - Present*

*Mentor: Prof. Ashish Chiplunkar (IIT Delhi)*

- Formulated online randomized algorithm for a variant of weighted k-server problem.
- Mitigated the gap between established upper bound and lower bound complexities.

**The Art Gallery Problem: A Survey**

*Jul 2020 - Jan 2021*

*Submitted to [ACM Computing Surveys Journal](#)*

- Studied NP-hardness,  $\exists R - Completeness$  and bounds on AGT problem,
- Analyzed numerous approximation and parameterized algorithms for AGT.

**Nash Equilibrium of Networked Public Good Games**

*Jan 2021 - Present*

*Mentor: Dr. Palash Dey (IIT Kharagpur)*

- Algorithmic analysis of PSNE for Game Theoretic Problem of Networked Public Good Games.
- Established parameterized hardness and formulated XP-algorithms.

- Formulated algorithms for Game Theoretic problem of computing Margin of Victory for tournament solutions.
- Contrived parameterized algorithms with parameters including tree-width for the NP-Hard problem.

**Image Augmentation and Auxiliary Loss Duo***Jul 2021 - Dec 2021**Participating in [ML Reproducibility Challenge 2021](#)**Coauthors Faraaz Rehman Mallick and Dewang Modi*

- Reproduced AAAI21 paper on Improving Sample Efficiency in Model-Free Reinforcement Learning
- Implemented and experimented with a new model based on image reconstruction and augmentation.

**SOFTWARE PROJECTS**

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**HTTP Authentication***May 2021 - July 2021*

- Implemented Java Library for secure HTTP Authentication using Java Cryptography Architecture.
- Summer intern Project at Oracle ExaCC team.

**Shoten***Jan 2019 - July 2019*

- Web Application serving as Online Book Store and Print Shop using MySQL, JSP, HTML-CSS.

**TinyC Compiler***July 2019 - Nov 2019*

- Compiler for language TinyC, a subset of C with a reduced subset of functionalities.
- Implemented parser and lexer using Yacc, BISON, FLEX, C, C++.

**RISC Processor***July 2019 - Nov 2019*

- Developed Reduced Instruction Set Computer Processor and simulated on FPGA Spartan 3 boards.
- Designed a single cycle executable processor using Verilog for a subset of MIPS instructions.

**SKILLS AND COURSE WORK**

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<b>Theoretical CS</b>	Approximation, Online, Parameterized and Randomized Algorithms, Algorithmic Game Theory, Advanced Graph Theory, Computational Geometry, Computational Complexity and Cryptography & Network Security.
<b>Learning Theory</b>	Reinforcement Learning, Deep Learning, Advanced Machine Learning, Natural Language Processing, Linear Algebra and Probability & Statistics.
<b>Software &amp; Tools</b>	MySQL, Java Cryptography Architecture, Matlab, HTML, CSS, JSP, Python, C++, C, GIT.
<b>Other Relevant Courses</b>	Discrete Maths, Operating Systems, Computer Networks, Software Engineering.
<b>Languages</b>	English, French, Hindi.

**ACADEMIC ACHIEVEMENTS**

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<b>GATE Scholarship</b>	Availing <a href="#">GATE Scholarship</a> for Teaching Assistantship at CSE, Kharagpur.
<b>Department Rank</b>	Currently holding Department Rank 5 in the Computer Science Department.
<b><a href="#">Department Change</a>'19</b>	Changed Department to CS (first year) with rank among top 10 at IIT Kharagpur.
<b>JEE Advanced</b> '17	Attained an All India Rank of 1464 among 1.7 lakh students in <a href="#">JEE Advanced</a> 2017.
<b>SJVN Merit Scholar</b> '17	Awardee of <a href="#">SJVN</a> Merit Scholarship for performance in Senior Secondary Examination.
<b>NTSE</b> '15	Recipient of National Talent Search Examination ( <a href="#">NTSE</a> ) Scholarship (State Rank 1).
<b><a href="#">RIMC</a></b> '13	Secured National Rank in top 60, State Rank 1 in Rashtriya Indian Military College Exam.

**EXTRA CURRICULAR**

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Co-Founder Annapurna, an initiative working against global poverty, hunger and wastage of food resources.