

Arindam Khan

CONTACT INFORMATION

Mailing Address:

Department of Computer Science and Automation, Indian Institute of Science (IISc),
Bengaluru, Karnataka, India 560012.

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RESEARCH INTERESTS

Algorithms, Optimization, Theoretical ML.

Specially, Approximation Algorithms, Online Algorithms, Graph Algorithms, Computational Geometry, Combinatorial Optimization, and Algorithms for Big Data and ML.

EDUCATION

Georgia Institute of Technology, Atlanta, USA. 2010-2015.

- **Ph.D.** in *Computer Science (Algorithms, Combinatorics & Optimization)*,
Thesis: *Approximation Algorithms for Multidimensional Bin Packing*,
Advisor: Prasad Tetali.
- **M.S.** in *Mathematics*.

Indian Institute of Technology (IIT), Kharagpur, India. 2004-2009.

- **B. Tech** and **M. Tech** (Dual Degree) in Computer Science and Engineering,

RESEARCH EXPERIENCE

Indian Institute of Science, Bengaluru, India.

Assistant Professor

January '19 to present

Technical University (TU), Munich, Munich, Germany.

Postdoctoral Researcher

November '17 to December '18

IDSIA (Swiss Artificial Intelligence Lab), Lugano, Switzerland.

Ricercatore (Researcher)

November '15 to October '17

Indian Statistical Institute, Kolkata, India.

Visiting Scientist

September '15 to October '15

Georgia Institute of Technology, Atlanta, USA.

Graduate Research and Teaching Assistant

August '10 to August '15

Microsoft Research, Redmond, USA.

Research Intern in Theory Group

May '14 to August '14

University of California, Berkeley, USA.

Visiting Student Researcher

August '13 to December '13

Microsoft Research, Silicon Valley, USA.

Research Intern in Search Labs

May '13 to August '13

TU Eindhoven, Eindhoven, Netherlands.

Visiting Student Researcher

Feb-Mar '13, Sept-Oct '14

IBM Research, New Delhi, India.

Blue Scholar in Analytics & Optimization Group

June '09 to July '10

Korea University, Seoul, South Korea.

Undergraduate Summer Intern

May '08 to July '08

University of Illinois, Urbana-Champaign, USA.

Undergraduate Summer Intern

May '07 to July '07

CONFERENCE
PUBLICATIONS

(For theory papers, author names are listed alphabetically.)

- *Multi-Armed Bandits with Bounded Arm-Memory: Near-Optimal Guarantees for Best-Arm Identification and Regret Minimization.*
Arnab Maiti, Vishakha Patil, Arindam Khan.
To appear in Thirty-sixth Annual Conference on Neural Information Processing Systems (**NeurIPS**): 2021.
- *A 3-Approximation Algorithm for Maximum Independent Set of Rectangles.*
Waldo Gálvez, Arindam Khan, Mathieu Mari, Tobias Mömke, Madhusudhan Reddy Pittu, Andreas Wiese.
To appear in ACM-SIAM Symposium on Discrete Algorithms (**SODA**): 2022.
- *Tight Approximation Algorithms for Geometric Bin Packing with Skewed Items.*
Arindam Khan, Eklavya Sharma.
International Workshop on Approximation Algorithms for Combinatorial Optimization (**APPROX**): 22:1-22:23, 2021.
- *Peak Demand Minimization via Sliced Strip Packing.*
Max A. Deppert, Klaus Jansen, Arindam Khan, Malin Rau, Malte Tutas.
International Workshop on Approximation Algorithms for Combinatorial Optimization (**APPROX**): 21:1-21:24 2021.
- *On Guillotine Separable Packings for the Two-Dimensional Geometric Knapsack Problem.*
Arindam Khan, Arnab Maiti, Amatya Sharma, Andreas Wiese.
International Symposium on Computational Geometry (**SOCG**), 48:1-48:17, 2021.
Selected for presentation in Highlights of Algorithms (**HALG**) 2021.
- *Improved Approximation Algorithms for 2-Dimensional Knapsack: Packing into Multiple L-Shapes, Spirals, and More.*
Waldo Gálvez, Fabrizio Grandoni, Arindam Khan, Diego Ramírez, Andreas Wiese.
International Symposium on Computational Geometry (**SOCG**), 39:1–39:17, 2021.
Selected for presentation in Highlights of Algorithms (**HALG**) 2021.
- *Group Fairness for Knapsack Problems.*
Deval Patel, Arindam Khan, Anand Louis.
International Conference on Autonomous Agents and Multiagent Systems (**AA-MAS**), p. 1001-1009, 2021.

- *Best-Fit Bin Packing with Random Order Revisited.*
Susanne Albers, Arindam Khan and Leon Ladewig.
International Symposium on Mathematical Foundations of Computer Science (**MFCS**):
7:1-7:15, 2020.
Best Paper Award sponsored by EATCS (European Association of Theoretical
Computer Science).
Selected for presentation in Highlights of Algorithms (**HALG**) 2021.
- *On guillotine separability of squares and rectangles.*
Arindam Khan, Madhusudhan Reddy Pittu.
International Workshop on Approximation Algorithms for Combinatorial Optimiza-
tion (**APPROX**): 47:1-47:22, 2020.
Selected for presentation in Highlights of Algorithms (**HALG**) 2021.
- *A Tight $(3/2 + \epsilon)$ Approximation for Skewed Strip Packing.*
Waldo Galvez, Fabrizio Grandoni, Klaus Jansen, Arindam Khan, Malin Rau.
International Workshop on Approximation Algorithms for Combinatorial Optimiza-
tion (**APPROX**): 44:1-44:18, 2020.
Selected for presentation in Highlights of Algorithms (**HALG**) 2021.
- *Improved Online Algorithms for Knapsack and GAP in the Random Order Model.*
Susanne Albers, Arindam Khan, Leon Ladewig.
International Workshop on Approximation Algorithms for Combinatorial Optimiza-
tion (**APPROX**): 22:1–22:23, 2019.
Selected for presentation in Highlights of Algorithms (**HALG**) 2020.
- *Approximating Geometric Knapsack via L-packings.*
Waldo Galvez, Fabrizio Grandoni, Salvatore Ingala, Arindam Khan, Andreas Wiese.
58th IEEE Annual Symposium on Foundations of Computer Science
(**FOCS**): 260–271, 2017.
Selected for presentation in Highlights of Algorithms (**HALG**) 2018.
- *Improved Pseudo-Polynomial-Time Approximation for Strip Packing.*
Waldo Galvez, Fabrizio Grandoni, Salvatore Ingala, Arindam Khan.
Foundations of Software Technology and Theoretical Computer Science
(**FSTTCS**): 9:1–9:4, 2016.
- *Improved Approximation for Vector Packing.*
Nikhil Bansal, Marek Elias and Arindam Khan.
27th Annual ACM-SIAM Symposium on Discrete Algorithms
(**SODA**): 1561-1579, 2016.
- *On Weighted Bipartite Edge Coloring.* Arindam Khan, Mohit Singh.
Foundations of Software Technology and Theoretical Computer Science
(**FSTTCS**): 136-150, 2015.
- *An Improved Approximation Algorithm for Two-Dimensional Bin Packing.*
Nikhil Bansal, Arindam Khan. 25th Annual ACM-SIAM Symposium on Discrete
Algorithms (**SODA**): 13-25, 2014.
- *Role of Conformity in Opinion Dynamics in Social Networks.*
Abhimanyu Das, Sreenivas Gollapudi, Arindam Khan and Renato Paes Leme.
ACM Conference on Online Social Networks (**COSN**):25-36, 2014.
- *Discovering Bucket Orders from Data.*
Sreyash Kenkre, Arindam Khan and Vinayaka Pandit.
SIAM International Conference on Data Mining (**SDM**):872-883, 2011.

JOURNAL
PUBLICATIONS

(For theory papers, author names are listed alphabetically.)

- *Approximating Geometric Knapsack via L-packings,*
Waldo Galvez, Fabrizio Grandoni, Salvatore Ingala, Arindam Khan, Andreas Wiese.
To appear in ACM Transactions on Algorithms (**TALG**).
- *Best-Fit Bin Packing with Random Order Revisited.*

Susanne Albers, Arindam Khan and Leon Ladewig.

Algorithmica 83(9): 2833-2858 (2021)

- *Improved Online Algorithms for Knapsack and GAP in the Random Order Model.*
Susanne Albers, Arindam Khan, Leon Ladewig.
Algorithmica 83(6): 1750-1785 (2021).
- *The matching augmentation problem: a $7/4$ -approximation algorithm.*
Joseph Cheriyan, Jack Dippel, Fabrizio Grandoni, Arindam Khan, Vishnu V. Narayan.
Mathematical Programming, 182, pages 315–354, 2020.
- *Approximation and online algorithms for multidimensional bin packing: A survey.*
Henrik I. Christensen, Arindam Khan, Sebastian Pokutta, Prasad Tetali.
Computer Science Review, 24: 63-79, 2017.
- *On Mimicking Networks Representing Minimum Terminal Cuts.*
Arindam Khan, Prasad Raghavendra.
Information Processing Letters (**IPL**), Volume 114, Issue 7, Pages 365-371, 2014.
- *Diffuse Reflection Diameter and Radius for Convex Quadrilateralizable Polygons.*
Arindam Khan, Sudebkumar Pal, Mridul Aanjaneya, Arijit Bishnu, Subhas Nandy.
Discrete Applied Mathematics (**DAM**), 161(10-11): 1496-1505 (2013).
- *Attribute-Based Messaging: Access Control and Confidentiality.*
Rakeshbabu Bobba, Omid Fatemeh, Fariba Khan, Arindam Khan, Carl A. Gunter, Himanshu Khurana, Manoj Prabhakaran.
ACM Transactions on Information and System Security (**TISSEC**). 13(4): 31:1-31:35 (2010)

PAPERS IN
SUBMISSION/
MANUSCRIPT

- *Universal and Tight Online Algorithms for Generalized-Mean Welfare.*
Siddharth Barman, Arindam Khan, Arnab Maiti.
CoRR abs/2109.00874 (2021)
- *Approximation for Generalized Multidimensional Bin Packing,*
Sreenivas Karnati, Arindam Khan, and Eklavya Sharma.
CoRR abs/2106.13951 (2021).
- *Approximation Algorithms for Generalized Multidimensional Knapsack.*
Arindam Khan, Eklavya Sharma, K. V. N. Sreenivas.
CoRR abs/2102.05854 (2021).
- *Group Fairness for Knapsack Problems.*
Deval Patel, Arindam Khan, Anand Louis.
Under submission (invited for Special Issue of JAAMAS on Fair Division) in Journal for Autonomous Agents and Multiagent Systems (JAAMAS).
- *A Tight $(3/2 + \epsilon)$ Approximation for Skewed Strip Packing.*
Waldo Galvez, Fabrizio Grandoni, Klaus Jansen, Arindam Khan, Malin Rau.
Under submission in Algorithmica.
- *On Minimum Linear Ordering Problems,*
Arindam Khan, Prasad Tetali.
- *A Geometric Approach to Diverse Group Formation,*
Sreenivas Gollapudi, Arindam Khan, Janardhan Kulkarni and Kunal Talwar.

GRANTS

- *Pratishtha Trust Young Investigator Award*, 2021: Contingency INR 3,00,000, Honorarium INR 6,00,000.
- Co-PI (with Dr. Siddharth Barman and Dr. Anand Louis) for the center on *polynomials as an algorithmic paradigm*, supported by **Indo-US Science and Technology Forum (IUSSTF)**. This is a joint Indo-US Virtual Network Center with Georgia Tech, TIFR, and UC Berkeley.
- IISc-NPCI consultancy project (with Prof. Shalabh Bhatnagar).
- IISc startup grant of INR 38,00,000.
- IISc travel grant of INR 2,00,000 to attend APPROX'19 at MIT, USA.

AWARDS/ACHIEVEMENTS

- **Pratishtha Trust Young Investigator Award**, 2021.
- **Best Paper Award** at the 45th International Symposium on Mathematical Foundations of Computer Science (MFCS) 2020. The award is sponsored by EATCS (European Association for Theoretical Computer Science).
- Five papers are selected for contributed presentations in Highlights of Algorithms (HALG), 2021.
- SIAM Student Travel Award for SODA 2014.
- Winner, Palletization Contest, IEEE ICRA 2013 Robot Challenge - VMAC : Virtual Manufacturing Automation Competition.
- CETL/BP Outstanding Teaching Assistant Award 2013 Finalist, Georgia Tech. (One nominee from each school).
- Winner of Google Games: programming and puzzles competition, Atlanta, 2012 and 2013.
- Georgia Tech ARC Fellowship, Fall 2012.
- Georgia Tech ACO Fellowship, Fall 2010.
- IBM Blue Scholarship, 2009.
- Nominated for *Innovative Students Project Award for Masters level projects*, Indian National Academy of Engineering, 2009.
- Highest Semester GPA at IIT Kharagpur in four semesters (Autumn 2007 to Spring 2009 : 10, 9.78, 9.86, 10 respectively).
- Jagadis Bose National Science Talent Search Scholarship, 2005.
- 1st in Mathematical Olympiad Contest in Kshitij, IIT Kharagpur, 2008.
- State-level topper in Mathematics Aptitude Test (MAT), 2002.
- State-level topper in Achievement cum Diagnostic Test in Mathematics (ADTM), organized by Center for Pedagogical Studies in Mathematics, India (CPSM), 2002.

STUDENTS

Present PhD Students:

- Vishakha Patil (Joint with Prof. Y. Narahari). (Recipient of **Google PhD Fellowship** (only 4 in the country) and PMRF Fellowship (declined).)
- Aditya Subramanian.
- Aditya Lonkar.

Present M.Tech Research Students:

- Swati Allabadi (Joint with Dr. Anand Louis),
- KVN Sreenivas.

Graduated Students:

- Eklavya Sharma (2019-2021) [M.Tech (Research)], now PhD student at UIUC.
- Arka Ray (2019-2021) [M.Tech (Coursework)], now RA at IISc.

Present/Past Interns/Project Assistants:

Aditya Varre (IIT Bombay, now at EPFL Switzerland), Karthik Murali (NIT Suratkal, now at Univ. of Waterloo), Madhusudhan Reddy Pittu (IIT Kharagpur, now at CMU), Siddharth Jayshankar (IIT Kanpur, now at Microsoft Research India), Kishen Gowda (IIT Gandhinagar, now at University of Maryland, College Park), Arnab Maiti (IIT Kharagpur), Amatya Sharma (IIT Kharagpur), Debajyoti Kar (IIT Kharagpur), Siba Smarak Panigrahy (IIT Kharagpur), Debarsho Sannyashi (IIT Kanpur), Shreyans Nagori (IIT Delhi), Santanu Rathod (IIT Bombay), Nikhil Ayyadevara (IIT Delhi), Rajni Dabas (through *ACM India Anveshan Setu Fellowship*). Dhawal Jethwani (IIT BHU)

RECENT INVITED
TALKS

- IISc-MSR Theory Seminar, Online, 2021.
- Summer School on Theoretical Foundations of Computer Science, Online, 2021.
- International Bin Packing Seminar, Online, 2021.
- EECS Symposium, IISc Bengaluru, 2020.
- Recent Trends in Algorithms, IIT Gandhinagar, India, 2020.
- CALDAM Indo-French Pre-Conference School on Algorithms and Combinatorics, IIT Hyderabad, India, 2020.
- Research workshop in University of Chile, Santiago, Chile, 2020.
- Georgia Tech ACO seminar, Atlanta, USA, 2019.
- IIT Kharagpur Theory seminar, Kharagpur, India, 2019.
- TIFR Theory Seminar, TIFR, Bombay, 2018.
- IIT Bombay Theory Seminar, IIT Bombay, 2018.
- Kiel University Theory Seminar, Kiel, Germany, 2017.
- EADS Seminar, University of Copenhagen, Denmark, 2017.
- TUM OR Seminar, Munich, Germany, 2017.
- ARC Seminar, Georgia Tech, Atlanta, 2015.
- ISI Theory Seminar, Kolkata, 2015.
- TU Eindhoven Theory Seminar, Eindhoven, Netherlands, 2014.

TEACHING
EXPERIENCE

As Instructor:

- At Indian Institute of Science, Bengaluru, India:
 - E0206: Theorist's Toolkit (Online, Aug- Dec 2021)
(Co-taught with Dr. Anand Louis).
 - E0234: Introduction to Randomized Algorithms (Online, February 2021-June 2021)
(Co-taught with Dr. Siddharth Barman).
 - E0206: Theorist's Toolkit (Online, October 2020 - January 2021)
(Co-taught with Dr. Anand Louis).
 - E0249: Approximation Algorithms (Jan-June 2020)
(Co-taught with Dr. Anand Louis).
 - E0225: Design and Analysis of Algorithms (Aug-Dec 2020)
(Co-taught with Dr. Anand Louis).
 - E0249: Approximation Algorithms (Jan-June 2019)
(Co-taught with Dr. Anand Louis).
- At Indian Statistical Institute, Kolkata, India:
 - Approximation Algorithms: Research Course (Fall 2015)
(Co-taught with Prof. Arijit Bishnu).

As Teaching Assistant:

- At Georgia Tech, USA:
 - (*Nominated for CETL/BP Outstanding Graduate Teaching Assistant*)
 - CS4510: Automata and Complexity (Spring 2012).
 - CS6505: Computability and Algorithms (Spring 2013).
 - CS4540: Advanced Algorithms (Spring 2014) (taught approximation algorithms).
 - CS4510: Automata and Complexity (Spring 2014)(held monthly review sessions).

CS6505: Computability, Complexity and Algorithms (Spring 2014).
CS3510: Design and Analysis of Algorithms (Spring 2015).

PROFESSIONAL
SERVICE

- Senior Member, IEEE (elevation to the grade of IEEE Senior member from 2021).
- Member of ACM and SIAM.
- Participated as mentor in ACM India Anveshan Setu Fellowship 2021.
- Reviewer/subreviewer for conferences: STOC, FOCS, SODA, ITCS, ICALP, ESA, SPAA, FSTTCS, APPROX, SWAT, STACS, WAOA, CIAC, WG, etc.
- Reviewer/subreviewer for journals: SIAM Journal on Computing (SICOMP), IEEE Transactions on Information Theory, Mathematical Programming, Discrete Optimization, Journal of Scheduling, Inform Journal on Computing, Algorithmica, TALG, TOCS, Operations Research, etc.
- Organizer, [International Bin Packing Seminar](#), Online, 2021.
- Organizer, [IISc-MSR Theory Seminar](#), Online, 2021.
- Organizer, Quantum workshop, SPCOM 2020.
- Member, Departmental Finance Committee (DFC) (2019-present), Building Committee (2019-present), CSA Outreach Committee (2021-present).
- Faculty coordinator, CSA Undergraduate Summer School, 2019.