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Profiles: [Google Scholar](#), [dblp](#), [LinkedIn](#)

Education

- 2020 **PhD in Theoretical Computer Science (Verification)**
(Expected) IST Austria (Institute of Science and Technology Austria)
Advisor: Krishnendu Chatterjee
- 2017 **MSc in Computer Science (Systems)**
Georgia Tech (Georgia Institute of Technology)
GPA: 3.7/4
- 2017 **Graduate Diploma in Mathematics**
University of London (London School of Economics and Political Science)
Grade: Distinction
- 2015 **BSc in Mathematics**
Yazd University
Advisor: Mohammad Farshi, GPA: 17.98/20 (Distinction)
- 2014 **BSc in Computer Science**
Yazd University
Advisor: Mohammadreza Hooshmandasl, GPA: 17.87/20 (Distinction)

Grants and Fellowships

- 2019–2021 **Facebook PhD Fellowship** – \$159,000
- 2019 **Facebook Internship Fellowship** – \$56,000
- 2018–2021 **Doctoral Fellowship (DOC)** of the Austrian Academy of Sciences – €112,500
- 2018–2020 **IBM PhD Fellowship** – \$120,000 – declined in 2019
- 2015–2020 **IST Austria PhD Fellowship** – €180,000
- 2019 **Scheme 7 Research Grant** of the London Mathematical Society (LMS) – £1,000
- 2019 **IEEE ComSoc Student Travel Grant** for ICBC – \$600
- 2019 **ACM SIGPLAN Student Grant** for POPL/PLMW – \$650
- 2018 **Scheme 7 Research Grant** of the London Mathematical Society (LMS) – £500
- 2017 **Internship Fellowship** of the IMDEA Software Institute – €7,000
- 2015 **Internship Scholarship** of the Austrian Exchange Agency (OeAD) – €3,600
- 2012–2015 **Yazd University Exceptional Talent Fellowship** – €6,000
- 2011–2015 **Iranian National Elites Foundation Stipend** – €2,400

Awards and Honours

2019 **IEEE Computer Society Best Student Paper Award**

Also known as the Lance Stafford Larson Prize
First Place for [POPL'19], \$500

2018 **Khwarizmi Research Award**

Iran's Most Prestigious Research Prize
Awarded by the Iranian President to 10 researchers each year
Ranked First in the "Basic Sciences" Category, €5,000
Youngest laureate in the history of the Award (age at the time: 23)

International Mathematics Competition for University Students (IMC)

- 2015 Gold Medal (First Prize)
- 2014 Silver Medal (Second Prize)
- 2013 Silver Medal (Second Prize)
- 2012 Bronze Medal (Third Prize)

ACM International Collegiate Programming Contest (ICPC)

- 2015 World Finalist
- 2014 Gold Medal (1st Team) – Asian Regional Contest, Lahore
- 2013 Bronze Medal – Asian Regional Contest, Tehran
- 2011 Bronze Medal – Asian Regional Contest, Tehran

2015 **Outstanding Improvement Award**

(as Co-leader of Yazd University Mathematics Competitions Team)
Awarded by the Iranian Mathematical Society for the highest 3-year performance growth among teams participating in the Iranian Mathematics Competition

2015 **Heidelberg Laureate Forum**

Meeting of Turing and Fields Laureates with Selected Young Researchers
Attended with nomination by ACM

2014 **Southeastern European Mathematics Olympiad for University Students**

Gold Medal

North Countries Universities Mathematical Competition

- 2017 Third Prize
- 2016 Third Prize

2014 **Iranian Nationwide Exam for Entrance to Graduate Studies (Concours)**

Ranked 3rd in Computer Science and 13th in Mathematics
Ranked 11th in Sanjesh Olympiad in Mathematics

Iranian Mathematics Competition for University Students (IMS)

- 2013 Silver Medal
- 2012 Bronze Medal

Iranian National Olympiad in Informatics

- 2011 Silver Medal
- 2010 Silver Medal

Publications

In Computer Science, conferences are the main peer-reviewed venue of publication and conference papers are at least as prestigious as journal articles. Especially, publishing in flagship and top-rated conferences is extremely competitive.

Conference rankings below are quoted from the CCF (Chinese Computing Federation) and CORE (Computing Research and Education, Australia) websites. The highest possible rank is *A* in CCF and *A** in CORE. Note that CCF is extremely selective and only the very top conferences/journals are ranked as *A*.

Names appear in alphabetical order, except that co-authors who are located in countries where the order matters in their career (e.g. China, Iran, Russia) are put first.

PEER-REVIEWED CONFERENCE PUBLICATIONS

- [PLDI'20]
CCF: A, CORE: A*

1. K. Chatterjee, H. Fu, A.K. Goharshady, E.K. Goharshady
Polynomial Invariant Generation for Non-deterministic Recursive Programs
41st ACM Conference on Programming Language Design and Implementation, PLDI 2020
- [ESOP'20]
CORE: A

2. K. Chatterjee, A.K. Goharshady, R. Ibsen-Jensen, A. Pavlogiannis
Optimal and Perfectly Parallel Algorithms for On-demand Data-flow Analysis
29th European Symposium on Programming, ESOP 2020
- [OOPSLA'19]
CCF: A, CORE: A*

3. M. Huang, H. Fu, K. Chatterjee, A.K. Goharshady
Modular Verification for Almost-Sure Termination of Probabilistic Programs
34th ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications, OOPSLA 2019
- [PLDI'19]
CCF: A, CORE: A*

4. P. Wang, H. Fu, A.K. Goharshady, K. Chatterjee, X. Qin, W. Shi
Cost Analysis of Nondeterministic Probabilistic Programs
40th ACM Conference on Programming Language Design and Implementation, PLDI 2019
- [ICBC'19]

5. K. Chatterjee, A.K. Goharshady, A. Pourdamghani
Probabilistic Smart Contracts: Secure Randomness on the Blockchain
IEEE International Conference on Blockchain and Cryptocurrency, ICBC 2019
- [SAC'19a]
CORE: B

6. K. Chatterjee, A.K. Goharshady, A. Pourdamghani
Hybrid Mining: Exploiting Blockchain's Computational Power for Distributed Problem Solving
34th ACM Symposium on Applied Computing, SAC 2019
- [SAC'19b]
CORE: B

7. K. Chatterjee, A.K. Goharshady, E.K. Goharshady
The Treewidth of Smart Contracts
34th ACM Symposium on Applied Computing, SAC 2019
- [POPL'19]
CCF: A, CORE: A*

8. K. Chatterjee, A.K. Goharshady, N. Okati, A. Pavlogiannis
Efficient Parameterized Algorithms for Data Packing
46th ACM Symposium on Principles of Programming Languages, POPL 2019
IEEE Computer Society Best Student Paper Award

- [CONCUR'18]
CORE: A
9. K. Chatterjee, A.K. Goharshady, R. Ibsen-Jensen, Y. Velner
Ergodic Mean-payoff Games for the Analysis of Attacks in Cryptocurrencies
29th International Conference on Concurrency Theory, CONCUR 2018
- [Blockchain'18]
10. A.K. Goharshady, A. Behrouz, K. Chatterjee
Secure Credit Reporting on the Blockchain
IEEE International Symposium on Blockchain and its Applications, Blockchain 2018
- [IJCAI'18]
CCF: A, CORE: A*
11. K. Chatterjee, H. Fu, A.K. Goharshady, N. Okati
Computational Approaches for Stochastic Shortest Path on Succinct MDPs
27th International Joint Conference on Artificial Intelligence, IJCAI 2018
- [ESOP'18]
CORE: A
12. K. Chatterjee, A.K. Goharshady, Y. Velner
Quantitative Analysis of Smart Contracts
27th European Symposium on Programming, ESOP 2018
- [ATVA'17]
CORE: A
13. K. Chatterjee, A.K. Goharshady, A. Pavlogiannis
JTDec: A Tool for Tree Decompositions in Soot
15th International Symposium on Automated Technology for Verification and Analysis, ATVA 2017
- [CAV'17]
CCF: A, CORE: A*
14. K. Chatterjee, H. Fu, A.K. Goharshady
Non-polynomial Worst-case Analysis of Recursive Programs
29th International Conference on Computer Aided Verification, CAV 2017
- [CAV'16]
CCF: A, CORE: A*
15. K. Chatterjee, H. Fu, A.K. Goharshady
Termination Analysis of Probabilistic Programs through Positivstellensatz's
28th International Conference on Computer Aided Verification, CAV 2016
- [POPL'16]
CCF: A, CORE: A*
16. K. Chatterjee, A.K. Goharshady, R. Ibsen-Jensen, A. Pavlogiannis
Algorithms for Algebraic Path Properties in Concurrent Systems of Constant Treewidth Components
43rd ACM Symposium on Principles of Programming Languages, POPL 2016
- [SGT'15]
17. M.R. Hooshmandasl, M.A. Meybodi, A.K. Goharshady, A.Shakiba
A Combinatorial Approach to Certain Topological Spaces Based on Minimum Complement S-Approximation Spaces
8th Iranian Seminar on Geometry and Topology, 2015

PEER-REVIEWED JOURNAL PUBLICATIONS

- [IJMSI'20]
18. A. Shakiba, A.K. Goharshady, M.R. Hooshmandasl, M.A. Meybodi
A Note on Belief Structures and S-Approximation Spaces
Iranian Journal of Mathematical Sciences and Informatics, IJMSI 2020
- [TOPLAS'19a]
CCF: A
19. K. Chatterjee, A.K. Goharshady, P. Goyal, R. Ibsen-Jensen, A. Pavlogiannis
Faster Algorithms for Dynamic Algebraic Queries in Basic RSMs with Constant Treewidth
ACM Transactions on Programming Languages and Systems, TOPLAS 2019

- [TOPLAS'19b] CCF: A 20. K. Chatterjee, H. Fu, A.K. Goharshady
Non-polynomial Worst-case Analysis of Recursive Programs
ACM Transactions on Programming Languages and Systems, TOPLAS 2019
- [RESS'19] IF:4.039 21. A.K. Goharshady, F. Mohammadi
An Efficient Algorithm for Computing Network Reliability in Small Treewidth
Reliability Engineering and System Safety, 2019
- [TOPLAS'18] CCF: A 22. K. Chatterjee, A.K. Goharshady, R. Ibsen-Jensen, A. Pavlogiannis
Algorithms for Algebraic Path Properties in Concurrent Systems of Constant Treewidth Components
ACM Transactions on Programming Languages and Systems, TOPLAS 2018
- [DAM'15] 23. A.K. Goharshady, M.R. Hooshmandasl, M.A. Meybodi
[1, 2]-sets and [1, 2]-total Sets in Trees with Algorithms
Discrete Applied Mathematics, 2015
- [JDM'14] 24. M.R. Hooshmandasl, A. Shakiba, A.K. Goharshady, A. Karimi
S-Approximation: A New Approach to Algebraic Approximation
Journal of Discrete Mathematics, 2014

SUBMITTED MANUSCRIPTS AWAITING PEER-REVIEW

- [ACGMP'20] • A. Asadi, K. Chatterjee, A.K. Goharshady, K. Mohammadi, A. Pavlogiannis
Faster Algorithms for Quantitative Analysis of Markov Chains and Markov Decision Processes with Small Treewidth

NON-RESEARCH PUBLICATION

- A.K. Goharshady
Introducing the Heidelberg Laureate Forum
Newsletter of the Iranian Mathematical Society (in Persian), vol. 142 (1393:4), 2015

Supervising Experience

- ongoing **Scientific Supervision of Research Interns at IST Austria**
Pratyush Agarwal, Ali Asadi, Mohammad Mahdavi, Parsa Mirtaheri, Kiarash Mohammadi, Shreya Pathak
- 2019 Ehsan Kafshdar Goharshady, led to publications [SAC'19b, PLDI'20]
- 2018–2019 Arash Pourdamghani, led to publications [SAC'19a, ICBC'19]
- 2018 Ali Behrouz, led to publication [Blockchain'18]
- 2017–2018 Nastaran Okati, led to publications [IJCAI'18, POPL'19]
- 2018–2019 **Co-leader of the University of Bristol Mathematics Team at IMC**
- 2013–2015 **Co-leader of Yazd University Mathematics Competitions Team**

Teaching Experience

- AS LECTURER
- Yazd University (Undergraduate Courses)**
- 2014–2015 Problem Solving for Mathematics Competitions

2012–2015 Design and Implementation of Algorithms

Shahid Bahonar University of Kerman (Undergraduate Course)

2014 Design and Implementation of Algorithms

2010–2015 **Mathematics and Computing Olympiads Training Courses**

- National Exceptional Talents Organisation of Iran
- Education Organisations of Provinces of Kerman, Yazd and Khorasan-e Razavi
- High Schools of Hasheminejad (Mashhad), Farzanegan (Mashhad), Tabatabaee (Bonab), Ejei (Isfahan), Sadouqi (Yazd) and Farzanegan Amin (Isfahan)

AS TEACHING ASSISTANT

IST Austria (PhD Courses)

2020 Computer Science Track Core Course (Complexity Theory)

2018 Formal Methods

2017 Computer Science Track Core Course (Randomised Algorithms)

Sharif University of Technology

2016 Data Structures and Algorithms

Yazd University

2015 Programming with C, Advanced Programming with C++

2014 (Enumerative) Combinatorics, (Abstract) Algebra, Matrices and Linear Algebra

2017 **Art of Problem Solving (AoPS)**

Courses for Gifted High School Students and USA Maths Olympiad Preparation

Introduction to Algebra, Prealgebra, Introduction to Geometry, Introduction to Counting and Probability, AMC Advanced Preparation

AS GRADER

2018–2019 International Mathematics Competition for University Students (IMC)

2017 Czech-Polish-Slovak-Austrian (CPSA) Mathematics Olympiad

Exchange, Research Visits and Internships

09/2019 – 12/2019 **Facebook Research**

PhD Research Intern, Facebook Blockchain Research Team (Calibra)

02/2018 **University of Bristol**

Visiting Researcher, Fixed-Parameter Computational Algebra
Hosted by Fatemeh Mohammadi

09/2017 – 12/2017 **Madrid Institute for Advanced Studies (IMDEA)**

Research Intern, Logics and Algorithms for Verification of Hyperproperties
Advised by César Sánchez

2016 **University of Vienna**

Guest Doctoral Student

2016 **Vienna University of Technology (TU Wien)**

Guest Graduate Student

- 06/2015 – 09/2015 **IST Austria**
Research Intern, Fixed-Parameter Algorithms for Program Verification
Advised by Krishnendu Chatterjee
- 2013 – 2015 **Yazd Laboratory of Quantum Information Processing**
Research Assistant, Algorithms for Domination-like Problems on Graphs
Advised by Mohammad Reza Hooshmandasl
- 2013 **Hakim Sabzevari University**
Visiting Undergraduate Student

Talks and Presentations

INVITED TALKS

- 12/2019 **Termination Analysis of Probabilistic Programs**, Aarhus University
10/2018 **Introduction to Competitive Programming**, Yazd University
An Invitation to National Undergraduate Mathematics Competitions
09/2014 Vali-e Asr University of Rafsanjan
08/2014 Yazd University

CONFERENCE PRESENTATIONS

- 01/2019 **Efficient Parameterised Algorithms for Data Packing**, 46th ACM Symposium on Principles of Programming Languages (POPL)
09/2018 **Quantitative Analysis of Smart Contracts**, 12th Alpine Verification Meeting (AVM)
09/2018 **Ergodic Mean-Payoff Games for the Analysis of Attacks in Crypto-Currencies**, 29th International Conference on Concurrency Theory (CONCUR)
07/2018 **Secure Credit Reporting on the Blockchain**, IEEE International Symposium on Blockchain and its Applications
07/2018 **Computational Approaches for Stochastic Shortest Path on Succinct MDPs**, 27th International Joint Conference on Artificial Intelligence (IJCAI)
04/2018 **Quantitative Analysis of Smart Contracts**, 27th European Symposium on Programming (ESOP)
10/2017 **Faster Techniques for Analysis of Control Flow Graphs using Tree Decompositions**, 15th International Symposium on Automated Technology for Verification and Analysis (ATVA)
10/2016 **A Unifying Algorithm for Domination-like Problems in Graphs with Constant Treewidth**, 6th Polish Combinatorial Conference, Będlewo, Poland.

Other Activities and Skills

- 2017–2018 Representative of Computer Science Graduate Students at IST Austria
2017–2018 Member of IST Austria’s Task Force for the Improvement of the PhD Program
2018 Member of IST Austria’s internal awards committee for Best Lecturer and Best Teaching Assistant Awards

PEER-REVIEW

- ACM Transactions on Computational Logic (TOCL)
International Journal of Network Management
International Conference on Computer Science Logic (CSL 2020)

International Conference on Quantitative Evaluation of Systems (QEST 2019)
International Colloquium on Automata, Languages and Programming (ICALP 2019,
2020)
IEEE Transactions on Reliability
International Conference on Algebraic Combinatorics (FPSAC 2018)
Information Processing Letters
Acta Mathematica Sinica

LANGUAGES

Persian: Native (also familiar with Tajiki script)
English: Fluent
French: Basic (can read and write technical texts in computer science and maths)
Arabic: Intermediate
German: Basic

COMPUTING SKILLS

Professional in C, C++ and Java
Fluent in Python
Familiar with Android Development, Linux Shell Scripting, MIPS and JavaScript
OS: Debian-based distros of GNU/Linux, Editors: GNU Emacs and Eclipse
Experienced in \LaTeX

MEMBERSHIPS

IEEE Communications Society, since 2019
IEEE Computer Society, since 2018
Society for Industrial and Applied Mathematics (SIAM), since 2016
Association for Computing Machinery (ACM), since 2011
Iranian National [Scientific] Elites Foundation (BMN), since 2010
Young Scholars Club of Iran (YSC), 2010 to 2015
Iranian Mathematical Society, 2012 to 2014

References (Sorted alphabetically)

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