

Arash Rafiey

Associate Prof. Math and Computer Science
Indiana State University, IN, USA Sept.

2014–Current

Adjunct Prof. Simon Fraser University, Canada

Sept. 2015–Current

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Past Positions	◇ Postdoctoral Fellow, Simon Fraser University, Canada	May 2006- Sept. 2009
	◇ Researcher, IDSIA, Switzerland	Oct. 2009- Sept. 2011
	◇ Researcher, University of Bergen, Norway	Oct. 2011- Sept. 2012

Research Skills and Interests	◇ Design and Analysis of Algorithms
	◇ Operation Research with Applications in Healthcare
	◇ Machine Learning and Constraint Satisfaction Problem
	◇ Large Scale Optimization, Stochastic Optimization, Combinatorial Optimization and Scheduling
	◇ Data Mining and Pattern Recognition
◇ Computational Biology (Inverse Protein Folding, RNA and DNA folding, Sequencing)	

Honors and Awards	◇ National Science Foundation (NSF) Award (PI, 141 K)	Sept. 2017- Sept. 2020
	◇ Invited speaker to International Colloquium on Graphs and Optimization, Switzerland	July 2016
	◇ COMPETE research grant, awarded by Indiana State University	Sept. 2015- Sept. 2016
	◇ Invited speaker to Workshop on Graph Homomorphism(Fields Institute Toronto)	July 2011
	◇ PIMS Postdoctoral Fellowships, awarded by Pacific Institute for the Mathematical Sciences, Simon Fraser University	Sept. 2007-Sept. 2009
	◇ Thomas Holloway Studentship, awarded by Royal Holloway University of London	Sept. 2003-Aug. 2006
	◇ Overseas Research Scholarship, awarded by the Committee of Vice-Chancellors and Principals of the Universities of United Kingdom	Sept. 2004-Aug. 2006
◇ Silver Medal in Iranian Mathematics Olympiad for High School Students	1996	

Education	◇ PhD in Computer Science	Sept. 2003-Mar. 2006
	Department of Computing Science, Royal Holloway, University of London, London, U.K. THESIS : <i>Combinatorial Optimization and Extremal Problems in Digraphs (With Distinction)</i> SUPERVISORS: Prof. Gregory Gutin	
	◇ B.Sc. in Software Engineering	Sept. 1997 – May 2002
	Electrical and Engineering Department, Iran University , Tehran, Iran THESIS : <i>Circular Chromatic Number of Hypergraph (grade : 20 out of 20)</i>	

Selected Presentations	◇ <i>Digraphs and Polymorphisms</i>	
	<i>Workshop on Graph Classes, Optimization and Width Parameters (GROW 2017) (by invitations)</i> October 2017, Toronto , Canada.	
	◇ <i>Bi-Arc Digraphs and Conservative Polymorphisms</i>	
	<i>The 6-th Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM)</i> June 2017, Toronto, Canada.	

- ◇ ***Graph Classes and Ordering Characterizations***
International Colloquium on Graphs and Optimization, (GO X) July 2016, Rigi Kaltbad, Switzerland.
- ◇ ***Ordering With Forbidden Patterns***
ESA September 2014, Wroclo, Poland.
- ◇ ***Space Complexity of List H-coloring:a dichotomy.***
SODA Jan. 2014, Oregon, Portland, USA.

**Teaching Ex-
periences**

◇ **Courses Taught At Indiana State University**

- . Computer Networks Fall 2023
- . System Programming Spring 2020
- . Complexity Theory I (undergrad course) Spring 2020
- . Complexity Theory II (grad course) Spring 2020
- . Data Structure and Algorithm (undergrad) Fall 2016, 2017, 2018, 2019, 2020,2023
- . Algorithm I (grad and undergrad) Fall 2014, 2015, 2016, 2017 and Spring 2022,2023
- . Algorithm II (grad course) Spring 2015,2016, and 2017
- . Discrete Math and Advanced Discrete Math Fall 2014, 2015, and 2018
- . Computational Biology (grad course) Spring 2017
- . Software Project Fall 2016
- . Optimization Tools, Data Mining, and Big Data Spring 2016,2018
- . Introduction to Computer Science and Programming (80 students) Fall 2017,2018
- . Introduction to Computer Science (freshmen course 80 students) Spring 2015

◇ **Courses Taught At Simon Fraser University**

- . Data Structure and Algorithms (75 students) Summer 2014
- . Object-Oriented Application Design in C++ Summer 2008

**Supervision
Experiences**

◇ **PhD Students Co-supervision**

- . Kamyar Khodamoradi, Simon Fraser University Jan. 2013-Sept. 2017
Topic: Algorithms for scheduling and routing problems.
- . Ehsan Iranmanesh, Simon Fraser University Jan. 2013-Sept. 2016
Topic: Vehicle routing with skill sets.
- . Mayssam Nevisi, Simon Fraser University Jan. 2011- Mar. 2016
Topic : Matrix partitions of graphs: Algorithm and Complexity.
- . Mehdi Karimi, Simon Fraser University May 2007- May 2010
Topic : Minimum cost homomorphism to digraphs.
- . Alireza Khodabakhshi, Simon Fraser University May 2006- May 2010
Topic : Inverse protein folding problems.

◇ **Master Students Supervision/Co-supervision**

- . Ali Pazoki, Simon Fraser University Sept. 2015- Oct. 2017
Topic : List Homomorphism to oriented trees
- . Fateme Hadinezhad, Indiana State University Sept. 2015 May 2017
Topic: Sequence alignment

Services

- ◇ University Service
 - Member, University research council Aug. 2016- May 2018
 - Member, University faculty council Aug. 2016- May 2019
 - University search committee chairperson 2015, 2016, 2022, 2023
 - Computer Science Program Director Since January 2022
- ◇ Professional Service
 - Program Committee of COCOA conference 2023
 - Program Committee of ICORES conference 2015,16,17,18,23
 - Referee for Journal of Combinatorial Theory, Journal of Graph Theory, SIAM Journal of Discrete Math, Journal of Discrete Math, Journal of Discrete Applied Math, Electronic Journal of Combinatorics, Algorithmica and conferences such as STOC, FOCS, SODA, ICALP, ESA, IWOCA, and WG.

Applied Research Experiences

- ◇ **Optimizing automated patient-specific refill packaging and delivery schedules**
BC Courier problem for Fraser Health of British Columbia May 2013- May 2014
 - Design a model for sending samples from host hospitals to destinations and minimizing the traveling time and maximizing the coverage.
 - Implementation in C++
 - Resulted Paper : [A Network Model for the Hospital Routing Problem](#) ICORES 2015.
- ◇ **Coordinated scheduling problem with time window constraints**
Joint work with school of Business, Simon Fraser University Sept. 2009- Nov. 2010
 - Modeled the problem as a network flow with specific properties
 - Designed and implemented an efficient algorithm in C++
 - Resulted Paper : [Coordinated Scheduling of a Single Machine with Sequence Dependent Setup Times and Time Window Constraints](#).
Int. Journal of Production Research, 50 (8): (2012).
- ◇ **Level of Repair Analysis of interest of UK and US military** Sept. 2004- Dec. 2005
 - Model the defense logistics support planning problem as a graph homomorphism problem
 - Designed the first polynomial time algorithm to solve the problem
 - Resulted paper: [Level of Repair Analysis and Minimum Cost Homomorphism of Graphs](#).
Discrete Applied Math. 154 : 881-889 (2006).
- ◇ **Data Mining, Finding Patterns** Sept. 2008- Sept. 2009
 - Resulted paper: [Mining cohesive patterns from graphs with feature vectors](#) .
ACM-SIAM Data Mining Conference 2009.
- ◇ **Computer Vision, Pattern Recognition** Sept. 2001- Sept. 2002
 - Resulted paper: [On the skeletons attached to the grey scale images](#). ICMLA 2002.

References

- ◇ **Professor Pavol Hell**
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- ◇ **Professor Gregory Gutin**
Department of Computer Science
Royal Holloway, University of London
Egham, Surrey TW20 0EX United Kingdom
Email : gutin@cs.rhul.ac.uk tel : +44 1784 414229
- ◇ **Professor Binay Bhattacharya**
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◇ **Professor Geoffrey Exoo**

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Terre Haute, Indiana, USA

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