

# Sainyam Galhotra

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## CONTACT INFORMATION

Graduate Student  
College of Information and Computer Science  
University of Massachusetts  
Amherst, USA

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## RESEARCH INTERESTS

Influence Maximization, Entity Resolution, Software testing, Large-scale Data Mining, Graph theory and Social Network Analysis

## EDUCATION

**Master's and PhD in Computer Science,**  
*University of Massachusetts, Amherst, USA*

CGPA : 4.0/4.0  
Sept 2015 - Present

**B.Tech in Computer Science and Engineering,**  
*Indian Institute of Technology (IIT), Delhi, India*

July 2010 - May 2014

## SELECTED PUBLICATIONS

- **Sainyam Galhotra**, Arya Mazumdar, Soumyabrata Pal and Barna Saha. 'The Geometric Block Model.' **AAAI 2018**, shorter version in NIPS Workshop (LDFGG) 2017.
- **Sainyam Galhotra**, Donatella Firmani, Barna Saha and Divesh Srivastava. 'Robust Entity Resolution via Crowdsourcing' **ACM SIGMOD Conference 2018**.
- **Sainyam Galhotra**, Yuriy Brun and Alexandra Meliou. 'Fairness Testing: Testing Software for Discrimination.' **ESEC/SIGSOFT FSE 2017**.  
**ACM SIGSOFT DISTINGUISHED PAPER AWARD**
- **Sainyam Galhotra\***, Akhil Arora\* and Sayan Ranu. 'Debunking the Myths of Influence Maximization'. **ACM SIGMOD Conference 2017**.
- **Sainyam Galhotra\***, Akhil Arora\* and Shourya Roy. 'Holistic Influence Maximization: Combining Scalability and Efficiency with Opinion-Aware Models'. **ACM SIGMOD Conference 2016**.
- **Sainyam Galhotra**, Amitabha Bagchi, Srikanta Bedathur, Maya Ramanath and Vidit Jain. 'Tracking the Conductance of Rapidly Evolving Topic-Subgraphs'. Proceedings of Conference on Very Large Databases, **VLDB 2016**.
- **Sainyam Galhotra**, Akhil Arora, Srinivas Virinchi and Shourya Roy. 'ASIM: A Scalable Algorithm for Influence Maximization under the Independent Cascade Model'. World Wide Web Conference, **WWW Companion 2015**.
- Vidit Jain and **Sainyam Galhotra**. 'Min- $d$ -Occur: Ensuring Future Occurrences in Streaming Sets'. Conference on Uncertainty in Artificial Intelligence, **UAI 2014**.

## WORK EXPERIENCE

**Google Research**, Mountain View, USA : Research Internship  
*Devise analytics support over google datasets*

May 2016 - August 2016

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\*Equal Contribution

Devised efficient and scalable algorithms for recommending services to fasten the feature engineering pipeline on billions of internal datasets.

**Xerox Research Center India (XRCI) : Budding Scientist**

*Member of Text and Graph Analytics team*

June 2014 - August 2015

Worked on devising scalable algorithms to solve complex problems in the area of data mining and graph mining.

**Yahoo Labs, Bangalore, India : Research Internship**

*Predicting trends with high probability*

May 2013 - July 2013

Designed an algorithm to predict trending topics and tested it on real time twitter data. This work has been published in UAI - 2014.

**École Nationale Supérieure des Télécommunications, France**

*JVM Modification to offer Dynamic Software Updates*

May 2012 - July 2012

Corrected and improved the Continuations extension of Java Virtual Machine (JVM). Extended continuations to implement a prototype of Dynamic Software Updating.

MASTER'S THESIS

**Crowdsourced Entity Resolution**

January 2016 - May 2017

Working with Prof. Barna Saha (UMass), Dr. Divesh Srivastava (AT&T) and Dr. Donatella Firmani (University of Rome Tre) to devise robust algorithms to assign questions to the faulty crowd and use their answers to cluster the data items. The main focus is towards reducing the cost and minimizing the number of queries to the crowd.

INVITED TALKS

1. Tracking the Conductance of Rapidly Evolving Topic-Subgraphs
  - **Indian Institute of Technology (IIT), Delhi** September 2016
  - **NDA Workshop, co-located with SIGMOD 2016, CA, USA** July 2016
2. Holistic Influence Maximization: Combining Scalability and Efficiency with Opinion-Aware Models
  - **University of California, Santa Barbara, California** June 2016
  - **Facebook Inc., Menlo Park, California** June 2016
  - **Palo Alto Research Centre (PARC), California** June 2016
3. ASIM: A Scalable Algorithm for Influence Maximization under the Independent Cascade Model
  - **University of Perugia, Italy** May 2015

AWARDS AND ACHIEVEMENTS

- First recipient of **Krithi Ramamritham Computer Science Scholarship** (2016-17) among the UMass CS graduate students for the contribution towards research in data management, computer systems, or related fields.
- Received SIGMOD travel award consecutively for two years (2016 and 2017).
- Granted UAI 2014 Scholarship.
- Presented paper at conferences held at **SUDA Research Institute**, China 2013 and **WWW 2015**, Italy.
- **National Initiative of Undergraduate Studies (NIUS)** scholar, since 2010.
- **All India Rank 53** in IIT-JEE (Joint Entrance Examination)-2010 among over 500,000 students.
- **State Rank 1** and **All India Rank 20** in AIEEE (All India Engineering Entrance Examination)-2010 among about 1 million students.
- Awarded CBSE Certificates of Merit in mathematics for being among the **top 0.1%** nationwide in Secondary and Senior Secondary years, respectively.
- Awarded school topper **gold medal** in National Science Olympiad (NSO) and a **silver medal** in mathematics olympiad.

- Secured **first position** among Physics, Chemistry, Mathematics stream for Common Entrance Test of Panjab University, Chandigarh - 2010.

PROFESSIONAL  
SERVICE

- **Reviewer:** TKDE, CIKM 2017, KDD 2017, SEA 2017, WWW 2017, NIPS 2016, CoDS 2015.
- **Teaching Assistant:** Algorithms for data science (*CS590D*) at UMass Amherst.
- **Student Mentor** for 2 incoming graduate students at UMass Amherst.
- **Grader** for a course namely, (Inside the Box) *CS335* at UMass Amherst.
- **Intern Mentor** at Xerox Research Centre India (XRCI) for Srinivas Virinchi, PhD student (UMD, College Park).
- **Organizing Committee:** XRCI Open, 2015.
- **Mentored** 3 BTech students for their undergraduate thesis at IIT Delhi.

PATENTS

- **Sainyam Galhotra** and Narayanan Unny. ‘System to predict the channel of customer contact’, Filed: USPTO, 2015.
- Akhil Arora, **Sainyam Galhotra**, Srinivas Virinchi and Shourya Roy. ‘Methods and Systems for Identifying Target Users of Content’, Filed: USPTO, 2015.
- Akhil Arora, Manoj Gupta, Neeta Pande, **Sainyam Galhotra** and Shourya Roy. ‘System for Identifying Root Causes of Churn for Churn Prediction Refinement’, Filed: USPTO, 2016.

OTHER  
PUBLICATIONS

- **Sainyam Galhotra\***, Akhil Arora\* and Sayan Ranu. ‘Debunking the Myths of Influence Maximization’. NorthEast Database Day (Oral Talk), **NEDB 2016**.
- Shourya Roy, Sandipan Dandapat, R. Mariappan, **Sainyam Galhotra**. ‘ $QA^{RT}$ : A System for Real-time Holistic Quality Assurance for Contact Center Dialogues’, **AAAI 2016**.
- **Sainyam Galhotra**, Akhil Arora, and Shourya Roy. ‘Holistic Influence Maximization: Combining Scalability and Efficiency with Opinion-Aware Models’. NorthEast Database Day (poster), **NEDB 2016**.
- Deepali Semwal, Sonal Patil, **Sainyam Galhotra**, Akhil Arora and Narayanan Unny. ‘STAR: Real-time Spatio-Temporal Analysis and Prediction of Traffic Insights using Social Media’. ACM IKDD Conference on data sciences, **CODS 2015**.
- Amitabha Bagchi, Cristina M. Pinotti, **Sainyam Galhotra**. ‘Optimal Radius for Connectivity in Duty-Cycled Wireless Sensor Networks’. **ACM MSWIM 2013**.
- **Sainyam Galhotra**, Shigeru Kanemitsu. ‘An adaptation method for removing arsenate species from water solution’. SUDA energy saving research institution, China 2013.

JOURNAL  
PUBLICATIONS

- Amitabha Bagchi, Cristina M. Pinotti, **Sainyam Galhotra**, Tarun Mangla. ‘Optimal Radius for Connectivity in Duty-Cycled Wireless Sensor Networks’. ACM Transactions on sensor networks (TOSN).
- **Sainyam Galhotra**, Shigeru Kanemitsu, Hiroyuki Kondo. ‘An adaptation method for removing arsenate species from water solution’. Pure and Applied Mathematics Journal 2015.
- **Sainyam Galhotra**, J. K. Bhattacharjee and Bijay K. Agarwalla. ‘Turing - Hopf instabilities through a combination of diffusion, advection and finite size effects’. Journal of Chemical Physics

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\*Equal Contribution

(JCP), USA

- Bijay K. Agarwalla, **Sainyam Galhotra** and J. K. Bhattacharjee. ‘Diffusion driven instability to a drift driven one: Turing patterns in the presence of an electric field’. Journal of Mathematical Chemistry (JOMC), Springer Publication 2013.

UNDERGRADUATE  
THESIS

**Develop Graph algorithms for trend analysis**

July 2013 - May 2014

Worked with Prof. Amitabha Bagchi, Prof. Maya Ramanath and Dr. Srikanta Bedathur to develop efficient data structure to store graphs and develop approximation algorithm for faster computation of various parameters over it.

RESEARCH  
PROJECTS

**Fairness auditing for data-driven processes**

Prof. Alexandra Meliou and Prof. Yuriy Brun, UMass Amherst

Sept 2015 - May 2017

- Developed auditing support to identify unfair or discriminatory use of data by algorithms.

**Sentiment based Influence maximisation**

Akhil Arora and Dr. Shourya Roy, XRCI, India

July 2014 - Aug 2015

- Developed an approximate influence maximisation algorithm for large graphs.
- Modelling the sentiment based flow of information in a probabilistic setting.

**Graphical Analysis of Big data**

Dr. Narayanan E. Unny and Dr. Shourya Roy, XRCI, India

July 2014 - Aug 2015

- Developed a system and methodology to track a customer over time to predict the propensity of a customer to communicate and the preferred channel of communication to use.

**Optimal Radius for Connectivity in Duty-Cycled Wireless Sensor Networks**

Prof. Amitabha Bagchi, IIT Delhi, India

Jan 2013 - May 2013

- Investigated the transmission radius for connectivity by modelling the network as random geometric graph.
- Simulated large graphs using efficient data structures and algorithms (kd-tree, union find algo).

TECHNICAL SKILLS

**Programming languages:** C, C++, Python, Java, R, Matlab, SQL

**Packages used:** Numpy, Scipy, Boost, OpenGL

**Applications and Tools:** L<sup>A</sup>T<sub>E</sub>X, Matlab, GNU Plot, Shell Scripting, OpenOffice, MS Office

**Worked with large graph datasets:** NetHEPT (15K nodes and 62K edges), DBLP (317K nodes and 1M edges), YouTube (1M nodes and 3M edges), Twitter (7M nodes and 3B edges) and Friendster (65M nodes and 1.8B edges)

POSITIONS OF  
RESPONSIBILITY

**Overall Coordinator, XRCI-CSR** (Corporate Social Responsibility)

- Initiated the CSR group at Xerox Research Centre India and led the team from the front for the social activities like cleanliness campaign, distributing food to the needy and so on.

**Committee Member, XRCI Open**

- Organised technical events at the conference at Xerox Research Centre India, Bangalore.