

# Sahil Garg

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**Research Interest** MACHINE LEARNING (low resource, robustness, interpretability, semi-supervision, information theory, nonparametric), NATURAL LANGUAGE PROCESSING (relation extraction, dialog modeling, text clustering), DEEP LEARNING (continual learning), COMPUTATIONAL PSYCHIATRY (early diagnosis, therapeutic dialogues), NEUROSCIENCE (auto encoding, neurogenesis), ROBOTICS (information gathering, spatio temporal modeling).

**Education** **University of Southern California (USC)** Aug 2013 -Aug 2019  
PhD in Computer Science (Machine Learning) Advisor: Aram Galstyan  
*Title:* “Hashcode Representations of Natural Language for Relation Extraction”  
*Committee:* Aram Galstyan (chair), Kevin Knight, Irina Rish, Greg Ver Steeg, Roger Ghanem.

**Thapar Institute of Engineering and Technology** July 2005 - July 2009  
Bachelor of Engineering (B.E.) in Computer Science

## Selected Publications

### Conference Proceedings

*Modeling Dialogues with Hashcode Representations: A Nonparametric Approach.* Sahil Garg\*, Irina Rish, Guillermo Cecchi, Palash Goyal, Sarik Ghazarian, Shuyang Gao, Greg Ver Steeg, Aram Galstyan. Proceedings of AAAI Conference on Artificial Intelligence (**AAAI-20**).

*Nearly-Unsupervised Hashcode Representations for Relation Extraction.* Sahil Garg\*, Aram Galstyan, Greg Ver Steeg, Guillermo Cecchi. Proceedings of the Conference on Empirical Methods in Natural Language Processing (**EMNLP-19**).

*Kernelized Hashcode Representations for Relation Extraction.* Sahil Garg\*, Aram Galstyan, Irina Rish, Guillermo Cecchi, Shuyang Gao. Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI-19**).

*Neurogenesis-Inspired Dictionary Learning: Online Model Adaption in a Changing World.* Sahil Garg\*, Irina Rish, Guillermo Cecchi, Aurelie Lozano. Proceedings of the International Joint Conference on Artificial Intelligence (**IJCAI-17**).

*Extracting Biomolecular Interactions Using Semantic Parsing of Biomedical Text.* Sahil Garg\*, Aram Galstyan, Ulf Hermjakob, Daniel Marcu. Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI-16**).

*Persistent Monitoring of Stochastic Spatio-temporal Phenomena with a Small Team of Robots.* Sahil Garg\*, Nora Ayanian. Proceedings of Robotics: Science and Systems (**RSS-14**).

*Learning Nonstationary Space-Time Models for Environmental Monitoring.* Sahil Garg\*, Amarjeet Singh, Fabio Ramos. Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI-12**).

## Workshop Proceedings

*Therapeutic Dialogue Modeling via Locality Sensitive Hashing*. Sahil Garg\*, Guillermo Cecchi, Irina Rish, Shuyang Gao, Greg Ver Steeg, Palash Goyal, Aram Galstyan. Presented in *ICML 2018 Workshop, AI and Computational Psychology: Theories, Algorithms and Applications (CompPsy 2018)*.

*Dialogue Modeling via Hashing Functions*. Sahil Garg\*, Guillermo Cecchi, Irina Rish, Shuyang Gao, Greg Ver Steeg, Sarik Ghazarian, Palash Goyal, Aram Galstyan. Proceedings of *IJCAI 2018 Workshop, Linguistic and Cognitive Approaches to Dialog Agents (LaCATODA 2018)*.

*Neurogenesis-Inspired Dictionary Learning: Online Model Adaption in a Changing World*. Sahil Garg\*, Irina Rish, Guillermo Cecchi, Aurelie Lozano. *ICLR 2017 - Workshop Track*.

*Efficient Space-Time Modeling for Informative Sensing*. Sahil Garg\*, Amarjeet Singh, Fabio Ramos. Proceedings of *KDD 2012 Workshop, Knowledge Discovery from Sensor Data (SensorKDD 2012)*.

## Professional Services

### Program Committee Member for Conferences in CS

The AAAI Conference on Artificial Intelligence (AAAI)	2017, 2018, 2020
Neural Information Processing Systems (NeurIPS)	2017, 2018, 2019
International Conference on Machine Learning (ICML)	2018, 2019, 2020
International Conference on AI and Statistics (AISTATS)	2019, 2020
International Conference on Learning Representations (ICLR)	2019, 2020

### Reviewer for Journals

IEEE Robotics and Automation Letters (2019)

## Research Experience

### Icahn School of Medicine at Mount Sinai

Sept 2019 - present

*Developing machine learning models, interpretable and data-efficient, for research problems in computational psychiatry.*

### Postdoctoral Fellow

Advisor: Cheryl Corcoran

### University of Southern California (USC)

Mar 2015 - Aug 2019

*Developing machine learning models, which are computationally scalable, trainable in a robust manner on small sets of labeled examples, applicable to natural language processing for healthcare.*

### Research Assistant

Advisor: Aram Galstyan

May 2015 - Mar 2016

*Info-theoretic modeling of brain fMRI dynamics using CorEx.*

Advisor: Aram Galstyan

June 2014 - Oct 2015

*Phase transitions in community detection using CorEx.*

Advisor: Aram Galstyan

April 2014 - Sept 2014

*Generative modeling of a complex network and its structural properties like clustering, power law degree distribution, degree correlation, etc.*

Advisor: Aram Galstyan

Oct 2013 - April 2014 Advisor: Nora Ayanian  
*Persistent sensing of environmental phenomena with a team of robotic sensors.*

June 2013 - Sept 2013    Advisor: Milind Tambe  
Developing computationally scalable game theoretic algorithms for securing nat-  
ural resources.

## IIIT Delhi

April 2011 - May 2013      Advisor: Amarjeet Singh and Fabio Ramos  
*Learning non-stationary models efficiently for sensing environment dynamics.*

## Research Internship Experience

Summers of 2016, 2017

Mentors: Irina Rish &amp; Guillermo Cecchi

June 2017 - present                      Collab: Irina Rish & Guillermo Cecchi  
*We developed an info-theoretic framework for modeling therapeutic dialogues via hash functions.*

June 2017 - Aug 2017 Collab: Elif K Eyigöz & Guillermo Cecchi  
*Language based Discrimination for Parkinson's Disease.*

July 2016- Aug 2016 Collab: Stephen J. Heisig  
*We investigated into the spatio-temporal modeling of pressure Mat data dynamics for an early detection of Parkinson's disease.*

## Teaching Experience

Coordinated Mobile Robotics, Spring 2014     Teaching Advisor: Nora Ayanian

## Software Engineering Experience

June 2010 - Dec 2011      Manager: Harman Singh & Krish Palaniappan  
Developed a server side application in education domain including database design and a RESTful API.

Commudel, India

Aug 2009 - June 2010                      Manager: Srinivasareddy Chennareddy  
Developed a component to parse the data packets, as per the configurable  
ISO8583 format, into business objects for financial transactions.

Global Logic, India

Feb 2009 - Aug 2009 Manager: Atul Srivastava  
Developed a component for subscribing RSS feeds in a user friendly manner with an efficient search utility.

Graduate  
Coursework

chine Learning, Applied Linear Algebra, Estimation Theory, Advanced Analysis of Algorithms, Randomized Algorithms (A), Digital Geometry Processing, Scientific Computing and Visualization.

**Educational programs**

[2015 Complex Systems Summer School, Santa Fe Institute.](#)

**Other Accomplishments**

99% percentile secured in all India entrance exams IIT-JEE-05 (200k participants) and AIEEE-05 (600k participants).  
1st rank secured in C++ skill exams (for online placements in undergrad school) conducted by companies Informatica Business Solutions (CS batch of 80 students), and Global Logic (220 students).

**Research References**

[Aram Galstyan](#) galstyan@isi.edu  
Research Associate Professor Univ. of Southern California  
Director of AI Division USC ISI

[Irina Rish](#) rish@us.ibm.com  
Associate Professor MILA, Univ. of Montreal

[Guillermo A. Cecchi](#) gcecchi@us.ibm.com  
Principal Research Staff Member IBM T. J. Watson Research Center

[Greg Ver Steeg](#) gregv@isi.edu  
Research Associate Professor Univ. of Southern California

[Amarjeet Singh](#) amarjeet@iiitd.ac.in  
Assistant Professor IIIT Delhi  
Co-Founder & Chief Technology Officer Zenatix

[Fabio Ramos](#) fabio.ramos@sydney.edu.au  
Professor Univ. of Sydney

[Daniel Marcu](#) marcu@isi.edu  
Research Associate Professor Univ. of Southern California  
Director of MT/NLP Amazon

[Kevin Knight](#) kevin.crawford.knight@gmail.com  
Professor Univ. of Southern California  
Chief Scientist for NLP Didi Chuxing

**Engineering References**

[Nitin Gupta](#) nitin@commdel.net  
Co-Founder & Managing Partner Commdel Consulting Services Pvt Ltd  
Co-Founder & Director- Product & Strategy Agility MobileForce Solutions  
Co-Founder & Director Core Doc2Info Services Pvt. Ltd.

[Amit K Verma](#) amit@commdel.net  
Co-Founder & Director Commdel Consulting Services Pvt Ltd  
Co-Founder & Director Agility MobileForce Solutions

Co-Founder

**Srinivasareddy Chennareddy**

VP Products, Digital Marketing & Sales

Co-Founder (exited in 2015)

**Harman Singh**

Senior Software Engineer

Co-Founder (exited in 2011)

Core Doc2Info Services Pvt. Ltd.

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CG Parivar Group

Agility MobileForce Solutions

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Amazon

Snowpal Software Services