# Curriculum Vitae: Krishna P. Gummadi

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## Scientific Career

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|---|---|
| 2017 – *Present* | Professor of Computer Science, **Saarland University**, Germany |
| 2012 – *Present* | Tenured Independent Researcher, **Max Planck Institute for Software Systems**, Germany |
| 2005 – 2011 | Tenure-track Independent Researcher, **Max Planck Institute for Software Systems**, Germany |
| 2000 – 2005 | Graduate Research Assistant, **University of Washington, Seattle**, USA |

## Education

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| December 2005 | Ph.D. in Computer Science and Engineering, **University of Washington, Seattle**, USA |
| December 2002 | M.S. in Computer Science and Engineering, **University of Washington, Seattle**, USA |
| August 2000 | B.Tech. in Computer Science and Engineering, **Indian Institute of Technology, Chennai**, India |

## Research Interests

I am broadly interested in the measurement, modeling, analysis, design, and evaluation of complex Internet-scale systems. In the past, my research has focussed on Internet access networks, trusted cloud computing, peer-to-peer and overlay routing systems. My recent research is largely centered around *social computing systems*, which are an emerging class of societal-scale human-computer systems. Popular examples include Facebook, Twitter, YouTube, Yelp, eBay seller ratings, Wikipedia and Amazon's Mechanical Turk. My studies of social computing systems attempt to *Understand*, *Predict*, and *Control* the behaviors of their constituent human users and computer systems. Specifically, they tackle the challenges associated with assessing the credibility of information shared by anonymous online crowds, understanding and controlling privacy risks for users sharing data on online forums, understanding, predicting and influencing viral information diffusion on social media sites, and enhancing fairness and transparency of data-driven (algorithmic) decision making increasingly being used to model and replace human decision making in social computing systems.

## Research

All refereed publications are listed in reverse chronological order at:
http://www.mpi-sws.org/~gummadi/publications.html
**Award papers:**

- *Best paper nominee:* Conference on Fairness, Accountability and Transparency (FAT*) 2018
- *Test-of-Time paper:* ACM SIGCOMM Test-of-Time Award 2017
- *Best paper honorable mention:* IC3W2 Conference on the World Wide Web (WWW) 2017
- *Notable paper:* NIPS Synposium on ML and Law (ML+Law) 2016
- *Best paper:* ACM Conference on Online Social Networks (COSN) 2015
- *Distinguished paper:* USENIX Symposium on Usable Privacy and Security (SOUPS) 2014
- *Best paper*: AAAI International Conference on Weblogs and Social Media (ICWSM) 2012
- *Selected top picks*: ACM SIGCOMM Workshop on Online Social Networks (WOSN) 2012
- *Best student paper*: Usenix Symposium on Operating Systems Design and Implementation (OSDI) 2002
- *Best student paper*: ACM SIGCOMM Internet Measurement Workshop (IMW) 2002
- *Best paper*: SPIE/ACM Conference on Multimedia Computing and Networking (MMCN) 2002

**Bibliometrics (from Google Scholar):** `https://scholar.google.com/citations?user=Bz3APTsAAAAJ`

- Citation count: **22,006**, H-index: **44**, i10-index: **70**
- Spread of publications across highly selective venues in different research communities
  - **Systems and Networking** (# pubs: **22**): SOSP / OSDI (3), NSDI (2), SIGCOMM (3), IMC (9), CoNEXT (1), EuroSys (1), HotNets (1), HotDep (1), HotCloud (1)
  - **Security and Privacy** (# pubs: **8**): Usenix Security (2), IEEE S&P (1), NDSS (1), SOUPS (2), WPES (1), USEC (1)
  - **Datamining, Information Retrieval, and Machine Learning** (# pubs: **27**): WWW (8), WSDM (2), KDD (1), NIPS (1), AAAI (1), SIGIR (2), CIKM (3), RecSys (1), Trans. on the Web (1), AISTATS (1), FAT/FAT-ML (6)
  - **Social Computing, Social Media, and HCI** (# pubs: **22**): ICWSM (10), W/COSN (5), CSCW (3), CHI (1), UbiComp (1), ICTD (1), Journal on Population and Development Review (1)

**Broader impact:**

- **Online social networks and social media**: Datasets from empirical studies of the structure and evolution of online social networks as well as information diffusion over them, have been used by over a *thousand research groups*. The impact of this work has been recently recognized by the *ACM SIGCOMM Test of Time Award*. My group has also made several (over 10) public releases of software code, apps, and system deployments on a variety of topics related to *search and recommendations* in online social media sites like Twitter and Facebook. These apps and systems have been used by over a *hundred research groups*. They have also influenced the design of Twitter's search system.

- **Trust and privacy in social media:** Our techniques for assessing trustworthiness of identities (Usenix Security 2014) and detecting fraudulently promoted online content (COSN 2015) have influenced abuse detection and mitigation strategies at Facebook and Yelp. Our recent work (IEEE S&P 2018) identified several serious privacy vulnerabilities of Facebook's advertising interfaces, including one that would allow a malicious advertiser to discover personally identifying information like phone numbers or website visits of any Facebook user. Our solutions to plug the privacy leaks have since been deployed by Facebook engineers. In another line of work, our software designs (EuroSys 2012) for scaling trust (payment) management mechanisms in credit networks are being leveraged to scale transactions in the commercial Ripple payment network.

- **Internet transparency**: Our publicly deployed *Glasnost* system to make access ISPs' traffic shaping transparent, has been used by over *four million end users* and telecom *regulators in several countries*, including US, Canada, Singapore, and multiple EU countries). Glasnost also catalyzed the creation of *Measurement-Lab* (M-Lab), a partnership of academic and industry researchers and policy makers to build and support tools to make the Internet more transparent. Glasnost was one of the first tools to be deployed on M-Lab and I have served on its steering committee since its foundation. Measurement-Lab in turn, inspired the recent creation of *Data Transparency Lab* (DTL), a community of researchers, policymakers and industry representatives working to advance online personal data transparency through scientific research and design. I have served as the chair of the inaugural DTL grants committee.

- **Peer-to-peer systems**: Datasets gathered by our studies of peer-to-peer file sharing systems have been used by over *a thousand research groups*. The Internet measurement tools that we built to conduct our studies, particularly the Interent path latency and bandwidth measurement tools (*King* and *sProbe*), have been used by more than *two hundred research groups*. Our *Monarch* technique to emulate transport protocol flows has been used by Microsoft researchers to test the peformance of new experimental transport protocols over their Xbox Live gaming network before deploying them.

## Advising & Mentoring

**Past advisees (with their year of graduation and their first employment):**

*Postdoctoral researchers:*
1. Rijurekha Sen (2018), Assistant Professor at IIT Delhi, India
2. Oana Goga (2017), Researcher at CNRS, France
3. Saptarshi Ghosh (2016), Assistant Professor at IIT Kharagpur, India
4. Denzil Correa (2016), Data Scientist at Bayer Business Services, Germany
5. Meeyoung Cha (2010), Assistant Professor at KAIST, Korea (Currently Associate Professor)

*Doctoral (Ph.D.) students:*
1. Mainack Mondal (2017), Postdoctoral Researcher at University of Chicago, USA
2. Bimal Viswanath (2016), Researcher at Bell Labs, Germany
3. Nuno Santos (2013), Assistant Professor at IST, Portugal
4. Massimiliano Marcon (2011), Software Engineer at SAP, Germany
5. Marcel Dischinger (2010), Senior Software Engineer at Barracuda networks, Germany
6. Alan Mislove (2009), Assistant Professor at Northeastern University, USA (Currently Associate Professor)

*Masters students:*
1. Naveen Kumar Sharma (2012) Ph.D. student, University of Washington, USA
2. Farshad Kooti (2012) Ph.D. student, University of Southern California, USA
3. Alexey Reznichenko (2010) Ph.D. student, Max Planck Institute for Software Systems, Germany

*Research interns:*
Advised more than 25 undergraduate and graduate interns over the past 12 years. Many of the undergraduate interns have gone on to pursue Ph.D. programs at various universities, including UC Berkeley, MIT, Cornell, University of Washington, UC San Diego, Univeristy of Michigan, and University of Wisconsin. Several of the graduate interns have assumed faculty or researcher positions at different organizations including UBC (Canada), UFMG (Brazil), QMUL (UK), Google Research (USA), and QCRI (Qatar).

**Current advisees:**

*Postdoctoral researchers:*
Przemyslaw Grabowicz (2013 – )

*Doctoral (Ph.D.) students:*
Till Speicher (2017 – ), Nina Grgic-Hlaca (2016 – ), Abhijnan Chakraborty (2015 – ), Joanna Biega (2014 – ), Reza Babaei (2013 – ), Muhammad Bilal Zafar (2012 – ), Juhi Kulshrestha (2011 – )

## Teaching Activities

- *Summer School:* Cornell Maryland Max-Planck Summer School in Computer Science, Summer 2017
- *Saarland University:* Core undergraduate course on *Distributed Systems*, Winter 2016
- *Saarland University:* Advanced undergraduate course on *Social Media Analysis*, Summer 2016
- *Saarland University:* Graduate seminar on *Human vs. Algorithmic Decision Making*, Winter 2015
- *Saarland University:* Graduate seminar on *Security and Privacy in Online Social Networks*, Summer 2013
- *Summer School:* Estonian Summer School on Computer and Systems Science, Summer 2012
- *Winter School:* INRIA's Winter School on Hot Topics in Distributed Systems, Winter 2010
- *Saarland University:* Core undergraduate course in *data networks*, Summer 2007

## Professional Service

- As **General Conference Co-Chair**:

    AAAI's International Conference on Web and Social Media (ICWSM) 2016, Cologne, Germany

- As **Technical Program Committee Co-Chair**:
    - Fairness, Transparency, and Privacy Workshop, DALI 2018. Canary Islands, Spain
    - Data Transparency Lab Conference (DTL) 2015, Cambridge, MA, USA
    - International World Wide Web Conference (WWW) 2015, Florence, Italy
    - ACM Conference on Online Social Networks (COSN) 2014, Dublin, Ireland
    - ACM SIGCOMM Internet Measurement Conference (IMC) 2013, Barcelona, Spain.

- As **Program Committee Member**: Served on several PCs of internationally leading conferences and workshops in the following areas (only select ones mentioned):
    - *Systems & Networking:* SIGCOMM 2014-2012, 2009-2007; IMC 2016, 2012, 2010; NSDI 2013, 2009-2007; OSDI 2012
    - *Datamining, IR, & ML:* KDD 2018-2015; WWW 2018-2013, 2010; WSDM 2018-2016, 2012; FAT-ML 2017-2016; FAT* 2018; DESIRES 2018
    - *Databases, Security, & Privacy:* ICDE 2018; VLDB 2014; IEEE S&P (Oakland) 2014; NDSS 2014
    - *Social Media & Computational Social Science:* ICWSM 2015-2014; COSN 2015-2013; WebScience 2016

- As **Associate / Guest Editor:**
    - ACM Transactions on the Web (2014 - *Present*)
    - EVISE Information Systems Journal (2016 - *Present*)
    - IEEE Journal on Selected Areas in Communication on *Measurement of Internet Topologies* 2012

- As **Steering / Organizing Committee Member:**
    - Conference on Fairness, Accountability, and Transparency (2017 - *Present*)
    - Data and Algorithmic Transparency Workshop (DAT) (2016 - *Present*)
    - AAAI's International Conference on Web and Social Media (ICWSM) (2016 - *Present*)
    - ACM Conference on Online Social Networks (COSN) (2013 - 2015)
    - Measurement Lab (M-Lab) (2009 - *Present*)

- As **Scientific Advisory Board Member:**
    - Labex User Centric Network (UCN@Sophia) (2016 - *Present*)

- As **Selection Committee / Review Panel Member:**
    - WWW Test-of-Time Award Selection Committee 2018
    - CNIL-INRIA Privacy Research Award Selection Committee 2017
    - Data Transparency Lab's (DTL) Grants Committee 2017-2015
    - DFG's (German Science Foundation) review panel for a priority program on Geo-Informatics 2016
    - ESF's (European Science Foundation) selection committe for a new ICT institute in Cantabria 2011

## Institute (MPI-SWS) Service

- **Founding Member:** I joined the institute at the time of its founding in 2005. Over the past 12 years, I not only established my own independent research group, but I also actively participated in building up the institute. Today, MPI-SWS hosts over 80 researchers (faculty, postdocs, PhD students, and interns) and is recognized as one of the premier institutes for foundational Computer Science research in Germany and Europe.
- **Graduate Program Chair:** As the first grad program chair between 2005 and 2008, led the establishment of the program, including defining the program requirements and setting up the application site.
- **Internship Program Chair:** As the first intern program chair between 2005 and 2007, led the establishment of the program. I have also since chaired the internship program in 2010 and 2012.
- **Faculty Recruiting Chair:** I led our institute faculy recruiting efforts in 2014 and 2016.
- **Website Redesign Chair:** I led the efforts to completely redesign our institute Website in 2015-2016.

**Funding Sources**

**MPG Indepedent Research Group:**
- **Funding source:** Base funding provided by the Max Planck Institute for Software Systems (MPI-SWS), Max-Planck-Gesellschaft, for my research group.
- **Amount (Euros):** 2.4 Million Euros over more than 12 years. Annual budget of 1 postdoc position + 70K Euros for funding PhD students + approximately 60K Euros (depending on the year) for travel.
- **Period:** Since 2005 and continuing as I now have a tenured position at the institute.
- **Role of the PI:** Independent research group leader.

**Methods and Tools for Understanding and Controlling Privacy:**
- **Funding source:** German Research Foundation (DFG)
- **Amount (Euros):** 250,000 Euros.
- **Period:** 2016-2020
- **Role of the PI:** Unit Coordinator.

**Exposing Demographic Biases of News Publishers and Promoters on Social Media:**
- **Funding source:** Data Transparency Lab (DTL)
- **Amount (Euros):** 50,000 Euros.
- **Period:** 2017-2018
- **Role of the PI:** Co-Project Supervisor.

**Increasing Transparency of Data Aggregation by Facebook and its Partners:**
- **Funding source:** Data Transparency Lab (DTL)
- **Amount (Euros):** 50,000 Euros.
- **Period:** 2017-2018
- **Role of the PI:** Co-Project Supervisor.

**Impact of Data Deletion in Social Media on Data Quality:**
- **Funding source:** AT&T Research
- **Amount (Euros):** 25,000 Euros.
- **Period:** 2015-2015
- **Role of the PI:** Project Supervisor.

**Online Social Networks:**
- **Funding source:** German Federal Ministry of Education and Research (BMBF) and Indian Science and Technology (DST)
- **Amount (Euros):** 250,000 Euros.
- **Period:** 2011-2015
- **Role of the PI:** Co-Coordinator.

**Under Submission – Foundations for Fair Social Computing:**
- **Funding source:** European Research Council (ERC) Advanced Grant
- **Amount (Euros):** 2,500,000 Euros.
- **Period:** 2018-2023
- **Status:** Second stage of the evaluation.

**Under Submission – Cluster of Excellence on Digital Reality:**
- **Funding source:** German Research Foundation (DFG)
- **Period:** 2018-2028
- **Status:** Second stage of the evaluation.

**Under Submission – Innovative Training Network for Algorithm Auditors:**
- **Funding source:** European Commission's Horizon 2020
- **Amount (Euros):** 480,000 Euros.
- **Period:** 2018-2022

## Recent Invited / Keynote / Distinguished Lectures

- IEEE International Conference on *Communication Systems and Networks*, Bangalore, January 2018
- Lorentz Center's Workshop on *Intersectionality and Algorithmic Discrimination*, Leiden, December 2017
- European Big Data Value Forum's Panel on *Transparency and Accountability of Algorithmic Systems*, Versailles, November 2017
- ETH Zurich's Lecture Series on the *Law and Economics of Innovation*, Zurich, September 2017
- RecSys Workshop on *Responsible Recommendation*, Como, August 2017
- Leverhulme Center's *Future of Intelligence* Symposium, Cambridge, July 2017
- NYU School of Law's Symposium on *Algorithms and Explanations*, New York, April 2017
- CPDP Panel on *Algorithmic Transparency*, Brussels, January 2017
- University of Maryland's Workshop on *Data-Driven Security*, Maryland, January 2017.
- DARPA's Workshop on *Technologies for Scalable, Self-Organizing Communities*, New York, January 2017.
- IEEE SMC's Inter-disciplinary Workshop on *The Human Use of Machine Learning*, Venice, December 2016.
- IEEE ICDM Workshop on *Privacy and Discrimination in Datamining*, Barcelona, December 2016.
- NIPS Symposium on *ML and Law*, Barcelona, December 2016.
- 3rd GESIS *Winter Computational Social Science* Symposium, Cologne, November 2016.
- Complex System Society's *2016 Conference on Complex Systems*, Amsterdam, September 2016.
- Microsoft Research's Symposium on *Machine Learning: Technology, Law, & Policy*, Cambridge, September 2016.
- 2016 Workshop on *Social Impact Through Network Science (SINS)*, Venice, June 2016.
- Distinguished Lecture at Laboratorie d'Informatique de Grenoble, CNRS Grenoble, January 2016.