ANNUAL REPORT 2020

Computer Networks Group
Institute of Computer Science
Faculty of Mathematics and Computer Science
Georg-August-Universität Göttingen

COMPUTER NETWORKS GROUP
GOLDSCHMIDTSTRASSE 7, 37077 GÖTTINGEN, GERMANY
HTTP://WWW.NET.INFORMATIK.UNI-GOETTINGEN.DE/

December 2020
Editor: Prof. Dr. Xiaoming Fu
Introduction

Founded in April 2007, the Computer Networks Group is devoted to cutting-edge leading research and education programs in the field of network architectures, protocols and applications. This report series intends to review the most relevant and important research results and other achievements and activities performed by the Computer Networks Group. The present report summarizes those of the year of 2020.

Due to the coronavirus pandemic, things went more difficult in 2020 than previous years: many of our teaching and research activities had to be online; many research visits, project meetings and conference attendance had to be cancelled, postponed or shortened. We look forward to a brighter and more prosperous new year in 2021 with the projected wide injection of COVID-19 vaccine, great treatments and social changes. Stay safe and healthy!

Group Members

Weijun Wang and Fabian Wölk joined the NET group as PhD students in January and July 2020, respectively. Dr. Tingting Yuan joined the group in October 2020. Dr. Sripriya Srikant Adhatarao and Dr. Shichang Ding completed their PhD theses in September and December 2020, respectively. After his joint PhD study from NET group, Dr. Shuai Xu completed his PhD thesis at Southeast University in November 2020 and joins Nanjing University of Aeronautics and Astronautics as a faculty member. Dr. Mayutan Arumaithurai joined Deutsche Bahn AG as a 5G Senior Expert in May 2020.

Dr. Hui Zheng (Ranplan Ltd, UK, April 2019-March 2020), Dr. Jinxu Zhao, Yue Zhang, Yi Li, and Xin Gao (Tsinghua U, China, Dec 2019-Mar 2020) spent research visits at NET group, contributing to its research activities. Also, several student assistants worked on projects and BSc/MSc. thesis work; they are an important part of the team.

By the end of year 2020, the research group comprises 1 professor, 3 senior researchers/postdoc fellows, 7 PhD students, as well as a couple of master and bachelor students. See Table 1 for detailed information.

Table 1: Member of Computer Networks Group (as of 31.12.2020):

<table>
<thead>
<tr>
<th>Admin staff</th>
<th>Head</th>
<th>Postdocs</th>
<th>PhD researchers</th>
<th>Adjunct researchers/lecturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary: Tina Bockler</td>
<td>Prof. Dr. Xiaoming Fu</td>
<td>Dr. Sripriya Adhatarao, Dr. Tingting Yuan, Dr. Yali Yuan</td>
<td>Bangbang Ren, Yachao Shao, Weijun Wang, Yunxiao Wang, Fabian Wölk, Jiaquan Zhang, Pablo Gutierrez-Marques (extern)</td>
<td>PD Dr. Mayutan Arumaithurai (DB), Prof. Dr. Xu Chen (SYSU), Assoc. Prof. Dr. Yang Chen (Fudan), Prof. Dr. Noel Crespi (Telecom SudParis), Assoc. Prof. Dr. Hong Huang (HUST), Assist. Prof. Dr. Lei Jiao (Oregon), Assoc. Prof. Dr. Sameer Kulkarni (IIT), Prof. Dr. Wenzhong Li (Nanjing), Prof. Dr. Jar-Der Luo (Tsinghua), Assoc. Prof. Dr. Lingjun Pu (Nankai), Dr. Hannes Tschofenig (ARM), Assist. Prof. Dr. Shuai Xu (NUAA), Assoc. Prof. Dr. Song Yang (Beijing I. Tech)</td>
</tr>
</tbody>
</table>
Teaching and Supervision
During 2020 the Group has provided the following courses:

**Lectures:**
- Computer Networks, 4 ECTS
  - WS2019/20, WS2020/21
- Advanced Computer Networks, 5 ECTS
  - SS2020 (contributed by Dr. Hannes Tschofenig, ARM Ltd.)
- Computer Networks, 4 ECTS (exam only)
  - SS2020

**Exercise classes:**
- Computer Networks
  - WS2019/20, WS2020/21

**Lab courses:**
- Practicum Advanced Networking (Data Science Edition), 6 ECTS
  - SS2020, WS2020/21
- Practicum Networking Lab, 6 ECTS
  - SS2020
- Smart Cities (in cooperation with City Göttingen), 6 ECTS
  - WS2020/21

**Seminars:**
- Adv. Topics in Mobile and Social Communications, 6 ECTS
  - WS2020/21
- Adv. Topics in Computer Networking, 6 ECTS
  - SS2020
- Internet Technologies, 4 ECTS
  - SS2020, WS2020/21

Research Areas and Projects
The Computer Networks group is committed to explore innovative networking technologies and utilize its full potential, knowledge and experience in the analysis, design, and evaluation of emerging and future network technologies, systems, and applications. Its current main research areas include:

- Architectures, protocols, mechanisms and applications for cloud computing and data centers, including resource and service management, energy efficiency, data delivery, software-defined networks, network function virtualization, cloud systems, applications and services. This has been conducted in collaboration with Microsoft Research, Deutsche Telekom, Nokia Bell Labs, Huawei, Cisco, Ericsson, NEC, UC Riverside, U. Oregon, Sorbonne University, BUPT, Fudan University, Tsinghua University, Nanjing University, and Landesforschungsinstitut des Freistaats Bayern (FORTISS) etc.

- Future Internet architectures and protocols, including information-centric networking, software-defined networking, reliability and congestion control, pub/sub architecture, disaster management, measurement, and related security mechanisms for supporting large-scale content delivery and other applications over the Internet. This area has been in collaboration with UC Riverside, UCLA, Columbia University, University College London, University of Rome “Tor Vergata”, Swedish Institute of Computer Science, KDDI, Panasonic, Cisco, Ericsson, Huawei, NEC, Bell Labs, Osaka University, University of Tokyo, Waseda University, NICT, Fudan University, Tsinghua University, and Nanjing University, etc.

- Social networks/social computing, including socio-aware networking/computing infrastructure, mobile social networks, as well as social behavior studies and social influence, in collaboration with researchers from Göttingen (including sociologists, socio-psychologists, economist, physicists and epidemiologists), nationally (MPI-DS, MPI-SWS, L3S/University of Hannover, University of Frankfurt) and internationally (University Oregon, University of Chicago, University of Cambridge, Bell Labs, Tsinghua University, Fudan University, Nanjing University,
University of Science and Technology of China, Huazhong University of Science and Technology, China Telecom, Tencent, TAL, etc.

- Mobile computing, pervasive/social sensing and applications e.g., in smart cities and smart mobility/transport scenarios, leveraging machine learning (in particular compressive sensing) and data mining techniques where appropriate, in cooperation with Aalto University, University of Helsinki (Finland), Uppsala University (Sweden), University of Aston, University of Essex, Ranplan Ltd (UK), IMT Telecom-SudParis, Cisco (France), Hong Kong University of Science and Technology, Tsinghua University, Nankai University, Nanjing University, University of Science and Technology of China (China), NEC, National Institute of Informatics (Japan), as well as the Chair of Bioclimatology, Chair of Information Management, Chair of Human Resource Management, and Institute of Geography at the University of Göttingen, University Medical Center Göttingen, City Göttingen, Wolfsburg AG, Landesforschungsinstitut des Freistaats Bayern (FORTISS) and Birmingham City Council.

Some funded projects in 2020 include:

- COSAFE – “Cooperative Connected Intelligent Vehicles for Safe and Efficient Road Transport”, sponsored by EU H2020 MCSA-RISE program
- “Zero-Touch/Automated Network Management with Artificial Intelligence”, funded by Lower Saxony Ministry of Education and Culture (MWK)
- Gift funding on “HTTP2.0+ over 5G/B5G Networks”, sponsored by Huawei Technologies
- Gift funding on “Future Networks”, sponsored by Huawei Technologies
- “Smart Health”, sponsored by CSC Scholarship program
- “Socioeconomic Big Data”, sponsored by CSC Scholarship program
- “Mobile Smart Sensing and Analytics”, sponsored by CSC Scholarship program

Publications, Technical Reports and Theses

Editorials

Papers in Peer-Reviewed Journals
5. * Song Yang, Fan Li, Ramin Yahyapour, Xiaoming Fu, Delay-Sensitive and Availability-Aware Virtual Network Function Scheduling for NFV. IEEE Transactions on Services Computing, early access, DOI: 10.1109/TSC.2019.2927339
7. *Hong Huang, Wei Zhou, Huaqian Sheng, Dongxiao Yu, Hai Jin, Core Decomposition and Maintenance in Weighted Graph, World Wide Web (Springer), early access, DOI: 10.1007/s11280-020-00857-0
15. *Gong, Q., Y. Chen, X. He, Y. Xiao, P. Hui, X. Wang, and X. Fu, "Cross-Site Prediction on Social Influence for Cold-Start Users in Online Social Networks", ACM Transactions on the Web (accepted), June 2020.

Papers in Peer-Reviewed International Conferences and Workshops

(Extended) Abstracts, Posters and Demos
28. Weijun Wang, Tingting Yuan, Minghao Han, Han Zhang, Yu Ma, Meng Li, Sripriya S. Adhatarao and Xiaoming Fu, A Real-time Social Distance Measurement and Record System for COVID-19, poster session, 18th ACM International Conference on Embedded Wireless Systems and Networks (EWSN 2021), Feb 2021

Technical Reports

PhD Dissertations
30. Shichang Ding, "User Attribute Inference via Mining User-Generated Data", PhD Dissertation, Faculty of Mathematics and Computer Science, University of Göttingen, Göttingen, December 2020
32. Shuai Xu, “Key Techniques of User Geo-Location Prediction with Big Data”, PhD Dissertation, School of Computer Science, Southeast University, Nanjing, China, Nov 2020 (co-supervised with Prof. Jiuxin Cao)

Master Theses
33. Yufan Dong, Inferring People’s Socioeconomic Status via Home Location, bachelor thesis, Institute of Computer Science, University of Göttingen, Göttingen, Sept 2020
34. Yifan Chen, A multi-task deep learning approach to improve recommendation with incomplete user profiles, master thesis, Institute of Computer Science, University of Göttingen, Göttingen, July 2020
35. Disha Purohit, Longitudinal Multiomics Analysis, master thesis, Institute of Computer Science, University of Göttingen, Göttingen, Mar 2020

Bachelor Theses
37. Immo Hellwig, Theoretical and Experimental Investigation on Recent Advances in HTTP from Transportation View, bachelor thesis, Institute of Computer Science, University of Göttingen, Göttingen, June 2020

Scientific Contacts
Incoming short/mid-term researcher visits

<table>
<thead>
<tr>
<th>Incoming visitors</th>
<th>Institution (from)</th>
<th>Detailed information</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Matthias Wählisch</td>
<td>Freie Universität Berlin</td>
<td>Visiting NET group, attended a PhD disputaton and discussed collaborations</td>
<td>Sept 2020</td>
</tr>
<tr>
<td>Dr. Hui Zheng</td>
<td>Ranplan Co. Ltd., UK</td>
<td>Visited NET group for 8 months</td>
<td>June 2019-Mar 2020</td>
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* denotes IEEE Xplore publication.
### Outgoing research visits

<table>
<thead>
<tr>
<th>Outgoing visitors</th>
<th>Institution visited</th>
<th>Detailed information</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>X. Fu</td>
<td>University of Oregon, USA</td>
<td>Visiting Prof. Jun Li and Lei Jiao for collaboration on advanced networks</td>
<td>Feb-Mar 2020</td>
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### Conferences, events and meeting participations and presentations

<table>
<thead>
<tr>
<th>Participant</th>
<th>Conference/event</th>
<th>Detailed information</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>X. Fu</td>
<td>2nd International Conference on Social Computing (ICSC 2020), Beijing &amp; virtual</td>
<td>Giving a keynote</td>
<td>Dec 2020</td>
</tr>
<tr>
<td>Y. Shao</td>
<td>IEEE ICPADS 2020, virtual</td>
<td>Presenting a paper</td>
<td>Dec 2020</td>
</tr>
<tr>
<td>S. Adhatarao</td>
<td>IEEE MSN 2020, virtual</td>
<td>Presenting a paper</td>
<td>Dec 2020</td>
</tr>
<tr>
<td>J. Zhang</td>
<td>IEEE MSN 2020, virtual</td>
<td>Presenting a paper</td>
<td>Dec 2020</td>
</tr>
<tr>
<td>X. Fu</td>
<td>EAI QShine 2020, virtual</td>
<td>Giving the keynote speech</td>
<td>Nov 2020</td>
</tr>
<tr>
<td>X. Fu</td>
<td>IEEE ICNP 2020, virtual</td>
<td>Chairing a session at ICNP 2020; TPC Co-Chair and chairing a session at NIPAA 2020 workshop</td>
<td>Sept 2020</td>
</tr>
<tr>
<td>X. Fu</td>
<td>ACM MOBICOM 2020-MobiArch, virtual</td>
<td>Chairing a session at MobiArch 2020 workshop</td>
<td>Sept 2020</td>
</tr>
<tr>
<td>X. Fu</td>
<td>5th China National Conference on Big Data and Social Computing (BDSC’20), Beijing &amp; virtual</td>
<td>Giving a keynote</td>
<td>Aug 2020</td>
</tr>
<tr>
<td>Y. Yuan</td>
<td>IEEE INFOCOM 2020, virtual</td>
<td>Presented a paper</td>
<td>July 2020</td>
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<tr>
<td>X. Fu</td>
<td>IFIP Networking 2020, virtual</td>
<td>TPC Chair</td>
<td>May 2020</td>
</tr>
<tr>
<td>X. Fu</td>
<td>Project meetings for a DFG CRC proposal on Data Heterogeneity, Göttingen &amp; virtual</td>
<td>Discussing collaborations on data science</td>
<td>Jan-May, Dec 2020</td>
</tr>
<tr>
<td>X. Fu, F. Wölk, W. Wang</td>
<td>Meeting City Göttingen leaders and public transport company (GöVB), Göttingen</td>
<td>Discussing collaborations on smart cities</td>
<td>Apr-July 2020</td>
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### News Press Releases

<table>
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<tr>
<th>Source</th>
<th>Detailed information</th>
<th>Date/Edit</th>
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<tbody>
<tr>
<td>University of Chicago Knowledge Lab news</td>
<td>Journal of Social Computing Launch</td>
<td>Dec 2020</td>
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### Awards

- Sripriya Srikant Adhatarao, Outstanding Dissertation (Summa Cum Laude) at the Faculty of Mathematics and Computer Science, University of Göttingen, September 2020.
Professional Services (X. Fu unless noted)

University Services
• International Officer - Computer Science, Faculty of Mathematics & Computer Science, University of Göttingen
• Substitution Member of Faculty Board, Faculty of Mathematics & Computer Science, University of Göttingen
• Board member, Institute of Computer Science, University of Göttingen
• Director, Sino-German Institute of Social Computing, University of Göttingen
• Member, Center for Computational Sciences, University of Göttingen
• Member, Centre for Statistics, University of Göttingen
• Member, Campus Institute Data Science (CIDAS), University of Göttingen
• Steering Board Member of International Master/PhD program “Internet Technology and Information Systems (ITIS)”, University of Göttingen
• Speaker of Doctoral program “PhD in Computer Science” (PCS) program, University of Göttingen
• Chair of Admission Committee for “Master in Applied Computer Science” program, University of Göttingen
• Examiner for Master’s program of “Economics and Business Management”, University of Göttingen
• Coordinator of Planet-Lab membership for University of Göttingen

Elected, Appointed or Adjunct Positions
• Vice Director, Center for Social Network Research, Tsinghua University, Beijing, China
• Board Member, Tsinghua-NRI China Research Center, Beijing, China
• Guest Professor, Nanjing University, China
• Guest Professor, Northeastern University, China
• Guest Professor, Shanghai University of Finance and Economics, China
• Guest Professor, University of Oregon, Eugene, OR, USA
• Grant Evaluator: DFG, Fulbright Programs, NSFC, RGC, etc.
• Board Member, GDPCH (Gesellschaft für Deutsche Professoren Chinesischer Herkunft e.V.)

Conference organization
• General Chair, 5th ACM SIGCOMM Asia-Pacific Workshop on Networking (APNet 2021), Shenzhen, China, June 2021
• Steering Committee Chair, ACM/IEEE SIGMOBILE International Workshop on Mobility in the Evolving Internet Architecture (MobiArch)
• Steering Committee, IEEE ICDCS 2019-2020 International Workshop on Network Meets Intelligent Computations (NMIC)

• Steering Committee, IEEE HotICN 2020

**Technical Program Committees**

• TPC Co-Chair, [IFIP Networking 2020](#)

• TPC Co-Chair, [IEEE Workshop on New Internetworking Protocols Architectures, and Algorithms (NIPAA 2020) at ICNP 2020](#)

• TPC Co-Chair, [IEEE INFOCOM 2020 Workshop on New IP: The Next Step](#)

• TPC Member, IEEE INFOCOM 2020

• TPC Member, Elsevier Computer Communications (COMCOM) Journal (Mayutan Arumaithurai)

**Journal Editorship**

• Founding Co-Editor-in-Chief, [Journal of Social Computing](#) (IEEE and Tsinghua University Press)

• Technical Editor, IEEE Communications Magazine

• Technical Editor, IEEE Network

• Associate Editor, IEEE Transactions on Network and Service Management

• Associate Editor, IEEE Transactions on Network Science and Engineering

• Associate Editor, IEEE Networking Letters

• Area Editor, Elsevier Computer Communications Journal

• Associate Editor, Springer-Nature Computer Science

• Associate Editor, Chinese Journal of Electronics

• Guest Co-Editor, IEEE Transactions on Network and Service Management Special Issue of Selected Papers of IFIP Networking 2020

• Guest Co-Editor, [IEEE Network Special Issue on Interplay between Machine Learning and Networking Systems, 2021](#)

**Previous (Bi)Annual Reports of NET Group**


*Enjoy reading and look forward to seeing you in 2021!*