Gopika Premsankar

https://gpremsan.github.io
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Education

2015 – 2020 **Doctor of Science (Tech.)**, Department of Computer Science, *Aalto University*, Finland

Supervisor: Prof. Mario Di Francesco, *advisor:* Prof. Tarik Taleb

Dissertation: Scalable networked systems: analysis and optimization

2013 – 2015 **Master of Science (Tech.) with distinction**, Department of Computer Science, *Aalto University*, Finland

Graduated with distinction

Thesis: Design and implementation of a distributed MME on OpenStack

2006 – 2010 **Bachelor of Technology**, Department of Electrical and Electronics Engineering, *National Institute of Technology Karnataka*, Surathkal, India

Professional experience

Jan '24 – **Assistant professor, tenure-track**, *Aalto University*, Espoo, Finland.
Department of Information and Communications Engineering,
School of Electrical Engineering

Sep '21 – Jan '24 **Postdoctoral researcher**, *University of Helsinki*, Helsinki, Finland.
Project: Scalable and energy-efficient networked systems at the edge
Supervisor: Prof. Sasu Tarkoma

Feb '21 – Aug '21 **Postdoctoral researcher**, *Ivey Business School, Western University*, London, ON, Canada.
Project: Optimization of energy in edge networks
Supervisor: Prof. Bissan Ghaddar

Apr '20 – Jan '21 **Postdoctoral researcher**, *Aalto University*, Espoo, Finland.
Project: Modeling LoRa networks
Supervisor: Prof. Mario Di Francesco

Sep – Dec '19 **Research intern**, *Nokia Bell Labs*, Dublin, Ireland.
Project: Data-driven approach to improve energy efficiency of cellular base stations
Supervisor: Dr. Diego Lugones

Jun – Sep '19 **Visiting PhD student**, *Duke University*, Durham, NC, USA.
Project: Investigation of networking challenges for augmented reality applications
Host: Prof. Maria Gorlatova

May '18 **Visiting PhD student**, *National Chiao Tung University*, Hsinchu, Taiwan.
Two week visit to exchange ideas related to edge computing and Internet of Things
Host: Prof. Yu-Chee Tseng

May – Sep '16 **Research intern**, *IBM Research*, Dublin, Ireland.
Project: Edge computing for vehicular applications in smart cities
Host: Prof. Bissan Ghaddar

2011 – 2013 **Software engineer**, *Cisco Systems India Private Limited*, Bangalore, India.
Test engineer for mobile packet core network elements
Developed deep understanding of LTE networks and telecommunications industry

2010 – 2011 **Associate software engineer**, *Accenture*, Bangalore, India.
Application developer in pharmaceutical and life sciences division

Research funding

Sep '21 – Jan '24 **Scalable and Energy-efficient Networked Systems at the Edge**, Academy of Finland postdoctoral researcher, Award amount: 240,820 EUR

The project establishes energy-efficiency as a fundamental metric in designing and deploying applications in edge data centers. The goal is to minimize the energy consumed of networking infrastructure while still supporting the always-on, connected services of the future. The project ended in Jan '24 on starting as faculty at Aalto University.

Feb '21 – Jan '22 **Optimization of energy in edge networks**, postdoc pooli (Finnish Cultural Foundation), Principal investigator, Award amount: 52,000 EUR

The project involved devising new optimization models to allocate resources in data centers such that energy consumed is minimized. The project ended in Aug '21 as I received other funding.

Publications

Journals

[J8] J. Jeong, G. Premsankar, B. Ghaddar, and S. Tarkoma. A robust optimization approach for placement of applications in edge computing considering latency uncertainty. In: *Omega* (2024), p. 103064. ISSN: 0305-0483. DOI: https://doi.org/10.1016/j.omega.2024.103064. **Impact factor: 6.9**.

[J7] G. Premsankar and B. Ghaddar. Energy-Efficient Service Placement for Latency-Sensitive Applications in Edge Computing. In: *IEEE Internet of Things Journal* (2022). DOI: 10.1109/JIOT.2022.3162581. **Impact factor: 10.238**.

[J6] V. Toro-Betancur, G. Premsankar, C.-F. Liu, M. Słabicki, M. Bennis, and M. Di Francesco. Learning How to Configure LoRa Networks with No Regret: a Distributed Approach. In: *IEEE Transactions on Industrial Informatics. In press.* (2022). DOI: 10.1109/TII.2022.3187721. **Impact factor: 11.648**.

[J5] Y. Zhang, T. Scargill, A. Vaishnav, G. Premsankar, M. Di Francesco, and M. Gorlatova. InDepth: Real-time Depth Inpainting for Mobile Augmented Reality. In: *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 6.1 (Mar. 2022). DOI: 10.1145/3517260.

[J4] G. Premsankar*, G. Piao*, P. K. Nicholson, M. D. Francesco, and D. Lugones. Data-Driven Energy Conservation in Cellular Networks: A Systems Approach. In: *IEEE Transactions on Network and Service Management* 18.3 (2021), pp. 3567–3582. DOI: 10.1109/TNSM.2021.3083073. *Equal contribution.

[J3] B. Jedari, G. Premsankar, G. Illahi, M. Di Francesco, A. Mehrabi, and A. Ylä-Jääski. Video Caching, Analytics and Delivery at the Wireless Edge: A Survey and Future Directions. In: *IEEE Communications Surveys & Tutorials* 23.1 (2021), pp. 431–471. DOI: 10.1109/COMST.2020.3035427. **Impact factor: 25.249**.

[J2] G. Premsankar, B. Ghaddar, M. Slabicki, and M. Di Francesco. Optimal configuration of LoRa networks in smart cities. In: *IEEE Transactions on Industrial Informatics* (2020). DOI: 10.1109/TII.2020.2967123. **Impact factor: 11.648**.

[J1] G. Premsankar, M. Di Francesco, and T. Taleb. Edge computing for the Internet of Things: A case study. In: *IEEE Internet of Things Journal* 5.2 (2018), pp. 1275–1284. DOI: 10.1109/JIOT.2018.2805263. **Impact factor: 10.238**.

Book chapter

[B1] G. Premsankar and M. Di Francesco. Advances in Cloud Computing, Wireless Communications and the Internet of Things. In: *Analytics for the Sharing Economy: Mathematics, Engineering and Business Perspectives*. Springer, 2020, pp. 71–94. DOI: 10.1007/978-3-030-35032-1_6.

Conferences

[C9] M. Lintunen, G. Premsankar, H. Tenhunen, S. Tarkoma, and A. Rao. Poster: Automatic Mass Power Outage Detection in Radio Access Networks. In: *Proceedings of the 21st Annual International Conference on Mobile Systems, Applications and Services*. 2023, pp. 559–560. DOI: 10.1145/3581791.3597365.

[C8] T. Scargill, G. Premsankar, J. Chen, and M. Gorlatova. Here To Stay: A Quantitative Comparison of Virtual Object Stability in Markerless Mobile AR. In: *Second International Workshop on Cyber-Physical-Human System Design and Implementation*. May 2022, pp. 24–29. DOI: 10.1109/CPHS56133.2022.9804545.

[C7] V. T. Betancur, G. Premsankar, M. Slabicki, and M. Di Francesco. Modeling communication reliability in LoRa networks with device-level accuracy. In: *INFOCOM 2021-IEEE Conference on Computer Communications*. IEEE. 2021. DOI: 10.1109/INFOCOM42981.2021.9488783. **Acceptance rate: 19.9%**.

[C6] G. Premsankar, B. Ghaddar, M. Di Francesco, and R. Verago. Efficient placement of edge computing devices for vehicular applications in smart cities. In: *NOMS 2018-2018 IEEE/IFIP Network Operations and Management Symposium*. IEEE. 2018, pp. 1–9. DOI: 10.1109/NOMS.2018.8406256. **Best student paper award**.

[C5] S. K. Mohanty, G. Premsankar, and M. Di Francesco. An Evaluation of Open Source Serverless Computing Frameworks. In: *CloudCom*. 2018, pp. 115–120. DOI: 10.1109/CloudCom2018.2018.00033.

[C4] M. Slabicki, G. Premsankar, and M. Di Francesco. Adaptive configuration of LoRa networks for dense IoT deployments. In: *NOMS 2018-2018 IEEE/IFIP Network Operations and Management Symposium*. IEEE. 2018, pp. 1–9. DOI: 10.1109/NOMS.2018.8406255.

[C3] S. Bayhan, G. Premsankar, M. Di Francesco, and J. Kangasharju. Mobile content offloading in database-assisted white space networks. In: *International Conference on Cognitive Radio Oriented Wireless Networks*. Springer. 2016, pp. 129–141. DOI: 10.1007/978-3-319-40352-6_11.

[C2] G. Premsankar, K. Ahokas, and S. Luukkainen. Design and implementation of a distributed mobility management entity on OpenStack. In: *2015 IEEE 7th International Conference on Cloud Computing Technology and Science (CloudCom)*. IEEE. 2015, pp. 487–490. DOI: 10.1109/CloudCom.2015.54. Short paper.

[C1] J. Costa-Requena, J. L. Santos, V. F. Guasch, K. Ahokas, G. Premsankar, S. Luukkainen, O. L. Pérez, M. U. Itzazelaia, I. Ahmad, M. Liyanage, et al. SDN and NFV integration in generalized mobile network architecture. In: *2015 European conference on networks and communications (EuCNC)*. IEEE. 2015, pp. 154–158. DOI: 10.1109/EuCNC.2015.7194059.

Talks and presentations

27/02/2024 Panelist on "How to catalyze diversity in science?", IUPAC Global Women's Breakfast 2024, *Aalto University*, Finland

06/02/2024 Guest lecture: Sustainability of AI, Spring 2024: Elements of Sustainable ICT, *Aalto University*, Finland

06/07/2022 Energy-Efficient Service Placement for Latency-Sensitive Applications in Edge Computing, 32nd European Conference on Operational Research (EURO 2022), *Espoo*, Finland

12/10/2021 Invited (virtual) guest lecture: LoRa, Autumn 2021: Networked Systems and Services, *University of Helsinki*, Finland

22/03/2021 Invited (virtual) guest lecture: Infrastructure for edge computing, Spring 2021: Edge Computing, *Duke University*, NC, USA

05/08/2019 Elevator pitch: towards scalable communication networks, NeTS Early Career Work shop 2019, *National Science Foundation*, Arlington, VA, USA

11/10/2018 Demo: long range connectivity for IoT, Research day, *Aalto University*, Finland

10/05/2018 Research directions for edge computing and LoRa, *National Chiao Tung University*, Hsinchu, Taiwan

25/04/2018 Adaptive configuration of LoRa networks for dense IoT deployments,
Efficient placement of edge computing devices for vehicular applications in smart cities,
conference paper presentations, *IEEE NOMS 2018*, Taipei, Taiwan

07/09/2016 Optimizing the placement of edge devices in vehicular networks, final internship presentation, *IBM Research*, Dublin, Ireland

29/06/2016 Opportunistic content offloading using white space and ISM spectrum, *IBM Research*, Dublin, Ireland

03/12/2015 Design and implementation of a distributed Mobility Management Entity on OpenStack, conference paper presentation, *IEEE CloudCom 2015*, Vancouver, Canada

Awards and honours

Aug '19 Travel grant for NeTS Early Career Workshop, National Science Foundation, VA, USA

Spring '19 Aalto Foundation travel grant for research visit to Duke University

Apr '18	Best student paper award, IEEE/IFIP NOMS 2018
Apr '18	Student travel grant, IEEE/IFIP NOMS 2018, Apr 23-27, 2018, Taipei, Taiwan
Nov '15	Student travel grant, IEEE CloudCom, Nov 30-Dec 3, 2015, Vancouver, Canada
2013 – 2015	Aalto University Category B Scholarship for Master's study programme
2012, 2013	Two Cisco Achievement Program awards for excellent work
2010, 2011	Quarterly awards for "Excellence as a Business Operator" at Accenture
2006 – 2010	Scholarship for Bachelor's study programme, Scholarship Programme for Diaspora Children (Ministry of Overseas Indian Affairs, Government of India)

Teaching and supervision

Teaching assistant

Fall '22	DATA11003: Distributed Data Infrastructures, University of Helsinki
Fall '21	CSM13001: Distributed Systems, University of Helsinki
Fall '20	CS-E4190: Cloud Software and Systems, Aalto University
Fall '17, '18	CS-E4100: Mobile Cloud Computing, Aalto University
Spring '17	CS-E4002: The Internet of Things: Selected Themes, Aalto University
Fall '14, '15, '16	CS-E4005 Methods and Tools for Network Systems, Aalto University

Master's thesis supervisor

2024 -	Ekaterina Khelbova
2024 -	Abinaov Murali

Master's thesis advisor

2022 – 2023	Advised two M.Sc. thesis students at University of Helsinki
2018 – 2020	Advised six M.Sc. thesis students at Aalto University

Academic service

Technical program committee member

International Workshop on Edge Systems, Analytics and Networking (EdgeSys 2024), co-located with ACM EuroSys 2024

International Workshop on Networked AI Systems (NetAISys), co-located with ACM MobiSys 2023, 2024

Grace Hopper Conference for Women in Computing, Computer Systems Engineering (CSE) track committee member 2019

ACM EuroSys (Shadow PC), 2018

Conference organization

Workshop and tutorial chair, IoT Conference 2024

Registration chair, ACM MobiSys 2023

Session organizer and chair, Applications of OR in telecommunications for EURO 2022

Reviewer

Journals: ACM Computing Surveys, IEEE Transactions on Mobile Computing, IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Internet of Things Journal, IEEE Systems Journal, IEEE Network Magazine, IEEE Open Journal of the Communications Society, Elsevier Pervasive and Mobile Computing, Elsevier Computer Networks, Springer Wireless Networks

Conferences: ICIS 2022, ACM IMWUT / UbiComp 2022, IEEE ICDCS 2021, IEEE WoWMoM (2019, 2020), IEEE Sarnoff 2019, IEEE SMARTCOMP 2017, IEEE PerCom (2016, 2021)

Media coverage

2022 Tammenlastuja (Magazine of the Finnish Cultural Foundation) 03/22, Energiatehokkuus on tulevaisuuden mittari

Additional activities

2019 – 2020 Website redesign co-chair, board member, N2Women

2017 – 2020 Contributor to open source simulator, Framework for LoRa (FLoRa) for end-to-end simulations of LoRa networks

2017 – 2020 Volunteer in codebar, Women for Women Workshops and Django Girls, Helsinki with the goal to improve representation of underrepresented groups in technology