Xu Tao

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Research Interest

My research lies at the intersection of machine learning and networked systems, focusing on computing and communication optimization, on-device AI, edge intelligence, and energy-efficient solutions. I apply these innovations to Smart Agriculture, Smart Cities, and Industry 4.0 to enhance efficiency, scalability, and sustainability.

Education

Ph.D. in Computer Science   Aug 2021 - May 2025
Advisor: Dr. Simone Silvestri
University of Kentucky, USA

M.S. in Computer Engineering   Apr 2018
Politecnico di Torino, Italy
Thesis: A Policy-Based Architecture for Container Migration in Software Defined Infrastructures.
Advisors: Dr. Flavio Esposito (Saint Louis University, USA)
                      Dr. Guido Marchetto (Politecnico di Torino, Italy)

B.S in Computer Engineering   Jul 2015
(Double degree exchange program)
Politecnico di Torino, Italy   Sep 2014 - Jul 2015
Luoyang Normal University, China   Sep 2011 - Jul 2015

Professional Experience

Research Assistant, University of Kentucky, USA   May 2022 - Present
– Research on NSF SCC funded project Smart Integrated Farm Network for Rural Agricultural Communities (SIRAC).

Teaching Assistant, University of Kentucky, USA   Sep 2021 - May 2022
– CS 101: Introduction to Computers.

Researcher, LINKS Foundation, Italy   May 2018 - Aug 2021
– Research on EU-Funded Project including Model-Based Framework for Dependable Sensing and Actuation in Intelligent Decentralized IoT Systems (BRAIN-IoT).

Visiting Scholar, Saint Louis University, USA   Aug 2017 - Feb 2018
– Research on policy-based architecture for container migration in software-defined infrastructures.

Software Development Intern, Seica, Italy   Mar 2017 - May 2017
– Integrating the smart home system with a cloud platform for remote processing and automation.

Laboratory Assistant, Politecnico di Torino, Italy   Sep 2016 - Feb 2017

– Lab session assistant of Computer Network Technologies and Services.

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Publications

Book Chapters

- Mohammad Rifat Ahmmad Rashid, Davide Conzon, **Xu Tao**, and Enrico Ferrera. "Privacy Awareness for IoT Platforms: BRAIN-IoT Approach." Security and Privacy in the Internet of Things: Challenges and Solutions, Vol. 27, 2020. ISBN 978-1-64368-052-1.

Peer-Reviewed Journal Papers

- **X. Tao**, D. Monaco, A. Sacco, S. Silvestri, and G. Marchetto. "Delay-Aware Routing in Software-Defined Networks via Network Tomography and Reinforcement Learning." IEEE Transactions on Network Science and Engineering (TNSE), 2024.
- A. K. Singh, B. J. BalabayglooBehzad, B. BekeeBarituka, S. W. Blair, S. Fey, F. Fotouhi, A. Gupta, A. Jha, J. C. Martinez-Palomares, K. Menke, A. Prestholt, V. K. Tanwar, **X. Tao**, A. Vangala, M. E. Carroll, S. K. Das, G. DePaula, P. Kyveryga, S. Sarkar, M. Segovia, S. Silvestri, and C. Valdivia. "Smart Connected Farms and Networked Farmers to Improve Crop Production, Sustainability and Profitability." Frontiers in Agronomy, Vol. 6, 2024.

Conference Proceedings

- **X. Tao**, J. Butcher, S. Silvestri, and S. K. Das. "iCrop+: An Edge-boosted Crop Disease Detection System via TinyML and LoRa Communication." IEEE International Conference on Pervasive Computing (PerCom Demo Track), 2025 (Best Demo Runner Up Paper Award).
- **X. Tao**, C. Cumini, A. Sacco, S. Silvestri, S. C. Montserrat and G. Marchetto. "FertilizeSmart: Exploiting IoT and Differential Evolution for Optimizing Crop Fertilization." IEEE/IFIP Wireless On-demand Network Systems and Services Conference (WONS), 2025.
- **X. Tao**, R. Zhao, S. Chehida, D. Conzon, E. Ferrera, and S. Bensalem. "A User-Centric Privacy Control Framework for Decentralized IoT Platforms." International Conference on the Quality of Information and Communications Technology (QUATIC), 2024.
- **X. Tao**, E. Damron, and S. Silvestri. "High-Precision Crop Monitoring Through UAV-Aided Sensor Data Collection." IEEE International Conference on Communications (ICC), 2024.
- **X. Tao**, J. Butcher, S. Silvestri, and Flavio Esposito. "iCrop: Enabling High-Precision Crop Disease Detection via LoRa Technology." IEEE International Conference on Computer Communications and Networks (ICCCN), 2024.
- **X. Tao** and S. Silvestri. "Network Tomography and Reinforcement Learning for Efficient Routing." IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS), 2023.
- S. Chehida, S. Bensalem, D. Conzon, and E. Ferrera, **Xu Tao**. "BRAIN-IoT Architecture and Platform for Building IoT Systems." International Conference on Internet of Things, Big Data and Security (IoTBDS) 2022.
- **X. Tao**, D. Conzon, E. Ferrera, L. M. Emmanuel Michel, M. Diaz-Nava, S. Li, A. Baouya, S. Chehida, and J. Goetz. "Model Based Methodology and Framework for Design and Management of Next-Gen IoT Systems." Eclipse Research International Conference on Security, Artificial Intelligence and Modelling for the Next Generation Internet of Things (SAMIoT), 2020.
- R. Zhao, **X. Tao**, D. Conzon, and E. Ferrera, "A Cross-platform Communication Mechanism for ROS-based Cyber-physical System." Eclipse Research International Conference on Security, Artificial Intelligence and Modelling for the Next Generation Internet of Things, 2020.

- E. Ferrera, **X. Tao**, D. Conzon, V. Pombo, M. Cantero, T. Ward, I. Bosi, and M. Sandretto. "BRAIN-IoT: Paving the Way for Next-Generation Internet of Things." International Conference on Internet of Things, Big Data and Security (IoTBDS), 2020.
- R. Nicholson, T. Ward, D. Baum, **X. Tao**, D. Conzon, and E. Ferrera. "Dynamic fog computing platform for event-driven deployment and orchestration of distributed Internet of Things applications." World Conference on Smart Trends in Systems Security and Sustainability (WorldS4), 2020.
- D. Conzon, M. R. A., Rashid, **X. Tao**, and E. Ferrera. "BRAIN-IoT: Model-Based Framework for Dependable Sensing and Actuation in Intelligent Decentralized IoT Systems." International Conference on Computing, Communications and Security (ICCCS) 2019.
- **X Tao**, F. Esposito, and G Marchetto. "A Policy-Based Architecture for Container Migration in Software Defined Infrastructures." IEEE Conference on Network Softwarization (IEEE NetSoft) 2019.

Posters and Abstracts
- **X. Tao**, and Simone Silvestri. "Integrating UAV and LoRaWAN in WSN for Intelligent Monitoring in Large-scale Rural Farms." IEEE International Conference on Pervasive Computing and Communications (PerCom Workshops PhD Forum), 2023.

▬▬▬ Awards, Fellowships & Grants

2025	**NSF Student Travel Grant Award**, IEEE PerCom Conference, Washington DC, USA
2024	**Cyber Physical Systems (CPS) Rising Stars**, University of Virginia, USA
2024	**Thaddeus B. Curtz Memorial Scholarship**, University of Kentucky, USA.
2024	**NSF Student Travel Grant Award**, IEEE PerCom Conference, France
2023	**NSF Student Travel Grant Award**, IEEE ICNP Conference, Iceland
2023	**NSF Student Travel Grant Award**, IEEE PerCom Conference, Atlanta, USA
2023	**Colosseum Young Gladiators Training**, Northeastern University, Boston, USA

Mentorship

May 2022 - present	Jackson Butcher, Master Student, Computer Science at UKY.
May 2023 - Dec 2024	Evan Damron, Undergraduate Student, Computer Science at UKY.
Dec 2023 - Jun 2024	Stefano Bassino, visiting master student, Politecnico di Torino, Italy.
Oct 2023 - Mar 2024	Christian Cumini, visiting master student, Politecnico di Torino, Italy.
Jan 2020 - Jun 2020	Yenchia Yu, Intern, LINKS Foundation, Turin, Italy.

Preffessional Activities

Journal Paper Peer Reviews

IEEE Transactions on Network Science and Engineering

Elsevier Ad-hoc Networks

Elsevier Pervasive and Mobile Computing

Elsevier Computer Networks

Journal of Network and Computer Applications

Conference Paper Peer Reviews

IEEE Conference on Computer Communications (INFOCOM)

IEEE International Conference on Communications (ICC)

IEEE International Conference on Distributed Computing Systems (ICDCS)

IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoW-MoM)

IEEE Conference on Local Computer Networks (LCN)

IEEE Global Communications Conference (GLOBECOM)

IEEE Consumer Communications & Networking Conference (CCNC)

IEEE Wireless Communications and Networking Conference (WCNC)

IEEE International Conference on Sensing, Communication, and Networking (SECON)

IEEE 20th International Conference on Mobile Ad Hoc and Smart Systems (MASS)

IEEE Conference on Local Computer Networks (LCN)

IEEE International Conference on Pervasive Computing and Communications (PerCom)

International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS)

IFIP Networking Conference (IFIP Networking)

IEEE/ACM 32nd International Symposium on Quality of Service (IWQoS)

IEEE International Conference on Smart Computing (SMARTCOMP)

Professional Memberships

2024 - present	**Vice President**, Association of Data and Computation (ADC), UKY
2023 - 2024	**Treasurer**, Graduate Student Association Computer Science (GSACS), UKY