Xu Tao

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Research Interests

My research interests encompass networked systems, including Cyber-Physical Agriculture Systems, decentralized Internet of Things (IoT) systems, and Software-Defined Networks, focusing on AI-driven optimization to enhance communication, computing efficiency, and Quality of Service (QoS). My work aims to improve the availability, scalability, adaptability, sustainability, and security of these systems, particularly in resource-constrained and dynamic environments.

Education

Ph.D. Candidate in Computer Science   Expected Graduation: June 2025
Advisor: Dr. Simone Silvestri
University of Kentucky, USA

Master of Science in Computer Engineering   April 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)

Bachelor of Science in Computer Engineering   July 2015
(Double degree exchange program)
Politecnico di Torino, Italy   Sep 2014 - July 2015
Luoyang Normal University, China   Sep 2011 - July 2015

Professional Experience

Research Assistant   May 2022 - Present
Department of Computer Science, University of Kentucky, USA

Teaching Assistant   Sep 2021 - May 2022
Department of Computer Science, University of Kentucky, USA

Researcher in IoT and Pervasive Technologies   May 2018 - Aug 2021
LINKS Foundation, Italy

Visiting Scholar   Aug 2017 - Feb 2018
Saint Louis University, USA

Software Development Intern — Mar 2017 - May 2017
Seica, Italy

Laboratory Assistant — Sep 2016 - Feb 2017
Department of Computer Engineering, Politecnico di Torino, Italy

Publications

Book Chapters

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

Peer-Reviewed Journal Articles

• **Xu Tao**, Doriana Monaco, Alessio Sacco, Simone Silvestri, and Guido Marchetto, "Delay-Aware Routing in Software-Defined Networks via Network Tomography and Reinforcement Learning" in 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" in Frontiers in Agronomy, Vol. 6, 2024.

Conference Proceedings

• **Xu Tao**, Christian Cumini, Alessio Sacco, Simone Silvestri, Salmeron Cortasa, Montserrat and Guido Marchetto. "FertilizeSmart: Exploiting IoT and Differential Evolution for Optimizing Crop Fertilization" in IEEE/IFIP Wireless On-demand Network Systems and Services Conference (WONS), 2025. (accepted)

• **Xu Tao**, Rui Zhao, Salim Chehida, Davide Conzon, Enrico Ferrera, and Saddek Bensalem. "A User-Centric Privacy Control Framework for Decentralized IoT Platforms" in International Conference on the Quality of Information and Communications Technology (QUATIC), 2024.

• **Xu Tao**, Jackson Butcher, Simone Silvestri, and Flavio Esposito. "iCrop: Enabling High-Precision Crop Disease Detection via LoRa Technology" in IEEE International Conference on Computer Communications and Networks (ICCCN), 2024.

• **Xu Tao**, Evan Damron, and Simone Silvestri. "High-Precision Crop Monitoring Through UAV-Aided Sensor Data Collection" in IEEE International Conference on Communications (ICC), 2024.

• **Xu Tao** and Simone Silvestri. "Network Tomography and Reinforcement Learning for Efficient Routing" in IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS), 2023.

• Salim Chehida, Saddek Bensalem, Davide Conzon, and Enrico Ferrera, **Xu Tao**. "BRAIN-IoT Architecture and Platform for Building IoT Systems" in International Conference on Internet of Things, Big Data and Security (IoTBDS) 2022.

• **Xu Tao**, Davide Conzon, Enrico Ferrera, Laurent Maillet-Contoz, Emmanuel Michel, Mario Diaz-Nava, Shuai Li, AbdelHakim Baouya, Salim Chehida, and Juergen Goetz, "Model Based Methodology and Framework for Design and Management of Next-Gen IoT Systems" in Eclipse Research International Conference on Security, Artificial Intelligence and Modelling for the Next Generation Internet of Things (SAMIoT), 2020.

- Rui Zhao, **Xu Tao**, Davide Conzon, and Enrico Ferrera, "A Cross-platform Communication Mechanism for ROS-based Cyber-physical System" in Eclipse Research International Conference on Security, Artificial Intelligence and Modelling for the Next Generation Internet of Things, 2020.
- Enrico Ferrera, **Xu Tao**, Davide Conzon, Victor Pombo, Miquel Cantero, Tim Ward, Ilaria Bosi, and Mirko Sandretto, "BRAIN-IoT: Paving the Way for Next-Generation Internet of Things" in International Conference on Internet of Things, Big Data and Security (IoTBDS), 2020.
- Richard Nicholson, Timothy Ward, Derek Baum, **Xu Tao**, Davide Conzon, and Enrico Ferrera. "Dynamic fog computing platform for event-driven deployment and orchestration of distributed Internet of Things applications" in World Conference on Smart Trends in Systems Security and Sustainability (WorldS4), 2020.
- Davide Conzon, Mohammad Rifat Ahmmad Rashid, **Xu Tao**, and Enrico Ferrera. "BRAIN-IoT: Model-Based Framework for Dependable Sensing and Actuation in Intelligent Decentralized IoT Systems" in International Conference on Computing, Communications and Security (ICCCS) 2019.
- **Xu Tao**, Flavio Esposito, and Guido Marchetto. "A Policy-Based Architecture for Container Migration in Software Defined Infrastructures" in IEEE Conference on Network Softwarization (IEEE NetSoft) 2019.

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

Working Papers

- **Xu Tao**, Simone Silvestri and Sajal K. Das. "A Cost-Efficient UAV-Assisted Data Collection Framework for High-Precision Crop Monitoring" in IEEE International Conference on Computer Communications (INFOCOM), 2025. (submitted)
- **Xu Tao**, Stefano Bassino, Alessio Sacco, Simone Silvestri and Guido Marchetto. "Age-optimal IoT Data Collection via UAV-assisted LoRa technology" in IEEE International Conference on Distributed Computing Systems (ICDCS), 2025. (in preparation)
- **Xu Tao**, Jackson Butcher, Simone Silvestri, and Flavio Esposito. "Edge AI-Enhanced Crop Disease Detection over Low-Power Wide Area Networks" in ACM Transactions on Cyber-Physical Systems. (in preparation)
- **Xu Tao**, Evan Damron, and Simone Silvestri "Optimizing Data Collection in UAV-aided Sensor Networks for Intelligent Irrigation Scheduling" in ACM Transactions of Sensor Network. (in preparation)

Awards, Fellowships & Grants

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 2023 - present	Evan Damron, Undergraduate Student, Computer Science at UKY.
May 2022 - present	Jackson Butcher, 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