Chengyi Qu

ASSISTANT PROFESSOR AT FLORIDA GULF COAST UNIVERSITY

Department of Computing & Software Engineering, U.A. Whitaker College of Engineering

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Education

University of Missouri - Columbia   *Columbia, Missouri, USA*

PH.D. IN COMPUTER SCIENCE   *Aug. 2018 - May. 2023*

- *Academic Advisor*: **Prof. Prasad Calyam** (Greg L. Gilliom Professor of Cybersecurity and Mizzou CERI Center Director)
- *Dissertation*: **Intelligent Orchestration of Computation and Networking for Drone Swarm Applications**
- **2023 Outstanding Ph.D. Student in Computer Science Department**

M.S. IN COMPUTER SCIENCE - CONVERT TO PH.D. PROGRAM   *Aug. 2016 - May. 2018*

Northeastern University   *China*

B.S. IN SOFTWARE ENGINEERING   *Sep. 2012 - May. 2016*

Work Experience

Florida Gulf Coast University   *Fort Myers, Florida, USA*

ASSISTANT PROFESSOR   *Aug. 2023 - now*

- PI and subawarded $199,472 from CyberFlorida Cyber training program.
- PI and awarded $5,000 from Head Start Program in FGCU U.A. Whitaker College of Engineering.
- Comittee Member: FGCU DENDRITIC AI and Data Science Institute

Argonne National Lab   *Lemont, Illinois, USA*

PH.D STUDENT RESEARCH AIDE/ SUMMER INTERN   *May. 2022 - Aug. 2022*

- Worked on an NSF/DoE CC* project: SciStream, with Dr. Rajkumar Kettimuthu (Fellow of the Argonne Computation Institute). Created a novel high-speed memory-to-memory scientific data streaming middleware over 1 Tbps Wide area network. Research outcomes were presented in an Invited Talk at the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC '22).
- Developed efficient and secure data streaming with state-of-the-art transport layer protocols, e.g., QUIC. Evaluated performance on a NSF-funded Adaptive Programmable Research Infrastructure Testbed viz., FABRIC. This is the first work on evaluating QUIC and benchmarking QUIC proxy on a large-scale research infrastructure testbed.

Center for Cyber Education, Research and Infrastructure (Mizzou CERI)   *Columbia, Missouri, USA*

RESEARCH ASSISTANT [ADVISOR: PROF. PRASAD CALYAM]   *Jan. 2020 - May. 2023*

- Used machine learning for addressing edge/cloud network communication, distributed computation, and security challenges in autonomous networked systems (e.g., drone swarms) within a novel system orchestration approach that is energy-aware, scalable, and optimized.
- Published over 21 peer-reviewed papers in prestigious conferences (e.g., IEEE INFOCOM, IEEE CNSM, IEEE eScience, ACM ICDCN) and journal venues (e.g., IEEE TNSM, Elsevier FGCS).
- Experience in writing National Science Foundation (NSF) proposals on cutting-edge research topics in collaboration with Professors and PostDocs nationally (1 proposal funded and 2 proposals in review).
- Mentored master's students and undergraduate students who come from diverse backgrounds in terms of e.g., race, gender, and culture.
- Worked on sponsored research projects funded by NSF and Army Research Lab. Collaborated with various universities i.e., UMass-Amherst, UNC Chapel Hill, U. of Southern California, Purdue U., U of Illinois-Chicago, U. at Buffalo SUNY, JNTU-India, and Missouri S & T.

Virtualization Multimedia and Networking (VIMAN) Lab   *Columbia, Missouri, USA*

RESEARCH ASSISTANT [ADVISOR: PROF. PRASAD CALYAM]   *Aug. 2018 - Dec. 2019*

- Developed a public safety application viz., "Panacea's Cloud" to help first responders to establish a mesh network to obtain visual situational awareness of an incident scene via video streaming and a microlocation service to update status of responders, patients, and supplies.
- Mentored 2 undergraduate researchers from 'NSF Research Experience for Undergraduates in Consumer Networking Technologies (REU)' in 2019. Developed an energy-aware computation offloading strategy for drone swarm systems by saving 25% on battery consumption.
- Cooperated with visiting scholars from Jawaharlal Nehru Technological U. and Army Research Lab (ARL) on improving drone video transmission in presence of occlusions. Proposed approach has been applied to deploy cameras on UAVs by Transparent Sky, LLC.

MU Bond Life Science Center
Columbia, Missouri, USA

SOFTWARE ENGINEER [ADVISOR: PROF. DONG XU] *Jan. 2017 - May. 2018*

- Built a new cross-platform App on Traditional Chinese Medicine (TCM) using tongue image for personal health monitoring. App had a total download of 300+ and 20+ 5 star reviews on both Apple App Store and Google Play.
- Migrated a local TCM diagnose database to a cloud service. Implemented an automated system for data storing, querying and analytics.

Neusoft Corporation
Shenyang, Liaoning, P.R.China

SOFTWARE ENGINEER TRAINEE *May. 2015 - Sep. 2015*

- Developed a human resource management website by leading a team of 4 undergraduate students. Website was widely used in the Neusoft HR system and its subsidiary, and increased 40% efficiency of human resources management.
- Used Struts, Spring and Hibernate framework for design and implementation. Redesigned database structure increased 20% speed in terms of computing, querying and results generation.

Teaching

Department of Computing and Software Engineering, Florida Gulf Coast University
Fort Myers, Florida, USA

ASSISTANT PROFESSOR *Aug. 2023*

- Redesign and taught course on Computer Network, 2 sections, 56 students, senior level.
- Mean Course Evaluation Score: **4.8/5**
- Newly-resigned course on Computer Security, 2 sections, 63 students, junior level. COIL program

EECS Department, University of Missouri - Columbia
Columbia, Missouri, USA

TEACHING ASSISTANT & INVITED LECTURER *Jan.- May. 2020, 2021, 2022*

- Assisted Prof. Prasad Calyam with teaching a course on 'Cloud Computing' (Spring 2020 and Spring 2021). Designed hands-on instruction labs that use public clouds such as e.g., AWS, GCP, as well as open clouds such as e.g., GENI, Chameleon, Nautilus, and CloudLab.
- Co-taught and gave invited Lectures in Cloud Computing in Spring 2022 with 60+ graduate and undergraduate students in class.
- Mean Course Evaluation Score: **4.7/5**

EECS Department, University of Missouri - Columbia
Columbia, Missouri, USA

TEACHING ASSISTANT *Aug.- Dec. 2020*

- Assisted Prof. Youssef Saab in teaching and grading a course on 'Advanced Algorithm Design and Analysis' (Fall 2020). Designed and taught lab lectures with 40+ undergraduate students.
- Responsible for lecturing, developing, and managing course materials, holding office hours, and submitting and approving grades.

Information Technology Department, University of Missouri - Columbia
Columbia, Missouri, USA

COURSE DESIGNER & LAB INSTRUCTOR *Aug. 2018 - Dec. 2019*

- Helped create three brand new courses with Prof. Ronny Bazan-Antequera: i) Cyber Security (Fall 2018), ii) Advanced Cyber Security (Spring 2019), and iii) Digital Forensics (Fall 2019).
- Worked on designing the digital forensics course from fundamentals. Designed 5 brand new digital forensics labs for students with entry-level to intermediate-level proficiency. Helped 20+ undergraduate IT students with mock job interviews.

Journal Papers or Articles

(J5) **C. Qu**, R. Singh, A. Esquivel Morel, P. Calyam. "Learning-based Multi-Drone Network Edge Orchestration for Video Analytics" *IEEE Transactions on Network and Service Management (TNSM), 2024* Link **Impact Factor: 4.76**

(Ph.D. Dissertation) **C. Qu**. "Intelligent Orchestration of Computation and Networking for Drone Swarm Applications", 2023

(J4) A. Esquivel Morel, **C. Qu**, D. Gafurov, G. Papadimitriou, E. Lyons, K.Thareja, A. Mandal, M. Zink, P. Calyam, E. Deelman. "FlyNet: Drones on the Horizon", *IEEE Internet Computing Magazine, 2023* Link

(J3) **C. Qu**, F. Sorbelli, R. Singh, P. Calyam, S. Das. "Environmentally-Aware and Energy-Efficient Multi-Drone Coordination and Networking for Disaster Response" *IEEE Transactions on Network and Service Management (TNSM), 2023.* Link **Impact Factor: 4.76**

(J2) R. Singh, **C. Qu**, A. Esquivel Morel, P. Calyam. "Location Prediction and Trajectory Optimization in Multi-UAV Application Missions" *Book Chapter for 'Intelligent Unmanned Air Vehicles for Public Safety Networks', Springer 'Unmanned System Technologies' Book, 2021.*, [Link]

(J1) **C. Qu**, P. Calyam, J. Yu, A. Vandanapu, O. Opeoluwa, K. Gao, S. Wang, R, Chastain, K. Palaniappan. "DroneCOCoNet: Learning-based Edge Computation Offloading and Control Networking for Drone Video Analytics" *Elsevier Future Generation Computer Systems (FGCS), 2021*, [Link] **Impact Factor: 7.19**

Conference Papers

(C21) Kevin Kostage, David West, Tim Meinert, **C. Qu**, Prasad Calyam and Luca Mazzola, "Enhancing Autonomous Intrusion Detection System with Generative Adversarial Networks" *IEEE eScience 2024*

(C20) Alicia Esquivel Morel, Zack Murry, Kevin Kostage, **C. Qu**, Prasad Calyam, "Enhancing Drone Video Analytics Security Management using an AERPAW Testbed" *International Workshop on Computer and Networking Experimental Research using Testbeds (CNERT 2024), in conjunction with IEEE International Conference on Computer Communications, INFOCOM 2024*

(C19) **C. Qu**, P Drefahl, W Guo, H Wang, "Autonomous Video Transmission and Air-to-Ground Coordination in UAV-Swarm-Aided Disaster Response Platform" *International Conference on Human-Computer Interaction (HCII), 339-355, 2024*

(C18) H Wang, C Zhao, X Huang, Y Zhu, **C. Qu**, W Guo, "Emotion Recognition in Dance: A Novel Approach Using Laban Movement Analysis and Artificial Intelligence" *International Conference on Human-Computer Interaction (HCII), 189-201, 2024*

(C17) **C. Qu**, Chaise Ballotti, Daniel De Sousa and Jiaqing Liu, "Intelligent UAS-Edge-Server Collaboration and Orchestration in Disaster Response Management" *IEEE International Conference on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE), 2023.*

(C16) **C. Qu**, R. Singh, Sharan Srinivas, P. Calyam, "Environmentally-Aware Robotic Vehicle Networks Routing Computation for Last-mile Deliveries" *IEEE International Conference on Computer Communications and Networks (ICCCN), 2023.* **Invited Paper**

(C15) A. Esquivel Morel,**C. Qu**, D. Gafurov, G. Papadimitriou, E. Lyons, K. Thareja, A. Mandal, M. Zink, P. Calyam, E. Deelman. "Network Services Management using Programmable Data Planes for Visual Cloud Computing" *IEEE International Conference on Computing, Networking and Communications (ICNC), 2023.*

(C14) **C. Qu**, J. Chung, Z. Liu, T. Bicer, R. Kettimuthu. "Evaluating SciStream (Federated Scientific Data Streaming Architecture) on FABRIC", *To appear in International Workshop on Innovating the Network for Data-Intensive Science (INDIS), co-located with the IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis (SC), 2022.*

(C13) A. Esquivel, **C. Qu**, E. Ufuktepe, C. Grant, S. Elfrink, P. Calyam, K. Pal. "Trust Quantification in a Collaborative Drone System with Intelligence-driven Edge Routing" *To appear in the Network Operations and Management Symposium (NOMS), 2023.*

(C12) **C. Qu**, J. Boubin, D. Gafurov, J. Zhou, N. Aloysius, H. Nguyen, P. Calyam. "UAV Swarms in Smart Agriculture: Experiences and Opportunities" *IEEE International Conference on Escience, 2022.* [Link]

(C11) **C. Qu**, R. Singh, A. Esquivel Morel, P. Calyam. "Learning-based Multi-Drone Network Edge Orchestration for Video Analytics" *IEEE International Conference on Computer Communications (INFOCOM), 2022.* [Link] **Acceptance Rate: 19.8%**

(C10) G. Papadimitriou, **C. Qu**, R. Tanaka, E. Lyons, K. Thareja, A. Mandal, M. Zink, P. Calyam, E. Deelman. "Automating Edge-to-cloud Workflows for Science: Traversing the Edge-to-cloud Continuum with Pegasus" *IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGrid) 2022.* [Link] **Best Paper Award**

(C9) **C. Qu**, R. Singh, A. Esquivel Morel, F. Sorbelli, P. Calyam, S. Das. "Obstacle-Aware and Energy-Efficient Multi-Drone Coordination and Networking for Disaster Response" *IEEE Conf. on Network and Service Management (CNSM), 2021.* [Link] **Acceptance Rate: 19.3%**

(C8) E. Lyons, **C. Qu**, S. Wang, K. Thareja, G. Papadimitriou, R. Tanaka, A. Mandal, M. Zink, P. Calyam, E. Deelman. "FlyNet: a platform to support scientific workflows from the edge to the core for UAV applications" *IEEE/ACM Utility and Cloud Computing Conf. (UCC), 2021.* [Link] **Acceptance Rate: 33.8%**

(C7) **C. Qu**, A. Esquivel Morel, D. Dahlquist, P. Calyam. "DroneNet-Sim: A Learning-based Trace Simulation Framework for Control Networking in Drone Video Analytics" *ACM Workshop on Micro Aerial Vehicle Networks, Systems, and Applications (DroNet), 2020.* [Link]

(C6) A. Esquivel, D. Kavzak Ufuktepe, R. Ignatowicz, A. Riddle, **C. Qu**, P. Calyam, K. Palaniappan. "Enhancing Network-edge Connectivity and Computation Security in Drone Video Analytics" *IEEE Applied Imagery Pattern Recognition Workshop (AIPR), 2020.* [Link]

(C5) J. Wu, A. Vandanapu, **C. Qu**, S. Wang, P. Calyam. "Energy-aware Dynamic Computation Offloading for Video Analytics in Multi-UAV Systems" *IEEE International Conference on Computing, Networking and Communications (ICNC), 2020.* [Link] **Acceptance Rate: 24.9%**

(C4) **C. Qu**, A. Esquivel, D. Dahlquist, P. Calyam. "Design of Trace-based NS-3 Simulations for UAS Video Analytics with Geospatial Mobility" *SPIE Defense + Commercial Sensing, 2020.* [Link]

(C3) **C. Qu**, R. Rao, R. Aktar, S. Wang, P. Calyam, K. Palaniappan. "Dynamic Computation Off-loading and Control based on Occlusion Detection in Drone Video Analytics" *ACM Distributed Computing and Networking (ICDCN), 2020.* **Acceptance Rate: 33.8%** [Link]

(C2) **C. Qu**, S. Wang, P. Calyam. "DyCOCo: A Dynamic Computation Offloading and Control Framework for Drone Video Analytics" *Midscale Education and Research Infrastructure and Tools (MERIT), An NSF sponsored Workshop co-located with IEEE ICNP, 2019.* [Link]

(C1) **C. Qu**, D. Chemodanov, O. Opeoluwa, S. Wang, P. Calyam. "Policy-Based Function-Centric Computation Offloading for Real-Time Drone Video Analytics" *IEEE Symposium on Local and Metropolitan Networks (LANMAN), 2019.* [Link] **Invited Paper**

Posters, Presentations, and Demos

(P7) **C. Qu** "Cybersecurity for the Elderly Healthcare and Senior Communities", *Cyber Florida Sunshine Conference, May 2024*

(P6) **C. Qu**, J. Chung, Z. Liu, T. Bicer, R. Kettimuthu. "Demo: SciStream: Mem-to-Mem Scientific Data Streaming over a Wide Area Network", *Network Research Exhibition (NRE), co-located with the IEEE/ACM SC, 2022.* [Link]

(P5) R. Kettimuthu, **C. Qu**, J. Chung, Z. Liu, T. Bicer. "Invited Talk: SciStream and its implementation on FABRIC testbed", *KNIT 5: A FABRIC Community Workshop, 2022.* [Link]

(P4) **C. Qu**, R. Singh, A. Esquivel, F. Betti, P. Calyam, and S. K. Das. "Poster: Multi-Drone Coordination and Networking Experiments for Disaster Response" *NSF AERPAW Fall Event, 2021.* **Best Poster Finalist** [Link]

(P3) E. Lyons, **C. Qu**, S. Wang, K. Thareja, G. Papadimitriou, R. Tanaka, A. Mandal, M. Zink, P. Calyam, E. Deelman. "Poster: FlyNet: a platform to support scientific workflows from the edge to the core for UAV applications" *NSF AERPAW Fall Event, 2021.* [Link]

(P2) **C. Qu**, R. Singh, F. Betti, P. Calyam, and S. K. Das. "Poster: Obstacle-Aware and Energy-Efficient Multi-Drone Coordination and Networking for Disaster Response" *MIZZOU Graduate Forum, 2021.*

(P1) **C. Qu**, S. Wang, P. Calyam. "Demo: DyCOCo: A Dynamic Computation Offloading and Control Framework for Drone Video Analytics" *IEEE MERIT Workshop, 2019.* [Link]

Advising and Mentorship

Mentored Graduate Students

- Durbek Gafurov (2021-2023), *CS Master Student at University of Missouri (joined Anchorage Digital)*
- Alicia Esquivel Morel (2020-2023), *CS PhD Student at University of Missouri (Currently)*
- Deniz Kavzak Ufuktepe (2021), *CS PhD Student at University of Missouri (Currently)*
- Raymond Chastain (2020), *CS Master Student at University of Missouri, joined Booz Allen Hamilton*
- Rounak Singh (2020-2021), *ECE Master Student at University of Missouri, joined Fannie Mae*
- Ope Opeoluwa (2019-2020), *CS Master Student at University of Missouri, joined Zillow*

Undergraduate Research Assistants

- Chaise Ballotti (2023) *SE Undergraduate Student at Florida Gulf Coast University, WiSER student*
- Kevin Kostage (2023-now) *SE Undergraduate Student at Florida Gulf Coast University*
- Daniel De Sousa (2023) *SE Undergraduate Student at Florida Gulf Coast University*
- Gian Zignago (2022-2023) REU student, *CS Undergraduate Student at University of Missouri*
- Ananya Hans (2021-2022), *Undergraduate Student at University of Missouri, joined National Research Council of Italy*
- Drew Dahlquist (2019-2020), *CS Undergraduate Student at University of Missouri, joined VMware*
- Robert Ignatowicz (2020) REU student, *CS Undergraduate Student at Stony Brook University*
- Alexander Riddle (2020) REU student, *CS Undergraduate Student at University of Missouri*
- Jeremy Wu (2019) REU student, *CS Undergraduate Student at Purdue University*
- Aditya Vandanapu(2019) REU student, *CS Undergraduate Student at the University of Illinois at Chicago*

Professional Service

Committee Member and Reviewer:

- Technical Program Committee (TPC) Member: ICNC, 2024; Wi-DroIT, 2022, 2023, 2024; MDPI Vehicles Journal
- Journal Peer-Reviewer: Elsevier Computer Networks 2024, Soft Computing 2024, ACM Transactions on Sensor Networks (TOSN) 2023, 2024, The Journal of Supercomputing 2023; IEEE Transactions on Network and Service Management 2019/2021/2022/2023; IEEE Transactions on Cloud Computing 2021/2022; IEEE Transactions on Mobile Computing 2019/2020/2021; Elsevier Future Generation Computer Systems 2020-2023; IEEE Transactions on Services Computing 2020; Journal of Network and Computer Applications 2020
- Conference Peer-Reviewer: IEEE ICNC, ACM MobiSys, IEEE GlobeCOM, IEEE ICCCN, IEEE CIoT, IEEE ICC, IEEE WoWMoM, AICAS, IEEE NetSoft, IEEE CSNet, IEEE NFV-SDN, and IFIP/IEEE IM

Other:

- Student Volunteer - IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis (SC 2022)
- Graduate Student Mentor - NSF-supported Undergraduate Research in Consumer Networking Technologies (REU) - 2019, 2020
- Mentor - University of Missouri DevOps Workshop 2021, University of Missouri Undergraduate Research Forum - 2020, 2021
- Mentor - MLH Hackathon: Hack WashU - 2019; TigerHacks - 2020
- Mentor - Missouri Collegiate Cyber Defense Competition (CCDC) competition (Spring 2019)

Honors and Awards

(2023) **Outstanding PhD Student**, Computer Science Department, University of Missouri (1/50)
(2023) **Outstanding PhD Student**, College of Engineering, University of Missouri
(2022) **Best Paper Award**, IEEE CCGrid 2022
(2021) **Media Report**, [Link] Missouri Compacts: Student Success, University of Missouri
(2019) **First Prize**, College of Engineering's 2019 Engineers Week Lab Exhibit Competition, University of Missouri
(2018) **Honor Student Scholarship**, Curator's Grant-in-Aid Scholarship, University of Missouri
(2016) **Student Scholarship**, China Scholarship Council (CSC) Scholarships

(2014) **Meritorious Winner**, Mathematical Contest In Modeling/Interdisciplinary Contest In Modeling, United States

Funded Grants

(2024) **DoD Cyber Exchange**, GenCyber Teachers Camp – Network and IoT Security - PI - $100,000
(2024) **FGCU WCE Head Start**, U.A. Whitaker College of Engineering, Florida Gulf Coast University - PI - $5000
(2024) **FGCU WCE BOG Retention Funds**, Florida Gulf Coast University - PI - $15,000
(2024) **FGCU COIL Cohort**, Florida Gulf Coast University - COIL program Cohort - $2,000
(2023) **Cybersecurity Leadership & Strategy Training Grant**, Sub-awarded with FIU Institute of Public Policy - PI - $199,472
(2023) **FGCU WCE Head Start**, U.A. Whitaker College of Engineering, Florida Gulf Coast University - PI - $5000
(2022) **NSF PAWR Supplement Grant**, Drone swarm experimentation in AERPAW testbeds - Grant Writer - $50,000

(Various years) **NSF Student Travel Grant**, IEEE eScience 2022, INFOCOM 2021, INFOCOM 2022, CNSM 2021, IM 2019, ICNP 2019