ALICIA ESQUIVEL MOREL

PhD Candidate in Computer Science

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PROFESSIONAL SUMMARY

Motivated PhD candidate specializing in cloud/edge computing and cybersecurity. Proven ability to lead research, publish papers, teach core computer science courses, and mentor students to research success. Seeking a research or faculty role applying expertise in cybersecurity and resilient network design for autonomous systems, leveraging advanced networking, AI, and testbed-driven validation in cloud and edge environments.

Research Interests: AI-driven security for cloud, edge, IoT, and mobile or resource-constrained networks, focusing on federated learning, Zero Trust Architecture, intrusion detection, threat modeling, and critical infrastructure resilience.

EDUCATION

University of Missouri **Expected Grad. Summer 2025**

Doctorate in CS (PhD CS) *Columbia, MO*

University of Missouri **Aug. 2018 – Aug. 2020**

Masters in Science in CS (MS CS) *Columbia, MO*

Universidad Technológica Intercontinental **Feb. 2008 – Nov. 2013**

Bachelor's Degree in Computer Systems Analysis (Licentiate equivalent) *Asunción, Paraguay*

WORK AND RESEARCH EXPERIENCE

University of Missouri - Columbia

Graduate Research Assistant – VIMAN Lab **May 2020 – Present**

- Conducted cutting-edge research in cloud computing, distributed networking, drone video analytics, and edge computing, with a focus on enhancing network-edge security through the Zero Trust paradigm. Developed solutions that boosted network efficiency in real-world environments, driving operational improvements.
- Played a key role in over 10 interdisciplinary research projects, contributing to 15+ peer-reviewed publications. Made advancements in the development of scalable, secure network architectures for next-generation networks.
- Leveraged NSF-funded testbeds such as GENI, POWDER, CHAMELEON, and FABRIC to transition simulation experiments to real-world applications. Innovated in-network processing techniques that resulted in improvement in data throughput using programmable data planes.
- Investigated the integration of edge computing into scientific workflows, enabling seamless access to distributed networking resources and improving computational efficiency for research teams.
- Collaborated with leading academic institutions, including The University of Chicago, RENCI, University of Southern California, University of Massachusetts Amherst, University of Washington, and University of Utah, advancing state-of-the-art networking technologies and edge computing architectures.
- Secured a top-three position in the UC2 DoD Spring 2022 White Paper Request for Information (RFI), focused on implementing Zero Trust network designs for military environments. The proposal, based on thesis research on Zero Trust at the tactical war-fighting edge, led to a $650,000 funded grant.

Graduate Teaching Assistant – EECS Department **August 2019 – Present**

- Assisted in teaching Cyber Defense, Cloud Computing, Algorithm Design and Programming (I & II), and Web Development for undergraduate and graduate classes with enrollments ranging from 70 to 300 students. Developed and facilitated hands-on lab sessions, providing support to enhance student learning.
- Provided comprehensive teaching support, including grading assignments and exams, and mentoring students on final projects. Guided over 100 students in developing practical, real-world solutions as part of various research projects.

Mentor and Student Coordinator – REU, Consumer Networking Technologies **May – August (2025, 2022, 2021, 2020)**

- Led three cohorts of six undergraduates, mentoring over 30 students across three years. Contributed to the application review process, interviewing more than 300 prospective students.

- Mentored students in applying advanced tools, including software-defined networking (SDN) platforms and cloud orchestration systems, applying research methodologies for designing and testing UAV communication protocols, leading to peer-reviewed publications and conference posters.

University of California, Santa Cruz **May – August 2024**

Senior Fellow Summer of Reproducibility (SoR) *Remote, Santa Cruz, CA*

- Collaborated with the Open Source Program Office on the Summer of Reproducibility (SoR) project to redesign TROVI, a platform focused on enhancing the reproducibility of research experiments. Primarily concentrated on improving the user experience (UX) for researchers uploading and sharing reproducible artifacts.
- Conducted UX research and design efforts, including literature reviews and the creation of wire-frames and prototypes to simplify and streamline the platform's interface.
- Optimized platform functionality by enhancing back-end integration with TROVI's API, streamlining experiment replication, and improving the reliability and reproducibility of research outcomes. The redesigned platform will be available soon for the broader research community.

Illinois Institute of Technology and The University of Chicago **May – August 2024**

Mentor REU - BigDataX: From theory to practice in Big Data computing at eXtreme scales *Chicago, IL*

- Mentored six undergraduate researchers across two cohorts, providing guidance and support throughout their research projects, leading to peer-reviewed publications and conference posters.
- Led projects in diverse fields, including self-driving cars, edge and cloud computing, 5G technology, power-efficient weather stations, smart buoy systems for coastal and marine ecosystems, and extreme learning machines for meteorological prediction, resulting in peer-reviewed publications and conference posters.

The University of Chicago **May – August 2023**

Research Assistant - Chameleon Cloud *Chicago, IL*

- Conducted research on infrastructure deployment, use-case development, and testbed establishment, contributing to the development of scalable, real-world solutions.
- Designed tools and methodologies for deploying IoT fleets using Chameleon Cloud (CHI@Edge), a container-based platform, enabling efficient management and scaling of IoT deployments.

PUBLICATIONS

[1] T. Ahmad, **Esquivel Morel, Alicia**, N. Cheng, P. Kannappan, P. Calyam, K. Sun, and J. Pan, "Future uav/drone systems for intelligent active surveillance and monitoring," *Under Review*, vol. x, no. x, pp. xxx–xxx, 2025.

[2] **Esquivel Morel, Alicia**, E. Ufuktepe, S. Poduvu, D. Gafurov, K. Palaniappan, and P. Calyam, "Arculus: Zero trust for situational awareness tasks in tactical edge networks," *Under Review*, vol. x, no. x, pp. xxx–xxx, 2025.

[3] **Esquivel Morel, Alicia**, M. Powers, K. Keahey, Z. Murry, T. J. Sitzmann, J. Zhou, and P. Calyam, "Floto: Beyond bandwidth-a framework for adaptable, multi-sensor data collection in scientific research," in *International Conference on High Performance Computing*, Springer, 2025, pp. 427–438.

[4] S. Poduvu, R. L. Neupane, **Esquivel Morel, Alicia**, R. Mitra, V. Anand, R. Chadha, and P. Calyam, "Demonstration of low-overhead zero trust at the tactical warfighting edge," in *MILCOM 2024-2024 IEEE Military Communications Conference (MILCOM)*, IEEE, 2024, pp. 682–683.

[5] S. Poduvu, R. L. Neupane, **Esquivel Morel, Alicia**, R. Mitra, V. Anand, R. Chadha, and P. Calyam, "Task-based access control for computation and communication in the tactical warfighting edge," in *MILCOM 2024-2024 IEEE Military Communications Conference (MILCOM)*, IEEE, 2024, pp. 839–846.

[6] C. Qu, R. Singh, **Esquivel Morel, Alicia**, and P. Calyam, "Learning-based multi-drone network edge orchestration for video analytics," *IEEE Transactions on Network and Service Management*, 2024.

[7] W. Fowler, **Esquivel Morel, Alicia**, and K. Keahey, "Encoding consistency: Optimizing self-driving reliability with real-time speed data," in *Proceedings of the 4th Workshop on Flexible Resource and Application Management on the Edge*, 2024, pp. 47–50.

[8] **Esquivel Morel, Alicia**, Z. Murry, K. Kostage, C. Qu, and P. Calyam, "Enhancing drone video analytics security management using an aerpaw testbed," in *IEEE INFOCOM 2024-IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, IEEE, 2024, pp. 1–6.

[9] S. Poduvu, S. M. Saghaian, E. Ufuktepe, **Esquivel Morel, Alicia**, and P. Calyam, "Risk-based zero trust scale for tactical edge network environments," in *Proceedings of the Eighth ACM/IEEE Symposium on Edge Computing*, 2023, pp. 306–312.

[10] **Esquivel Morel, Alicia**, W. Fowler, K. Keahey, K. Zheng, M. Sherman, and R. Anderson, "Autolearn: Learning in the edge to cloud continuum," in *Proceedings of the SC'23 Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis*, 2023, pp. 350–356.

[11] **Esquivel Morel, Alicia**, D. Gafurov, P. Calyam, C. Wang, K. Thareja, A. Mandal, E. Lyons, M. Zink, G. Papadimitriou, and E. Deelman, "Experiments on network services for video transmission using fabric instrument resources," in *IEEE INFOCOM 2023-IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, IEEE, 2023, pp. 1–6.

[12] **Esquivel Morel, Alicia**, C. Qu, P. Calyam, C. Wang, K. Thareja, A. Mandal, E. Lyons, M. Zink, G. Papadimitriou, and E. Deelman, "Flynet: Drones on the horizon," *IEEE Internet Computing*, vol. 27, no. 3, pp. 35–43, 2023.

[13] **Esquivel Morel, Alicia**, E. Ufuktepe, C. Grant, S. Elfrink, C. Qu, P. Calyam, and K. Palaniappan, "Trust quantification in a collaborative drone system with intelligence-driven edge routing," in *NOMS 2023-2023 IEEE/IFIP Network Operations and Management Symposium*, IEEE, 2023, pp. 1–7.

[14] M. Miller, A. Ramachandran, **Esquivel Morel, Alicia**, D. Gafurov, and P. Calyam, "Transmitting information with global-designation of emergency routes for edge video processing," in *NOMS 2023-2023 IEEE/IFIP Network Operations and Management Symposium*, IEEE, 2023, pp. 1–7.

[15] **Esquivel Morel, Alicia**, P. Calyam, C. Qu, D. Gafurov, C. Wang, K. Thareja, A. Mandal, E. Lyons, M. Zink, G. Papadimitriou, *et al.*, "Network services management using programmable data planes for visual cloud computing," in *2023 International Conference on Computing, Networking and Communications (ICNC)*, IEEE, 2023, pp. 130–136.

[16] R. Tanaka, G. Papadimitriou, S. C. Viswanath, C. Wang, E. Lyons, K. Thareja, C. Qu, **Esquivel Morel, Alicia**, E. Deelman, A. Mandal, *et al.*, "Automating edge-to-cloud workflows for science: Traversing the edge-to-cloud continuum with pegasus," in *2022 22nd IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid)*, IEEE, 2022, pp. 826–833.

[17] R. Singh, C. Qu, **Esquivel Morel, Alicia**, and P. Calyam, "Location prediction and trajectory optimization in multi-uav application missions," in *Intelligent Unmanned Air Vehicles Communications for Public Safety Networks*, Springer, 2022, pp. 105–131.

[18] C. Qu, R. Singh, **Esquivel Morel, Alicia**, F. B. Sorbelli, P. Calyam, and S. K. Das, "Obstacle-aware and energy-efficient multi-drone coordination and networking for disaster response," in *2021 17th International Conference on Network and Service Management (CNSM)*, IEEE, 2021, pp. 446–454.

[19] **Esquivel Morel, Alicia**, D. K. Ufuktepe, R. Ignatowicz, A. Riddle, C. Qu, P. Calyam, and K. Palaniappan, "Enhancing network-edge connectivity and computation security in drone video analytics," in *2020 IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, IEEE, 2020, pp. 1–12.

[20] C. Qu, **Esquivel Morel, Alicia**, D. Dahlquist, and P. Calyam, "Dronenet-sim: A learning-based trace simulation framework for control networking in drone video analytics," in *Proceedings of the 6th ACM Workshop on Micro Aerial Vehicle Networks, Systems, and Applications*, 2020, pp. 1–6.

[21] C. Qu, **Esquivel Morel, Alicia**, D. Dahlquist, and P. Calyam, "Design of trace-based ns-3 simulations for uas video analytics with geospatial mobility," in *Geospatial Informatics X*, SPIE, vol. 11398, 2020, pp. 59–66.

Conferences, Presentations, and Travel Grants

AERPAW Community Workshop 2025 May 27–30, 2025 | Raleigh, NC
Panelist:*"AERPAW User Stories Panel."*
NSF Student Travel Grant Recipient.

2025 Digital Agriculture Symposium Apr. 11, 2025 | Columbia, MO
Presenter:*"Edge Computing/Networking and Knowledge Discovery for Farm Intelligence."*
Poster Presenter:*"Modernizing Crop Management with Integrated IoT, Machine Vision, and Edge AI."*

AI Unlocked: Empowering Higher Education through Research and Discovery Workshop Apr. 2–3, 2025 | Denver, CO
Attendee. NSF Student Travel Grant Recipient.

AraFest'24 | ARA Annual Community Event Aug. 24–27, 2024 | Ames, IA
Attendee. NSF Student Travel Grant Recipient.

FABRIC KNIT9 Community Workshop Sep. 24, 2024 | Kansas City, MO
Attendee. NSF Student Travel Grant Recipient.

MERIF - Midscale Experimental Research Infrastructure Forum Sep. 25–27, 2024 | Kansas City, MO
Presenter:*"Choosing the Right Testbed." NSF Student Travel Grant Recipient.*

ISC High Performance, Workshop on Converged Computing on Edge, Cloud, and HPC May 11–15, 2024 | Hamburg, Germany
Presenter:*"FLOTO: Beyond Bandwidth – A Framework for Adaptable, Multi-Sensor Data Collection in Scientific Research."*
NSF Student Travel Grant Recipient.

FABRIC KNIT8 Community Workshop Mar. 19–21, 2024 | San Diego, CA
Attendee. NSF Student Travel Grant Recipient.

SC'24 – Inter. Conference for High Performance Computing, Networking, Storage, and Analysis Nov. 17–22, 2024 | Atlanta, GA
Attendee.

SC'23 – Inter. Conference for High Performance Computing, Networking, Storage, and Analysis Nov. 12–17, 2023 | Denver, CO
Presenter:*"AutoLearn: Learning in the Edge to Cloud Continuum."*
NSF Student Travel Grant Recipient.

ARA Public Launch 2023 Sep. 6–8, 2023 | Ames, IA
Poster Presenter:*"Big Data Analytics for Agriculture Automation."*
NSF Student Travel Grant Recipient.

ACM/IEEE Symposium on Edge Computing (SEC 2023) Dec. 6–9, 2023 | Wilmington, DE
Presenter:*"Risk-based Zero Trust Scale for Tactical Edge Network Environments."*
NSF Student Travel Grant Recipient.

AERPAW Community Workshop 2023 May 8–11, 2023 | Raleigh, NC
Attendee. NSF Student Travel Grant Recipient.

4th Chameleon Cloud User Meeting May 2–3, 2023 | Chicago, IL
Presenter:*"Software/infrastructure Development and Operations (DevOps) with Chameleon edge to cloud."*
NSF Student Travel Grant Recipient.

POWDER-RENEW Mobile and Wireless Week Jan. 23–27, 2023 | Salt Lake City, UT
Attendee. NSF Student Travel Grant Recipient.

FABRIC KNIT5 Community Workshop Sep. 20–22, 2022 | Chicago, IL
Presenter:*"An "On-the-fly" Deeply Programmable End-to-end Network-Centric Platform for Edge-to-Core Workflows."*
NSF Student Travel Grant Recipient.

IEEE Secure Development Conference (SecDev 2022) Oct. 18–20, 2022 | Atlanta, GA
Attendee. NSF Student Travel Grant Recipient.

IEEE Inter. Conference on Communications (ICC 2022) (Hybrid) May 16–20, 2022 | Seoul, South Korea
Attendee. NSF Student Travel Grant Recipient.

International Conference on Computing, Networking and Communications (ICNC) Feb. 20–22, 2022 | Honolulu, HI
Presenter:*"Network Services Management using Programmable Data Planes for Visual Cloud Computing."*
EECS Travel Fellowship Recipient - University of Missouri.

TECHNICAL SKILLS

Programming/Scripting (Python, Bash); Cloud Platforms (AWS, Google Cloud, Chameleon Cloud, CloudLab); Networking/Testbeds (SDN, DevOps, Network Deployment/Configuration, FABRIC, POWDER, GENI, AERPAW, ARA); Operating Systems (Linux - Ubuntu/CentOS, macOS, Windows); Cybersecurity (Zero Trust Architecture, Network Security, Intrusion Detection); Tools/Software (Docker, Kubernetes, Git, LaTeX, Wireshark); Other Skills (IoT Fleet Deployment, UX Research/Design, Data Analysis, Technical Writing, FAA Part 107 Drone License).

PROFESSIONAL SERVICE

University of Missouri, Columbia **Fall 2023 – Present**
Student Employee Advisory Board *Columbia, MO*

- Represented the interests and welfare of student employees, advocating for their development and well-being.

- Actively contributed to discussions and decision-making during regular board meetings.
- Provided valuable insights and recommendations to improve student employee experiences and policies.

IEEE / ACM **Spring 2020 – Present**

Peer Reviewer for International Conferences and Journals

- Reviewed papers for conferences and journals including Globecom, TNSM, Wi-DroIT, ETT, TDSC, FGCS, COMNET, IJNM, JPDC, SECON, CNSM, IPCCC, ICC, NGNI, and UCC.

PROFESSIONAL AFFILIATIONS

Association for Computing Machinery (ACM) **Spring 2023 – Present**

Special Interest Group in High Performance Computing (SIGHPC)

Institute of Electrical and Electronics Engineers (IEEE) **Spring 2021 – Present**

Communication Society (ComSoc), Youth Professionals, Women in Engineering

Upsilon Pi Epsilon (UPE) - University of Missouri **Fall 2021 – Present**

International Honor Society for Computing Disciplines

AWARDS AND RECOGNITIONS

Electrical Engineering Department, University of Missouri **Spring 2024**

Outstanding Ph.D. Student Award

U.S. Department of State's Bureau of Educational and Cultural Affairs **2018 – 2020**

- Fulbright-CAL Scholarship, LASPAU Administered – *University of Missouri, Columbia, MO*
- Fulbright Intensive English Program, IIE Administered – *Georgia Institute of Technology, Atlanta, GA*

United States Embassy in Paraguay **2009 – 2014**

- Hayes Scholarship, Intensive English Courses – *Centro Cultural Paraguayo Americano, Asunción – Paraguay*

University Consortium for Cyber Security, Department of Defense – UC2 **Spring 2022**

Top three white paper request winner for information (RFI) to the academic community on new cyber technologies pertaining to the topic of implementing secure network designs for military environments, Zero Trust at the tactical war-fighting edge.