Kasra Ahmadi, Ph.D Candidate.

Work Authorization: U.S. Permanent Residency Process Initiated **(Approved I-140 (NIW))**
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Education

1. University of South Florida, Tampa; **Ph.D. in Computer Science**; Jan 2022 to May 2025; GPA: 3.93/4
2. Amirkabir University of Technology, Tehran; M.Sc. in Information Technology; Sep 2018 to Sep 2021.
3. Isfahan University of Technology**,** Isfahan; B.Sc. in Computer Science; Sep 2012 to Jul 2017.

Skills

- **Data** — AWS Glue, Airflow, Kafka, Kinesis, PowerBI, Postgres, MongoDB
- **ML** — Pytorch, Pandas, Numpy, Flower, Scikit-learn, Huggingface
- **Programming** — Python, C, C++, Verilog, Typescript, Node.js, Java, JavaScript, Bash, QT, QML, SQL
- **Cloud** — Lambda, Step functions, S3, EC2, DynamoDB, Aurora, IAM, API Gateway, CloudFormation
- **IoT** — Vitis, ARM Cortex-M4, FPGA, Stm32, Raspberry Pi, AVR, Arduino
- **Others** — Linux, Git, Docker, Jira, GraphQL, Rest API, Wireshark, Selenium, Postman, Webservice

Work Experience

- **University of South Florida,** Tampa, US — Jan 2022 - Present
  Research Assistant
    - Researching fine-tuning large language models (**LLMs**) using **Federated Learning**, while ensuring privacy preserving through the implementation of **differential privacy (DP)** at the client side.
    - Researching algorithm level error detection schemes for **Number Theoretic Transform (NTT)** utilized in **Kyber** and **Dilithium,** NIST selected **Post-Quantum Cryptography (PQC)** schemes.
    - **Researching**, **simulating**, and **implementing** algorithm-level error detection schemes for classical cryptosystems such as the Montgomery Ladder and Window method for ECSM.
    - Performance assessment of Post-Quantum Cryptography schemes on **FPGAs**, **ARM**, and **Embedded Linux**.
    - Work under National Science Foundation (NSF) Grant # 1801488;
    - Teaching assistant of graduated Cryptography, Operating Systems, Network Lab, and System Design Lab.

- **Transparency Wise**, St.Petersburg, US — May 2024 - Aug 2024
  Software Engineer, Intern
    - Led a team of 3 software engineers and 2 designers to develop a **recommender system** for nutrient recommendations tailored to various growth stages of corn and soybeans to achieve high yield farming practices.
    - Implemented an **event-driven** architecture utilizing **Lambda functions**, **Step Functions**, **Event Bridge**, **SES**, and **API Gateway** to promote loose coupling and **scalability**. Additionally, leveraged **AWS Glue** as **ETL** tool for processing laboratory reports to support the recommender model.

- **Paar Lift,** Tehran, Iran — Jan 2019 - Apr 2020
  Software Engineer
    - Analyzed optimal floor levels for elevators at specific times to reduce passenger wait times using machine learning, such as **Logistic Regression** and **KNN**. Utilized data-driven approaches to enhance elevator efficiency and passenger experience.
    - Establishing a connection between Raspberry Pi embedded boards and elevators through the CAN bus protocol for the real-time data transfer of elevators to a Linux-powered **IoT**.
    - Building **ETL** pipelines by using Apache airflow to extract, ingest, and load elevator traffic data to an **OLAP** storage.
    - Performing **Data visualization**, **big data analytics,** and **statistical modeling** on elevators traffic data.
    - We decreased hotels passengers' waiting time by 27%, equating to a time savings of 11 seconds per passenger. Project's demo.

Publications
<div align="right">**C=Conference, J=Journal, S=In Submission**</div>

[S.1] Ahmadi, K, et al (2025), "**An Interactive Framework for Implementing Privacy-Preserving Federated Learning: Experiments on Large Language Model.**" Manuscript submitted to *IEEE Symposium on Security and Privacy 2025*

[J.1] Aghapour, S., Ahmadi, K., Anastasova, M, et al. (2025). "**PUF-Dilithium: Design of a PUF-Based Dilithium Architecture Benchmarked on ARM Processors.**" *ACM Trans. Embed. Comput. Syst., 24(2).*

[J.2] Ahmadi, K., et al. (2024). "**Efficient Error Detection Schemes for ECSM Window Method Benchmarked on FPGAs.**" *IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 32(3), 592-596.*

[J.3] Ahmadi, K., et al. (2024). "**Efficient Error Detection Cryptographic Architectures Benchmarked on FPGAs for Montgomery Ladder.**" *IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 32(11), 2154-2158.*

[J.4] Aghapour, S., Ahmadi, K., Anastasova, M, et al. (2024). "**PUF-Kyber: Design of a PUF-Based Kyber Architecture Benchmarked on Diverse ARM Processors.**" *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 43(12), 4453-4462.*

[C.1] Ahmadi, K. et al. (2023). "**A P2P file sharing market based on blockchain and ipfs with dispute resolution mechanism.**" *In 2023 IEEE International Conference on Artificial Intelligence, Blockchain, and Internet of Things (AIBThings) (pp. 1-5).*

[S.2] Ahmadi, K, et al (2025), "**Efficient Algorithm Level Error Detection for Number-Theoretic Transform Assessed on FPGAs and ARM**" Manuscript submitted to *ACM Trans. Embed. Comput. Syst.*

[S.3] Ahmadi, K, et al (2025), "**Error Detection Schemes for τ-NAF Conversion within Koblitz Curves Benchmarked on Various ARM Processors**" Manuscript submitted to *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems.*

[S.4] Aghapour, S., Ahmadi, K., Kermani, M, et al (2024) "**Efficient Fault Detection Architectures for Modular Exponentiation Targeting Cryptographic Applications Benchmarked on FPGAs**" Manuscript submitted to *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems II.*

[S.5] Darzi, S., Ahmadi, K., Aghapouri, S, et al (2023) "**Envisioning the future of cyber security in post-quantum era: A survey on pq standardization, applications, challenges and opportunities**" Manuscript submitted to *ACM Comp Survey.*

Certifications

- **AWS Certified Solutions Architect** - **Associate**, View Certification (Dec 2023)
- Deep Neural Networks with PyTorch, View Certificate (Oct 2024)
- Intro to Federated Learning, View Certificate (Oct 2024)
- Artificial Intelligence Privacy and Convenience, View Certificate (Aug 2024)
- Federated Fine-tuning of LLMs with Private Data, View Certificate (Aug 2024)
- ETL and Data Pipelines with Shell, Airflow and Kafka, View Certificate (Jan 2024)
- Divide and Conquer, Sorting and Searching, and Randomized Algorithms, View Certificate (Oct 2023)

Projects

- **Secure Microcontrollers Remote Programmer**
  Developed and designed a **QT/QML** application along with a server API using Node.js to enable the programming of Microchip microcontrollers remotely while preserving the company's hex files confidentiality.
- **GPS Car Tracker**
  Utilized **STM32** and ArduinoIDE for the hardware implementation. Additionally, Node.js was employed for the server API.
- **Android Game published on Google Play**
  Designed and developed an online Trivia Android game (Footxam) by using **Java** and **Node.js**.

Services

- Mentor at REU Site: Cryptography and Coding Theory at the University of South Florida (Summer, 2023)
  NSF award: 2244488
- Conducted peer review for **15** manuscripts from "Transactions on Embedded Computing Systems", "IEEE Transactions on Circuits and Systems I: Regular Papers", and "IEEE Transactions on Very Large Scale Integration (VLSI) Systems".
- Speaker at Great American Teach-In (Winter, 2023)