Assistant Teaching Professor Interview

Department of Electrical and Computer Engineering

Name: Srinivas Rahul Sapireddy

Date: May 2, 2025

Introduction & Background

Educational Background

Degree	University
PhD. in Electrical and Computer Engineering (summer 2025)	University of Missouri Kansas City
Advanced Diploma in Artificial Intelligence (2020)	NIELIT, Kerala, India
M.S. in Computer Science (2018)	University of Illinois Springfield
M.S. in Electrical Engineering (2016)	University of Missouri Kansas City
B.Tech in Electronics and Communications Engineering (2014)	Jawaharlal Nehru Technological University Hyderabad

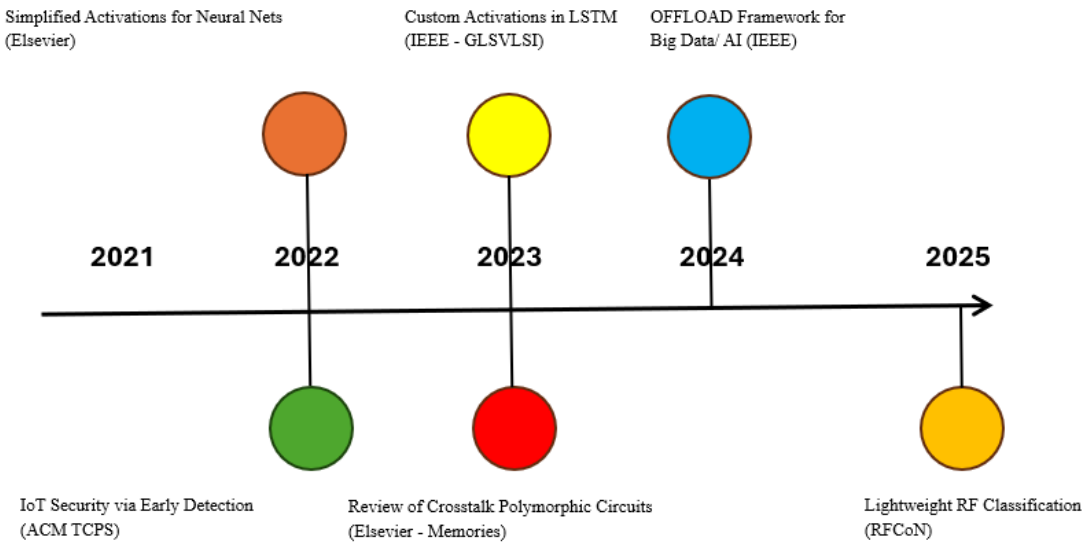
- **Teaching Roles** – Adjunct Instructor (4 courses)
- **Research & Publications** – 7+ papers

Publications & Research Areas

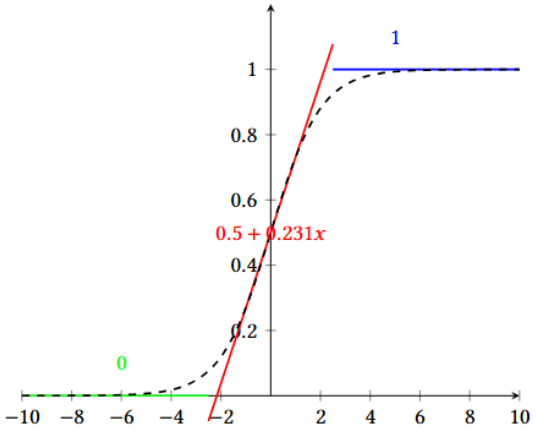
Efficient ML with Real-World Applications

Research Focus Areas

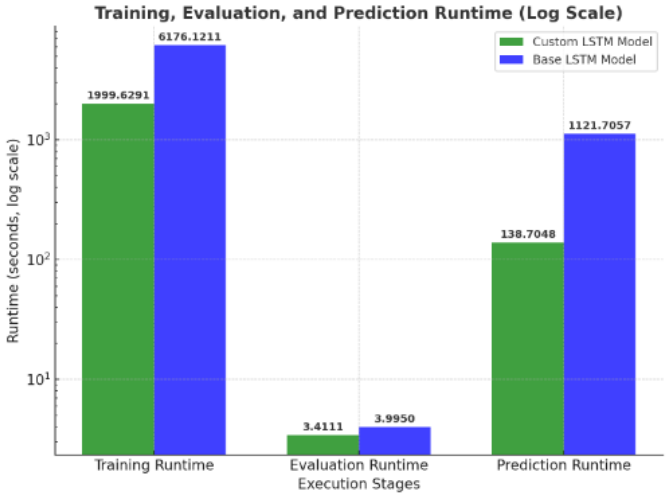
- AI Accelerator Design: Software-Hardware co-design approaches for ultra-low power computing
- Data Engineering: Dataset and features tailored towards hardware; RF applications
- Custom Activation Functions for LSTM/CNN



Custom Activation Function Plot (Sigmoid vs. PWL)

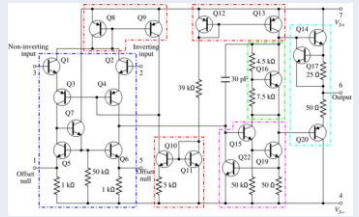
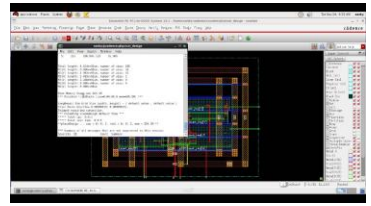
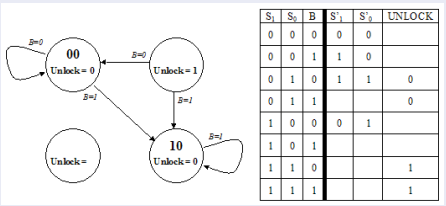
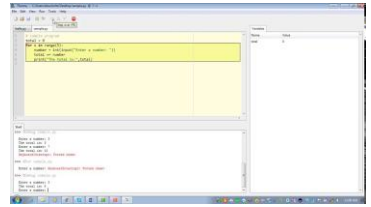


Accuracy & Runtime Comparison Bar Graph



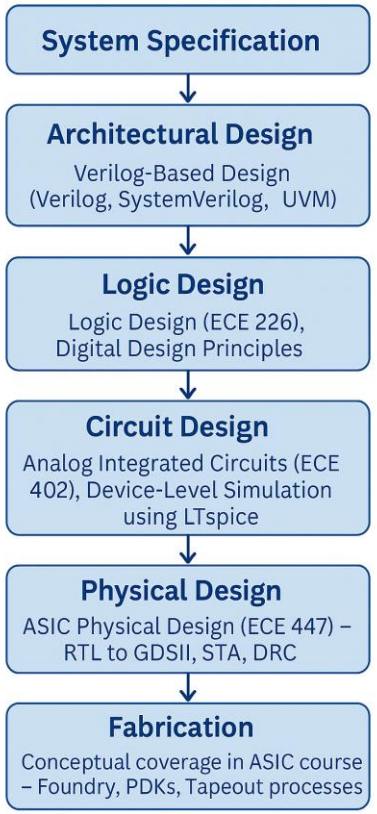
UMKC

Teaching Experience

Course Name	Tools Used	Student Projects
ECE 402/5533 – Analog IC Design **(Spring 2023, Spring 2024)**	LTspice (Linear Technology)	
ECE 447/5547 – ASIC Physical Design **(Fall 2023, Fall 2024)**	Cadence, Synopsys	
ECE 226 – Logic Design **(Spring 2025)**	FSM Builder	
ECE 216 – Engineering Computation **(Spring 2025)**	Python, C, MATLAB	

Practice Oriented Curriculum Design Examples

Course Name	Topics	Tools
RTL Design	Practical Verilog/SystemVerilog teaching with synthesis-level understanding	ModelSim Advanced Simulation and Debugging
Design for Test (DFT)	Introduce scan insertion, ATPG, and test coverage labs	SYNOPSYS Silicon to Software
UVM	Teach modular testbenches and verification environments	SIEMENS
Embedded Systems	Design using microcontrollers, RTOS concepts, and real-time interfacing	KEIL Tools by ARM
Wireless Communications	Teach modulation, channel modeling, and digital signal processing concepts	GNURadio



UMKC

Student Mentorship & Initiatives

What I've Done:

- **Senior Design Mentorship:**
  Guided students on hands-on capstone projects focused on logic and physical design flow.
- **Workshops & Labs:**
  Conducted sessions introducing Verilog and design flow concepts through lab-based learning in ECE 447 and 5533.
- **Group Projects & Peer Learning:**
  Designed and supervised student group projects promoting collaboration and real-world problem-solving.

What I Plan to Initiate:

- **UMKC IEEE Student Chapter Involvement:**
  Looking forward to organizing technical workshops and student research showcases in collaboration with IEEE-UMKC.
- **Special Topic Workshops:**
  Plan to introduce modular short sessions on SystemVerilog, UVM, and DFT to prepare students for VLSI and verification roles.

IEEE

STUDENT GOVERNMENT ASSOCIATION UMKC

UMKC

Lab Vision & Co-Working Model for Teaching and Research

My Approach

"I aim to cultivate confident, industry-ready engineers through hands-on learning, inclusive support, and real-world design experience."

Core Pillers

Hands-On Learning in Every Course

All courses include lab components that reinforce lecture content. For instance, in **ECE 447 (ASIC Physical Design)**, students use **Cadence Innovus** to perform full RTL-to-GDSII flow, connecting theory with real-world chip design.

Active Student Engagement

Interactive methods such as **problem-solving worksheets**, **"student-as-teacher" activities**, and **board demonstrations** encourage deeper learning and peer teaching.

Collaborative & Competitive Mindset

Group-based projects and competitions promote teamwork and innovation. Students have participated in **design contests and hackathons**, applying concepts in high-pressure, real-world environments.

Industry-Aligned Focus

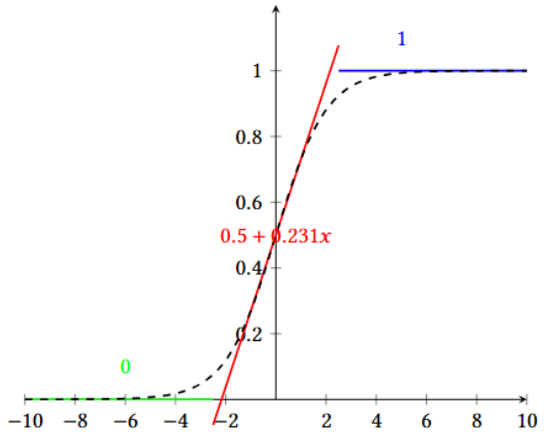
Emphasis on **internships, entrepreneurship**, and **startup thinking**, with projects modeled on **industry challenges** using tools like **Synopsys, Cadence, and Verilog**.

UMKC

Notable Research Contributions

- Developed **Custom Custom Activation for LSTM Model** achieved over **3× faster training** (1999.63s vs. 6176.12s) and **8× faster prediction** (138.70s vs. 1121.71s) compared to the Base LSTM Model on an Intel processor. This demonstrates up to **50%+ runtime improvement** while maintaining comparable accuracy (80.02% vs. 82.18%) and F1-score (0.8049 vs. 0.8212).

- Implemented a lightweight RF modulation classification approach using entropy-based features like Phase Diagram Entropy and R-value analysis, eliminating the need for STFT. Achieved over **93% accuracy** in classifying four modulation types (AM, FM, DSB, SSB) with prediction time reduced to **under 0.5 seconds**, offering a **5× improvement in efficiency** compared to STFT-based methods.



Piecewise Linear Approximation of sigmoid activation function

Metric	Custom LSTM Model	Base LSTM Model
Accuracy (Training)	99.72%	99.86%
Training Runtime (seconds)	1999.6291	6176.1211
Evaluation Runtime (seconds)	3.4111	3.9950
Test Loss	2.7334	3.1135
Test Accuracy	80.02%	82.18%
F1-Score	0.8049	0.8212
AUC-ROC	0.8735	0.8930
Prediction Runtime (seconds)	138.7048	1121.7057

Comparison of Software Metrics between Custom LSTM and Base LSTM Models on GPU

UMKC

Awards & Recognitions

Proposal Writing Experience:

- Participated in proposal development activities for NSF and DoD
- Participated in grant report preparation through data analysis, outcome review, and compliance support.

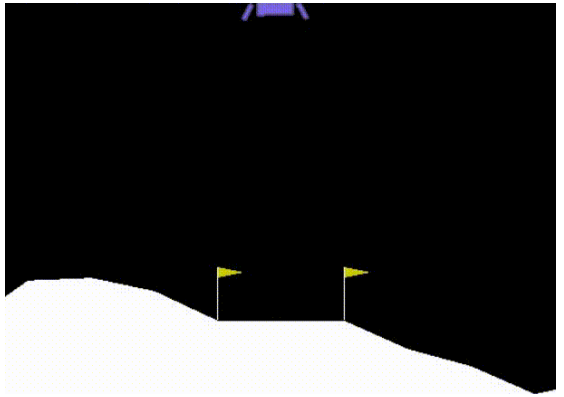
Contribution to the Field:

- Participated a reviewer for ISVLSI and GLSVLSI conferences

Student Honors

- Dean International Scholar Award (UMKC)
- 3rd Prize Award, UMKC Hackathon, AI Track
- 2nd Prize Award, UMKC Hackathon, Entrepreneur Track
- Took over ECE 433/5533 on short notice during an emergency in Spring 2024 and received a $3,000 appreciation stipend from the department and Dean

Lunar Lander AI project demo from UMKC Hackathon



UMKC

HACK-A-ROO

UMKC

Why UMKC?

1. **Proven Teaching Record at UMKC:**
   Have successfully taught multiple undergraduate and graduate courses including Logic Design, ASIC Physical Design, and Analog IC Design.

2. **Deep Familiarity with Students and Curriculum:**
   Over 5 years at UMKC, with multiple semesters of experience as an Instructor and TA — developing a deep understanding of the university's academic environment and student needs.

3. **Aligned with UMKC's Mission – Access, Success, and Impact:**
   Focused on hands-on, inclusive teaching that supports student growth and career readiness.

4. **Ready to Contribute from Day One:**
   Already embedded in departmental workflows — prepared to lead courses, mentor students, and collaborate on curriculum enhancements.

UMKC

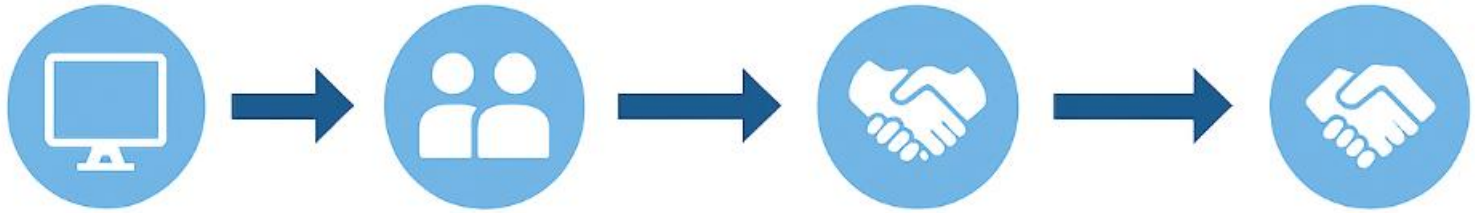
Future Vision at UMKC

Plan to expand course offerings and continuously update teaching strategies in Logic Design, ASIC Physical Design, and Analog IC Design to align with technological advancements and industry needs.

Aim to build deeper engagement with students by introducing active learning techniques, mentorship programs, and interdisciplinary collaboration to enhance learning outcomes.

1 Innovate in Teaching

3 Strengthening Student Connections



2 Support UMKC's Mission

Advancing UMKC's Mission – Access, Success, and Impact

4 Drive Immediate Impact

Prepared to contribute immediately by initiating new course designs, driving curriculum enhancements, mentoring research projects, and collaborating in departmental activities.

Thank you

I welcome your questions.

Contact:
Srinivas Rahul Sapireddy
Email: ssdx5@umsystem.edu | GitHub: https://github.com/srsapireddy