

AI and Machine Learning Initiatives at USC Aiken

**Center for Cyber Initiatives,
Awareness, and Artificial
Intelligence (CCIA-AI)**



About the CCIA-AI

The Center for Cyber Initiatives, Awareness, and Artificial Intelligence (CCIA-AI) at USC Aiken was established to enhance the university's NSA-designated Center of Academic Excellence in Cyber Defense (NSA CAE-CD). CCIA-AI serves as a strategic hub integrating cybersecurity education, applied AI research, and regional workforce development.

The center unifies efforts by faculty, a dedicated Cyber Director, and the Department of Computer Science, Engineering, and Mathematics to deliver a cutting-edge cyber curriculum infused with artificial intelligence and machine learning. As student enrollment, research outcomes, and industry partnerships continue to grow, the CCIA-AI codifies USC Aiken's leadership in cyber education and applied AI research.

Mission

The CCIA-AI is committed to:

- Producing a career-ready cyber and AI-empowered workforce.

- Advancing applied research in cybersecurity and machine learning.
- Promoting cyber awareness and AI literacy across South Carolina and beyond.

This is achieved through:

- A curriculum rooted in computer science and cybersecurity.
- Integration of machine learning and AI tools in classrooms and capstone experiences.
- Professional development opportunities such as internships, research, and student-led SOC operations.
- Community and K-12 outreach to inspire future cyber professionals.

AI and Machine Learning Outcomes at USC Aiken

The **AI extension of the CCIA-AI** emphasizes applied research and cyber educational outcomes. Cyber faculty have expertise in AI and proactively infuse AI/ML tools across the cyber and software engineering curriculum.

The mission of the CCIA-AI is to produce an educated cyber workforce and applied research group capable of handling the cyber

needs of South Carolina and the nation. Students gain real-world experience through internships, research, industry capstones, and a student-led Security Operations Center (SOC), ensuring they are career-ready.

The CCIA-AI also builds cyber and AI awareness through programming for the public and K-12, inspiring future careers in academia, government, and industry.

Contributing AI/Machine Learning Faculty

- Dr. Hala Strohmeir-Berry – Cybersecurity & AI
- Dr. Ali AlSabeh – Cybersecurity & AI
- Dr. Ahmed Ahmed – Cybersecurity, Electrical Engineering & AI
- Dr. Md Karim – Cybersecurity & AI
- Vacancy: Software Engineering/AI Faculty (Fall 2026)

Other Contributors:

- Tom Scott – USC Aiken Cyber Workforce Development Specialist

- Ruth Patrick – Science Education Center, K-12 Staff
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Faculty Contributions and Professional Activities

Dr. Hala Strohmeir-Berry – AI/ML Presentations

- IEEE International Symposium on Digital Forensics & Security, Boston, MA (Apr 2025) – Session Chair & Presenter.
- IEEE Southeast Conference, Charlotte, NC (Apr 2025) – Research on network threat detection via dynamic ensemble learning.
- South Carolina Academy of Science (Apr 2025) – Posters for AI/ML-driven capstone projects.
- IEEE ICCA (Dec 2024) – Session Chair & Research on Jailbreaking ChatGPT.
- Penn State SAP Cybersecurity Conference (Oct 2024) – Keynote on AI and Cybersecurity.
- SRNL Workforce Development in AI (Aug 2024) – Keynote.
- UGA Innovation Symposium (Aug 2024) – Panelist on Cybersecurity Innovation.

Dr. Ahmed Ahmed – Publications in AI/ML and Cybersecurity

Focus: Applying ML techniques to smart grids and cyber defense.

Notable works:

- Secured cluster-based electricity theft detectors.
- Countering evasion attacks in smart grids with reinforcement learning.
- Deep reinforcement learning for cyber-attack detection.
- Trojan and backdoor attacks in smart grid AI.

(Publications in IEEE Access, IEEE CCNC, IEEE IoT Journal, and Applied Sciences.)

Dr. Ali AlSabeh – AI and Networking Publications

Focus: AI models for cybersecurity, P4 programming, and smart networks.

- Security Applications of P4 Switches.
- Hybrid inspection models for DGA detection.
- Ransomware prevention and smart NIC research.
- Generative AI applications in networking.

Grants and Funding

- **GenCyber 2024** – Dr. Strohmeir-Berry & Dr. Gary Senn – Funded.
 - **Cyber Workforce Pipeline to SRNS** – Scott McKay – \$250,000 (Funded).
 - **BSRA Workforce Development (Cyber & Engineering)** – USCA – \$1.6M (Funded).
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Educational Outcomes and Courses

Graduate Level

- **CSCI A620:** Introduction to AI/ML (supervised & unsupervised learning, SVM, decision trees, regression).

Undergraduate Level (Fall 2025)

- **CSCI A300:** Introduction to Machine Learning (new foundational course).
- **CSCI A545, Cyber Capstone, Forensics courses:** Labs with AI/ML integration.

Workforce Development (Tom Scott – Summer 2025):

- **CSM 389:** IT Legal & Ethics – Legal & ethical implications of AI.

- **CSM 356:** Special Topics in Cyber – AI-focused sessions with guest experts.
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Professional Certificate in AI and Machine Learning with Generative AI

Launch: Academic Year 2025–2026

A hands-on, industry-aligned certificate preparing professionals for AI/ML roles, emphasizing generative AI (ChatGPT, DALL·E, LLMs).

Key Features:

- 15-week curriculum with real-world labs & case studies.
- Capstone project for applied AI/ML.
- Tools: Python, TensorFlow, PyTorch, Hugging Face, OpenAI APIs.

Sample Weekly Topics:

- Week 1: AI/ML Foundations
- Week 4: Classification & Decision Trees
- Week 8: Deep Learning with TensorFlow
- Week 12: LLMs & Prompt Engineering

- Week 14: Ethics & AI Governance
 - Week 15: Capstone Presentation
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Outreach and Engagement

- Tom Scott presented USC Aiken's AI initiatives at **Vigitrust (Ireland), Charleston Digital Corridor, and AegisX Charleston.**
- K-12 programming and community awareness events to grow cyber/AI literacy.