Ahmed M. Hamza – Curriculum Vitae

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Academic Degrees

2022	Doctorate of Philosophy in Computing University of Portsmouth, Hampshire, UK Thesis: "Q-learning Augmented Optimization of High Efficiency Video Coding" Advisor: Djamel Ait-Boudaoud
2010	Master of Science in Computer Science Georgetown University, Washington, DC Thesis: "Global structural similarity algorithm for human metabolome compounds" Advisors: Bala Kalyanasundaram, Mahendran Velauthapilai
2007	Bachelor of Science in Computer Science The American University in Cairo, Cairo, Egypt Minor in Electronics, Magna Cum Laude

Professional History

2024-present	Associate Teaching Professor University of Colorado at Boulder (Boulder, CO) Computer Science Department College of Engineering and Applied Sciences
2022 – 2024	Undergraduate Program Director
2018 – 2024	Lecturer Rochester Institute of Technology (Rochester, NY) Computing Security Department Golisano College of Computing and Information Sciences
2013 – 2017	Lab Instructor American University, Kuwait College of Engineering
2010 - 2012	Database Manager & Research Programmer Lombardi Research Institute, Georgetown University Medical Center (Washington DC)
2007-2009	Research Assistant Georgetown University (Washington, DC)
2008	Research Intern, Automotive Speech Systems Robert Bosch Inc. (Palo Alto, California)

Teaching Experience

CU Boulder (Boulder, CO)
Courses taught with substantially revised curriculum or introduced:

- Special Topics in Computer Science: AI and Machine Learning Security
- Special Topics in Computer Science: Malware Reverse Engineering
- CSCI – 5413: Computer Security and Ethical Hacking (40-50 students)
    - Revised w/focus on hardened networks and systems, attacks on AI systems
    - Created collaborative practical components and labs
- CSCI – 5301: Intro to Cybersecurity (50-60 students)
    - Redesigned for CS program students, technical focus
- DTSC – 5300: Intro to Security for Data Scientists (~80 students)
    - Revised for Data Science students and AI content

- MS-CS & MS-AI Online Programs at CU Boulder
    - Authored the Security and Ethical Hacking specialization series and (currently) Intro to Computing Security specialization. Online, async, self-contained delivery and assessment.

RIT (Rochester, NY)
Courses taught with substantially revised curriculum or introduced:

- CSEC –140 Introduction to Cybersecurity
- CSEC – 201 Mechanics of Programming
    - Third course in programming sequence
- GCIS –124 Software Engineering Intro Sequence II (Data Structures and Algorithms)
- CSEC – 471 Penetration Testing

Teaching History:

- CSEC 490: Capstone
  Leading/coordinating faculty in the management of Capstone projects (~70 graduating or BS/MS students). Developed materials on report writing and research poster creation/presentation.
- CSEC-201: *Programming for Information Security*
  Systems programming, intro to C and memory management, x86/MASM, and stack based buffer overflows for local and remote code execution (exploitation). Re-wrote course design. Improved practical exam pass rate from ~68% to ~85%.
- CSEC-202: *Reverse Engineering*
  Introduction to the concepts of static and dynamic analysis, including advanced disassembly and debugging, binary analysis, x86 and x64 Intel, and modern malware. Project based course.
- GCIS-123/124: *College-wide, Software Engineering Programming Intro Sequence.*
  Co-designed teaching materials, labs, and revised active learning approaches to reduce WDF rates by ~60%
- CSEC-471: *Pentesting*—Offensive auditing and testing concepts with fundamental practice, in all stages of the cybersecurity kill chain for modern intrusion attacks.
- CSEC-473: *Computer Defense Techniques*—Team-based Attack/Defense competition preparation, simulation of virtualized red/blue team exercises with rotational roles.
- CSEC-140: *Introduction to Cybersecurity*—Broad technical intro to several areas of security including Ethics. Course co-authored during 2020 lockdown and remote-instruction period.
- CSCI-142: *Object Oriented Programming*—4 credit course, object Oriented concepts in Java, high-level language concepts and project work in Java scheduler Multi-Threading, Networking,

Generics and JCF, File I/O, Events, and introductory graph algorithms (search, backtracking, shortest-path). Designed labs, quizzes, HW, materials.
- CSCI-141: *Computer Science Programming Sequence*— 4 credit, Python based, intensive programming intro for Comp Sci., Comp Eng., Software Eng., and Comp. Security students.

Leadership and Administrative Experience

Undergraduate Program Director - 2022/23
Computing Security Dept., Rochester Institute of Technology (Rochester, New York)
- Led the undergraduate curricular development, industry Co-op process, Scholarship Awards, and Global Scholar (satellite campus) admissions.
- Managed the Undergraduate Capstone course, graduating teams, and faculty
- Represented the Dept. of Computing Security (now Cybersecurity) in the College Curriculum Committee, University open houses, and new Dubai/Croatia programs.
- Participated in the creation of unique dual-major degree programs with the College of Liberal Arts, leading to the B.S Cybersecurity-PolSci, and B.S Cybersecurity-Modern Languages.

Research Experience

RIT Global Cybersecurity Institute, CyberVSR Program Faculty (2023-2024), Rochester, NY
Led visiting-scholar student research groups in the following areas:
- Autonomous defense and offense with agentic ML
- Leak-ishness (leak-similarity) of passwords in password strength measurement

Dissertation, **University of Portsmouth**, Hampshire, UK (2022)
Title: *Q-learning Augmented Optimization of High Efficiency Video Coding*
Investigated the application of Reinforcement Learning as real-time improvement on (human) hand-designed heuristics (Lagrangian selection) in video coding, for compression efficiency in the HEVC/H.265 standard
Committee: Djamel Ait-boudaoud, Shikon Zhou, Abdelrahman Abdelazim.

Publications

Preprints and Reports
Sylvia Llosa, Guillermo Llosa, Ahmed M. Hamza, “A critical analysis of guided language-driven agents in offensive security”. (report) 2025.

Ross Clarke, Joe Abbate and Ahmed M. Hamza, “A preliminary review of autonomous action and response in SOC defensive spaces”, 2023 (report)

Ahmed Hamza, Abhi Muva and Joseph Casale “A Critical Evaluation of ML-based Password Guessers for Leak-similar Secrets”, arxiv 2022

Book Chapters
D. Roman Kulchitsky, Amir F. Zeid & Ahmed M. Hamza.. “Experimenting with Latent Semantic Analysis: Intelligent Technologies in the Classroom”. In Global Innovation of Teaching and Learning in Higher Education: Transgressing Boundaries (Ed. Peter & Prudence Layne). Springer Press, 2014

Refereed Conference Proceedings and Journal Publications

Ahmed M. Hamza et al., “HEVC Rate Distortion Optimization with Source Modeling,” Image Processing: Algorithms and Systems. In Proc. Of Electronic Imaging 2021 (EI2021). ISSN: 2470-1173. doi: doi:10.2352/ISSN.2470-1173.2021.10.IPAS-259

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Ahmed M. Hamza, Abdelrahman Abdelazim, and Djamel Ait-boudaoud. “*Parameter optimization in H.265 Rate-Distortion by single-frame semantic scene analysis.*” In: IS&T International Symposium on Electronic Imaging. Image Processing: Algorithms and Systems XVII. Society for Imaging Science and Technology, 2019.

Milan Dordevic, Ahmed M. Hamza & Fadi Safiedinne, “Optimization of Exam Distribution. Assessment and Evaluation in Higher Education,” European Journal of Education Studies, vol. 2(1), July 2016.

Ahmed M. Hamza, Abdelrahman Abdelazim, and Djamel Ait-boudaoud. “Pixel Decimation of RD-Cost Functions in the H.265 Encoder”. Visual Information Processing and Communication, In Proc. Of Electronic Imaging 2016 (EI2016) . San Francisco, CA. Feb. 2016.

A. Abdelazim and A.M. Hamza. “*Adaptive hierarchical motion estimation optimization for scalable HEVC*”, IEEE 8th GCC Conference & Exhibition, Muscat, 2015, pp. 1-5. doi: 10.1109/IEEEGCC.2015.7060088

Roman Kulchitsky, Amir F. Zeid & Ahmed M. Hamza. LSA-Based Feedback for Assessing Student Learning in IT-Enabled IR Courses. SSRN Electronic Journal, December 2012.

Sherif G. Aly, Ahmed M. Hamza, Ismail Elhelw, Moataz Nour. (2007) A Multi Tiered Framework for Web Service Access Control, SWWS 2007: 4954

Grants and Funding

External Funding
(Co-PI) Uzun, Pelletier, Wright, Olson, Rahbari, Hamza, et al. Cybersecurity Clinic.
Program: Google Cybersecurity Clinics, Google Foundation. Total amount: $500, 000. 8/1/ 2023.

Internal Funding– RIT Golisano College of Computing and Information Sciences (Jan 2022) Faculty Development Grant – Advanced Penetration Testing for Hardened Networks and Systems

Supervision

Ph.D Committees

Sylvia Llosa, Computer Engineering, University of Colorado at Boulder, 2024-present

M.S Thesis Supervision

Ross Clarke, Computing Security, Rochester Institute of Technology, 2025
Joseph Casale, Computer Science, Rochester Institute of Technology, 2023

Independent Research and Undergrad Projects
Supervised Undergraduate Thesis: 12
Supervised Graduate Independent Studies: 5

Supervised Undergraduate Independent Studies: 4

Student Club Mentorship
Coach, CU Boulder Cyber Club, 2024-present

- 2024 Collegiate Penetration Testing Competition, Western Regionals (Stanford U, CA)
- 2025 National Collegiate Cyber Defense Competition, Rocky Mountain Region (Denver, CO)

College, Departmental and University Service

CU Boulder

Boulder Faculty Assembly, Academic Affairs Committee (2025)
CS Dept. Undergraduate Committee (2024-present)

RIT

CSEC Dept. Curriculum Committee (2019 to 2023)
GCCIS College Curriculum Committee (2022 to 2023)
CSEC Dept. Undergrad Capstone Director (2022-2023)

Professional Service

Technical Program Committee
The International Conference on Digital Forensics and Cyber Crime, EAI, 2022-present

Reviewer
ICSIT 2024: 15th International Conference on Society and Information Technologies
ICDF2C 2022: 13th EAI International Conference on Digital Forensics & Cyber Crime

Professional Development

SIGCSE 2025 – Technical Symposium on Computer Science Education, Pittsburgh, PA (February 2025)

NSA-CAE Faculty Trainings – Browser Exploitation August 2023
Dakota State University – Baltimore, MD.

NSA-CAE Faculty Trainings – Docker Containerization. April 2023
Dakota State University/Cal State/UC Riverside – Palm Desert, CA.

OSCE / PEN-300 Certification Training
Offensive Security Inc, Remote (online), June-August 2022
Industry benchmark for advanced practical security.

NSA-CAE Trainings – Computer Forensics
University of Cincinnati, Ohio, June-July 2022

Honors

Graduate Fellowship – Georgetown University Graduate School of Arts and Sciences, 2007

Academic Merit Scholarship – American University in Cairo, 2002

Language

English and Arabic
Programming Languages: Assembly (x86, x64, 80821), C, C++, Java, Python, Haskell, Scheme, shell, Javascript, Lisp, Perl, Rust