Salma Emara

PRESENT APPOINTMENT

Assistant Professor, Teaching Stream
The Edward S. Rogers Sr. Department of Electrical and Computer Engineering, University of Toronto
10 King's College Road
Toronto, Ontario, Canada, M5S 3G4

PERSONAL AND CONTACT INFORMATION

Citizenship: Egyptian
Date of Birth: September 1996
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EDUCATION

University of Toronto, Toronto, Ontario, Canada
The Edward S. Rogers Sr. Department of Electrical and Computer Engineering

- ♢ **Ph.D.**, Computer Engineering, SEPTEMBER 2018 – NOVEMBER 2022
  - ↪ *Dissertation:* "Sequential Decision-Making in Networking Algorithms Using Deep Reinforcement Learning"
  - ↪ *Advisor*: Baochun Li
  - ↪ *Thesis Committee*: Alberto Leon-Garcia, Jonathan Rose, Yashar Ganjali and Mohamed Hefeeda

American University in Cairo, Cairo, Egypt
Department of Electronics and Communications Engineering

- ♢ **B.Sc.**, Electronics and Communications Engineering, JUNE 2018
  - ↪ *Thesis Advisors*: Hassanein Amer and Ramez Daoud

PROFESSIONAL EXPERIENCE

University of Toronto, Toronto, Ontario, Canada
The Edward S. Rogers Sr. Department of Electrical and Computer Engineering

Assistant Professor, Teaching Stream — **January 2023 – Present**

- ♢ Course Instructor

Winter 2023 – 2026	APS 105: Computer Fundamentals Click to view the Winter 2023 lectures playlist
Winter 2024, Fall 2024 – Fall 2025	ECE 1513: Introduction to Machine Learning Click to view the lectures playlist
Fall 2023 – 2025	ECE 244: Programming Fundamentals Click to view a sample lecture

Ph.D. Candidate — **September 2018 – November 2022**

- ♢ Course Instructor — **January 2022 – April 2022**

Winter 2022	APS 105: Computer Fundamentals Click to view an online or an in-person sample lecture

♢ Graduate Teaching Assistant **January 2019 – December 2021**

Winter 2019 – 2021	APS 105: Computer Fundamentals Click for the recorded tutorials of Winter 2021
Fall 2019 – 2021	ECE 244: Programming Fundamentals Click for recorded tutorials of Fall 2020

♢ Research Assistant **September 2018 – November 2022**

supervised by Professor Baochun Li

American University in Cairo, Cairo, Egypt
Department of Electronics and Communications Engineering

♢ Undergraduate Teaching Assistant **September 2015 – May 2018**

Fall 2015 Spring 2016	ECE 210: Digital Logic Design
Spring 2017 Fall 2017 Spring 2018	ECE 435: Microcontroller System Design

♢ Undergraduate Research Assistant **June 2014 – August 2016**

supervised by Professor Nageh Allam

Honors and Awards

♢ Departmental Teaching Award, University of Toronto. [1] **May 2026**

♢ Early Career Teaching Award, Faculty of Applied Sciences and Engineering, University of Toronto. **April 2025**

♢ Departmental Teaching Award, University of Toronto.[1] **May 2024**

♢ Departmental Teaching Award, University of Toronto. [1] **May 2023**

♢ ECE Fellowship, University of Toronto.
September 2018 – December 2022

♢ Departmental Teaching Award, University of Toronto. [1] **May 2022**

♢ Departmental Teaching Assistant Award, University of Toronto. [1]
May 2022

♢ Shortlisted for TATP TA Teaching Excellence Award, University of Toronto. [2]
March 2022

♢ Vector Scholarship in Artificial Intelligence (VSAI).
September 2018 – August 2019

♢ President Cup, American University in Cairo. [3]
June 2018

♢ Mohamed El Beleidy Academic Award, American University in Cairo. [3]
June 2018

[1] The award is determined by student votes conducted by the ECE Student Club at the end of the academic year.
[2] The award is determined by student and faculty nominations and an award committee.
[3] The award is granted to the highest GPA students in the graduating class.

♢ Academic Achievement Scholarship, American University in Cairo. The award offers a 30% tuition fee discount to students with a GPA higher than 3.7. **2015 – 2018**

♢ Highest GPA, School of Sciences and Engineering, American University in Cairo. **2015 – 2018**

♢ Top in the world in Physics, IGCSE Examinations. **June 2012**

Professional Development

♢ Certificate in the Effective Teaching Practice Framework, Association of College and University Educators (ACUE) **June 2024**

Publications

♢ **Books**

[B2] **Salma Emara**, "*Khufu: Object-Oriented Programming using C++*," Online Book, 2024.

[B1] **Salma Emara**, Baochun Li, "*Snefru: Learning Programming with C*," Online Book, 2023.

♢ **Journal Articles** (in reverse chronological order)

[J3] **Salma Emara**, Fei Wang, Baochun Li, Timothy Zeyl, "*Pareto: Fair Congestion Control with Online Reinforcement Learning*," IEEE Transactions on Network Science and Engineering, vol. 9, no. 5, pp. 3731 – 3748, 2022.

[J2] **Salma Emara**, Silas Fong, Baochun Li, Ashish Khisti, Wai-Tian Tan, Xiaoqing Zhu, John Apostolopoulos, "*Low-Latency Network-Adaptive Error Control for Interactive Streaming*," IEEE Transactions on Multimedia, vol. 24, pp. 1691 – 1706, 2022.

[J1] Nada Atef, **Salma Emara**, Dina S. Eissa, Ahmed El-Sayed, Omar A. M. Abdelraouf, Nageh K. Allam. "*Well-dispersed Au nanoparticles prepared via magnetron sputtering on TiO2 nanotubes with unprecedentedly high activity for water splitting*," Electrochem. Sci. Adv. 2020; e2000004.

♢ **Papers in Conference Proceedings** (in reverse chronological order)

[C13] Kareem Ibrahim, **Salma Emara**, "AI as a Calibration Anchor: Improving Grading Consistency in Large Introductory Programming Courses," in Proceedings of the 2026 ACM Virtual Global Computing Education Conference V. 2 (SIGCSE Virtual 2026), Virtual Event, November 12 – 15, 2026.

[C12] Ibraheem El Sheikha, **Salma Emara**, "Work-in-Progress: PiazzaPlus - Enhancing Piazza Search with Semantic Matching," in the Proceedings of American Society for Engineering Education (ASEE) Annual Conference, Charlotte, North Carolina, United States, June 21 – 24, 2026.

[C11] Yuanrong Han, **Salma Emara**, "Textbook-Embedded Virtual Teaching Assistant That Answers CS1 Questions With Verifiable Citations," in the Proceedings of the IEEE/ACM International Conference on Software Engineering (ICSE), Rio de Janeiro, Brazil, April 12 – 18, 2026.

[C10] Vaibhav Seshadri, Yassine Berrachid, Ethan Hugh, Abhishek Madan, **Salma Emara**, "*Alan: A Classroom Deployment of An Educational Chatbot That Cites Resources*," in the Proceedings of the 57th ACM Technical Symposium on Computer Science Education (SIGCSE TS), St. Louis, Missouri, United States, February 18 – 21, 2026.

[C9] **Salma Emara**, Fatemeh Jazinizadeh, Hamid Timorabadi, "*Connecting the Dots - Exploring the Benefits of Cross-Disciplinary Learning in a First-Year Programming Course*," in the Proceedings of American Society for Engineering Education (ASEE) Annual Conference, Montreal, Canada, June 22 – 25, 2025.

[C8] Raiyan Ishamam, **Salma Emara**, Hamid Timorabadi, "*Work In Progress: TextMatch - A Semantically Enhanced Textbook Recommendation System*," in the Proceedings of American Society for Engineering Education (ASEE) Annual Conference, Montreal, Canada, June 22 – 25, 2025.

[C7] Xinyuan Fan, Hamid Timorabadi, **Salma Emara**, "*Work-in-Progress: TextCraft: Automated Resource Recommendation for Custom Textbook Creation*," in the Proceedings of American Society for Engineering Education (ASEE) Annual Conference, Portland, United States, June 23 - 26, 2024.

[C6] **Salma Emara**, Daniel Liu, Fei Wang, Baochun Li, "*Cascade: Enhancing Reinforcement Learning with Curriculum Federated Learning and Interference Avoidance —- A Case Study in Adaptive Bitrate Selection*," in the Proceedings of IEEE INFOCOM 2024 Workshop on Distributed Machine Learning and Fog Networks (FOGML), Vancouver, Canada, May 20-23, 2024.

[C5] Fei Wang, **Salma Emara**, Isidor Kaplan, Baochun Li, Timothy Zeyl, "*Multi-Agent Deep Reinforcement Learning for Cooperative Edge Caching via Hybrid Communication*," in IEEE International Conference on Communications (ICC), Selected Areas in Communications —- Machine Learning for Communications and Networking Track, Rome, Italy, May 28 —- June 1, 2023.

[C4] **Salma Emara**, Fei Wang, Isidor Kaplan, Baochun Li, "*Ivory: Learning Network Adaptive Streaming Codes*," in the Proceedings of the 30th IEEE/ACM International Symposium on Quality of Service (IWQoS), 2022 (*acceptance rate*: 24.3 %).

[C3] **Salma Emara**, Baochun Li, Yanjiao Chen, "*Eagle*: Refining Congestion Control by Learning from the Experts," in the Proceedings of IEEE INFOCOM 2020 (*acceptance rate*: 19.8 %).

[C2] Silas L. Fong, **Salma Emara**, Baochun Li, Ashish Khisti, Wai-Tian Tan, Xiaoqing Zhu, John Apostolopoulos, "*Low-Latency Network-Adaptive Error Control for Interactive Streaming*," in Proceedings of the 27th ACM International Conference on Multimedia (MM '19), October 21 – 25, 2019, Nice (*acceptance rate*: 26.5 %).

[C1] **Salma Emara**, Ayah Elewa, Omar Wasil, Kholoud Mostafa, Nada Abdelkhalek, Ahmed H. Soliman, Hassan Halawa, Malak ElSalamouny, Ramez Daoud, Hassanein Amer, Ahmed Khattab, Hany ElSayed, Tarek Refaat,"*Heterogenous ITS Architecture for Manned and Unmanned Cars in Suburban Areas*," in the Proceedings of the IEEE 23rd International Conference on Emerging Technologies and Factory Automation (ETFA), Torino, Italy, September 2018.

♢ **Abstracts in Conferences** (in reverse chronological order)

[A4] Qin Liu, Fiona Coll, Shurui Zhou, **Salma Emara**, "Reconsidering Competency-Based Assessment in the Age of AI," Competency Based Assessment (CBA) Symposium, May 21 and 22, 2026

[A3] Nazli Ada Selcuk, **Salma Emara**, Fatemeh Jazinizadeh, "Enhancing Image Understanding and Problem Solving in Virtual Teaching Assistance for Engineering Mechanics Courses," in the Proceedings of CEEA/ACEG (Canadian Engineering Education Association/Association Canadienne De L'Éducation En Génie), Moncton, Canada, June 14 – 17, 2026.

[A2] **Salma Emara**, "The Pedagogical Impact of Computer-Based Exams in Programming Courses," in the Proceedings of CEEA/ACEG (Canadian Engineering Education Association/Association Canadienne De L'Éducation En Génie), Montreal, Canada, June 18 – 21, 2025.

[A1] **Salma Emara**, Yvonne Yang, Riya Bansal, Xiaochong Wei, Baochun Li, "Work-In-Progress: Crafting an Interactive Online Textbook for Programming Students," CEEA/ACEG (Canadian Engineering Education Association/Association Canadienne De L'Éducation En Génie), Edmonton, Alberta, June 15 – 19, 2024.

♢ **Dissertation**

[D1] **Salma Emara**, "Sequential Decision-Making in Networking Algorithms using Deep Reinforcement Learning," Ph.D. Dissertation, Department of Electrical and Computer Engineering, University of Toronto, June 2023.

♢ **Pending Patent**

[P1] Zhenhua Hu, Timothy J. Zeyl, **Salma Emara**, Baochun Li, Fei Wang, "Method and Apparatus for Multiple Reinforcement Learning Agents in a Shared Environment," filed on December 31, 2021.

MENTORING

University of Toronto, Toronto, Ontario, Canada
The Edward S. Rogers Sr. Department of Electrical and Computer Engineering

♢ M.Eng Thesis Projects (ECE 2500)

Raiyan Ishmam May 2024 – April 2025
Thesis titled "Semantically Optimized Textbook Recommendation System"

Yuanrong (Rex) Han May 2024 – January 2025
Thesis titled "Textbook-Specific Chatbot for Programming Courses"

Elva (Xinyuan) Fan May 2023 – January 2024
Thesis titled "Resource Recommendation for Custom Textbook Creation"

Zining Yin September 2019 – June 2020
Thesis titled "Reinforcement Learning to Refine Congestion Control"

♢ Undergraduate Research Interns

Nazli Ada Selcuk May 2025 – August 2025
Research topic "Enhancing Image Understanding in Virtual Teaching Assistance"

Ibraheem El Sheikha May 2025 – August 2025
Research topic "Enhancing Piazza Search with Semantic Matching"

Jinning Liu May 2025 – August 2025
Research topic "Visualizing C and C++ Program Execution and Memory Behavior"

Vir Patel May 2025 – August 2025
Research topic “Diversifying the Knowledge Base of RAG-based Virtual Teaching Assistants”

Warrick Tsui May 2025 – August 2025
Research topic “Improving Conversational Language of Virtual Teaching Assistants”

Nora Liu May 2025 – August 2025
Research topic “Enhancing Programming Textbook Exercises with Automated Feedback”

Jiahan (William) Wen May 2024 – August 2024
Research topic “Semantically Smart Search Bar within Online Textbooks"

Rea Ahuja May 2023 – Present
Research topic “Using ChatGPT to Translate Compiler-Error Messages in CS1"

Daniel Liu May 2022 – August 2022
Research topic “Curriculum Federated Reinforcement Learning"

Fei Wang September 2019 – August 2020
Research topic “Online Reinforcement Learning for Congestion Control"

Isidor Kaplan April 2020 – August 2020
Research topic “Reinforcement Learning for Adaptive Streaming Codes"

♢ Undergraduate Capstone Design Projects (ECE 496)

Jiahan Wen, Zhuoran Wang, Kexin Xiang, Matthew Zannier 2025 – 2026
Project “LeetHelper: Context-Aware AI Guidance for LeetCode"

Danish Islam, Avid Eslami, Mohammad Sadman Hossain, Harmit Goswami 2025 – 2026
Project “LLM-Powered Productivity Tool to Accelerate Literature Review"

Junyu Li, Ridvik Pal, Alexander Chen 2025 – 2026
Project “AI-Powered Grading Bot"

Nidaa Rabah, Mariam Aser, Alicia Barlow, Elia Cheng 2025 – 2026
Project “Early Programming Education Coding Tool"

Meghna Ravikumar, Harshit Sohaney, Yun Jia Hao, Anne Chow 2024 – 2025
Project “Augmented Reality in Engineering Education (AREE)"

Adrien Mery, Oyku Ugur, Joshua LaPointe, Bora Bayazit 2024 – 2025
Project “Project Teammate Finder App"

Ethan Hugh, Vaibhav Seshadri, Abhishek Madan, Yassine Berrachid 2024 – 2025
Project “Course-Specific ChatBot"

Jenifer Hossain, Silvia Lopez Portillo, Aric Leather 2023 – 2024
Project “AI-Powered Personalized Teaching Assistant"

Maryam Younis, Mansi Patel, Krishna Patel 2023 – 2024
Project “UofT Commuter Hub"

♢ Engineering Science Thesis Projects (ESC 499)

Tianyang Liao September 2019 – April 2020
Thesis titled “Refine Congestion Control Using PCC Expert"

Denzyl Layne September 2019 – April 2020
Thesis titled “Deep Q-Learning to Refine Congestion Control"

Professional Service

- ♢ **First Year Curriculum Committee Member**, Faculty of Applied Science and Engineering, University of Toronto, June 2026 – Present.
- ♢ **Curriculum Matters Committee Member**, ECE Department, University of Toronto, July 2023 – Present.
- ♢ **Working Group on Teaching-Based Computing**, ECE Department, University of Toronto, Winter 2026.
- ♢ **ECE Workload Working Group**, ECE Department, University of Toronto, Fall 2024.
- ♢ **TPC Member or Reviewer** for the following conferences and journals:

  Computing Education. ACM Special Interest Group on Computer Science Education (SIGCSE) 2024 and Canadian Engineering Education Association (CEEA) Conference 2024 – 2025.

  Multimedia, Networks and Communications. IEEE/ACM Transactions on Networking (ToN) 2025, IEEE Transactions on Network Science and Engineering (TNSE) 2024, IEEE Globecom AINextGenWN Workshop 2024, Multimedia Systems (MMSys) 2023 and 2025, IEEE Transactions on Mobile Computing 2022, IEEE International Symposium on Information Theory (ISIT) 2022, Computer Networks 2021, IEEE Transactions on Wireless Communications 2021, Multimedia Systems Journal 2020, IEEE Transactions on Mobile Computing 2020.

  Machine Learning. Association for the Advancement of Artificial Intelligence (AAAI) 2023 and 2024, International Conference on Machine Learning (ICML) 2022, PAIR^{2}Struct: Privacy, Accountability, Interpretability, Robustness, Reasoning on Structured Data Workshop at the International Conference on Learning Representations (ICLR) 2022.

Scholarly Talks

[ST1] “Continual Reinforcement Learning”, Invited Talk, University of Toronto, August 1, 2024

[ST2] “Reinforcement Learning: Case Study on Stock Trading”, Invited Virtual Online Talk, Hong Kong Polytechnic University, March 13, 2022