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
Email: salma@ece.utoronto.ca
Website: https://www.eecg.utoronto.ca/~salma/

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 – 2024	APS 105: Computer Fundamentals Click to view the Winter 2023 lectures playlist
Winter 2024	ECE 1513: Introduction to Machine Learning Click to view the lectures playlist
Fall 2023	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 Winter 2020 Winter 2021	APS 105: Computer Fundamentals Click for the recorded tutorials of Winter 2021
Fall 2019 Fall 2020 Fall 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 for Winter 2023, University of Toronto. The award is determined by student votes conducted by the ECE Student Club at the end of the academic year.   **May 2023**

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

◇ Departmental Teaching Award for Winter 2022, University of Toronto. The award is determined by student votes conducted by the ECE Student Club at the end of the academic year.   **May 2022**

◇ Departmental Teaching Assistant Award for Fall 2021, University of Toronto. The award is determined by student votes conducted by the ECE Student Club at the end of the academic year.   **May 2022**

◇ Shortlisted for TATP TA Teaching Excellence Award, University of Toronto. The award is determined by student and faculty nominations and an award committee.   **March 2022**

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

◇ President Cup, American University in Cairo. The award is granted to the highest GPA students in the graduating class.   **June 2018**

◇ Mohamed El Beleidy Academic Award, American University in Cairo. The award is granted to the highest GPA students in the graduating class. **June 2018**

◇ 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**

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

◇ M.Eng Thesis Projects

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

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 Design Projects

Ethan Hugh, Vaibhav Seshadri, Abhishek Madan and Yassine Berrachid
May 2022 – August 2022
Research topic "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

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"

PUBLICATIONS ◇ **Books**

[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)

[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, "*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)

[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.

PROFESSIONAL
SERVICE

◇ **Curriculum Matters Committee Member** at the ECE Department at the University of Toronto, July 2023 – Present.

◇ **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.

Multimedia, Networks and Communications. IEEE Transactions on Network Science and Engineering (TNSE) 2024, IEEE Globecom AINextGenWN Workshop 2024, Multimedia Systems (MMSys) 2023, 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] "Reinforcement Learning: Case Study on Stock Trading", Invited Virtual Online Talk, Hong Kong Polytechnic University, March 13, 2022