

# Salma Emara

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## 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  
*Email:* [salma@ece.utoronto.ca](mailto:salma@ece.utoronto.ca)  
*Website:* <https://salmaemara.com/>

## 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	APS 105: Computer Fundamentals
Winter 2020	<a href="#">Click for the recorded tutorials of Winter 2021</a>
Winter 2021	
Fall 2019	ECE 244: Programming Fundamentals
Fall 2020	<a href="#">Click for recorded tutorials of Fall 2020</a>
Fall 2021	
- ◇ 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	ECE 210: Digital Logic Design
Spring 2016	
Spring 2017	ECE 435: Microcontroller System Design
Fall 2017	
Spring 2018	
- ◇ 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*

- ◇ 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”
- ◇ 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”
- ◇ 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 TiO<sub>2</sub> nanotubes with unprecedentedly high activity for water splitting,*” Electrochem. Sci. Adv. 2020; e2000004.
- ◇ **Papers in Conference Proceedings** (in reverse chronological order)

- [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.

◇ **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<sup>2</sup>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