

# OMID RAJABI SHISHVAN, PH.D.

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## EDUCATION

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**University at Albany, State University of New York** 2016-2022  
Ph.D. in Electrical and Computer Engineering

- Advisor: Gary J. Saulnier, Ph.D.
- Dissertation Title:

*ACT5 EIT System:  
A Multiple-Source Electrical Impedance Tomography System*

**University of Rochester** 2012-2015  
M.Sc. in Electrical Engineering

**Sharif University of Technology** 2007-2012  
B.Sc. in Electrical Engineering

## RESEARCH EXPERIENCE

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**Postdoctoral Researcher** 2022 - Present

- Improving the performance of the ACT5 EIT System

**Graduate Student Research Assistant** 2019 - 2022

- Design and implementation of the architecture and the digital components of ACT5 EIT system. The ACT5 system is an electrical impedance tomography system for medical imaging. The project components include GUI written in MATLAB on PC, various hardware components using FPGAs, and the communication links in the system and between the system and the PC.

**Graduate Student Research Assistant** 2016 - 2019

*Breakthrough Interactive Thinking Systems Lab*

- Explored the possibilities of applying machine intelligence in healthcare applications, especially using deep learning techniques on analyzing electrocardiogram recordings of newborn babies.

**Graduate Student Research Assistant** 2012 - 2016

*Advanced Computer Architecture Lab*

- Explored methods on improving power delivery on processors. Explored alternatives to conventional packet delivery methods on a multi-core processor architecture.

## TEACHING EXPERIENCE

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Laboratory and/or Teaching Assistant for **Introduction to Circuits, Systems Analysis and Design, Programming for Engineers, Introduction to Engineering Design, Introduction to Engineering Analysis, Circuits and Signals, Advanced CMOS VLSI Design, Advanced Digital Design Using FPGA, Microprocessor Systems Lab, Microprocessor Systems Design, Logic Circuits**

## PUBLICATIONS

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### Journal/Magazine Articles

- **O. Rajabi Shishvan**, A. Abdelwahab, N. Barbosa da Rosa Jr., G. J. Saulnier, J. L. Mueller, J. C. Newell, and D. Isaacson. ACT5 electrical impedance tomography system. *IEEE transactions on biomedical engineering*, 71(1):227–236, 2024

- S. J. Hamilton, P. A. Muller, D. Isaacson, V. Kolehmainen, J. Newell, **O. Rajabi Shishvan**, G. Saulnier, and J. Toivanen. Fast absolute 3D CGO-based electrical impedance tomography on experimental tank data. *Physiological Measurement*, 43(12):124001, 2022
- G. J. Saulnier, A. Abdelwahab, and **O. Rajabi Shishvan**. DSP-based current source for electrical impedance tomography. *Physiological Measurement*, 41(6):064002, 2020
- H. Habibzadeh, K. Dinesh, **O. Rajabi Shishvan**, A. Boggio-Dandry, G. Sharma, and T. Soyata. A survey of Healthcare Internet of Things (HIoT): A clinical perspective. *IEEE Internet of Things Journal*, 7(1):53–71, 2019
- **O. Rajabi Shishvan**, D. S. Zois, and T. Soyata. Machine intelligence in healthcare and medical cyber physical systems: A survey. *IEEE Access*, 6:46419–46494, 2018

### Conference Publications

- K. Enzer, N. Barbosa Da Rosa Junior, A. Keck, E. Hagopian, J. Brinton, **O. Rajabi Shishvan**, G. Saulnier, J. Newell, D. Isaacson, and J. Mueller. Longitudinal characterization of ventilation and perfusion in infants with bronchopulmonary dysplasia using electrical impedance tomography. In *C26. NOVEL TECHNOLOGIES AND IMAGING APPROACHES IN PEDIATRIC RESPIRATORY MEDICINE*, pages A5161–A5161. American Thoracic Society, 2024
- N. Barbosa Da Rosa Junior, C. Vargas-Acevedo, **O. Rajabi Shishvan**, G. Saulnier, J. Newell, D. Isaacson, J. Mueller, and J. Zablah. Evaluation of blood volume changes in the lung using eit pre and post catheterization in pediatric patients with pulmonary vein stenosis. In *C59. PICKING UP THE KIDS AT BALBOA PARK: INSIGHTS IN PEDIATRIC PULMONARY HYPERTENSION*, pages A6026–A6026. American Thoracic Society, 2024
- N. Barbosa Da Rosa Junior, **O. Rajabi Shishvan**, G. Saulnier, J. Newell, D. Isaacson, A. Keck, E. DeBoer, J. Hoppe, and J. Mueller. EIT images of ventilation and perfusion correlate with spirometry in patients with cystic fibrosis and healthy controls. In *C74. CYSTIC FIBROSIS AND NON-CF BRONCHIECTASIS*, pages A6464–A6464. American Thoracic Society, 2024
- A. Abdelwahab, **O. Rajabi Shishvan**, and G. J. Saulnier. Minimizing coaxial cable effects on EIT measurements using the two-port network parameters. In *2023 IEEE Biomedical Circuits and Systems Conference (BioCAS)*, pages 1–5, 2023
- **O. Rajabi Shishvan**, N. Barbosa da Rosa Junior, G. J. Saulnier, J. Mueller, J. C. Newell, and D. Isaacson. Preliminary human-subject results of ACT5 EIT system. In *23rd International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT2023)*, 2023
- C. Wilcox, N. Barbosa da Rosa Junior, J. Mueller, J. C. Newell, G. J. Saulnier, **O. Rajabi Shishvan**, and D. Isaacson. Total cardiac vector reconstruction using EIT and ECG data. In *23rd International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT2023)*, 2023
- A. Abdelwahab, **O. Rajabi Shishvan**, and G. J. Saulnier. A modified Howland current source design for simultaneous EIT/ECG data acquisition. In *International Conference of Bioelectromagnetism, Electrical Bioimpedance, and Electrical Impedance Tomography (ICBEM-ICEBI-EIT 2022)*, pages 208–211, 2022
- **O. Rajabi Shishvan**, A. Abdelwahab, and G. J. Saulnier. Practical Implementation of a Novel Output Impedance Measurement Technique for EIT System While Attached to a Load. In *2020 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*. IEEE, 2021
- **O. Rajabi Shishvan**, A. Abdelwahab, and G. J. Saulnier. ACT5 EIT system. In *21st International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT2021)*, page 55, 2021
- A. Abdelwahab, **O. Rajabi Shishvan**, and G. J. Saulnier. A new method for simultaneous EIT/ECG data acquisition. In *21st International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT2021)*, page 36, 2021
- **O. Rajabi Shishvan**, A. Abdelwahab, and G. J. Saulnier. Measuring current source output impedance in EIT systems while attached to a load. In *2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, pages 1452–1456. IEEE, 2020

- A. Abdelwahab, **O. Rajabi Shishvan**, and G. J. Saulnier. Performance of an adaptive current source for EIT driving loads through a shielded coaxial cable. In *2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, pages 1448–1451. IEEE, 2020

### Book Chapters

- **O. Rajabi Shishvan**, D. S. Zois, and T. Soyata. Incorporating artificial intelligence into medical cyber physical systems: A survey. In *Connected Health in Smart Cities*, pages 153–178. Springer, 2020
- **O. Rajabi Shishvan** and T. Soyata. Deep learning using CUDA. In *GPU Parallel Program Development Using CUDA*, pages 425–437. Chapman and Hall/CRC, 2018
- H. Habibzadeh, **O. Rajabi Shishvan**, and T. Soyata. CUDA libraries. In *GPU Parallel Program Development Using CUDA*, pages 383–395. Chapman and Hall/CRC, 2018

### Thesis

- **O. Rajabi Shishvan**. *ACT5 EIT System: a Multiple-Source Electrical Impedance Tomography System*. PhD thesis, State University of New York at Albany, 2022

## INVITED TALKS

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- National Center for Adaptive Neurotechnologies, Albany, NY. April 2023

## PROFESSIONAL SERVICES & CERTIFICATIONS

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- **Journal Referee:** IEEE Access (2018 - 2022), IEEE Internet of Things (2020), Journal of Computational Social Science - Springer (2019).
- **Conference Technical Reviewer:** Vehicular Technology Conference (VTC2019-Fall) (IEEE), Global Information Infrastructure and Networking Symposium (GIIS 2018) (IEEE).
- **Member:** The Institute of Electrical and Electronics Engineers (IEEE), IEEE Engineering in Medicine and Biology Society.
- **Certifications:** SUNY Startup Summer School (2023)

## SKILLS AND EXPERTISE

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- Programming and scripting languages: C/C++/Python/MATLAB/Linux Bash
- Digital hardware design using Verilog HDL.
- FPGA Design using Xilinx Vivado
- Proficient in machine learning and deep learning applications.
- In-depth knowledge of architectural and power simulators including GEM5, McPAT, DRAMsim and SimpleScalar.

## SELECTED COURSES

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Artificial Intelligence I, Machine Learning, Probability and Random Processes, Detection and Estimation Theory, Digital Signal Processing, Information Theory, Quantum Information, Computation, and Foundations, Advanced Computer Architecture, Introduction to VLSI, Advanced Memory Systems, Multiprocessor Architectures, Stochastic Modeling of Computer Systems