# Sahand Rezaei-Shoshtari
## AI | Robotics Researcher

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## 💼 Education

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|---|---|
| Present<br>Sep. 2020 | PhD, School of Computer Science, McGill University, Montreal, Canada<br>**Supervisors :** David Meger, Doina Precup |
| Dec. 2019<br>Sep. 2017 | Master of Engineering - Thesis, McGill University, Montreal, Canada<br>**Supervisors :** Inna Sharf, David Meger<br>**CGPA :** 4.00/4.00<br>**Thesis :** Learning Manipulator Dynamics for Control and Interaction Inference |
| Sep. 2016<br>Sep. 2012 | Bachelor of Mechanical Engineering, University of Tehran, Tehran, Iran<br>**Supervisor :** Masoud Shariat Panahi<br>**CGPA :** 3.98/4.00<br>**Thesis :** Online Path Planning for a Mobile Robot in Dynamic Environments using Reinforcement Learning |

## 💼 Work Experience

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| Sep. 2020<br>Mar. 2020 | Research Intern, Samsung AI Centre, Montreal, Canada<br>› Multimodal generative models for visuotactile perception<br>› Deep reinforcement learning for 5G networks |
| Mar. 2020<br>Jan. 2020 | AI Programmer, Ubisoft La Forge, Montreal, Canada<br>› Deep reinforcement learning for automated video game testing |
| Aug. 2019<br>Mar. 2019 | Research Intern, Samsung AI Centre, Montreal, Canada<br>› Object detection neural networks for human hand-wave motions<br>› Implemented the vision stack on-board of a mobile robot using Google Edge TPU |
| Apr. 2019<br>Sep. 2017 | Teaching Assistant, McGill University, Montreal, Canada<br>› **Courses :** System Dynamics and Control, Numerical Methods, Machine Element Design |

## 🎓 Publications

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|---|---|
| 2021 | **Sahand Rezaei-Shoshtari**, Francois R. Hogan, Michael Jenkin, David Meger, and Gregory Dudek. "Learning Intuitive Physics with Multimodal Generative Models". In *Thirty-Fifth AAAI Conference on Artificial Intelligence*. AAAI, 2021. *(Under Review)* |
| 2021 | Francois R. Hogan, Michael Jenkin, **Sahand Rezaei-Shoshtari**, Yogesh Girdhar , David Meger, and Gregory Dudek. "Seeing Through your Skin : Recognizing Objects with a Novel Visuotactile Sensor". In *The IEEE Winter Conference on Applications of Computer Vision (WACV)*. CVF/IEEE, 2021. |
| 2020 | Maryam Molamohammadi, **Sahand Rezaei-Shoshtari**, and Nathaniel Quitoriano. "Jacobian of Conditional Generative Models for Sensitivity Analysis of Photovoltaic Device Processes". In *Machine Learning for Engineering Workshop at Neural Information Processing Systems Conference (NeurIPS)*. 2020. |
| 2020 | **Sahand Rezaei-Shoshtari**, David Meger, and Inna Sharf. "Learning the Latent Space of Robot Dynamics for Cutting Interaction Inference". In *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, 2020. |
| 2019 | **Sahand Rezaei-Shoshtari**, David Meger, and Inna Sharf. "Cascaded Gaussian Processes for Data-efficient Robot Dynamics Learning". In *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, 2019. |

# 🎓 CERTIFICATIONS

Aug. 2019   Deep Learning and Reinforcement Learning Summer School in Edmonton, Canada

# ☰ SKILLS

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| Programming | Python, C++, C#, MATLAB, Simulink |
| Machine Learning Frameworks | PyTorch, TensorFlow, GPyTorch, GPFlow |
| Platforms | ROS, Docker |
| Robotic Software | Gazebo, MoveIt!, RViz, OpenCV, Bullet |
| Other Software | Unity 3D, SolidWorks, LaTeX, Microsoft Project |

# 💻 SELECT PROJECTS

### RLBASE : IMPLEMENTATIONS OF RL ALGORITHMS                                            2020
🜨 github.com/sahandrez/rlbase   ↗ Blog Post
> Minimalistic Deep RL implementations as an educational resource.
> Fork of OpenAI Spinning Up with additional algorithms.

### LEARNING QUADROTOR CONTROLS USING DATA-EFFICIENT MODEL-BASED REINFORCEMENT LEARNING     2017
🜨 github.com/sahandrez/quad_pilco   ↗ Simulation Videos
> Implemented PILCO (Probabilistic Inference for Learning Control) on a quadrotor to learn the control policies under the loss of an actuator
> Successfully learned to hover with only three actuators

### MOTION PLANNING AND CONTROL UTILITIES FOR KINOVA JACO 2 ROBOT                          2017-2018
🜨 github.com/sahandrez/jaco_control
> Worked on the full stack of Kinova Jaco 2 robot
> Implemented impedance control, feedforward torque control, and velocity control utilities
> Implemented motion planning utilities for joint space and Cartesian space planning

# 🎓 HONORS AND AWARDS

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| Nov. 2019 | IROS Student and Developing Countries (SDC) Travel Award ($600), IEEE/RSJ IROS 2019 |
| 2017-2018 | Grad Excellence Award ($5000) in Mechanical Engineering, McGill University |
| 2015-2016 | Faculty of Engineering Award, Ranked 2$^{nd}$, University of Tehran |
| 2014-2015 | Faculty of Engineering Award, Ranked 3$^{rd}$, University of Tehran |
| 2012-2012 | Nationwide University Entrance Exam, Ranked 19$^{th}$, Iran |

# 💼 EXTRACURRICULAR ACTIVITIES

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| Sep. 2019 | Volunteer, 2019 Montreal AI Symposium in Montreal, Canada |
| May 2019 | Volunteer, 2019 IEEE International Conference on Robotics and Automation (ICRA) in Montreal, Canada |

# ❝ REFERENCES

References available upon request.