

# Sebastian Pilarski

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🇺🇸 Citizen: Canada, USA

## Technical Skills

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**Programming Languages:** C/C++, Python, Java, C#, Scala, MATLAB, Javascript, VHDL

**Libraries/Frameworks:** STL, Keras, SciPy, Sklearn, Pandas, TensorFlow, Node.JS, Electron, Unity3D

**Experience In:** AI: *Reinforcement Learning, Machine Learning*, FPGA, PCB Design, Microprocessors, Telecom

## Education

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**McGill University**

**Montreal, Canada**

**PhD in AI + Software Engineering (Partial collaboration with Siemens Energy)**

**Jan. 2019 - Present**

- *Researching reinforcement learning bandit algorithms (focus on delayed feedback)*
- *Using machine learning to improve safety-critical turbine design for more efficient and greener energy*

**B.Eng in Computer Engineering + Computer Science**

**Sept. 2014 - Dec. 2018**

## Work and Research Experience

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**Multi-Armed Bandit Research**

**Apr 2020 - Present**

- Researching methods to achieve near-optimal performance in delayed feedback settings *McGill University*
- Developed first practically applicable method to compute the optimal policy for Bernoulli bandits
  - Extended method to include the optimal policy for Bernoulli bandits with delayed feedback
  - Note: This is an absolutely optimal and not just asymptotically optimal solution.
- Developed effective algorithms for bandits with continuous reward distributions and delayed feedback

**Artificial Intelligence and Data Cloud R&D**

**Jan 2019 - Present**

- Researching machine learning and artificial intelligence applications for AGT engine design *Siemens Energy*
- Developed generative sampling technique and ML model to predict safety-critical engine deterioration
- Designed optimization tool that determines optimal R&D development paths for gas turbines
  - Discovered new more promising R&D directions
- Developed tool which trains ML models from simulations and generates optimized code for deployment to PLCs
  - Deployed neural networks directly in the control system
- Created prototype for simulation data cloud solution which enables systematic storage and querying of data
  - Solution has become new Siemens product with 15+ member development team behind it

**Researcher in Engineering (Graph Generation)**

**May 2018 - Aug. 2018**

- Researched SAT solving technique applications to graph domain with Prof. Dániel Varró *McGill University*
- Implemented algorithmic technique based upon Pure Literal Elimination from SAT solving *Montreal, Canada*
- Developed Pattern Matcher Analyzer framework and full Partial State Visualization

**Researcher in Engineering (IoT Smart City)**

**May 2017 - Aug. 2017**

- Researched IoT Smart City Integrations with Prof. Tho Le-Ngoc *McGill University*
- Developed system which manages and maintains Montreal's installed IoT devices *Montreal, Canada*
  - Manages cameras, traffic radars, Wi-Fi APs, RFID readers, etc.
  - Developed using Electron, runs on Node.JS backend
- Integrated and tested preliminary IoT architecture in Place des Arts, Montreal

**Atmo (Co-Founder)**

**May 2016 - Aug. 2016**

- *Successfully completed Owlspark Accelerator and pitched at Bayou Startup Showcase* *Owlspark Accelerator*
- Cofounded Atmo and developed software prototype of mobile application using Ionic *Houston, USA*
  - Atmo helps you discover new restaurants based on atmosphere, via mobile application
- Partnered with local business for trial and interviewed 150+ potential customers to determine requirements

## Publications

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- Delayed Reward Bernoulli Bandits: Optimal Policy and Predictive Meta-Algorithm PARDI (*To appear*) **IEEE TAI**  
• *Sebastian Pilarski, Slawomir Pilarski, Dániel Varró*
- Optimal Policy for Bernoulli Bandits: Computation and Algorithm Gauge **IEEE TAI**  
• *Sebastian Pilarski, Slawomir Pilarski, Dániel Varró*
- Predictions-on-Chip: Model-based Training and Automated Deployment of ML Models at Runtime **SOSYM**  
• *Sebastian Pilarski, Martin Staniszewski, Matthew Bryan, Frederic Villeneuve, Dániel Varró*
- On Artificial Intelligence for Simulation and Design Space Exploration in Gas Turbine Design **MODELS 2019**  
• *Sebastian Pilarski, Martin Staniszewski, Frederic Villeneuve, Dániel Varró*
- VIATRA Solver: A Framework for the Automated Generation of Consistent Domain-Specific Models **ICSE 2019**  
• *Oszkár Semeráth, Aren A. Babikian, Sebastian Pilarski, Dániel Varró*

## Invited Presentations

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- Predictions-on-Chip: Model-based Training and Automated Deployment of ML Models at Runtime **MODELS 2021**  
• Paper invited for presentation at MODELS 2021.

## Competitive Programs

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- Oxford Machine Learning Summer School** **Summer 2021**  
• Best-in-class training on a broad range of advanced topics and developments in machine learning.  
• Accepted 15% of applicants with participants joining from 59 countries. 98% having a postgrad degree.  
• Diverse participants - 53% from underrepresented groups, 42% female, 77% from academia.
- CIFAR Machine Learning + Reinforcement Learning Summer School** **Summer 2021**  
• Covers foundational research and new developments in deep learning and reinforcement learning.  
• 300 graduate students, post-docs, and professionals accepted from 56 countries.  
• Diverse participants - 56% students come from underrepresented groups in AI.
- Quantum Cryptography School for Young Students at University of Waterloo** **Summer 2013**  
• All-expenses paid summer school.  
• Topics included classical encryption, quantum encryption, quantum computing, and more.  
• 40 students selected from Canada, USA, Europe, Africa, and Asia.
- Summer Institute of Mathematics at the University of Washington, Seattle** **Summer 2012**  
• All-expenses paid summer mathematics institute.  
• Topics included Cantor sets, group theory, probability theory, and more.  
• 24 students from the USA and Canada qualified via performance on mathematics problem-solving set.
- Youth Ambassador to Chile** **Summer 2011**  
• Sponsored by the US State Department and Amigos de las Americas.  
• Program promotes mutual understanding and prepares youth to make a difference in their communities.  
• Selected to represent the USA through competitive process coordinated by US embassies and consulates.  
• Traveled to Washington, DC and several cities in Chile:
  - Spoke with ambassadors and community leaders of both countries.
  - Mentored by community, business, and NGO leaders.
  - Engaged in workshops, conferences, and many community service activities.

## Projects and Teams

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- McGill Robotics Team**  
• Former member of McGill Mars Rover Robotics team's electrical division (2015-2016).
  - Focused on power management - in charge of hotswap and load-sharing device systems.  
• In both 2015 and 2016, team placed 3rd in the European Rover Challenge in Poland.
- Tablut (Viking Chess) Artificial Intelligence** [Java]  
• Developed domain-customized Monte Carlo Algorithm and effective heuristics after analysis of gameplay.
- Artificial Intelligence Physics Reality Simulator** [C#/Unity]  
• Built simulator on Unity3D engine to enable training and testing of Robot AIs in customizable environments.
- Optimized MIPS Processor** [VHDL]  
• Built fully functional integer MIPS processor with data forwarding, branch prediction, and caching.

## Awards and Competitions

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- Siemens Energy Stipend **2019-2021**
- Grad Excellence Award in Engineering **2019-2021**
- McGill Engineering Doctoral Award **2019-2021**
- Graduate Research Enhancement and Travel (GREAT) Award **2019-2020**
- Paul Cmikiewicz SURE Award **2017, 2018**
- IEEEXtreme 11.0 Team Programming Competition [C++] **Canada: #1, International: #69**

## Miscellaneous

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### **Judo with the Canadian Olympic Team** **2014-2016**

- Participated in Canadian Olympic Judo Team practices and sessions multiple times per week.
- Clearance at the Institut National du Sport in Montreal.
- Trained with Olympic and World medalists from Canada and abroad.
- Discontinued training with Olympic team to focus more on research.

### **Languages**

- English - Native
- Polish - Native
- Spanish