

Ysael Desage

PhD Student, Scientific Developer



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Montreal (QC),
Canada



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LANGUAGES

English ●●●●●●●●
French ●●●●●●●●
Spanish ●●●●●●●●



EDUCATION

- 2023 ● MC GILL UNIVERSITY
PhD Electrical & Computer Engineering (*in progress*)
- 2020 ● UNIVERSITÉ DE MONTRÉAL
M. Sc. Computer Science
Operations Research
- 2018 ● UNIVERSITÉ DE MONTRÉAL
B. Sc. Physics
Astrophysics



ATTRIBUTES

- | | |
|------------------|---------------|
| • Innovative | • Flexible |
| • Self-motivated | • Diligent |
| • Meticulous | • Pedagogue |
| • Strategist | • Orderly |
| • Articulate | • Versatile |
| • Collaborative | • Resourceful |



SCHOLARSHIPS

- Industrial fellowship (2019-2020) **65 000 \$**



PROFILE

Application-oriented scientific Python developer with a significant research background. Highly adaptable, my focus revolves around problem-solving through the deployment of valuable solutions, ranging from fast off-the-shelf based deliverables, to custom cutting-edge approaches and infrastructures.

My background in physics provides me with a solid mathematical understanding and analytical intuition, blending holistically with artificial intelligence, operations research, sequential decision-making and modeling expertise to deliver innovative, performing and rigorous results.



EXPERIENCE

Communication & Representation

- Preparation and teaching of technical training/lectures for general public and specific internal teams.
- Cooperation and coordination in large company multi-disciplinary projects.
- Representation and promotion of a company at public events and collaborative partnership groups.
- Development of technical internal and general public-facing interactive dashboards.
- Internships supervision and coordination.

Research & Development

- Drive research and development initiatives.
- Coordination of (academic) research partnerships.
- Implementation of complex state-of-the-art research algorithms.
- Design, development and testing of multiple research prototypes.
- Conversion of successful/promising research prototypes to production.

Systems & Production

- Production of maintainable code with complete QA process.
- Development of object-oriented programs, leveraging multithreading, multiprocessing and parallelized/asynchronous computing.
- Planning and creation of various deep/machine learning predictive frameworks with automated model serving, evaluation and retraining. Deployed model types include SVMs, KNNs, gaussian processes, decision trees, gradient boosting, random forests and other ensemble methods, MLPs, CNNs, ResNets, RNNs, GRUs, LSTMs, Seq2Seq/Encoder-Decoder, Transformers and other attention-based architectures.
- Design and implementation of custom multi-objective operational control/optimization infrastructures. Deployed control resources include mathematical programs (linear, quadratic, MIP, MILP, non-linear), deep reinforcement learning, dynamic programming, pareto fronts, particle swarm optimization, genetic algorithms, and more.
- Design and rollout of adaptive self-learning and self-healing robust systems.
- Deployment of real-time missing data management for live operations.
- Development of API-led and event-based scalable projects with microservices.

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CERTIFICATIONS

- CORS Diploma
- **First Aid +**
- National Lifeguard Instructor
 - Pool
 - Waterfront
 - Ocean/Surf
- Australian Ocean Bronze Medallion
- Radio Operator



IT SKILLS

Programming & DevOps

- **Python**
- Bash
- Julia
- TensorFlow TFX
- LaTeX
- SQL
- Git
- Microsoft Office
- Docker
- VBA
- MongoDB
- Asana

Main Python Modules

- Numpy
- Jax
- Pandas
- Tigramite
- TensorFlow
- PySurvival
- Multithreading
- Imbalanced-Learn
- Multiprocessing
- SciPy
- NetworkX
- Statsmodels
- PandaPower
- FastAPI
- SKLearn
- Plotly / Seaborn
- PyTest
- PyMongo
- Flask
- Datetime
- Streamlit
- Requests
- Pyomo
- Logging
- ORTools
- ...



HOBBIES AND INTERESTS

- Sailing
- Various sports
- Lifesaving
- Movies
- Martial arts
- Nature & Outdoor
- Electronics
- Dance



TECH. EXPERTISE & KEY WORDS

Artificial Intelligence • Prediction • Optimization • Forecasting • Simulation
Problem Solving • Modeling • Neural Networks • Machine Learning • Control
Reinforcement Learning • Dynamic Programming • Self-Learning • Automation
Operations Research • Mathematical Programming • Sequential Decision-Making



PUBLICATIONS

Autonomous Control in Smart Buildings: a Deep Reinforcement Learning Approach – Cahiers du GERAD.



CONFERENCE ACTIVITIES

- **COP26 (United Nations) | Public interactive dashboard developer**
Multi-agent artificial intelligence applied to smart building clusters interacting with the electric grid.
- **EUROPT | Conference speaker**
Leveraging deep reinforcement learning through the framework of operations research.
- **IVADO | Invited conference speaker**
Modern deployment success: blending artificial intelligence and operations research.
- 2021 • **UNISSU | Sponsored panelist**
AI-driven HVAC optimization: the next disruptive innovation in real estate.
- 2020 • **IGEE | Invited conference speaker**
Applied introduction to machine learning and deep learning for electrical engineers.
- 2019 • **JOPT | Conference speaker**
Intelligent decision-making algorithms for energy storage systems.



ASSOCIATIONS & GROUPS



LIFESAVING SOCIETY
The Lifeguarding Experts



Canadian Association
of Physicists
Association canadienne
des physiciens et physiciennes



CIRRELT



GROUP FOR RESEARCH
IN DECISION ANALYSIS



CORS • SCRO

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CAREER HISTORY

BRAINBOX AI

September 2019 → Now

[Applied Artificial Intelligence Researcher](#)



Description

BrainBox AI utilizes self-adapting artificial intelligence technology to proactively optimize commercial buildings. Using deep learning, cloud-based computing, and a proprietary process, their artificial intelligence engine autonomously and granularly optimizes existing HVAC systems in real time for maximum impact on energy consumption, carbon footprint and building operations.

Summary

Outlined and created multiple deep/machine learning predictive frameworks with automated model serving, evaluation and retraining. Designed and developed an in-house multi-objective operational control/optimization infrastructure, resulting in a pending patent application. Lead multiple technical research and innovation initiatives, including a new company market expansion. Implemented and tested multiple custom algorithms involving cross-team expertise and collaboration.

SIGMA ENERGY STORAGE

May 2017 → May 2019

[Analyst and Engineering Intern](#)



Description

Sigma Energy Storage develops and designs portable climate-resistant thermomechanical energy storage systems. The company's technology reduces fossil fuel consumption and enables green energy use by firming intermittent renewables such as solar, wind, or tidal power, for maximum economic and environmental impact.

Summary

Created an electrical demand forecast and peak prediction tool; Developed multi-purpose energy storage control algorithms for energy markets arbitraging and industrial customers; Conducted thermodynamic and acoustic modeling.



LIFESAVING HISTORY

SN HAWAII

2018, 2019, 2021

[Ocean Lifeguard Instructor](#)



Summary

Ocean rescue instructing, enriched program development and coordinator, group management.

COROLLA BEACH RESCUE

Summer 2019

[Ocean Lifeguard](#)



Summary

Ocean rescue and training.



REFERENCES AVAILABLE ON REQUEST