

THIBAUT ASTIC, Ph.D.

Ph.D. in Geophysics | Machine Learning Enthusiast | Python Software Developer

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SUMMARY

- Computational geoscientist with expertise in machine learning, numerical modelling, geophysical data simulation and processing, inverse problem, and optimization, resulting in 10 scientific publications (5 peer-reviewed), 8 presentations at international conferences, and 1 scientific visualization award.
- Software developer (Python, MATLAB, Java) with 5+ years of experience building 2 open-source packages, 1 commercial software in an industry-academia consortium, and 1 interactive online geophysics textbook.
- Curious and innovative problem solver with great adaptability and autonomy, a goal-oriented mindset, and proven capabilities to work in a team in a dynamic work environment with tight deadlines.
- Proficient English speaker and French native speaker.

EXPERIENCE

Postdoctoral Researcher (EIT) (before September 2020: Ph.D. Candidate & Teacher Assistant)

Geophysical Inversion Facility (GIF) - University of British Columbia (UBC)

 July 2015 - Now (full-time)

 Vancouver, B.C.

- Develop methodologies and implement algorithms for subsurface imaging combining machine learning and physics simulations to simultaneously and quantitatively analyze multiple data types and produce enhanced economic resource estimation from 3D geological interpretations ([video presentation](#)).
- Core contributor of 2 open-source packages in Python, distributed through GitHub ([SimPEG](#), [discretize](#)), and 2 online geophysics textbooks ([EM GeoSci](#), [GPG](#)) with interactive tutorials ([EM apps](#), [GPG Labs](#)).
- Created Graphical User Interfaces and utilities for 1 commercial software in MATLAB and Java ([GIFtools](#)) as part of an industry-academia consortium ([Mitacs project](#)).
- Published 4 first author scientific papers on the development and application of data science approaches for geosciences (see publications sections).
- Presented works to sponsors, users, and technical audiences ([PDAC](#), [AME-Roundup](#), [IUGG](#), [SEG](#), RFG, SciPy).
- Assisted in teaching “Geophysics for practising geoscientists” for three years.

Research Associate (Jr. Eng.)

Polytechnique Montréal

 July 2014 - March 2015 (8-month mission)

 Montréal, Que.

- Evaluated geophysics ability to quantify the metals contents of old mining wastes and their economic potential.
- Designed and acquired test surveys for the chosen in-situ geophysical methods (Magnetic and IP).

Project Manager & Geophysical Engineer (Jr. Eng.)

Novatem Inc.

 October 2012 - March 2014 (full-time)

 Mont-Saint-Hilaire, Que.

- Managed multidisciplinary, international teams of 3 to 6 people for large-scale (up to 250,000 km of cumulated flight distance, covering areas of up to 50,000 km²) and high-resolution (up to a 25 m resolution) airborne magnetic, radiometric, and electromagnetic surveys in Norway and Canada.
- Liaised with field crew and office staff.
- Assumed the planning, logistics, data quality control, processing, and compilation in a deliverable.

LANGUAGES, TECHNOLOGIES & TOOLS

Python	Git	Scikit-learn	Jupyter notebook	Probability and statistics
MATLAB	Script Unix	Pandas	Machine learning	Data modelling
Sphinx	NumPy	Matplotlib	Inverse problem	Data visualization
LaTeX	SciPy	PyTorch	Optimization	Numerical simulation







CODE PORTFOLIO

- **Reproducible science:** Python scripts to reproduce the results of Astic et al. (2021): forward and joint inversion of geophysical and petrophysical data: <https://github.com/thast/Astic-2020-JointInversion>.
- **Reproducible science:** Jupyter notebooks and [cloud environment](#) (MyBinder and Azure) to reproduce the results of Astic & Oldenburg (2019), Petrophysically and Geologically guided Inversion (PGI). <https://github.com/thast/Astic-2019-PGI>.
- **Visualization:** Winner of the SciPy 2016 John Hunter Excellence in Plotting Contest: Magnetotelluric. <https://github.com/thast/SciPy-2016-Winner-Plot-John-Hunter-Excellence-Plotting-Contest-Magnetotelluric>.
- **Tutorial:** Modelling electromagnetic data in geophysics: <https://github.com/thast/Math607E>.

FIRST AUTHOR PUBLICATIONS IN MACHINE LEARNING

- **Ph.D. project on the joint analysis of multiple data types:**
 - o **Case study:** Astic, T., Fournier, D., & Oldenburg, D. W., 2020. Joint inversion of potential fields data over the DO-27 kimberlite pipe using a Gaussian mixture model prior, *Interpretation*, 8: SS47-SS62. <https://doi.org/10.1190/int-2019-0283.1>.
 - o **Generalization to multi-physics inversion:** Astic, T., Heagy, L. J., & Oldenburg, D. W., 2021. Petrophysically and geologically guided multi-physics inversion using a dynamic Gaussian mixture model, *Geophysical Journal International*, 224(1), 40-68. <https://dx.doi.org/10.1093/gji/ggaa378>.
 - o **Multi-datasets analysis methodology:** Astic, T. & Oldenburg, D. W., 2019. A framework for petrophysically and geologically guided geophysical inversion using a dynamic Gaussian mixture model prior, *Geophysical Journal International*, 219(3), 1989–2012. <https://doi.org/10.1093/gji/ggz389>.
 - o **Early outline:** Astic, T. & Oldenburg, D. W., 2018. Petrophysically guided geophysical inversion using a dynamic Gaussian mixture model prior, in *SEG Technical Program Expanded Abstracts 2018*, pp. 2312–2316. <https://doi.org/10.1190/segam2018-2995155.1>.

EDUCATION

Ph.D. in Geophysics	 2015 - 2020	 University of British Columbia	GPA: 4.00 / 4.0
M.A.Sc. in Geophysics	 2010 - 2012	 Polytechnique Montréal	GPA: 3.77 / 4.0
M.Eng. in Geological Eng.	 2007 - 2011	 Mines de Nancy (France)	GPA: 3.04 / 4.0

MISCELLANEOUS

- Registered at Engineers & Geoscientists BC as Engineer-In-Training (EIT). P.Eng. status to be determined.
- Completed 2 [Mitacs training courses](#) on project management and career professionalism.
- Proficient with ParaView.