

THIBAUT ASTIC, Ph.D.

Ph.D. in Geophysics | Machine Learning Enthusiast | Python Open-Source Developer

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SUMMARY

- Combine geophysical inversions and machine learning algorithms to analyze quantitatively multiple datasets and produce enhanced 3D geological interpretation.
- As part of a team, develop open-source software for numerical simulations in Python.
- Has experiences in project management, data acquisition and processing, and geological mapping.
- Has managed small multidisciplinary teams of three to six people.
- French native speaker, proficient English speaker.

EXPERIENCES

Postdoctoral Researcher

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

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

 July 2015 - Now

 Vancouver, BC

- Combined machine learning and geophysical inversions for multi-datasets analysis ([video presentation](#)).
- Contributed to open-source modelling software in Python, distributed through GitHub ([SimPEG package](#)).
- Created Graphical User Interfaces and utilities for commercial codes in Matlab and Java ([GIFtools project](#)).
- Wrote multiple scientific articles as first author (see publications section) and interactive tutorials ([EM apps](#)).
- Presented works to sponsors, users, and technical audiences ([SEG](#), [Roundup](#), [IUGG](#), RFG, SciPy conferences).
- Assisted in teaching "Geophysics for practising geoscientists" for three years.

Research Associate (EIT)

Polytechnique Montréal

 July 2014 - March 2015 (8-months mission)

 Montréal, QC

- Evaluated geophysics ability to quantify the metals contents of old mining wastes and their economic potential
- Characterized in a laboratory the physical properties of each phase (sterile to metal-rich wastes).
- Designed and acquired test surveys for the chosen in-situ geophysical methods (Magnetic and IP).

Project Manager & Geophysical Engineer (EIT)

Novatem Inc.

 October 2012 - March 2014 (full-time)

 Mont-Saint-Hilaire, QC

- Managed small multidisciplinary, international teams for high-resolution airborne magnetic, radiometric, and electromagnetic surveys in Norway and Canada.
- Liaised with field crew and office staff.
- Was in charge of the planning, logistics, data quality control, processing, and compilation in a deliverable.

Geophysical Operator

Quantec Geosciences Ltd.

 June 2012 - October 2012 (contracts)

 Toronto, ON

- Operated geophysical equipment for DCIP and MT surveys in Zambia and Canada.

Geological mapping - Research Assistant

Quebec Department of Natural Resources

 June - August, 2010 & 2011 (internships for two field seasons)

 Val d'Or, QC

- Mapped the geology of the Abitibi region.
- Described and interpreted outcrops and prepared samples for chemical and petrophysical analysis.

FIRST AUTHOR PUBLICATIONS

• **Ph.D. project:**

- 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*. <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>.







• **M.A.Sc. project:**

- o **Case study:** Astic, T. & Chouteau, M., 2019. Geological interpretation of the northern flank of the Matagami camp, Québec, using gravity and magnetic inversions, *Canadian Journal of Earth Sciences*, 56(5), 471–482. <https://doi.org/10.1139/cjes-2018-0049>.

CODE PORTFOLIO

- **Astic 2020:** Python scripts to reproduce the results of Astic et al. (2021): forward and joint inversion of potential fields data with petrophysical information. <https://github.com/thast/Astic-2020-JointInversion>.
- **Astic 2019:** Jupyter notebooks and [cloud environment](#) to reproduce the results of Astic & Oldenburg (2019), Petrophysically and Geologically guided Inversion (PGI). <https://github.com/thast/Astic-2019-PGI>.
- **The magnetotelluric method:** Winner of the SciPy 2016 John Hunter Excellence in Plotting Contest. <https://github.com/thast/SciPy-2016-Winner-Plot-John-Hunter-Excellence-Plotting-Contest-Magnetotelluric>.
- **A TDEM Forward Modelling Tutorial:** <https://github.com/thast/Math607E>.

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 Geo-Engineering	 2007 - 2011	 Mines de Nancy (France)	GPA: 3.04 / 4.0

MISCELLANEOUS

- Eligible for a GIT (Geoscientist-in-Training) designation. The following P.Geo. status is to be determined.
- Additional experience: GIS engineer assistant (2009, internship at the BRGM, the French geological survey).
- Proficient with Oasis Montaj, LaTeX, and Office. Competent with Geoscience ANALYST, ParaView, and QGIS.
- Valid driver license.