

Geological Survey of Canada

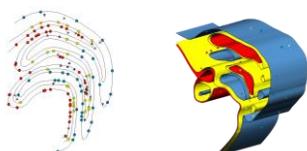
Postdoctoral Research Program (PRP)



The Geological Survey of Canada, Dept. of Natural Resources Canada, is seeking candidates for two Postdoctoral Research (PRP) positions in Ottawa starting 01 April 2018, or soon thereafter, and ending 31 March 2020. Both positions will contribute to the Canada-3D project (<https://xp-dev.com/trac/canadain3d>), a multi-scale multi-parameter geoscience modelling effort that will provide the future framework for a knowledge repository for the geology of Canada at a national scale. Qualified candidates for these 2 year positions are researchers who have obtained their PhD in the last 3 years (since 01 April 2015) with a specialization in computing for the Earth Sciences (see below for details). Potential candidates are encouraged to review the PRP web site (<http://www.nrcan.gc.ca/careers/17880>) and must apply through the PRP application site:

<https://emploisfp-psjobs.cfp-psc.gc.ca/psrssrfp/applicant/page1800?poster=785734>

Qualified candidates will be contacted for follow-up starting mid-March 2018, though online applications will be considered until the positions are filled. Questions regarding the PRP program and application process can be sent to nrcan.PRP.nrcan@canada.ca.



1. Title: 3D Implicit geological modelling method development

A 2 year Postdoctoral Research Position with the Geological Survey of Canada, in the Department of Natural Resources Canada, for **Earth Scientists** (or equivalents) who have obtained their PhD in the last 3 years with a specialization in numerical computation for 3D geomodelling with implicit surface codes.

Work Objective:

This PRP work will focus on development of 3D geological reference models, comparison of existing methods against these models, and advancement of existing implicit modelling techniques, including incorporation of geological knowledge into the modelling process. Optional work includes integration with geologically constrained geophysical inversion methods. Key aspects include:

1. Performance assessment of implicit codes with various constraint configurations and data densities, local anisotropy constraints, uncertainty modelling and uncertainty assessment.
2. Development of methods and interfaces between the implicit calculation engine and a geological knowledge manager for model validation, comparison and parameter selection.

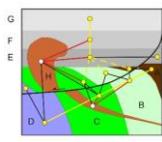
Essential Requirements:

- Extensive background in 3D modeling for geosciences
- Extensive background in scattered data approximation or kriging
- Extensive background in numerical/computational methods
- Implicit surface modelling
- Algorithm development
- C++
- Spatial / orientation statistics

Assets:

- Geometric topology
- Optimization and inversion (i.e. geophysical codes)
- Artificial Intelligence (machine learning / deep learning) □ Simulation

Questions about this position can be sent to Eric de Kemp: eric.dekemp@canada.ca.



		younger							
		H	G	F	E	D	C	B	A
older	H	0	0	-20	-20	-30	-50	-20	0
	G	0	0	-1	0	0	0	0	0
	F	20	1	30	-1	0	0	0	0
	E	20	0	1	30	0	-10	-10	-40
	D	30	0	0	0	30	-31	0	0
	C	50	0	0	10	31	30	-1	0
	B	20	0	0	10	0	1	30	-1
	A	0	0	0	40	0	0	1	30

2. Title: Knowledge representation and reasoning for 3D geological modelling

A 2 year Postdoctoral Research Position with the Geological Survey of Canada, in the Department of Natural Resources Canada, for **Earth Scientists** or **Computer Scientists** (or equivalents) who have obtained their PhD in the last 3 years with a specialization in Artificial Intelligence (Knowledge Representation and Reasoning) methods for Earth Sciences.

Work Objective:

The Canada-3D Project at the Geological Survey of Canada is investigating knowledge representation and reasoning techniques to support the development of regional-scale 3D geological models. Emphasis will be on leveraging existing knowledge to help fill areas with low data density and high uncertainty. The project will use Semantic Web/ontology approaches to guide and constrain the 3D geological modelling process, with an aim to develop a geological knowledge manager focussing on three aspects:

1. Development of ontology-based representations for: geological objects and processes, as well as geological relations and qualitative geometries.
2. Reasoning with these representations to validate possible 3D models and infer the existence and position of various geological entities.
3. Integration of the above components into 3D modelling implicit codes.

Essential Requirements:

- Extensive background in ontology-based representation and reasoning for Earth Sciences (or closely related areas)
- Semantic Web (OWL, RDF, SPARQL)
- Earth Sciences
- Computer programming experience, including C++ and web apis

Assets:

- 3D Geological Modelling including simulation approaches
- Qualitative spatial reasoning
- Geoscience data standards: GeoSciML, GWML2

Questions about this position can be sent to Boyan Brodaric: boyan.brodaric@canada.ca.