

Title: Postdoctoral Fellow (*Arctic Data e-Cosystem Scientist*)
Reports To: Professor Paul Arthur Berkman and Dr. Peter Pulsifer
Location: Fletcher School of Law and Diplomacy, Tufts University
FTE: 24 Months (with possible extension)

POSTDOCTORAL FELLOW *Arctic Data E-Cosystem Scientist*

BACKGROUND OF FLETCHER SCHOOL OF LAW AND DIPLOMACY AT TUFTS UNIVERSITY

The Fletcher School is committed to educating in an inclusive and supportive environment that welcomes students regardless of national origin, religion or citizenship status. At The Fletcher School, for more than 80 years, we have tried to “know the world.” Our job is to prepare our graduates to be practitioners in every dimension of international relations: economics, finance, diplomatic history, politics, culture, security and many other disciplines. The challenges we face in this turbulent 21st century quite literally transcend borders – we must be ready to *connect* in every sense of the word.

We seek to build partnerships between nations, government agencies and the public/private sector in order to be ready to shape international issues and events. Our extensive network of graduates today serves in every venue in the global milieu – heads of state and government, political leaders in power and opposition, judges, diplomats, senior military officers, corporate leaders at every level, international bankers, and development officials. The Fletcher School not only “knows the world,” but is part of shaping it through the global work of our graduates, students and staff.

BACKGROUND OF THE *PAN-ARCTIC OPTIONS* PROJECT

The Arctic Ocean is experiencing an environmental state-change with its diminishing sea-ice boundary, expanding human activities ranging from commercial shipping and energy development to ship-based tourism. Accordingly, side-by-side with indigenous peoples, Arctic and non-Arctic states have begun to develop national and international management regimes to address emerging issues, impacts and resources that cross or extend beyond sovereign jurisdictions in the Arctic Ocean. In every case, there will be challenges to implement agreements and build the necessary infrastructure to achieve Arctic sustainability in the face of political and financial constraints.

“Pan-Arctic Options – Holistic Integration for Arctic Coastal–Marine Sustainability” (www.panarcticoptions.org) is designed in an international, interdisciplinary and inclusive manner, involving cost-effective collaboration with currently funded projects to contribute to informed decision-making by policy makers from government and industry from 2015-2020 through the Belmont Forum (<http://igfagcr.org/announcements/2015/belmont-forum-announces-collaborative-research-awards-arctic-observing>). *Pan-Arctic Options* builds on the *Arctic Options* project that was funded by the United States and France from 2013-2016. The core team of *Pan-Arctic Options* includes natural and social scientists from Canada, China, France, Norway, Russian Federation and the United States who are integrating governance records (e.g., treaties and conventions), geospatial data (from the natural and social sciences) and stakeholder perspectives. This integrated decision-support process involves the co-production of options with the decision-makers and other stakeholders, regarding both governance mechanisms and built elements that are together needed for sustainable infrastructure development in the Arctic Ocean.

A unique observational contribution from *Pan-Arctic Options* will be the analysis of Automatic Identification System (AIS) data of ship traffic across the Arctic Ocean collected from polar-orbiting satellites from 2009 forward. The satellite AIS and sea-ice analyses will be integrated into the decision-support process, generating evidence and options without advocacy that will contribute to informed decision-making.

Results from the *Pan-Arctic Options* and *Arctic Options* projects are being disseminated via peer-reviewed journals and books, notably through a three-volume book series (*Sustainability of Shared Marine Regions*) that is being published by Springer with co-editors from *Pan-Arctic Options*. Results also are being shared via less-conventional methods entailing facilitated dialogues in annual venues (e.g., annual ambassadorial panels at the *Arctic Circle* in Reykjavik, Iceland) and in the 2018 *Ilulissat Summit: Arctic Sustainability Across the 21st Century*.

POSITION OVERVIEW

The position will include theoretical and applied research on knowledge and information systems in the context of environmental, economic and societal elements associated with Arctic sustainability. This research will be part of an holistic (international, interdisciplinary and inclusive) process to integrate evidence from the natural and social sciences, revealing options (without advocacy) that contribute to informed decision-making about built assets and governance mechanisms on a pan-Arctic scale.

The successful candidate will support the elaboration and practical application of "data e-cosystems" involving functional relationships (e.g., keystone or central evidence) of data sources (involving numeric and/or textual formats) within and between information collections that can be characterized in terms of their spatial, temporal or concept dimensions. Emphasis of this research will be on data e-cosystems associated with impacts, issues and resources in the Arctic Ocean that may have generalized applications. This work will be conducted in collaboration with international data organizations and projects. An important goal of this post-doctoral research is the practical implementation of automated tools and approaches to map relationships among data e-cosystems with visualization and other techniques that can be used by non-specialists.

DUTIES

Tasks include:

- Work with members of the *Pan-Arctic Options* team (including monthly teleconferences and annual team meetings), other researchers, communities of practice and decision-makers to develop practical models and mechanisms that will make better use of information and knowledge in the policy domain;
- Contribute to the decision-support process that integrates stakeholder perspectives, holistic evidence from the natural and social sciences, and governance records to reveal options without advocacy that contribute to informed decision-making for sustainable infrastructure development in the Arctic Ocean;
- Author/co-author scientific publications on large-scale information systems for informing policy;
- Assist with grant writing to secure ongoing funding to sustain the research project in view of related research and data management initiatives;
- Travel to conferences, meetings and other relevant national and international locations to report on research;
- Interact with relevant e-infrastructure organizations to collaborate on related data-mapping activities, including with the: *Belmont Forum e-Infrastructure and Data Management* program (<http://www.bfe-inf.org>); *Arctic Data Committee* (<http://arcticdc.org/>); *Arctic Data Center* (<https://arcticdata.io>) supported by the *National Science Foundation*; *World Data System* (<https://www.icsu-wds.org>) and *Committee on Data for Science and Technology* (<http://www.codata.org>) through the *International Council for Science*; *Research Data Alliance* (<https://www.rd-alliance.org>); and *Group on Earth Observations* (<http://www.earthobservations.org>);
- Participate in a post-doctoral network among international partners in the Belmont Forum project, especially with post-docs hired in France and Norway as part of *Pan-Arctic Options*; and
- Contribute to project research activities involving satellite AIS data of ship traffic in relation to sea ice in the Arctic Ocean as well as to indigenous knowledge networks through the *Exchange for Local Observations and Knowledge of the Arctic* (<https://eloka-arctic.org/>).

In addition to working with Pan-Arctic Options, the post-doctoral fellow will have opportunities to engage with other projects at Tufts University and partner institutions. There also will be opportunities to strengthen skills in research, analysis, proposal writing, managing students and staff, public speaking and publishing. The successful applicant may also be required to perform work in remote locations and/or work flexible hours in support of field activities or to disseminate results. The post-doctoral fellow will have the ability to work under stress and manage multiple projects; the ability to work well with others and accept direction, supervision and performance feedback; and to perform all related tasks as required.

REQUIREMENTS

- A completed Ph.D. in computer science, ecology, geographic information science, social science with a focus on socio-economic, biophysical or other systems-oriented disciplines in the natural or social sciences;
- Experience working collaboratively in an interdisciplinary environment;
- Creativity, with an ability to work well independently and as a key collaborator in teams;
- Respect for diverse cultures and backgrounds;
- Project management and leadership skills;
- Excellent oral and written communications skills;
- Problem-solving ability;
- Ability to manage multiple tasks simultaneously;
- Experience in interdisciplinary research involving social and natural scientists; and
- Experience with research communication to broad audiences.

DESIRABLE SKILLS

- Ability to work with cloud-based software, including creation of documentation, and collaboration using document and source control management systems (e.g., Google Docs or Github);
- Experience with large tabular datasets beyond simple spreadsheets (i.e., relational databases);
- Familiarity with Geographic Information Systems (GIS) and basic geospatial techniques;
- Familiarity with information systems and architectures;
- Familiarity with data management and knowledge discovery;
- A background in Arctic science and policy;
- Familiarity with semantic web methodologies and tools;
- Experience using systems or network analysis software;

The position will be filled as a Postdoctoral Fellow at Tufts University. This full-time position will be eligible for employee benefits and will be open until filled. The expected start date of the position is 1 May 2017.

Please send your cover letter, a current resume, contact information for three references and proof of your degree or completion schedule to paul.berkman@tufts.edu. Please remember to redact any Social Security numbers from the documents you upload. Tufts University is an Affirmative Action / Equal Opportunities employer and actively seeks candidates from diverse backgrounds. Please see the Tufts University non-discrimination statement (<http://oeo.tufts.edu/policies-procedures/non-discrimination-statement/>).

For additional information, please contact:

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