Information packet for NSERC CREATE trainee participation

Background

The NSERC CREATE grant "Training for novel approaches in quantitative climate science" is an exciting opportunity for undergraduate, masters, and doctoral students to obtain funding to participate in an enhanced undergrad/grad school experience. The goal of this training program is to foster deep, long-term, cross-sector collaborations (i.e., academia, government and industry) in climate science that are rooted in quantitative tools and to provide a pipeline of trainees for these sectors to access.

Students studying within the broad scope of *quantitative climate science* (QCS) at the University of Waterloo, University of Toronto, McGill University, and Dalhousie University are invited to apply. Participants will pursue interdisciplinary research with internationally-recognized researchers from these universities, in rapidly growing areas spanning *data-centric/high-performance computing in QCS*, *artificial intelligence in QCS*, and *computational oceanography*. A list of the participating supervisors is provided in Table 1.

Program highlights

Highlights of program participation are:

- an **annual summer school** where you will meet and interact with other CREATE participants,
- specialized **training modules** on topics not typically covered in grad school courses,
- **professional development workshops** to hone your writing and oral presentation skills,
- opportunities for **academic exchanges** with partner universities, and **paid internships**,
- opportunities to obtain **conference travel funding** to present your research,
- **networking** with other CREATE trainees and experts from the participating universities, as well as from government and industry,
- and more!

Description of program components

Some components of the training program are mandatory (depending on whether you are a masters or PhD student), and some are optional but strongly recommended. Details of each component of program participation are described below, and summarized in Table 2.

Summer school: This premier 5-day event will bring together CREATE trainees from the four participating universities, and will be hosted at the University of Waterloo. Activities will include presentations, workshops, and plenty of networking and relationship-building opportunities. The summer school will also facilitate participation in other program components. PhD-level trainees must attend two summer schools, and MSc-level trainees must attend one summer school.

Training modules: Each graduate-level (masters and PhD) trainee will be expected to complete three training modules. These will bridge subject matter expertise in climate, ocean, environmental, and geographical science core areas with cutting-edge methods in computer science, including AI and data science. PhD-level trainees will be required to help co-develop, modify, and improve training modules for future cohorts, drawing on their research and internship/exchange experiences to inform the improvements.

Paid internships: Trainees are encouraged to get hands-on experience through 4-month paid internships in government laboratories and climate technology companies. Through internships, trainees will gain real-world work experience in professional settings. Internships will enlarge

trainees' professional networks, expose them to data handling methods, and model types used in government and industry, and provide training opportunities not possible in a typical graduate studies' setting. Internships will provide practical opportunities to develop skills in communication (written and oral), teamwork and conflict resolution, project management, ethics, and knowledge transfer.

Mentorship: Each CREATE trainee will have either an undergraduate advisor or a masters/PhD supervisor, who will be one of the internationally-recognized CREATE supervisors from one of the four participating universities. Graduate-level trainees are encouraged to discuss with their supervisor about including another CREATE supervisor(s) on their supervisory/defence committee (note that this may depend on local institutional policies). This will broaden trainee perspectives and provide multiple role models for work-life balance, funding pathways, and professional goal setting.

Academic exchanges: The CREATE program provides opportunities to travel to partner institutions to participate in collaborative research, gaining teamwork and communication skills, along with alternative research perspectives. Exchanges are mandatory for PhD-level trainees, and strongly reccommended for masters-level trainees. The annual summer school will be a great place to discuss exchange opportunities with supervisors from the participating universities. Exchanges can consist of one or more experiences, but must have a combined duration of two weeks. Individual exchange experiences should be discussed on a case-by-case basis with your supervisor and potential exchange supervisor. Participating undergraduate students will be encouraged to explore graduate opportunities at participating institutions.

Communication: Graduate-level trainees will be required to complete workshops on written and oral scientific communication. These workshops will be hosted by professional writing/communication experts, and will be scheduled during the summer school.

Microcredentials: Graduate-level trainees will be required to obtain one microcredential to complement their QCS training. One example might be a project management microcredential offered by one of the participating universities, or by a government or industry partner as part of an internship. Trainees should discuss with their supervisor about what microcredential topics might be of interest to them and/or of value to their future carreer plans.

Conference travel funding: All trainees will be welcome to apply for conference travel funding to present their CREATE-funded research. Conferences are a great opportunity to apply the communication skills learned at the summer school by presenting your research to fellow conference participants, learn about the latest research in your area, and grow your academic and professional network.

Fellows Committee: This committee will consist of CREATE trainees and will represent the interests and developing needs of this group. Membership will be composed of up to 5 members with an aim to represent all participating institutions. A maximum of 2 Fellows Committee members can be based in any one participating department. The Fellows Committee will organize academic (e.g., reading groups) and professional (e.g., mock interviews, presentation workshops) activities, and will be encouraged to interface with national student groups such as the CMOS Student Chapter. This committee will meet up to twice per year.

Peer mentorship: All trainees will be encouraged to seek out peer mentors from across the participating universities to discuss and share their student experiences within and outside of the CREATE program. The CREATE leadership team expects to facilitate this with an online tool such as Slack. The Fellows Committee may consider developing a "buddy program" to help pair new trainees with peer mentors, and to organize dedicated peer mentorship-related activities.

Table 1: Alphabetic list of CREATE supervisors by institution, and their area of expertise within the CREATE program. The areas of expertise are clickable hyperlinks to each professor's web page, which trainees are encouraged to explore to learn more about potential supervisors, exchange supervisors, or collaborators.

Supervisor	University	Area of expertise
Dr. Fennel, Katja	Dalhousie	The quantifiable ocean
Dr. Musgrave, Ruth	Dalhousie	The quantifiable ocean
Dr. Kirshbaum, Daniel	McGill	Data-centric computing in QCS
Dr. Straub, David	McGill	The quantifiable ocean
Dr. Grisouard, Nicolas	Toronto	Artificial intelligence in QCS
Dr. Kushner, Paul	Toronto	Artificial intelligence in QCS
Dr. Dow, Christine	Waterloo	Data-centric computing in QCS
Dr. Fletcher, Chris	Waterloo	Artificial intelligence in QCS
Dr. Poulin, Francis	Waterloo	The quantifiable ocean
Dr. Scott, Andrea	Waterloo	Artificial intelligence in QCS
Dr. Stastna, Marek	Waterloo	Data-centric computing in QCS

Table 2: Summary of mandatory and strongly recommended program components by trainee level.

Program component	Mandatory	Strongly reccommended
Attend 2 summer schools	PhD	—
Attend 1 summer school	MSc	—
Complete 3 training modules	MSc, PhD	Undergrad
Academic mentorship	MSc, PhD	Undergrad
Communication workshops	MSc, PhD	Undergrad
Obtain 1 microcredential	MSc, PhD	Undergrad
Contribute to 1 training module	PhD	—
Academic exchange(s) totalling 2 weeks	PhD	MSc
4-month paid internship	—	Undergrad, MSc, PhD
Peer mentorship	—	Undergrad, MSc, PhD
Conference travel funding	—	Undergrad, MSc, PhD
Join Fellows Committee	—	Undergrad, MSc, PhD

NOTICE:

- NSERC requires the CREATE leadership team to distribute the CREATE Privacy Notice to all CREATE participants. Participants must read, *but do not have to sign* the Privacy Notice. For reference, the Privacy Notice is appended to this document.
- NSERC requires students to **acknowledge financial support from NSERC** in any research publication, conference presentation, etc., arising from research conducted as a participant in this CREATE program. (Students are encouraged to consult the NSERC Acknowledgment and Logos web resource for guidance.)

CREATE PROGRAM

PRIVACY NOTICE

This is to inform you that NSERC requires CREATE grantees (i.e., the CREATE Leader) to collect certain personal information from trainees, team members (co-applicants and collaborators) and other individuals participating in the CREATE program. The purpose of gathering this information is to generate statistics that enables NSERC to report on the CREATE program's overall performance. Only information that is needed will be requested. The personal information that is collected, used and disclosed is in accordance with the federal Privacy Act will be shared with the CREATE program committee. The personal information may also be shared with contractors hired to conduct data analysis, surveys or interviews on NSERC's behalf.

The Privacy Act gives individuals the right to access their personal information and request changes to incorrect information. For more information or to access your personal information or notify us about incorrect information, contact NSERC at CREATE@nserc-crsng.gc.ca .