In an effort to provide as many opportunities as possible, priority will be given to those who have not already received funding for a Faculty of Arts & Science international opportunity including 398 REP, ICM, CFHU or DIIIIF – (Some exceptions may apply, please inquire for details). All proposals involving undergraduate student travel must include the full participation of a faculty member with a continuous undergraduate appointment to the Faculty of Arts & Science (St. George). All student participants must be current Arts & Science (St. George) undergraduate students in good standing and be enrolled in an academic program at the time the proposed activity takes place.

PART I

Last Name: Gilbert  
First Name: Benjamin  
Title: Associate Professor

Sponsoring department:  
Ecology and Evolutionary Biology

UTOR Email Address: benjamin.gilbert@utoronto.ca

Part II – Project title and a brief description of your proposed project: The Direct and Indirect Effects of Global Changes on Species Diversity

EEB 398Y0Y L0101

The proposed EEB398Y ties in directly to my long-term research that is conducted at the Koffler Scientific Reserve. The research goals are to understand how global changes, such as fragmentation and climate change, change the ecological and evolutionary dynamics of species. These changes occur through direct changes to the environment species experience, but also through the indirect changes that are mediate by species interactions.

My two main goals for the research excursion program are to further my long-term research while training future scientists. My pedagogical objectives are to teach students the skills needed to design, implement, analyze and present data on ecological field experiments.

Objective 1: experimental design and implementation. This will begin with teaching the students about the experiment and the initial design, and having them maintain experimental treatments (through monitoring and implementing warming and isolation treatments).

Objective 2: data collection. Students will develop keys for identification of the focal plant and insect species. These will be used to collect data throughout the excursion, with experiments monitored at weekly intervals. Training in the use of technical equipment will be ongoing.

Objective 3: data analysis. Students will take part in basic data analysis, with the goal of determining
appropriate statistical tests for the biological hypotheses.

Objective 4: presentation of data. The final project for the excursion will involve a report that is formatted as though for publication in a journal.

**Proposed marking scheme.**
*Participation: 30%*
*Quality of data collection: 40%*
*Final report: 30%*

**Total number of undergraduate students participating:** 3

**Location of activity (city and country):** Koffler Scientific Reserve (King Township, Ontario)

**Dates of activity:** May 20 – Aug. 16 2019

**Role of faculty supervisor:**
*Please describe the role of the A&S faculty supervisor for this project and how they are involved.*
This project is one component of my long-term research, and I am involved in all steps of the REP398 project, from initial training to ongoing project development and discussions, to working directly with students. This provides students with one on one training and teaching, and ensures immediate feedback and individually tailored learning. I oversee student supervision, support and safety, both through my direct interactions with students and by ensuring that I or other faculty and support staff (e.g., the University of Toronto field site manager) are accessible at all times.

**PART III – Details of Proposed Activity Description of proposed activity:**
Global changes, such as fragmentation and climate change, impact species survival and fitness and occasionally produce catastrophic consequences of extinction. Whether species persist, thrive, or go extinct reflects responses to local abiotic conditions and how these conditions alter species interactions. The 399 research excursion students will participate in research undertaken by the Gilbert lab to test the effects of climate change and fragmentation on plants and insects at Koffler Scientific Reserve. They will assist with experiment maintenance, data collection and data analysis for experiments that test the direct effects of global changes on species interactions. Students will also have the opportunity to use long-term data or collect additional data for an independent research project. Students can read recent publications from the Gilbert lab for more information ([http://labs.eeb.utoronto.ca/gilbert/publications.htm](http://labs.eeb.utoronto.ca/gilbert/publications.htm)).

**Planned academic Outcomes:**
*How does this project relate to the academic goals of the applicant, unit and Faculty?*

My teaching and research objectives (above) are central to scientific training. They will benefit students aiming for careers in government agencies, as consultants, or in academia. The objectives are clearly aligned with the goals and objectives of EEB, which has a mandate to train students in biodiversity sciences.

**How will students be selected to participate in the proposed project?**
*Please list any prerequisites, specific conditions or other relevant information.*
Preference will be given to highly motivated EEB majors, students who have taken ecology courses and with a functional understanding of excel. Experience with outdoor activities (hiking, camping) is an asset. Students with an identified interest in research experience will also be given priority.

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**Indigenous Consultation:** NA

**How does this project meet the requirements of the REP Program?**

*Please consult the International Programs website for more information on REP: https://uoft.me/rep.*

The project meets the requirements of the REP Program – it is directed at motivated students who will benefit from first-hand experiential learning in a real research project. More generally, it helps students to develop an understanding of globally important issues, with a particular focus on biodiversity and conservation. Living at a research station is also a transformative process for many students, as they interact daily with faculty and graduate students undertaking world class research.

**Does this project require ethics approval?** no

All undergraduate students, graduate students, and faculty taking part in international opportunities must meet the UofT Safety Abroad guidelines as noted on the Safety Abroad website: http://www.studentlife.utoronto.ca/cie/safety-abroad in order to participate. Support will be provided by the Professional and International Programs (PIP) office at Woodsworth College to ensure safety abroad requirements are met.

**Part IV - Itinerary**

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<thead>
<tr>
<th>Dates</th>
<th>Location</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 20</td>
<td>Toronto / Koffler Scientific Reserve</td>
<td>Transportation to reserve and set-up housing/food</td>
</tr>
<tr>
<td>May 21 – June 28</td>
<td>Koffler Scientific Reserve</td>
<td>Training in plant id, experimental design. Experiment maintenance Initial biological surveys</td>
</tr>
<tr>
<td>Date</td>
<td>Location</td>
<td>Activity/Task Description</td>
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<tr>
<td>July 4 – Aug. 2</td>
<td>Koffler Scientific Reserve</td>
<td>Complete biological surveys. Implement new experiment Conduct Independent sampling and analysis</td>
</tr>
<tr>
<td>Aug. 5-15</td>
<td>Koffler Scientific Reserve</td>
<td>Complete independent sampling and analysis Submit final paper</td>
</tr>
<tr>
<td>Aug. 16</td>
<td>Toronto</td>
<td>Return to Toronto</td>
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</tbody>
</table>