

NSERC CREATE IACPES Exchange:

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Exchange Duration: Nov–Apr 2017

Harvard University, School of Engineering and Applied Sciences
Atmospheric Chemistry Modelling Group, Supervisor: Daniel Jacob

The NSERC CREATE IACPES program sponsored my Ph.D. exchange at Harvard University, where I was a Visiting Research Fellow from November to April 2017 (5 months) at the School of Engineering and Applied Sciences. I was working under the supervision of Dr. Daniel Jacob at the Atmospheric Chemistry Modelling Group. My project was on understanding anthropogenic and biogenic methane (CH₄) emissions in Canada using the GEOS-Chem chemical transport model, combined with measurements from ground-stations, aircraft campaigns, and satellite missions. This project provided valuable experiences for me in scientific modelling at the home of GEOS-Chem, one of the most widely-used models in atmospheric chemistry.

My previous research experience was experimental in nature, and this exchange allowed me to build skills in a natural extension of my research interests. I had the opportunity to learn with other graduate students who had also been working on projects related to the global CH₄ challenge, and this exchange of knowledge with other scientists created multiple opportunities for collaboration. For example, my knowledge of CH₄ emissions in the Canadian Oil Sands and work with Environment and Climate Change Canada (ECCC) scientists was highly relevant, as Canadian measurement campaigns are a critical element for studying greenhouse gas (GHG) emissions from North America as a whole. Furthermore, I was most interested in learning about satellite measurements of GHGs and how they can provide valuable information for studying emissions, and I had the opportunity to learn from experts in this area and apply these skills towards my own research.

In addition to the research experiences, Harvard University also presented many insightful learning and professional development opportunities. During my stay, there were conferences and public lectures that were relevant towards my field of study. I attended the Compufest 2017 January 9-3, where I took skill-building programming workshops in Python, R, and Machine

Learning. I also attended a public lecture by former Administrator of the U.S. Environmental Protection Agency (EPA) Dr. Gina McCarthy, where she spoke in detail about her career in science and environmental policy, and in particular how she was able to make contributions towards atmospheric policy in air pollution and climate change under the President's direct request. Finally, I had the opportunity to meet Dr. John H. Seinfeld and attend his lecture through the inaugural Atmospheric Chemistry Seminar at MIT, where I was also able to make contacts with other scientists working in my area of interest. All of this was in addition to learning through regular weekly group meeting presentations, atmospheric seminars with guest scientists, graduate student journal/research meetings, and multiple Ph.D. defences from the group over the duration of my stay.

My exchange at Harvard University was a highly enriching opportunity to advance my knowledge of atmospheric chemistry in the subject area of my Ph.D. In addition, I was able to build skills outside of my previous experiences to build a towards a broader level of expertise. The high number of workshops, seminars and guest lecturers during my stay provided constant learning and networking opportunities that contributed greatly towards my professional development. I am very grateful towards my supervisors and IACPES staff members who have given me this world-class educational opportunity through the NSERC CREATE program.