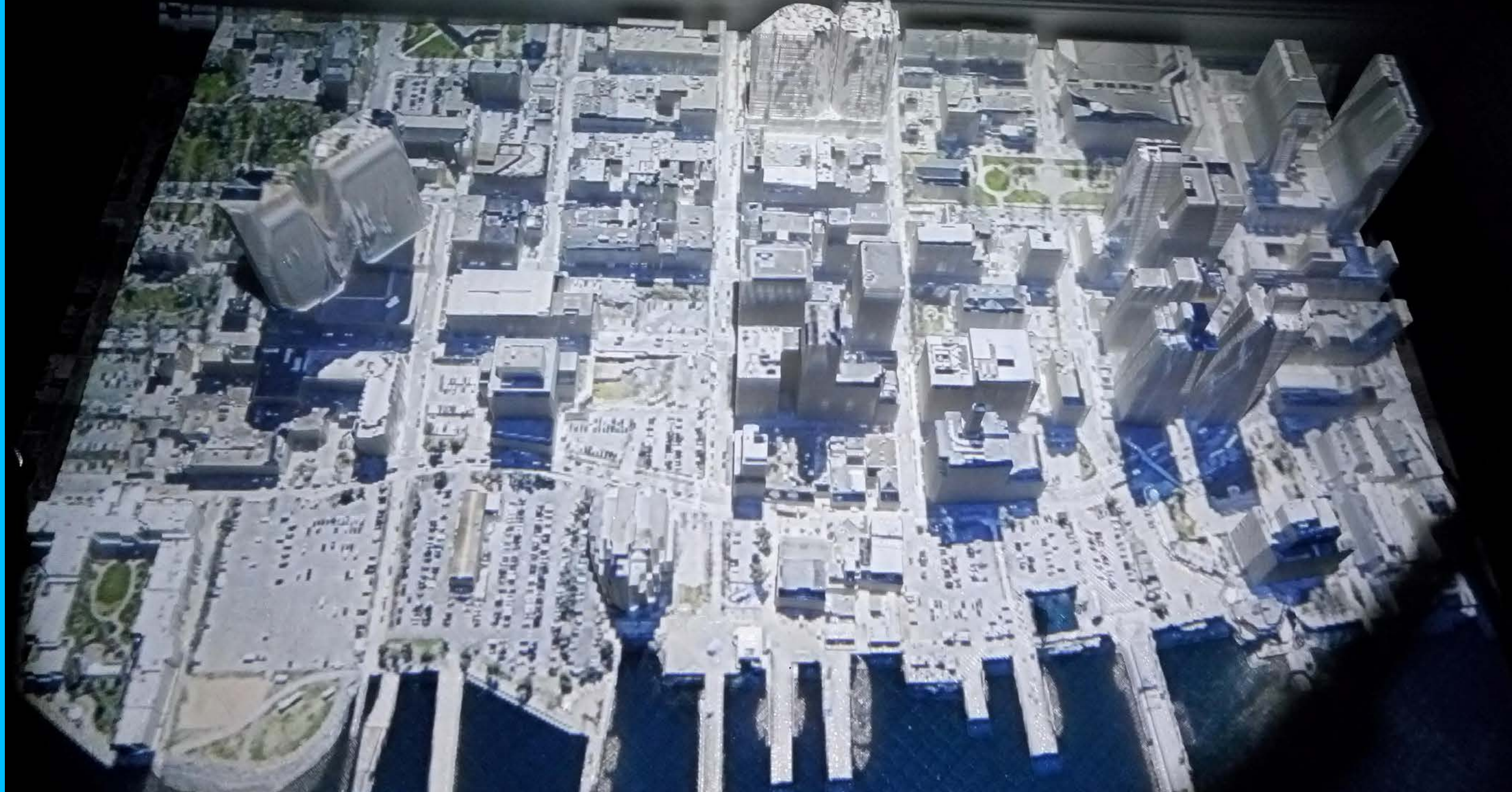


# Layers



This image was generated by projecting Halifax air photographs onto a 3D-printed model, then adding sea level scenarios. See the story inside for more details.

04  
May 2018

*A Dalhousie newsletter about GIS & Data*

 **DALHOUSIE  
UNIVERSITY**  
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GIS & DATA SERVICES  
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# IN THIS ISSUE



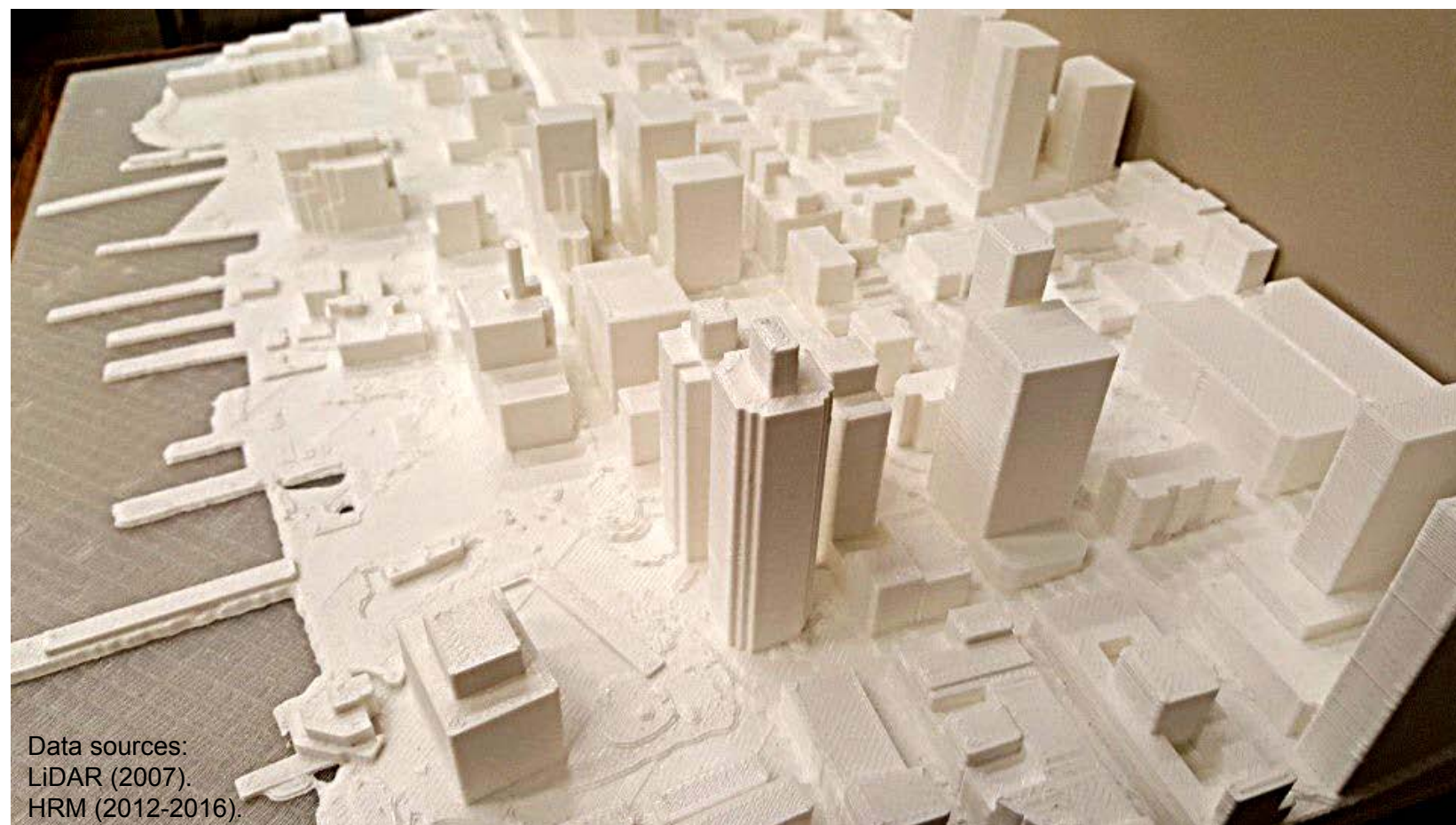
## Visualizing the Impact of Sea Level Rise in Downtown Halifax

We know that sea level rise can be temporary, in the form of a sea surge, or more permanent, due to climate change. If this were to happen, can you predict which areas along the Halifax Harbour would be most vulnerable?

Student projects provide challenges that can be solved by combining data resources, people skills and technology in unique and interesting ways. To see what this scenario might look like would require an accurate model and a projection system to simulate changes in water levels.

The use of LiDAR data would support precise imaging of surfaces in 3-dimensions. LiDAR is exceptional in that it provides accurate data for both a location (the horizontal axis) and a height (the vertical axis). In the urban area of Halifax, this provided a means for us to develop 3D models of the city – with or without buildings and ground features (such as roads, trees and paths).

Cam Robertson (MPlan, 2018) was a graduate student at Dalhousie University, a student assistant in the GIS Centre and conversant with LiDAR. Using this data, he generated a realistic 3D model of the Halifax Harbourfront. Adding to that were the simulations for sea level rise developed previously by the GIS Centre, the Geological Survey and HRM Planning. The image on the cover of this newsletter was generated by projecting Halifax air photographs onto the model, then adding in the various sea level scenarios which varied depending upon the climate change temperature and storm surge impacts.



Data sources:  
LiDAR (2007).  
HRM (2012-2016).

This 3D model was created using a large format 3D printer supplied by NOVACAD Systems in Dartmouth and graciously supported by NOVACAD's Gregor Ash (@gregor\_ash).

The end result was an elegant tool to display any type of urban change. The model has been very popular with visitors to the GIS Centre. It has also proven to be an effective teaching device, to carry to classrooms, to showcase what can be done with geospatial data.

Congratulations to Cam for completing this work and to Gregor Ash for his support and contribution to Cam's project.

The printed 3D model of downtown Halifax can be seen in the Dalhousie Libraries' GIS Centre. You can visit the GIS Centre Monday–Friday, from 9 a.m.–4 p.m. Take the elevator to the fifth floor of the Killam Library.

# Using Postal Codes to Support Spatial Analysis

A coding system is required to link health data and social data to Canadian geographic locations. Statistics Canada's Census Program established a detailed system of geographical units that covered all of Canada by 1961. Postal codes were introduced by Canada Post in 1971 and later expanded to include all of Canada. The areas represented by postal codes are adjusted on an annual basis (by Canada Post) whereas the census boundaries are adjusted every five years (by StatCan). Not only do both code listings change over time but the boundaries of these two coding systems do not match each other.

## Why use PCCF/PCCF+?

Postal code conversion files are used to connect administrative/survey datasets that contain postal codes but lack socio-economic information. Commonly used administrative datasets are the *Canadian Cancer Registry* and the *Vital Statistics – Birth Database*. Comparative variables (such as age, education and income) are present within census products but these do not include postal codes. Using a PCCF/PCCF+ facilitates the linkage of postal codes to census geographical units. The first PCCF was made available to academic researchers through the StatCan Data Liberation Initiative (DLI) in 1991. Since then, five versions of the PCCF+ product have been made available (numbered 2 through 6). Each version is further identified with a letter. For example, version 5G matches 2006 census units with 2009 postal codes.

## Why PCCF+ over PCCF?

This is best explained in cases where a postal code lies across a geographical unit boundary. PCCF uses a single link indicator (SLI=1) forcing each postal code to use only one set of census geocodes (introducing a systematic bias). In comparison, PCCF+ is a SAS control program that uses a population-weighted random allocation for postal codes that can link them to more than one census geographic area. The “plus” also indicates that there are more variables in the PCCF+ than are in the PCCF. They include: Health Regions; previous enumeration areas (census 1981/1986/1991/1996) and dissemination areas (census 2001/2006/ 2011); community size; neighbourhood income quintiles; immigrant terciles (national); etc.

## Precautions

Pay attention to when the data was collected and try to match the “vintage” of your data with that version of the PCCF+. Longitudinal research spanning more than one census may require the use of more than one postal code conversion file. You also need to know that the coding specificity between urban and rural areas is not always comparable. Our final word of caution is that



Dartmouth's B3B postal boundaries are shown here for 1996, 2001 and 2006. During this time B2Y was introduced and then retired.

no version of a postal code conversion file is perfect, so you must always look for and handle unmatched codes.

Note to researchers: Your methodology must cite which version(s) you have used and our license for the PCCF/PCCF+ files is restricted to Dalhousie users for academic research and teaching purposes only. If you need assistance, our DLI contacts are [Julie Marcoux](#) and [Sai Chua](#).

# Tips from Jen Strang for the GIS Community



## GIS Portal

We're making our spatial datasets more accessible to the Dalhousie community. Users can see the data and/or the spatial extent, look at the attributes, as well as download only the data and areas they are interested in. We are using ArcGIS Enterprise technology (ArcGIS Portal + ArcGIS Server) and have more than 130 layers of data and images available to try. Access to this data requires NetID authentication, so users must be connected to the Dalhousie network either through WPA2 (wireless connection), VPN, or a wired network connection.

We welcome feedback on your experience using the tool, as well as which datasets you would like to have added next. <https://arcgisportal.library.dal.ca/portal/home>

## ArcGIS Pro

We're working to have ArcGIS Pro (version 2.1) available for Dalhousie users. ArcGIS Pro is a big change for Esri desktop GIS; it's on its way to having all of the capabilities of ArcMap and much more. This software works alongside ArcMap (both applications can run on the same machine).

Some advantages of this new product include:

- software that fully uses 64-bit technology (so things work better and faster);
- 2D and 3D views that can be seen beside each other;
- basemaps are there by default and work much faster than in ArcMap;
- and a new, context-sensitive, ribbon environment similar to other Windows products

For more information about ArcGIS Pro, check out: <http://pro.arcgis.com/en/pro-app/get-started/overview-of-arcgis-pro.htm>

We currently have ArcGIS Pro running in the GIS Centre and it will be available in the Earth Sciences Lab for the fall semester. If you would like to try it out, please contact [gis@dal.ca](mailto:gis@dal.ca)

## Datasets to Explore

We continue to feature a few datasets in every issue of *Layers*. If you know of any interesting datasets that may be useful but not commonly known, tell us about them and we'll share them.

**Remote Sensing/Marine Data – Ocean Chlorophyll Concentration** (based on Aqua/MODIS data)

[https://neo.sci.gsfc.nasa.gov/view.php?-datasetId=MY1DMM\\_CHLORA](https://neo.sci.gsfc.nasa.gov/view.php?-datasetId=MY1DMM_CHLORA)

The chlorophyll datasets can be retrieved for different monthly or weekly ranges from 2002 to the current date. The data can be exported either as in GeoTIFF or as tabular data and is distributed through NASA.

**Nova Scotia Data – Data Locator – Elevation Explorer**

<https://nsgi.novascotia.ca/datalocator/elevation/>

This is a tool released by GeoNOVA allowing people to freely access NS LiDAR Point Clouds as well as other various scale elevation models. For more information check out <https://geonova.novascotia.ca/news-blog/geonova-releases-lidar-and-elevation-data>

**Marine Data – EMODnet (European Marine Observation and Data Network)**

<http://www.emodnet.eu/>

A group of 150 organizations pulling together various marine datasets for people to freely use. The data is organized thematically and includes geology, bathymetry, seabed habitat, chemistry, biology, physics and human activity.

## Tips from Julie Marcoux for the Data Community

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### A New Name & a New Look for the Data Research Guide

The *Data for the Social Sciences Research Guide* has been renamed the *Data and Statistics Research Guide* to better reflect its wider focus. Despite the new name, the link to access this research guide hasn't changed:

<http://dal.ca.libguides.com/data>

During the summer, all of our research guides including the *Data and Statistics Research Guide* will be updated with a new layout and more convenient navigation. You can also look forward to some updated data content – which will be featured in the next issue of *Layers*.

Several sessions on finding data and using Excel will be offered in May and June at the Dalhousie Libraries' Research Bootcamp. Registration is free. For details, see the Events page of our newsletter.

### Statistics Canada's New Dissemination Model

Stat Can's website will also be getting some updates over the next few months. You may already have noticed a few changes.

For example, if you go to *browse by subject page* and select a subject: <http://www.statcan.gc.ca/eng/subjects/index> you will be greeted with a new interface. You can filter the results that appear on the page by using facets on the left side of the page, and quickly retrieve data tables (not just CANSIM tables) by clicking on the Data tab. There are rumours that Stat Can is hoping to add a geography facet as a filter – making it much easier to find all available data for a given level of geography – and that CANSIM table numbers are being phased out.

If you have trouble finding content on the website while Stat Can undergoes its transition to a new dissemination model, don't hesitate to reach out to your data librarian for help (that's me!).



Contact Julie: [julie.marcoux@dal.ca](mailto:julie.marcoux@dal.ca)  
Data Librarian

## Esri Canada Winners – GIS Scholarship & App Challenge

Dalhousie students continue to use ArcGIS to support their coursework and research interests.

For the GIS Scholarship, eligible students submitted a poster and a report summarizing a current project. The 2018 winner was **Sarah Tasker**, a Masters student in the School for Resource and Environmental Studies. She employed a multiple-criteria evaluation method to assess and rank parcel suitability for Siting a Seniors' Facility in Sackville, Nova Scotia.

For the ECCE App Challenge, a team of three students had to design, develop and program an app to make a smart city smarter, within seven days. The Challenge winners were **Tyler Boutilier**, **Leah Fulton** and **Mikaila Bickford**. Their app could be used to find the nearest healthy food options from a current location, or flipped around, could be used to identify food desert areas within peninsular Halifax.

Congratulations!



James Boxall, beside Sarah Tasker accepting her GIS Scholarship from Janice DeMont, Esri Canada, Atlantic Representative for Higher Education. (Photo by Caitlin Cunningham)



Tyler Boutilier, Leah Fulton and Mikaila Bickford working on the App Challenge in the GIS Centre. (Photo by James Boxall)

## Events

# RESEARCH BOOTCAMP

for Research & Teaching Assistants and Graduate Students

May 14–June 6

All sessions are free but you must register to attend.

<https://dallibrariesresearchbootcamp2018.eventbrite.com>

### Tuesday, May 15

8:30–10:30 a.m.

*Easy Excel (IM)*

Cox Institute, Room 16  
Agricultural Campus

10:30 a.m.–12 p.m.

*Visualizing Data in Excel with Pivot Tables*

Cox Institute, Room 16  
Agricultural Campus

1–3 p.m.

*Excel Experts*

Cox Institute, Room 16  
Agricultural Campus

3–5 p.m.

*Finding Canadian Data*

Cox Institute, Room 16  
Agricultural Campus

### Tuesday, May 22

10–11:30 a.m.

*Intro to Data Management Planning*

Tupper Building, Theatre B (Carleton Campus);  
DMNB Saint John 105; Cobequid Room (Agricultural  
Campus)

### Wednesday, May 23

9–11 a.m.

*Easy Excel*

Marion McCain Building, Room 2019  
Studley Campus

### Thursday, May 24

10–11:15 a.m.

*Intro to Dataverse*

CHEB, Room 264 (Carleton Campus); DMNB Saint  
John 218; Cobequid Room (Agricultural Campus)

### Friday, May 25

10 a.m.–12 p.m.

*Visualizing Data in Excel with Pivot Tables*

Marion McCain Building, Room 1119  
Studley Campus

### Tuesday, June 5

10 a.m.–12 p.m.

*Searching for Canadian Data & Statistics*

Marion McCain Building, Room 2019  
Studley Campus

1:45–2:45 p.m.

*New Data Holdings at the Atlantic Research  
Data Centre*

CHEB, Room 264 (Carleton Campus); Cobequid  
Room (Agricultural Campus)

### Wednesday, June 6

10 a.m.–12 p.m.

*Excel Expert*

Marion McCain Building, Room 2019  
Studley Campus

Session descriptions at:

[http://dal.ca/libguides.com/ResearchBootcamp/2018/  
Schedule](http://dal.ca/libguides.com/ResearchBootcamp/2018/Schedule)

Register at:

<https://dallibrariesresearchbootcamp2018.eventbrite.com>



Find past issues of *Layers* [here](#)



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