FEATURE ARTICLE: Insights from Cognitive Mapping for Enriching Real-Time

FEATURE ARTICLE: Akua-Nutin: Air Subsidence In Chicoutimi (Quebec, Canada)

ARTICLE: Maps as a Reflection of Us: The Artwork of Phillip Bailey

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CARTOUCHE

CANADIAN CARTOGRAPHIC ASSOCIATION

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PRESIDENT'S MESSAGE

Monica Lloyd
Centre of Geographic Sciences - NSCC

Monica Lloyd is the President of the Canadian Cartographic Association and an instructor of Geographic Sciences at the Centre of Geographic Sciences.

Good day fellow cartographers and to all those passionate about mapping, geography and data visualization. It is with great pleasure that I take on the role of President of the Canadian Cartographic Association (CCA) for a two-year term of 2018-2020. I would first like to thank Julia Siemer for serving as our President for the past two years. Julia will now be stepping into a Past President role on the CCA executive. Secondly, I would like to express our gratitude to Chris Storie for his active involvement on the CCA executive over the past six years in various positions. Chris has planned two excellent conferences (Charlottetown and Winnipeg), overseen significant website updates and has been an active voice on behalf of the association. Thank-you Chris for your dedication and continued passion towards keeping our association active and moving into the future.

Chris originally encouraged me to become involved with the CCA at the Charlottetown conference in 2015. Saying "yes" to volunteering with this organization has rekindled my passion for cartography and exposed me to fascinating mapping projects happening across the country. It has provided me rewarding opportunities to present at conferences, organize our most recent conference held at the Centre of Geographic Sciences Centre of Geographic Sciences (COGS), Lawrencetown, Nova Scotia and make new friends who share my passion for cartography. I encourage you to get involved whether it is sharing your work at our conference, contributing content to our website, volunteering on our executive, speaking at your local school about careers in cartography or helping with our newsletter Cartouche. It will be well worth your time and may open up new opportunities for you to grow and build your network.

As some of you may know, I teach Cartography and GIS courses at COGS where we are proud to be providing hands on training in cartography for over 50 years. It was a treat to host the May 2018 conference at COGS. At this time we most of the faculty from the program were together for this event. You can read more about our story at **The Story of COGS**.

Thanks to our 2018 conference organizing team for helping plan a successful event. We had a fantastic meeting filled with special keynote speakers, excellent mapping talks, orienteering event and many memorable social events many of which are highlighted in this edition of Cartouche. It is clear from the conference talks that community and indigenous mapping is trending in our communities. How can we become more involved with community groups and share our expertise to their stories be told through maps? I encourage you all to get out and volunteer your expertise to help these groups put their stories on maps.

In 2019, the CCA would like to highlight and celebrate the work of Canadian cartographers from across the country. We will be posting monthly features of cartographers from each province starting on the East Coast and heading west then North. If you would like to share your cartographic work and story in the form of a blog post, please get in touch president@cca-acc.org . Our 2019 conference will be May 22-24th at the University of Northern British Columbia, Prince George, BC. Here we will celebrate "Mapping Our Resources." A call for presentations will be soon available. I look forward to seeing you in Prince George this spring.
Enjoy this edition of Cartouche. Thank-you to Gordon Campbell, Monica Rivers, Roger Wheate and all of contributors for making this newsletter possible. Cheers and Happy Mapping.

~ Monica Lloyd
President of the Canadian Cartographic Association
Faculty,Geographic Sciences – Cartography Concentration
Centre of Geographic Sciences (COGS)

Left to Right: Paul Illsley, David Raymond (back), Piers Churchill, Monica Lloyd, Martha Bostwick (back), Ada Cheung, John Wightman & John Belbin

PAST PRESIDENT'S MESSAGE

Julia Siemer
University of Regina

Julia Siemer is the Past President of the Canadian Cartographic Association and an associate professor of Geography at the University of Regina.

I would like to take this opportunity to thank all past and present members of the Executive Committee of the last two years for their work for and the dedication to the CCA. Serving as President of the Canadian Cartographic Association has been a truly rewarding experience for me.

At this year's annual conference in Lawrencetown, NS, in May/June, Monica Lloyd took over as new President of the CCA. I am confident the association is in very good hands with Monica as her organization of the annual conference at COGS has shown. In case you missed this very interesting and successful meeting 'Community Mapping: Place Making Through Maps' from May 30 to June 2 in Lawrencetown, you can read Bob Maher's summary of the meeting in his blog entry 'From Space to Place in Three Days'. Just like Bob, I would like to mention how much I enjoyed the diverse topics of the key note talks, presentations, and exhibits. A truly inspiring meeting. I am already looking forward and feeling excited about next year's meeting at UNBC in Prince George, BC. Watch out for further announcements and dates of the 2019 meeting.

One of the responsibilities of the Past President of the CCA is it to chair two of its committees: The Nomination Committee and the Awards Committee. In 1994, the CCA initiated the Award of Distinction to recognize individuals or groups who have made exceptional contributions in the field of Cartography in one of three categories: 1) exceptional professional contributions to the practice of cartography, 2) exceptional scholarly contributions to cartography, and 3) exceptional contributions to the Canadian Cartographic Association. A listing of past recipients can be found on our website. Please contact me directly at pastpresident@cca-acc.org to submit nominations for any of the three categories. Although there is no official deadline for nominations, please submit your nominations to me by the end of the year.

The nomination committee's responsibility is to identify and nominate members for positions of the Executive Committee and as chairs of Interest Groups. If you are interested in getting actively involved with the association – or know of someone who is – please let me or any other member of the Executive Committee know. We are always looking for members who bring new energy and ideas to the CCA. I might be contacting you later this Fall…

Happy mapping!
Julia

CCA Awards, 2018

Paul Heersink receives the **Award for Exceptional Contributions to the CCA**, from President Julia Siemer at the annual meeting in Lawrencetown, NS. Paul is a long time CCA member, serving as Treasurer 2010-16, and prior to that as Interest Group chair when he initiated the CCA blog. Over many years, he has informed us on Community Mapping with Esri Canada, as well as his personal mapping activities.

VICE PRESIDENT'S MESSAGE

Ted MacKinnon
GISP – Geomatics Specialist, Natural Resources

Ted MacKinnon is the Vice-President of the Canadian Cartographic Association and a Geomatics Specialist with the Department of Natural Resources.

"Everything is Related to Everything Else, but Near Things are More Related than Distant Things." Waldo Tobler

I am sure that we can all agree that the evolution of the Internet and advances in mobile technology now play a major role in map creation, and the way most people think about maps. Location has become a powerful tool allowing maps to play an influential role in our lives. Location data is becoming fundamental, especially considering that more then 90% of smartphone users utilize apps daily that use location based services.

A few months ago at the Consumer Electronic Show (CES) in Las Vegas, I had the opportunity to see first hand how companies are using geospatial data coupled with new concepts and technology to help move society towards an autonomous world. I witnessed new concepts like machine learning, connected vehicle services, geovisualization functionalities, and self-healing maps. Some pretty cool technology all thanks to the power of location and geospatial data.

These are exciting times, yet many fear as online mapping continues to grow that we will lose the detail that every good cartographer appreciates (and perhaps traditional paper maps will soon become collector items). As more and more benefit from new technologies that utilize the power of location, we must realize that this is not the first time, where changes in technology have helped broaden the reach of cartography.

During the 16th century, cartography was on the rise due to an increase in printing and the development of new surveying techniques. There was also the need to produce better maps, driven by increased commercial expansion, the colonization of new parts of the world, and increases in military. The improved mapping capabilities in GIS and remote sensing software have improved drastically over the past few decades, these days almost all geospatial professionals produce maps, yet very few of them consider themselves Cartographers.

Michael Goodchild helped put some of this into perspective recently at the CCA Conference, as he used the concepts of 'Place and Space' to help illustrate the different ways that cartography stills plays vital roles within our new electronic world. Regardless of the technology, the data or the methodology, there will still be a need for good cartographic design.

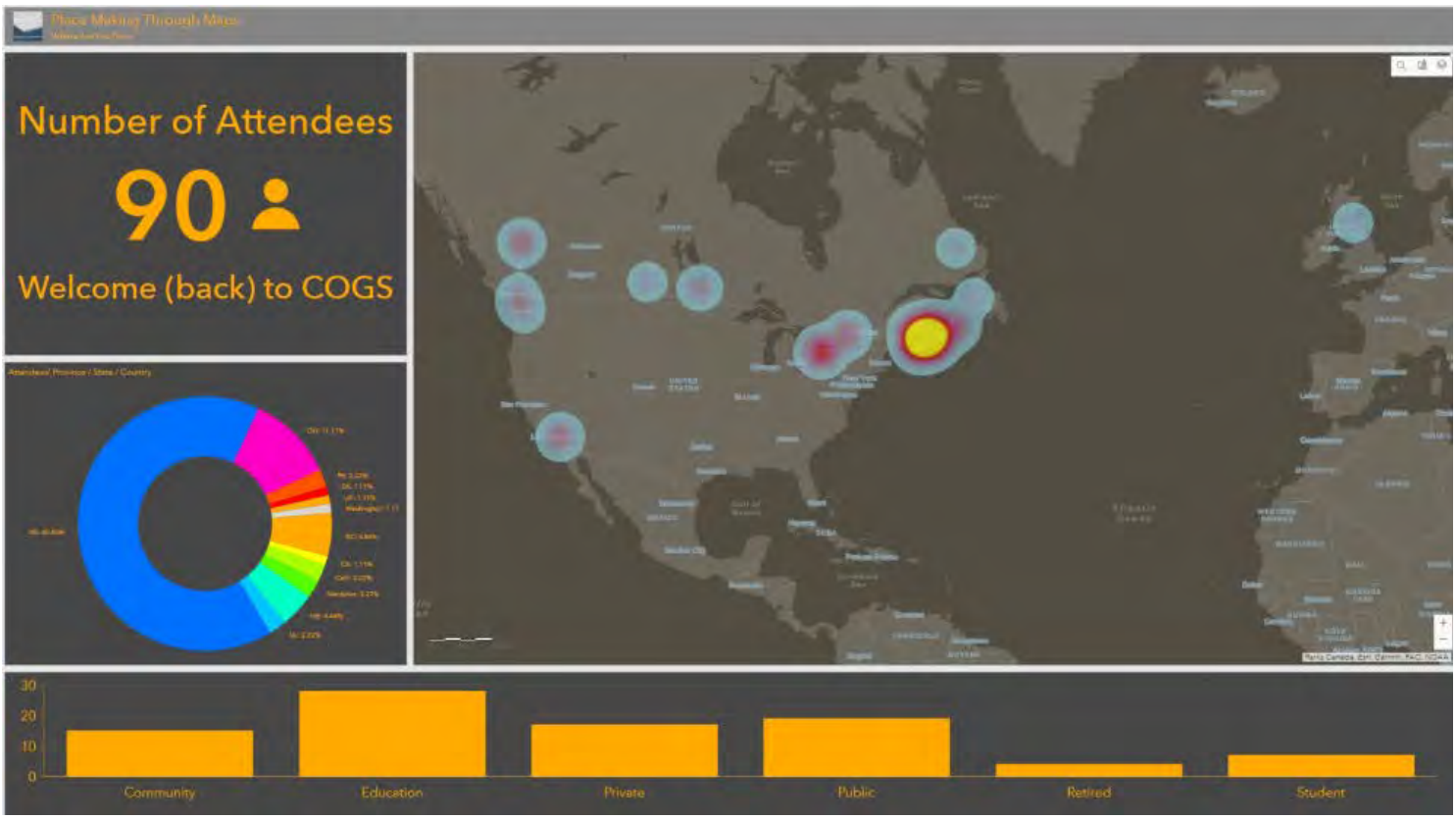
Technology advances quickly making it hard to predict what will be the next big developments in cartography, and it will continue to evolve with location still being one of the driving forces. When the CCA started in 1975, no one probably envisioned that someday people would be so dependent on maps, and how mapping technology would make everyday tasks more efficient. Cartography has played an important role in Canada, and it is up to us to make sure that the CCA continues to be relevant as the future of cartography evolves.

The activity and quality of presentations experienced while at the CCA conference seem to indicate that cartography is still strong in Canada, and that people still share a passion for the art of map making.

Thanks to the members of the CCA for the encouragement to join the Executive Committee, I was somewhat humbled when I was first approached, and almost declined since I was currently finishing a double term as the President of the Geomatics Association of Nova Scotia. However, I am glad to be part of an organization that shares such a passion for geography and all things spatial, and has become the voice of cartography in Canada. The CCA is a strong organization thanks to its members from coast to coast that continues to help it maintain its goals, year after year.

COGS 2018: From Space to Place in Three Days

The 43rd Annual Canadian Cartographic Association (CCA) conference was held at the Centre of Geographic Sciences (COGS) in Lawrencetown, Nova Scotia from May 30-June 1st. The flow of the conference can be characterized by the three keynotes.



Day 1. Ken Field. Esri, Redlands, California. Fake maps ! The Cartography of Elections.
Day 2. Mike Goodchild. Seattle, Washington. Place, Maps, GIS.
Day 3. Marcel Morin, Grand-Pré, Nova Scotia. GIS, Adobe, Creative Cartographic Design.

The first day included technical workshops by Esri on ArcGIS Pro/ArcGIS Maps for Adobe Creative Cloud. Before the breakout sessions, Ken Field presented a talk on the cartographic representation of election results, with primary reference to the latest US election. The day concluded with a lobster dinner at Port George and a bonfire on the beach along the Bay of Fundy shore. This offered a moment of nostalgia, harking back to the CCA GIS Summer Institute in 1987. (**Photo pictured to the right: @DaveAtCOGS**)

COGS 2018: From Space to Place in Three Days

Mike Goodchild delivered the keynote on the next day. He drew a comparison between a place-centric view and a space-centric view, using the language of GIS to illustrate the difference. In the automated space-centric view the attention is given to positional accuracy on the earth's surface and the concept of map layers. In the place-centric view, the focus is more upon the human context within the landscape. Further presentations on Day 2, emphasized the Inuit view of landscape (Claudio Aporta), as well the blurring of the line between art and cartography (Philip Bailey). During the final session, Ian Spooner discussed the work of Ian Brookes and the life of Robert Bell, in relation to place names in Northern Canada.

Marcel Morin kicked off Day 3 with a presentation on his work with First Nations groups across Canada. This was complemented by presentations by Thomas Herbreteau (Wolastoqey Nation, NB) and Tim Bernard and Gerald Gloade (Mainland Mi'kmaq, NS) on their place name digital atlas. The field trip on Saturday, hosted by Marcel Morin, was to the Grand Pre area, looking at the impact of the Acadian and New England Planters on the landscape. (Grand-Pre map on stretched canvas by Marcel Morin & photo of work by @kennethfield)

Map created by Marcel Morin.

Over the three days, we were challenged by a number of new concepts. What do we mean by 'place hierarchy?' What is implied by 'informality' and empty space in Nairobi, Kenya. Is the same true of the forests on South Mountain, Annapolis County? Or Goodchild's talk of the 'robot car'?

From COGS, we had in attendance, several generations of Cartography instructors: (**From left to right**) Paul Illsley, David Raymond, Piers Churchill, Martha Bostwick, Monica Lloyd, John Wightman, Ada Cheung and John Belbin. Together, they have managed to keep the mapping torch aflame.

COGS 2018: From Space to Place in Three Days

One memorable moment on the Thursday evening, at the Temple on Queen, was the induction of Michael Goodchild (**Right in image below**) into the Order of CANMAP by John Wightman (**Left in image below**). Showing that Canadians, in collaboration with our neighbours and First Nations have been able to share our knowledge and experience of the landscape, using modern technology.

It is my expectation that the next time the CCA brings its annual conference to Lawrencetown, we will be talking about 'place-based' technology rather than 'space-based' technology. We shall not be talking about 'empty spaces' but rather our immersion within the landscape.

I will close with a couple of afterthoughts. At the time of the conference, I was reading Claude Bissel's book on Ernest Buckler. The following quotation about Buckler struck me as relevant.

"For his work (and peace of mind) he needed isolation and a particular place..... And the place for him was the house in Centrelea."

We all have our particular place or a series of places over a lifetime. The CCA conference confirmed that Lawrence-town is a special place for many Cartographers and Geographers.

During the field trip to the Grand-Pré, I learned that Ian Spooner and Gerald Gloade had collaborated on bringing together western landscape science and Mi'kmac stories. This led me to check my copy of the book by Trudy Sable and Bernie Francis The Language of this Land, Mi'kma'ki. Phillip Bailey in his art had developed 'merged maps'. This set me thinking about combining different versions of the same landscape e.g. Micmac, Acadien, Black Loyalists in Nova Scotia. Or take, Nicholas Crane 's book The Making of the British Landscape, and imagine the richness of a similar book 'The Making of the Canadian Landscape'. (Merged Map below by Phillip Bailey – CartographeMe).

References:
-Claude Bissell. 1989. Ernest Buckler Remembered. University of Toronto Press.
-Trudy Sable and Bernie Francis. 2012 .The Language of this Land, Mi'kma'ki. CBU Press.
-Nicholas Crane. 2016. The Making of the British Landscape. From the Ice Age to the Present. Wiedenfeld and Nicolson.

Acknowledgements:
Thanks to Monica Lloyd, Michael Goodchild and Marcel Morin for their specific contributions, and to sponsors: John Wightman, CANMAP and Eric Melanson, Esri Canada.

Thanks to all presenters and to Dave MacLean for photographs and conference details, to see the schedule of presentations visit: **https://www.conferize.com/cca-2018-community-mapping-place-making-through-maps/schedule**

From Bob Maher's summary of the meeting in his blog entry, Posted on June 6, 2018 by maherrv
https://ernestblairexperiment.wordpress.com/2018/06/06/from-space-to-place-in-three-days/ Canada

Maps as a Reflection of Us: The Artwork of Phillip Bailey

As a child growing up in rural Annapolis County Nova Scotia, I was fascinated by geography and spent countless hours poring over atlases. I was also blessed and sometimes cursed, with an active imagination and a love and aptitude for drawing. These two passions collided when I began recreating what I saw in the atlases by hand. This childhood hobby led me to my current work. As a presenter at the 43rd Annual CCA Conference, I was pleased to have my work included in our discussion of place making through maps as my work aims to expand our perception of place. My goal is to create maps that blur the boundaries between "facts" and what we know or wish to be true.

Using maps that I hand draw and paint, I integrate two or more factual places to create merged geography that invokes new meaning for the viewer. In my work Cape Scotland (**see image**) one sees the integration of Cape Breton, Nova Scotia with Scotland. Ancestral roots are illustrated in a map that brings together history and geography in an artistically challenging interpretation. While the viewer will see situational accuracy represented in the work, the thrill of encountering the intersection of places not possible in reality inspires the imagination. Merge Map possibilities are endless, as each of us connect with many geographical locations as part of our past and present.

Personalized Maps use the tenet of Merge Maps with facts and themes from the lives of individuals. An example of this is seen in a commission I created as a gift for author Lawrence Hill. A close examination of his body of literature revealed facts about his life as well as themes found in his writing. Using geography that was prominent in his life and the lives of his characters, I created a map that is both visual art and an ode to the life and works of one of Canada's most celebrated authors. Some have described my personalized maps as artistic spy puzzles that may be used as educational tools or as deeply meaningful reflections of a person, group or community. My current work depicts the life of Dr. Daurene Lewis, the first Black female mayor in North America. This work, a donation to the Town of Annapolis Royal, was presented in commemoration of the 75th birthday of Dr. Daurene Lewis on Sept 9, 2018. The map not only symbolizes nonfictional places meaningful to Doctor Lewis. The work also includes fictional places created to indicate significant events or challenges in her life. For example, many mountain peaks are named after awards received by Doctor Lewis with the elevations representing the year of presentation. Some highways link places indicative of struggles encountered by Doctor Lewis. For example, SBF (Single Black Female) Village is connected to JWB (Jogging While Black) Avenue by Drive of Challenges.

If you are interested in viewing more of my work/the purchasing of prints/original artwork or a commission for a personalized creation:

email: **baileypl66@gmail.com**
or visit **www.cartographme.com**

GeoNOVA | GeoPDFs

John MacKinnon
Nova Scotia Geomatics Centre

John MacKinnon works as a GIS Technician within the Topographic Mapping section of Geographic Information Services located at the Nova Scotia Geomatics Centre in Amherst, Nova Scotia. John handles the cartographic responsibilities of the team as well as providing cartographic input to various projects at the Geomatics Centre. He was first introduced to the Geomatics field while working with his father (Raymond), who is a Nova Scotia Land Surveyor. An interest in Geography and art, as well as being a lifelong reader of National Geographic brought him to the Centre of Geographic Sciences Cartography program in Lawrencetown, Nova Scotia in 2004, 30 years after his father attended the same school, which was then the Nova Scotia Land Survey Institute. Upon Graduation he began working as a consultant for Geographic Information Services, which led to his current position within the Topographic Mapping Team.

Figure 1: Portion of the Bridgewater Geo PDF featured in the 2015 ESRI Map Calendar, which combines both the orthophoto and topographic maps from the Nova Scotia Resource Mapping Series into a high resolution interactive pdf that can be used to perform basic GIS operations.

Geographic Information Services (GIS) is the designated mapping service provider for The Province of Nova Scotia. As part of The Department of Internal Services, the GIS section provides all levels of government and our public clients with Foundation Geography and Geographic Services. The GIS Team based out of the Nova Scotia Geomatics Centre in Amherst are responsible for the production, maintenance, quality control and distribution of Foundation Geographic Databases including Nova Scotia's: Aerial Photography Database, Referencing System, Topographic Database, Property Records Database, Civic Addressing File, Coastal Series, and most recently Elevation Database derived from LiDAR data.

In recent years, due to an increased demand for digital products, the GIS Team has made a significant effort to provide web-based applications, which John has contributed to cartographically. An example of this would be the Coordinate Referencing Viewer, which provides access to Nova Scotia control survey monument coordinates, station info, sketches and photos. Another example would be the GeoNAMES Explorer, which gives the user the ability to search Nova Scotia community names and geographical feature names as well as view the history of how community names were established. (See references and Web Pages section for links to these products).

In addition to web-based applications, the GIS Team has also improved digital map products including an effort focusing on providing rich mapping content using the popular PDF format. The goal of the project is to provide the end user with a series of Geo PDF products that fulfill their mapping requirements without the use of an internet connection or a commercial GIS software license.

Originally the Topographic and Orthophoto maps were 2 separate products, distributed as standard PDF's as part of the Resource Mapping Series, which are still available by contacting the Nova Scotia Geomatics Centre. Additionally, a seamless provincial dataset and style set can be downloaded from the Geographic Data Directory for all topographic features that enables the user to recreate the topographic map within GIS software such as QGIS or ArcGIS.

GeoNOVA | GeoPDFs

The Geo PDF combines both the Orthophoto and Topographic Maps into a high resolution interactive pdf that can perform basic GIS functions without an internet connection or a GIS software license. With the installation of the free TerraGo toolbar plug-in for Adobe Reader, the Geo PDF provides end users with the ability to track and view their geographic location, verify and measure features, take notes, import geographic data and view attribute inside Adobe Reader at no extra cost. The end users include weekend hikers, government field workers as well as search and rescue. There are currently 354 Geo PDF's available in the Annapolis, Kings and Colchester counties, with Cumberland county and Sable Island currently in production.

To create the products, we used Esri's ArcGIS to assemble a single dynamic mxd with the use of the Data Driven Pages extension that combined all data used in both maps. The Geo PDF files were created using the TerraGo Publisher for ArcGIS extension.

To give the user the ability to view and print the two map products individually, the legend was converted from graphics to feature classes inside a separate data frame and both the map features and legend features were separated into Orthophoto and Topographic group layers. The layer structure of the table contents used in ArcGIS is maintained inside Adobe Reader during the Geo PDF creation, with the ability to toggle maps, legends and individual layers on and off.

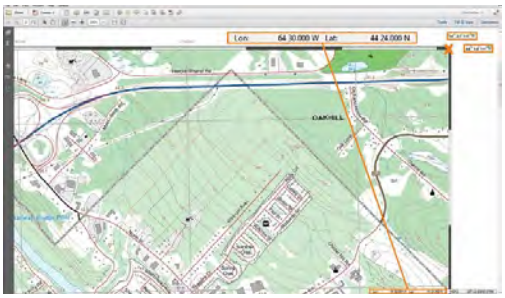


Figure 2: By hovering the mouse pointer over a location on the map, the Lat/Long coordinates are displayed in the bottom right of the PDF. Here the top right section of the map is selected with the value enlarged at the top.

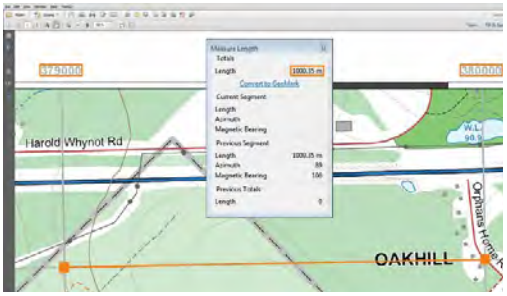


Figure 3: With the Geo Measure tool the user can measure map features inside the PDF. Here, the 1,000m grid is measured to a respectable accuracy.

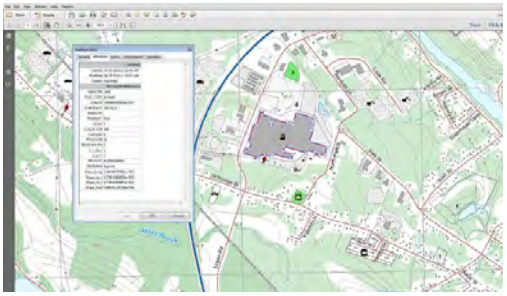


Figure 4: The Import Geo Marks tool allows the user to import shapefiles into the PDF and view the attributes. Here a building polygon from the Nova Scotia Topographic Database has been imported with its attributes.

Figure 5: The Google Map it! tool allows the user to select an area inside the PDF and automatically open Google Maps zoomed to the corresponding area. This can be especially useful to verify buildings with the use of Google Street View.

References and Web Pages

[1] Geographic Information Services: https://geonova.novascotia.ca/about
[2] To purchase Geo PDF's from the Government of Nova Scotia, contact geoinfo@novascotia.ca or call 1-902-667-7231
[3] To download seamless Nova Scotia Topographic Data, select the BASE Theme data on the Geographic Data Directory: https://nsgi.novascotia.ca/gdd/
[4} Nova Scotia Coordinate Referencing Viewer: https://gis8.nsgc.gov.ns.ca/NSCRS/
[5] Nova Scotia GeoNAMES Explorer: https://nsgi.novascotia.ca/geonames/
[6] Nova Scotia Elevation Explorer: https://nsgi.novascotia.ca/datalocator/elevation/
[7] TerraGo Product Overviews: http://www.terragotech.com/learn-more/product-overviews
[8] TerraGo Publisher for Arc GIS: http://www.terragotech.com/products/terrago-publisher/publisher-for-arcgis
[9] TerraGo Toolbar download: http://www.terragotech.com/products/terrago-toolbar

GeoNOVA | GeoPDFs

GeoPDF Tutorial

Download a GeoPDF from the following link (**https://www.dropbox.com/s/fgvjpo92j0i21dh/Bridgewater_GeoPDF.zip?dl=0**) provided by John MacKinnon of the Bridgewater area. This sample will show the benefits of GeoPDF layers, and how it is a great offline accessible map when working in remote areas.

Note* - To view the GeoPDF properly you need to have Adobe Reader or Acrobat installed on your PC.
- The TerraGo extension is compatible with Windows desktops.

Follow the next steps on how to download the **TerraGo Toolbar** to access the layers panel:

Step 1: Download the TerraGo Toolbar for Adobe Reader on Windows desktop at **http://www.terragotech.com/products/terrago-toolbar**

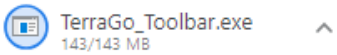
Step 2: Select "Download Now"

Step 3: Fill in the information fields then click "Download Now"

Step 4: Click "DOWNLOAD"

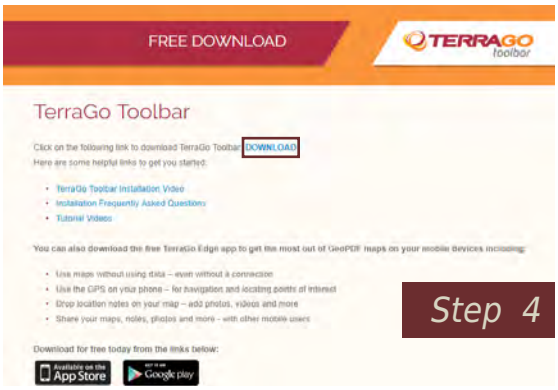
Note* - There are also links to helpful installation videos and FAQ's:
http://info.terragotech.com/Video/TerraGo-Toolbar-Installation
http://info.terragotech.com/Trial.Install.FAQ
http://www.terragotech.com/learn-more/videos#terrago-toolbar

Step 5: Downloaded file:



Double click on the .exe file to install.

You should now be able to open and view the GeoPDF in Adobe Reader. As described in the article above, there are lots of different GIS functions built into the document. Features to check out include the Layers icon on the left margin to begin exploring and under the TerraGo drop-down menu item at the top of the screen you can access the various built-in GIS tools and functions.



Note* As an alternative to the toolbar extension for Windows there is also an option to install the TerraGo Edge viewer application for iOS (iPad or iPhone) or an Android (tablet or smartphone) device.

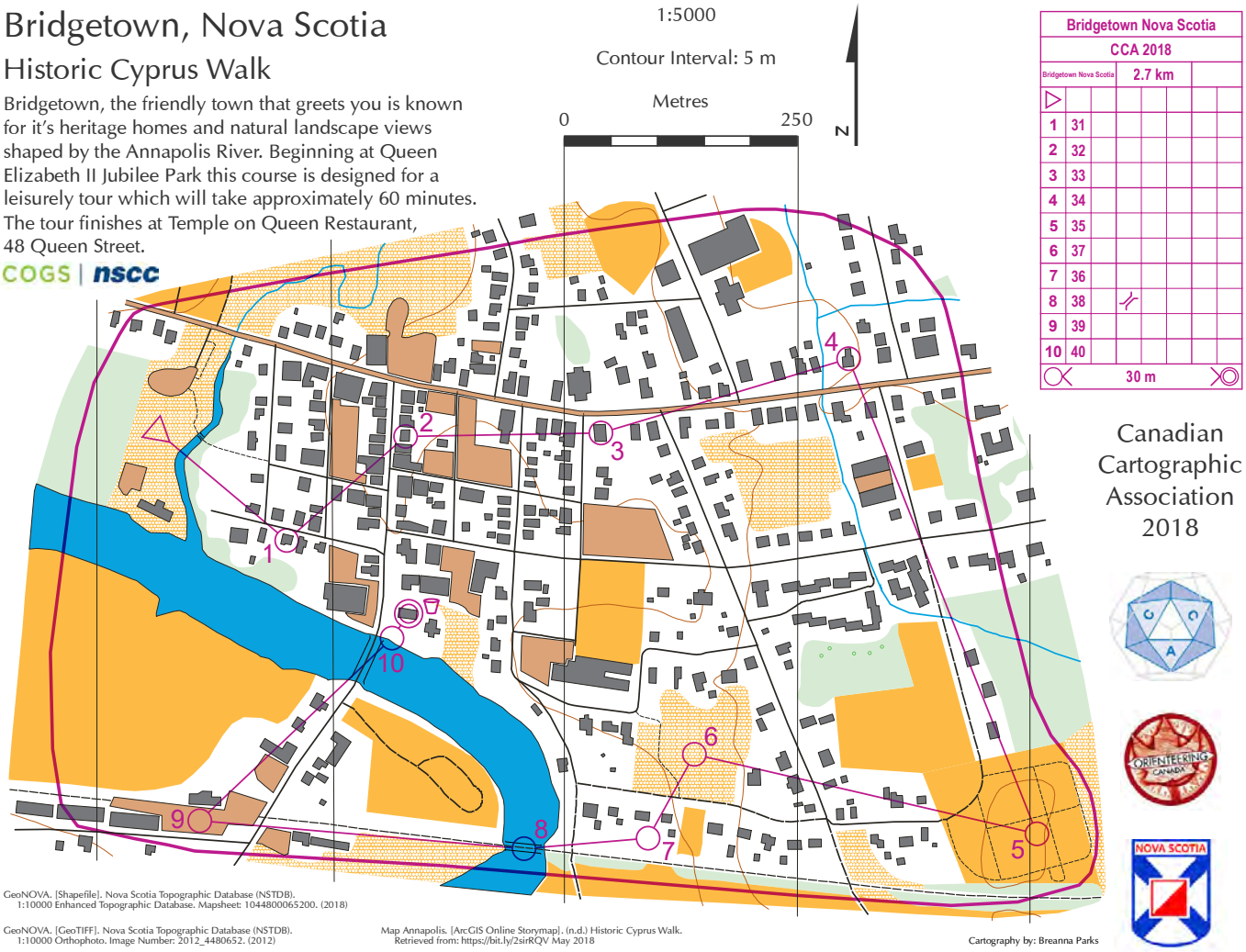
Orienteering Event through Bridgetown

Bridgetown, Nova Scotia

Historic Cyprus Walk

Bridgetown, the friendly town that greets you is known for it's heritage homes and natural landscape views shaped by the Annapolis River. Beginning at Queen Elizabeth II Jubilee Park this course is designed for a leisurely tour which will take approximately 60 minutes. The tour finishes at Temple on Queen Restaurant, 48 Queen Street.

COGS | nscc



Photos provided by Monica Lloyd

Insights from Cognitive Mapping for Enriching Real-Time Recommender Systems

Susan Kingdon, Nahed Balhaj Mouhamed, Sangwhan Cha, Arantza Respaldiza, Monica Wachowicz

Introduction

We are developing a Real-Time Recommender System to improve tourist experiences and promote cultural heritage. Our Recommender System gives an alternative to the typical tourist brochures and magazines, allowing for a more personalized experience for the tourist and Real-Time notifications of points of interest (POIs) in the tourist's vicinity. However, information about the tourist is necessary to give useful recommendations.

Data sources can include location data (e.g., beacons, GPS), retail data (e.g., transactions), contextual data (e.g., sensor data), social values (e.g., Twitter, Facebook, Instagram), and travel values (e.g., surveys, interviews). We explored a number of data sources in order to build a predictive model for the next generation of Recommender System.

How our Real-Time Recommender System Works

The City of Saint John, in New Brunswick, Canada served as a case study for our research. We attached 31 Estimote beacons to public objects (e.g., signs, parking meters, trees, garbage cans; see **Figure 1**) within Saint John's downtown core in proximity to POIs. Beacons transmit wireless signals that your smartphone can receive and interpret. The beacon monitoring technology on the smartphone notifies the tourist when they enter a beacon's range.

Figure 1: Placement of beacons near POI in downtown Saint John, N.B.

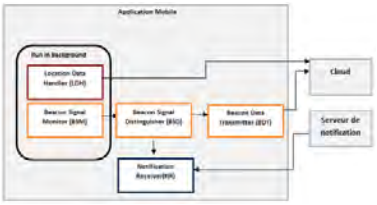


Figure 2: System architecture of the mobile application.

Our Recommender System runs through an application that can be installed on a mobile device. When the mobile application is initially loaded, it asks the tourist for permission to activate Bluetooth on their device. After the tourist activates Bluetooth, the mobile device is able to detect a beacon's broadcast signal, and the tourist will receive notifications upon entering the range of the beacon. Once notified, the tourist can choose to see information about a nearby POI.

Real-Time Recommender Systems bring many benefits. For example, if a nearby museum is already full of visitors, the Recommender System notifies the tourists who might prefer to postpone their visit, or to head there immediately. If a tourist is interested in visiting an outdoor attraction, but the weather forecast is suggesting rain within an hour, the Recommender System notifies the tourist and suggests alternative indoor activities such as shopping, dining, or visiting a museum. In both cases, the Real-Time Recommender System combines data from different sources to improve the tourist's experience.

System Architecture

The system architecture of the mobile application has five components: one for location data collected once GPS is active (bounded by the red box in **Figure 2**), three connected to the Bluetooth tag (bounded by the yellow boxes in **Figure 2**), and one to ensure the notification is displayed on a user's device (bounded by the blue box in **Figure 2**). The Location Data Handler collects GPS location data from the tourist's smart phone and sends this data to the cloud. This component runs in the background after the GPS location service is activated. The Beacon Signal Monitor creates a geofence for each beacon and monitors each geofence individually. This component also runs in the background. The Beacon Signal Distinguisher permits the distinction between two events: the entry and exit of the geofence region. The Beacon Data Transmitter sends the events to the cloud. And the Notification Receiver receives notifications from the server when the tourist enters the range of the beacon. Android version 4.3 or higher is necessary to use the mobile application.

Data Sent to the Cloud

Data collected from the beacon data and sent to the Cloud include: the user ID (ID of the user's Smartphone), beacon ID, time of entry into and exit from the geofence, and duration within the beacon range.

Data collected from the GPS data include: the user ID, latitude, longitude, street name, and the time and date in Real-Time. This data is sent to the Cloud consecutively once every second, when the application is open and GSP location data is activated on the Smartphone. The principal function of the data collected is to verify that all the functions for entry and exit of the beacon's geofence are working properly.

The Explorer Quotient and the Tourist Profiles

The Explorer Quotient (EQ) was created by Environics Research for Canada's international tourism marketer, the Canadian Tourism Commission (CTC), in an effort to learn what motivates travelers to Canada. Environics Research merged conventional research (e.g., Global Tourism Watch, Statistics Canada Travel Survey, Environics Analytics Prizm C2) with psychographic research based on social values and beliefs, and conducted a nation-wide survey of Canadians. Data for over 7100 respondents was collected and used to develop nine tourist profiles based on social values, travel values, travel motivations, and travel behaviors. Many of these tourist profiles overlap, making it difficult to distinguish between them using data analytics. Therefore, we took the EQ research and aggregated the tourist profiles into two tourist behaviour types: Guided and Explorer. The Guided tourist seeks a simple and convenient experience, delegating decision-making to others, while the Explorer tourist seeks an immersive experience, often including POIs that are not typical tourist attractions

A Decision Table Model for Predicting a Tourist Behaviour Type

Lacking Internet of Things data and historical data, we collected cognitive maps and conducted interviews in September, 2017 to collect a small data sample to evaluate our approach. The inputs for the model were POI information, 27 cognitive maps, and 35 interviews. We used a decision table algorithm as our model, chosen for this application because it is known to be robust for small data sets that have many attributes. This model was used to predict the tourist behaviour type: either Guided or Explorer.

The first data input is the POIs (**Figure 3**). Using the POIs listed in the Explorer Quotient public documents, we categorized POIs into 4 groups: nature (e.g., natural attractions, parks), culture (e.g., historical sites, museums, galleries), entertainment (e.g., restaurants, tours, shopping), and accommodation (e.g., hotels, cruises, home-stays). POIs were most densely clustered downtown, which is also where cruise ships dock.

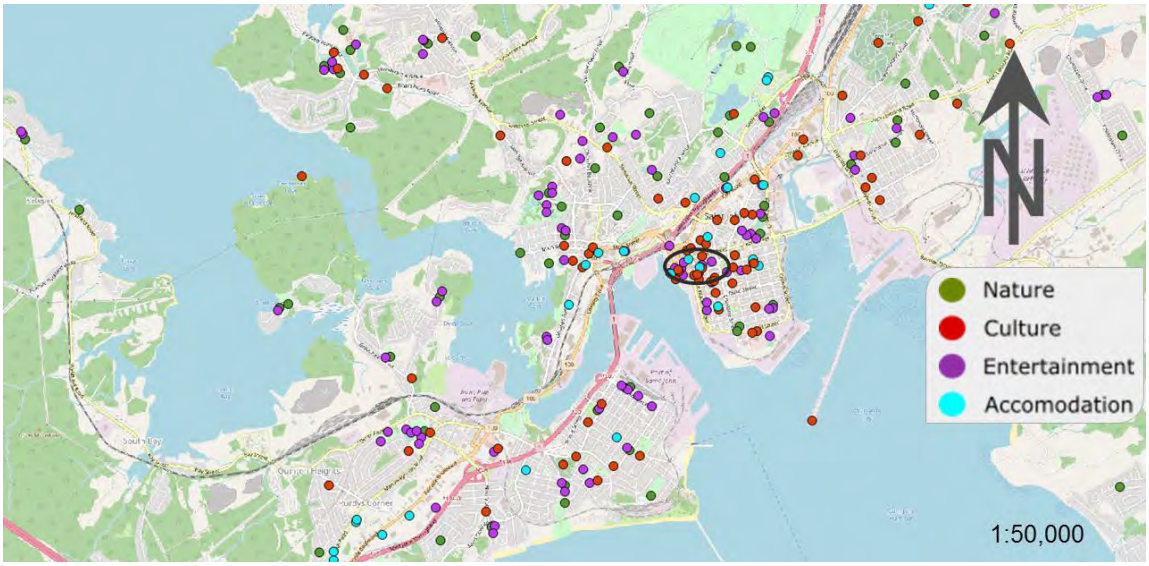


Figure 3: A map of Saint John, N.B. showing the location of points of interest (POIs) as GIS layers: green points for nature POIs, red points for culture POIs, purple points for entertainment POIs, and blue points for accommodation POIs. The black oval outline shows the region where tourists were interviewed and where cognitive maps were drawn and collected.

Insights from Cognitive Mapping for Enriching Real-Time Recommender Systems

The next data input is cognitive maps, which are a representation an individual's perception of geographical spaces, and are influenced by the individual's experiences. In collecting cognitive maps from tourists, we collect information about how a tourist has perceived a city and information about how they interacted with the city (e.g., POIs visited, events attended, infrastructure used, routes traveled). We collected these maps from tourists in the downtown core (within the black oval in **Figure 3**). Example cognitive maps from two tourists are shown in **Figure 4**. Although these two maps look very different, they were drawn by a couple travelling together. We asked each of them to explain their maps, and you can see similar features in both maps: the harbour, the walking path, the oil refinery, and the destination of their route: the Reversing Falls. Although the falls had a lasting impression, so also did the oil refinery.

Once the cognitive maps were collected, we interpreted the maps in order to produce attributes for our model. We manually counted primitives and listed the types used (points, lines, polygons, icons, and text), noted the primitive graphical components (e.g., position, size, page orientation), noted the spatial reference system structure (e.g., what was the reference artifact, dimensionality), whether a temporal reference system (a time sequence instead of spatial relation of points on the map) was used, and the type of POI(s) featured (types were nature, cultural, entertainment, accommodation).

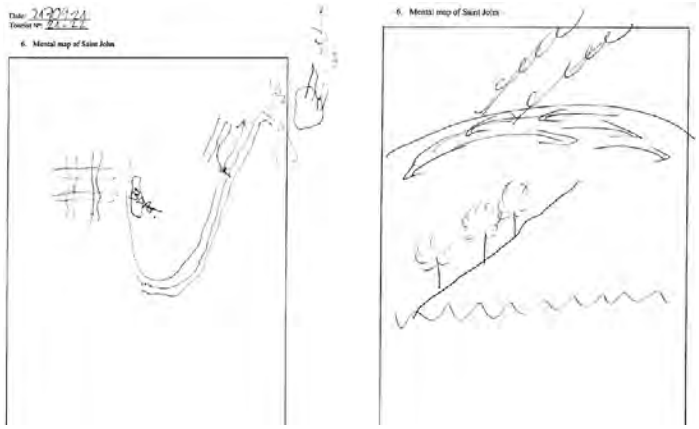


Figure 4: Cognitive maps of a husband (left) and wife (right) who travelled together. Similar features can be identified in both drawings: the harbour, a walking path along the harbour, the river, and the oil refinery (features are shown in sequence from left to right in the husband's map, and from bottom to top in the wife's map).

Using cognitive maps as a source of data provided a unique data set. However, they were time consuming to collect (e.g., physically traveling to Saint John) and to interpret (e.g., to create the attributes for our model).

The last input was personal interviews. We used the attractions (POIs), travel values, and social values given by the Explorer Quotient to guide the questions asked in the interview. We conducted interviews in the downtown core, where the POIs densely cluster near to where cruise ships dock (see black oval outline in **Figure 3**). These interviews were recorded and ranged from 5 to 30 minutes in duration. The resulting data set was small (35 instances) yet representative of the expected population of visitors.

Attributes used as input for the model were the purpose of the visit (purposes were categorized as cruise, vacation, business, stopover; **Figure 5**), the POI type(s) (types were categorized as culture, nature, entertainment, accommodation), and social and travel values (using the Explorer Quotient).

The interviews provided a first glimpse of tourists' experiences, despite the time required to conduct them and to interpret the results.

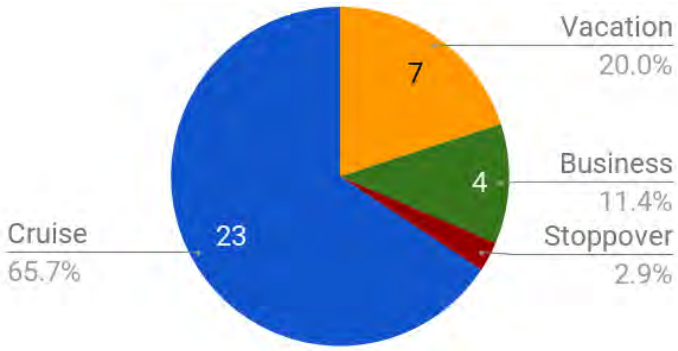


Figure 5: Purpose of travel for tourists interviewed in to Saint John, N.B., September 2018.

Main Outcomes

Even before we ran our results through a predictive model, we had an indication of the interests of tourists in Saint John from the interviews and cognitive maps. Tourists were most interested in visiting or learning about the local nature and culture POIs (**Figure 5**). Of particular interest to tourists were the harbor and/or the Reversing falls, and the local parks for nature POIs; history and/or historical sites, the farmer's market, and local industry (i.e. the oil refinery) for culture POIs; and food and/or drinks, tours, and walking for entertainment POIs (**Figure 6**).

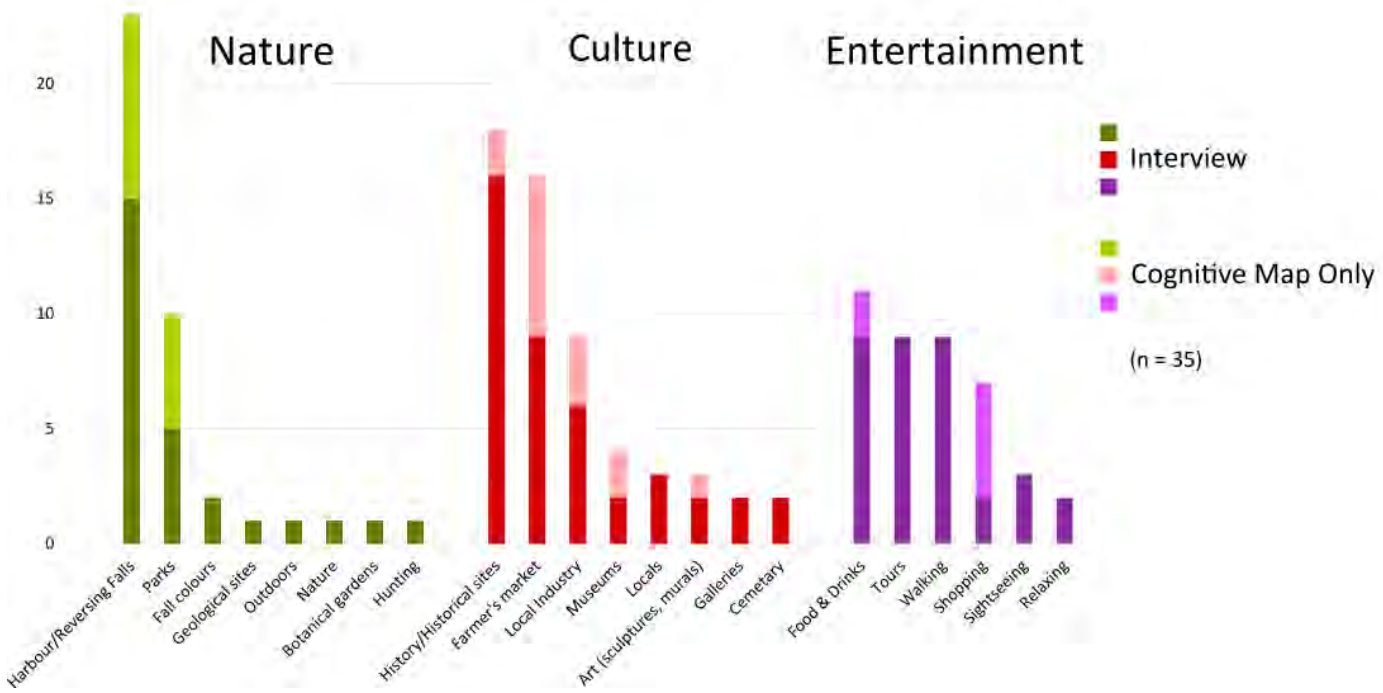


Figure 6: Comparison between information about POI type extracted from interviews and from the cognitive maps. The dark bars represent information taken from the interview, and the light colored bar represent any POI extracted from the cognitive maps that had not been mentioned during the interview.

We created a predictive model, in light of our initial data, aimed to classify each tourist behaviour type as either Guided or Explorer. Thirty-one attributes were extracted from the interviews and the cognitive maps. We used a decision table algorithm as our model (see generic example in **Table 1**), because these are known to work well with a small number of instances with a large number of attributes. We implemented the model using the WEKA machine learning software, developed at the University of Waikato, New Zealand, and tested the model using a 10-fold stratified cross-validation.

The model correctly classified 71% of the instances (**Table 2**) using our initial data set with few instances and many attributes; this percentage is likely to improve with more data.

		Combinations							
Attribute	Values	1	2	3	4	5	6	7	8
Attribute 1	Y, N	Y	Y	Y	Y	N	N	N	N
Attribute 2	Y, N	Y	Y	N	N	Y	Y	N	N
Attribute 3	Y, N	Y	N	Y	N	Y	N	Y	N
Output									
Output 1		X		X	X		X		X
Output 2			X			X		X	

Table 1: A generic example of a decision table

Correctly Classified Instances:	71.43%
Incorrectly Classified Instances:	28.57%

Table 2: Percentage of correctly and incorrectly classified instances

The confusion matrix was more accurate for the Guided tourist type than for the Explorer type, classifying 19 of 22 Guided tourists correctly (see **Table 3**). However, our data was biased toward the Guided tourist type. This bias is expected due to the time of year the data was collected: there is a larger proportion of cruise goers in the fall months compared to other types of tourists (65.7% of the tourists interviewed were from a cruise; **Figure 5**), and cruise goers tend to be of the Guided type. With more data taken at different times of the year, the bias could be corrected.

	Predictive Model Classification	
	Predicted: Guided	Predicted: Explorer
Actual: Guided	19	3
Actual: Explorer	7	6

Table 3: Confusion matrix

The results show that the predictive model relied mainly on two very different data inputs: purpose of the visit (an attribute extracted from the interviews), and cognitive map (whether or not the tourist chose to complete a cognitive map; **Table 4**). The data extracted from the interviews and the data extracted from the cognitive maps were unrelated and so this reliance was unexpected. This confirms that an effective Recommender System requires a variety of data sources to predict type of tourist behaviour, and cannot rely on demographics alone.

Purpose	Cognitive Map	Tourist Behaviour Type
Cruise	No	Guided
Business	No	Guided
Vacation	No	Guided
Cruise	Yes	Guided
Vacation	Yes	Explorer
Stopover	Yes	Guided
Business	Yes	Guided

Table 4: The most significant attributes for the predictive model: purpose and cognitive map

Future Research Work

Although we used Saint John as a case study, we feel that our research may be applied to other cities as well. Future research work will be focused on:

1) Improving the training data input. We focused on 3 data inputs: POIs, cognitive maps, and interviews. We can integrate other data sources and/or and other attributes to find the optimal dimension of a data set needed to predict an Explorer or a Guided tourist type. Collecting more data throughout the year would also reduce bias in the data.

2) Exploring other predictive models. With more data (e.g., 1000 instances), we can test the predictive model using Random Forest or Support Vector Machine algorithms, that may better predict tourist types.

3) Automating data collection, including integrating the survey function with the Recommender System, to further facilitate data collection.

Initial results are promising and, while Recommender Systems relying on a variety of data sources would be useful and enhance the experience of tourists, further research could increase the predictive power of the system.

University of New Brunswick, People in Motion Lab, Fredericton NB, CANADA
Corresponding Author: **susan.kingdon@unb.ca**

Akua-Nutin[i]: Air Subsidence In Chicoutimi (Quebec, Canada)

Majella-J. Gauthier
Ph.D. in Geography
Université du Québec à Chicoutimi
mgauthier@uqac.ca

The specific features of a region's physical geography are becoming increasingly precise. This is the case of the Saguenay-Lac-Saint-Jean region in Quebec where a phenomenon of atmospheric subsidence causes warmer temperatures and clearer skies in Chicoutimi, compared to Québec City, even though Chicoutimi is located 200 km further north.

The analysis performed relates three dimensions combining and leading to a characterization of the weather. The three conditions are: 1) higher daily maximum temperatures in Chicoutimi, 2) more precipitations in Quebec and 3) winds from the south. Although it is relatively rare for winds to blow from the south, the fact remains that they are caused by the passage of the jet stream, a high-altitude wind whose effects are reflected as gusts at ground level (Figure 1).

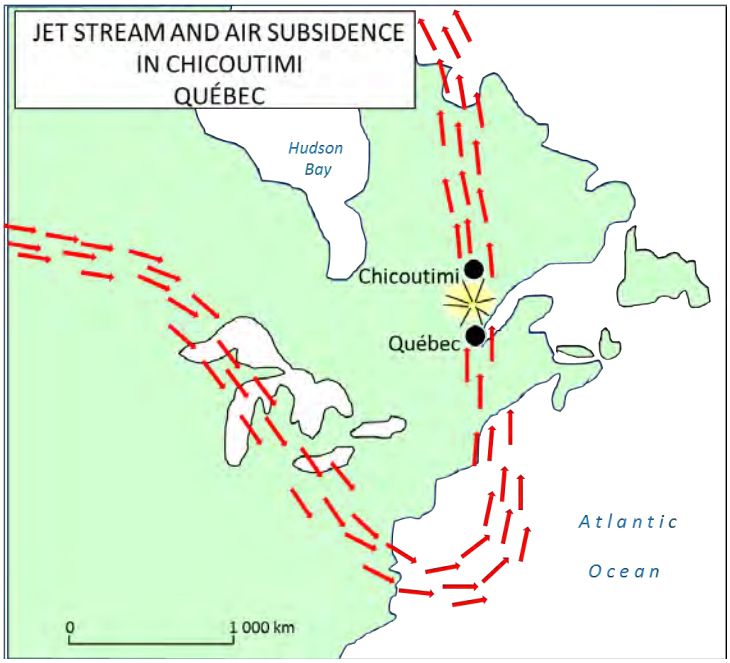


Figure 1

The example of May 7, 2017, is very revealing. At 1:00 pm, winds from the south swept across the Laurentian Massif, which reaches an altitude of 1,000 m (Figure 2). The air, forced to rise, cools and loses its moisture in the form of rain. When this air comes down again, it warms up to a gradient greater than during its ascent, causing the sky to clear; at that moment, the air temperature in Quebec is recorded at 12.6˚C while that of Bagotville is at 17.0 ˚C, a difference of 4.4˚C.

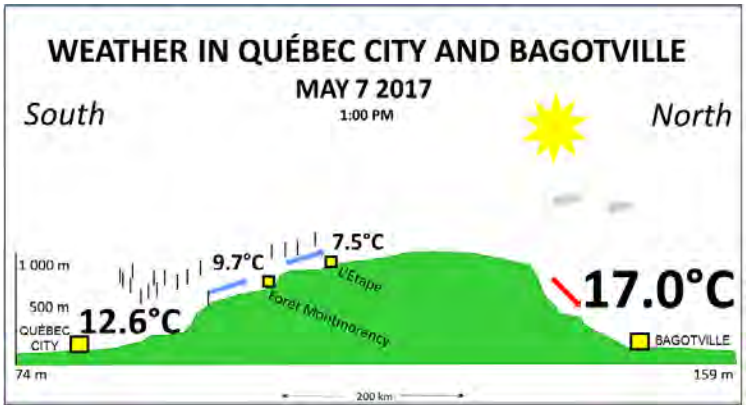


Figure 2

The objective of the study is to detect how often similar situations have occurred in the past and to try to develop a model based on a comparison of weather data from 1957 to 2017 between the two stations.

Akua-Nutin: Air Subsidence In Chicoutimi (Quebec, Canada)

As a result, the phenomenon does not always occur on a regular basis and peaks at certain periods during the year. First of all, the average frequency is at 2.5 (161 times over 61 years) and that the maximum daily frequency rises to five times for the same date and that there are many days when the phenomenon is absent.

Here is what results from the development of a general frequency model. The month of May dominates; it is followed by October. It reaches a low in August and an obvious absence during the winter period (Figure 3). In detail, the highest densities are concentrated between April 23 and May 24, and between September 28 and October 8. Akua-Nutin lasts an average of 16 hours and has occurred more often in recent decades.

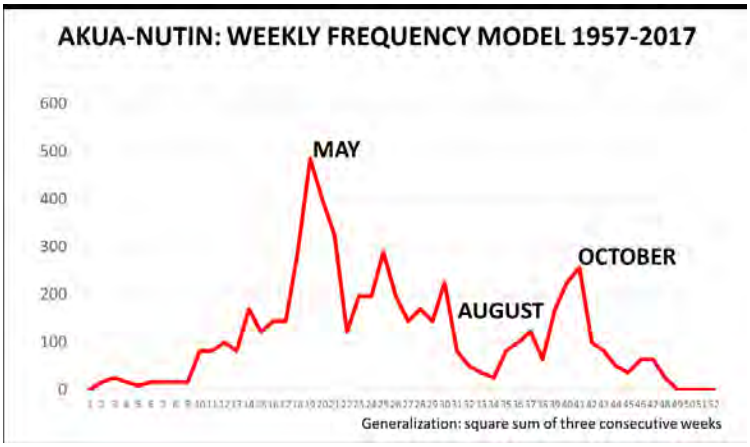


Figure 3

In conclusion, as a researcher, it is interesting to discover and document a special weather phenomenon affecting the Saguenay-Lac-Saint-Jean region such as Akua-Nutin. A phenomenon never before described in the land of the Innus. It is similar to the Chinook and the Foehn, but on a smaller scale. For more information on the study, see the research report available on the Web (Gauthier, 2018)[ii]

[i]**Akua-Nutin** is the name we give to the phenomenon. It is borrowed from the Innu language (an Amerindian community living in particular in the Saguenay-Lac-Saint-Jean region). It means Wind from the South: Akua=south, Nutin=Wind.

[ii]**GAUTHIER**, Majella-J., Akua-Nutin : subsidence atmosphérique à Saguenay, Université du Québec à Chicoutimi, Laboratoire d'expertise et de recherche en géographie appliquée (LERGA), rapport de recherche, 23 p. Research report, 23 p. Available in the Constellation section of the Université du Québec à Chicoutimi Library, **http://bibliotheque.uqac.ca/**

11th ICA Mountain Cartography Workshop: Mapping for Outdoor Activities in Mountains

Hvar, Croatia
May 21st-25th 2018

The 11th ICA Mountain Cartography Workshop organised by the Commission on Mountain Cartography (CMC) was held from May 21-25, 2018 in Hvar (island and city), Croatia. Workshops are held every second year, alternating with the International Cartographic Conferences (ICC).
This year the workshop venue did not follow the tradition of visiting high mountains. Instead, we met on a rugged island off the Dalmatian Coast. What 628 m Sveti Nikola, the highest peak on Hvar, lacks in altitude is compensated with its cliffs, maritime setting, history, and human interaction with the natural environment. Dražen Tutić, Matjaž Štanfeland Ana Kuveždić Divjak from the Faculty of Geodesy, University of Zagreb, together with Milo Tadic from Event&Travel Service, Stuttgart, Germany were the main organizers of the workshop. Dušan Petrovič, CMC chair, and Tom Patterson, CMC vice-chair, supported the organizers in preparation of the workshop.

The overall theme was "Mapping for Outdoor Activities in Mountains" and to address local issues in the field of mountain cartography. Two days of the workshop featured 35 presentations divided into nine sessions with the following topics: Mapping Mountains, Automation, Recreation, Caves, Volcanoes, Islands, and Oceans, Relief Presentation, Glaciers, Mountain Safety, Education, and Visualization.

The workshop was attended by 44 participants from the USA, Canada, New Zealand, Russia, Austria, Switzerland, Romania, Norway, U.K., Germany, Philippines, Slovenia, and Croatia. Four participants - Maša Arnež (Slovenia), Lukas Neugebauer and Benedikt Hajek (Austria), and Tomislav Jogun (Croatia), were able to attend thanks to ICA Young Mountain Cartographer Awards, and to present their work. The Workshop began on Monday evening with welcoming remarks from the local organizer, Dražen Tutić and the commission chair, Dušan Petrovič.

The program continued with a welcome dinner. The next two days were reserved for presentations. Each day started with a keynote presentation, first by Alex Tait from National Geographic Society with a talk titled "Mount Everest: What is left to Map?" and second by Tom Patterson from U.S. National Park Service with a talk titled "Designing 3D Terrain Maps". On Wednesday, the Commission had a meeting where Dušan Petrovič delivered current agenda and issues of CMC. On Tuesday evening participants enjoyed a mountain trivia contest prepared by Tom Patterson.

Thursday was a day for outdoor activities. In the morning, participants had an option for hiking to Sveti Nikola peak, or to walk to nearby Hvar Observatory where astronomer, Jaša Čalogović from Faculty of Geodesy gave a presentation of observations of the Sun that are conducted on this observatory. In the afternoon, the boat tour around Pakleni Islands offered swimming opportunity, views of the city of Hvar from seaside as well as the famous beaches which attract many tourists. The day concluded with a gala dinner. Friday was a final day for most of the participants, and after a wrap up and closing session, they departed Hvar. For those who stayed on the island, the organization team prepared hiking tour from Velo Grablje to Milna and back to Hvar, and for the evening a wine tasting in village Vrboska. More information on the workshop can be found on CMC website. [**http://www.mountaincartography.org/**]

Dušan Petrovič, Tom Patterson, Dražen Tutić

The next mountain cartography workshop will be held in the White Mountains, New Hampshire in May 2020. Please contact Roger Wheate (**wheate@unbc.ca**) for further information.

President’s Prize Maps 2018

President’s Prize

The CCA President’s Prize recognizes excellence in student map design and production and is open to all students at Canadian post-secondary institutions who have completed and produced a cartographic project in the preceding school year. The President’s Prize Competition consists of two prizes of $250, one for entries from college-level or CEGEP students, and one for entries from university-level students in the thematic map category:

A thematic map is a map that is meant to communicate a specific subject matter within a particular geographic area. They are often defined as special purpose maps and can be either quantitative or qualitative in nature. The International Cartographic Association (ICA) defines the thematic map this way: “A map designed to demonstrate particular features or concepts. In conventional use this term excludes topographic maps” (Dent 1999, 8).

President’s Prize (University)
Awarded to: **Henry V Godnitz**
Map Title: “The Saga of the Vinlanders”
Institution: University of Regina

President’s Prize (College or CEGEP)
Awarded to: **Johnny Eaton**
Map Title: Oh the Humanity
Institution: Centre of Geographic Sciences (COGS)

Carto-Québec Prize

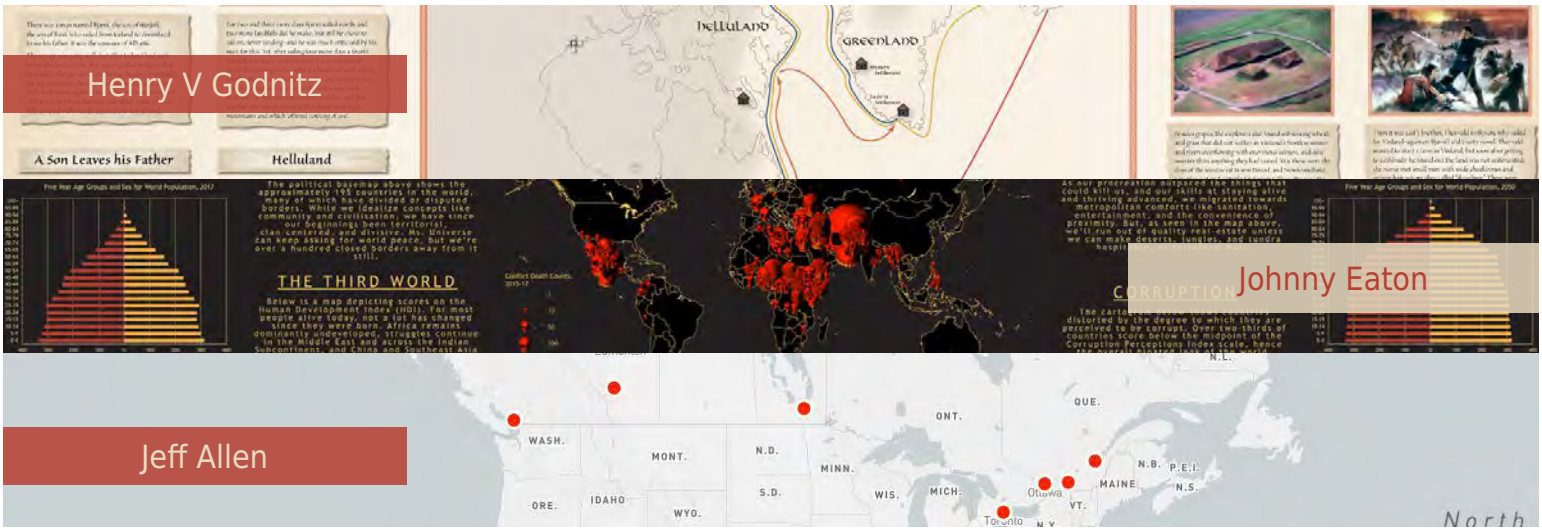
The Carto-Quebec Prize is a special annual competition for the best student-authored cartographic product in French. The award has been established through a gift from the former Association Carto-Québec to promote and recognize excellence in map design. The competition is open to all post-secondary students in Canada who have completed and produced a cartographic project in the preceding school year. The Carto-Quebec Prize will consist of two awards of $500, one for entries from college-level or CEGEP students, and one for entries from university-level students.

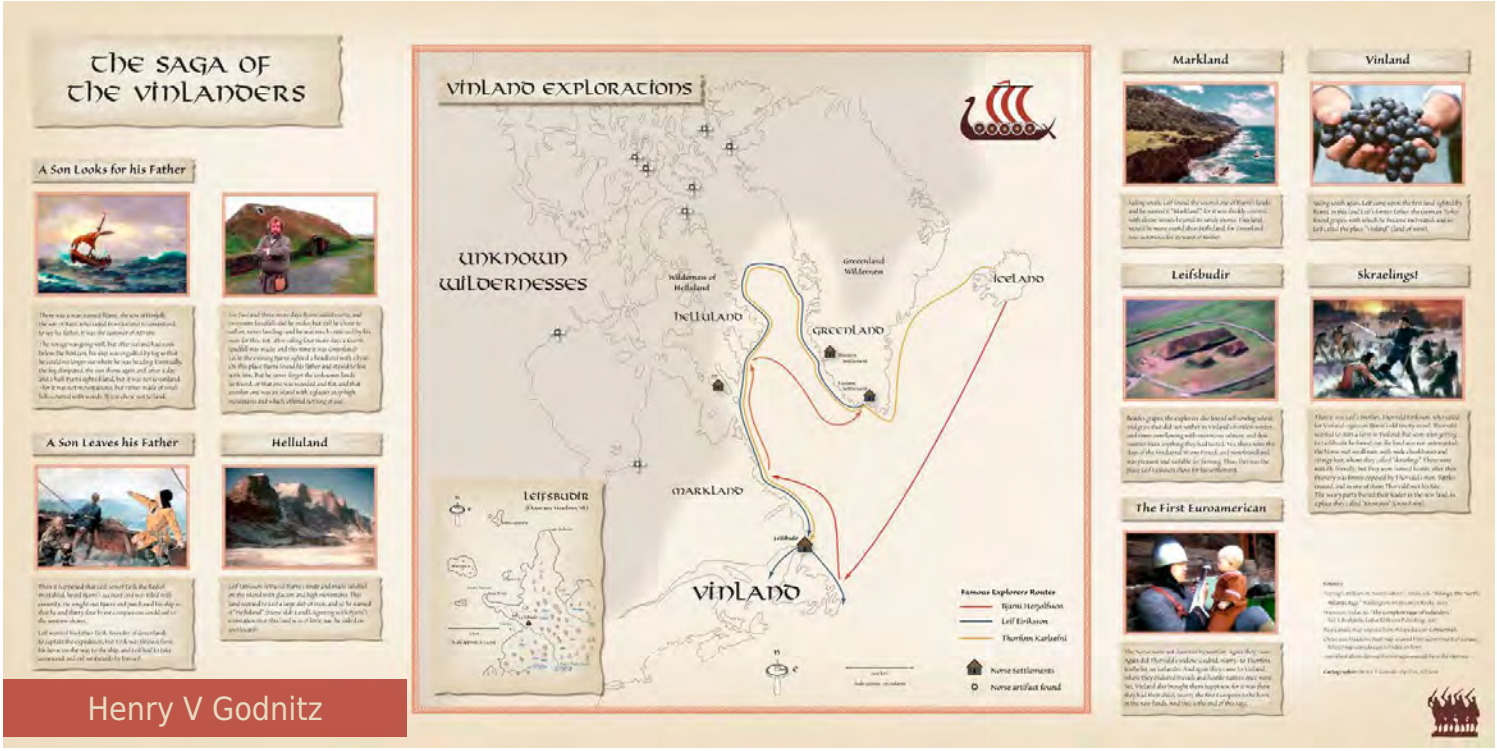
Not awarded in 2018

Web Map Award

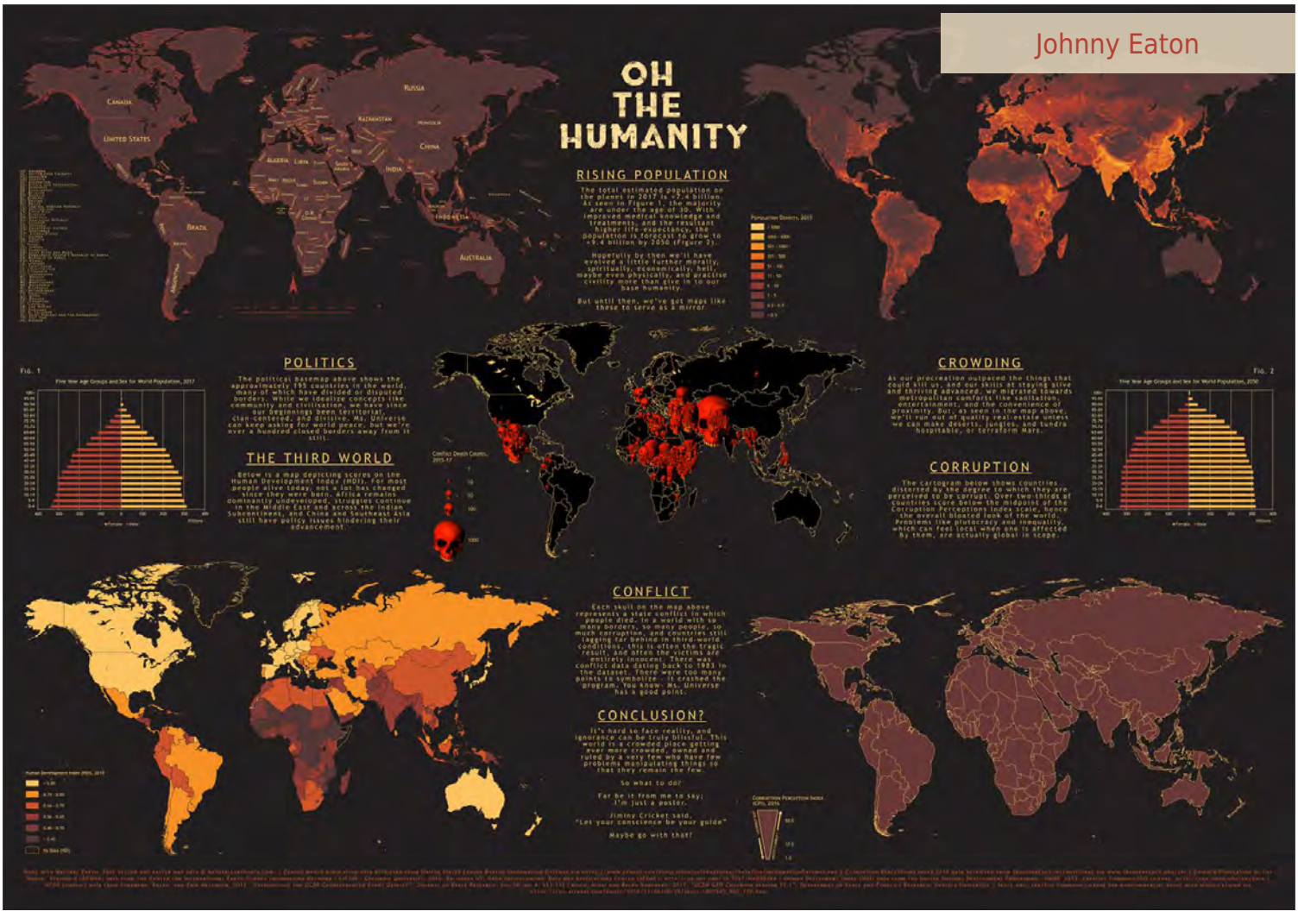
This award recognizes excellence in web mapping and is open to all post-secondary students who have completed and produced a web map in the preceding school year. The 2018 CCA Web Map Award Competition consists of one prize of $250 entries from college-level, CEGEP students, or university-level students.

Awarded to: **Jeff Allen**
Map Title: Access to Employment in Canadian Cities
Institution: University of Toronto
URL: **https://bit.ly/2LvhEsY**





Henry V Godnitz



Johnny Eaton

Design Objectives

I've built an interactive web map visualizing measures of access to employment for Canada's eight largest urban regions. The main objective of the map is to display measures of access to employment so that they can be used by researchers, urban planners, and the general public.

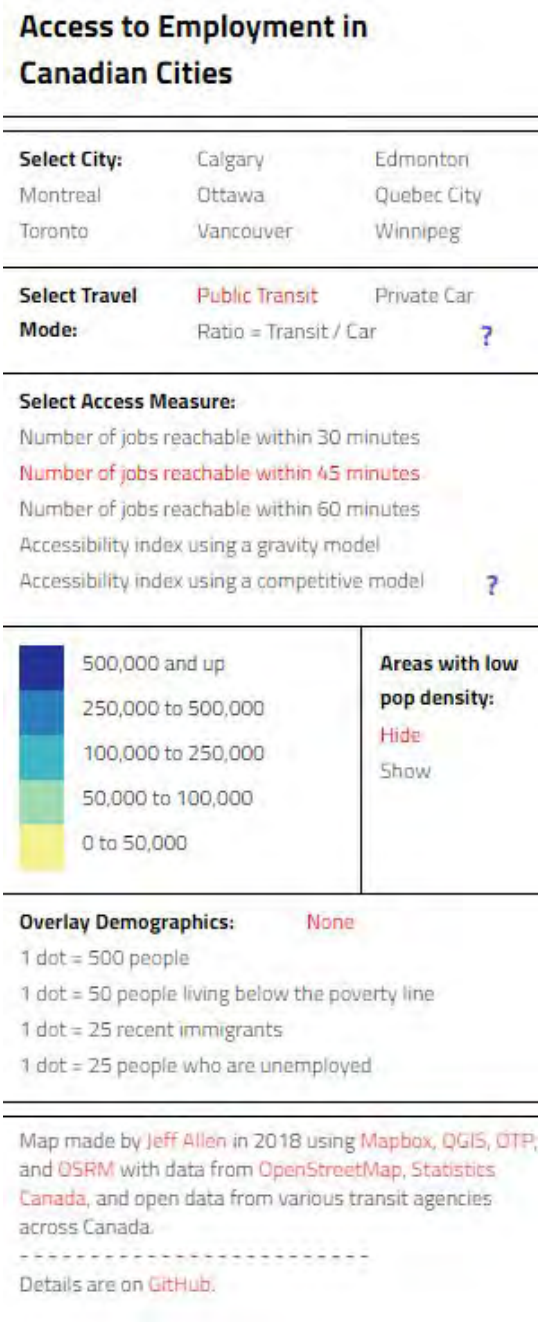
The base of the map is a choropleth at the Dissemination Area level which shows the number of jobs that can be reached within different commute times (30, 45, and 60 minutes), as well as two more advanced accessibility measures which are based on gravity and competitive formulations.

The side bar of the map has a legend as well as buttons which allow the user to switch between these types of access measures, compare levels of access between transit and car, as well as zoom to different cities. There is also a toggle to show or hide non-urban areas (population density of less than 200 people per km2). Additionally, the map includes the option of overlaying the locations of select demographic groups as a dot density layer to examine how and where different groups are aligned with regions of low access.

The map was built using tools from Mapbox (Studio, GL JS). The interface was coded using HTML, CSS, and JavaScript, but much of the data prepration was conducted in R, Python, and QGIS. Input data include OpenStreetMap, demographic and employment data from the 2016 census, and openly available transit schedules for agencies across Canada.

Code for the map and generation of its underlying data is available on GitHub at `https://github.com/SAUSy-Lab/canada-transit-access`

- Jeff Allen (2018)



Conference Schedule for 2019

Canadian Cartographic Association

May

44th Annual Conference of the Canadian Cartographic Association

University of Northern British Columbia
Prince George, BC
May 22nd-May 24th, 2019
Contact: Roger Wheate
https://cca-acc.org/

Canadian Association of Geographers/ Association Canadienne des Géographes

May

68th Annual Canadian Association of Geographers Conference

University of Winnipeg
Winnipeg, MB
May 27th-May 31st, 2019
https://www.cag-acg.ca/annual-meeting

Canadian Remote Sensing Society: 'Remote Sensing and Geomatics'

Jun

40th Canadian Symposium on Remote Sensing & Geomatics Atlantic

Fredericton, NB
June 4th-June 6th, 2019
https://crss-sct.ca/conferences/csrs-2019/

Association of Canadian Map Libraries and Archives

Jun

53rd Annual CARTO Conference of the Association of Canadian Map Libraries and Archives

McMaster University
Hamilton, ON
June 11th-June 14th, 2019
https://acmla-acacc.ca/

International Cartographic Association

Jul

29th International Cartographic Association Conference

National Museum of Emerging Science and Innovation
Tokyo, JP
July 15th-July 20th, 2019
https://icaci.org/

North American Cartographic Information Society

Oct

39th Annual North American Cartographic Information Society Meeting

Tacoma, WA
October 16th-October 19th, 2019
https://nacis.org/

FIRST NOTICE & CALL FOR PRESENTATIONS

MAPPING OUR VALUES: SOCIAL, HISTORICAL, AND NATURAL

Annual Canadian Cartographic Association Conference 2019

UNIVERSITY OF NORTHERN BRITISH COLUMBIA | 3333 University Way - Prince George, BC

The 44th Canadian Cartographic Association annual meeting, will be held in partnership with the Canadian Institute of Geomatics (BC) and the Northern BC GIS users group, at the University of Northern British Columbia, Canada's northernmost University.

We invite submissions for presentations or posters for general, special, and technical sessions. Talks and presentations may cover any area of mapping, geomatics and GIS, in the sub-areas of data acquisition, analysis and output. These may include topics such as Indigenous mapping, BC fires, UAVs and LiDAR, times series analysis, web and cloud-based mapping, as well as community and urban mapping. A formal call for presentations will follow in early January 2019.

Keynote Speaker

Chris Brackley, As the Crow Flies Cartography/Canadian Geographic - Indigenous Atlas of Canada

Key Dates

January 2019	Formal Call for Presentations
February 28, 2019	Abstract Submission Deadline
April 15, 2019	Early Registration Deadline

Conference

Wed May 22	Technical Day/Workshops, Icebreaker
Thurs May 23	Sessions & Social Event
Fri May 24	Sessions & Social Event
(Sat May 25)	Optional Field Trip: Barkerville Historic Gold Mining Town

To express interest in attending and to receive updates, please email **roger.wheate@unbc.ca**

CCA2019 UNBC
Prince George May 22-24

CANADIAN INSTITUTE OF GEOMATICS
ASSOCIATION CANADIENNE DES SCIENCES GÉOMATIQUES

NBC NORTHERN GIS USERS GROUP

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www.cca-acc.org

MEMBERSHIP COORDINATOR

Roger Wheate
University of Northern British Columbia

Membership Report, 2018

Membership has increased from 112 last year to 135 in 2018. This is largely due to the highly successful annual meeting in Nova Scotia, adding 40 'new' members as a result of their registration at the conference. Members are reminded they can choose whether to receive the journal as hardcopy or electronic.

Welcome new members 2018:

Roger Windsor	Shelburne	NS
Anatolijs Venovcevs	Happy Valley-Goose Bay	NL
Heather LeBlanc	Granville Rd	NS
Monica Rivers	Abercrombie	NS
Vicki Gazzola	Eastern Passage	NS
Debbra Wilkinson	Amherst	NS
Lori Haslett	Summerside	PE
Joseph Beland	Dartmouth	NS
Clint Loveman	Redlands	CA
Sylvia Dixon	Nictaux	NS
Steven Gaudet	Port Maitland	NS
Connor Howard	Truro	NS
Susan Kingdon	Fredericton	NB
Laura Syms	Sydney	NS
Joseph Gothreau	Prince George	BC
Thomas Herbreteau	Fredericton	NB
Jillian Ejdrygiewicz	Middleton	NS
Sylvain Gagnon	Memramcook	NB
Michael Benson	Millbrook	NS
James Bornemann	Sackville	NB
Phillip Bailey	Annapolis Royal	NS
Melanie MacDonald	Toronto	ON
Claudio Aporta	Fall River	NS
Marcel Morin	Grand Pre	NS
Michael Donnelly	Hampton	NS
Catherine Fraser	Antigonish	NS
Ruth Thurston	Lower Sackville	NS
Mila Cox	Halifax	NS
Monica Beaton	Nictaux West	NS
Reginald Lawrence	Truro	NS
Rylan Palmer-Dixon	Truro	NS
Margie Massier	Pasadena	NL
Andrew Sherin	Halifax	NS
Daniel Gallant	East Leicester	NS
David Colville	Lawrencetown	NS
Ian Holmes	Amherst	NS
Elizabeth Gallant	East Leicester	NS
Rachel Brighton	Kentville	NS
Lisa Sawyer	Innerleithen	Scotland
Ian Spooner	Wolfville	NS
Andrew Schroeder	Ottawa	ON
Michael Dragonetti	Calgary	AB

Mike Goodchild and Ada Cheung lead the lobster fest

Orienteers with backs to the wall

Newsletter of the/Bulletin de Canadian Cartographic Association/l'Association canadienne de cartographie

CCA Executive/Exécutif de l'ACC

President/Président
Monica Lloyd
Centre of Geographic Sciences
Nova Scotia Community College
Lawrencetown, NS B0S 1M0
E-mail: president@cca-acc.org

Vice President/Vice-président
Ted MacKinnon
GISP – Geomatics Specialist
Natural Resources
Amherst, NS B4H 3Y1
E-mail: t_mackinnon@yahoo.com

Past President/Président-sortante
Julia Siemer
Department of Geography and Environmental Studies
University of Regina
Regina, SK S4S 0A2
E-mail: pastpresident@cca-acc.org

Secretary/Secrétaire
Claire Gosson
38 Ridgeburn Gate
Ottawa, ON K1B 4C3
E-mail: secretary@cca-acc.org

Treasurer/Trésorier
Byron Moldofsky
177 Brookdale Ave
Toronto, ON M5M 1P4
E-mail: treasurer@cca-acc.org

Interest Group Chairs/ Présidents des groupes d'Intérêt

History of Cartography/ Histoire de la cartographie
Byron Moldofsky
E-mail: byron@geog.utoronto.ca

Education/Éducation
Claire Gosson
E-mail: secretary@cca-acc.org

Mapping Technologies and Spatial Data/ Technologie cartographiques et données spatiales
Vacant

Design and Geovisualization/ Cartographie analytique et design
Vacant

Appointees/Personnes nommées

Cartographica (submissions/ proposition d'articles)
Emmanuel Stefanakis
University of Calgary
Department of Geomatics Engineering
2500 University Drive N.W
Calgary, AB T2N 1N4
Email: emmanuel.stefanakis@ucalgary.ca

ICA Delegate/délégué à l'ACI
Roger Wheate
Faculty of Natural Resources
University of Northern British Columbia
Prince George, BC V2N 4Z9
E-mail: wheate@unbc.ca

Membership Coordinator/ Coordonnateur des adhésions
Roger Wheate
Faculty of Natural Resources
University of Northern British Columbia
Prince George, BC V2N 4Z9
E-mail: membershipcoord@cca-acc.org

Communications
Anna Jasiak
E-mail: annajasiak20@gmail.com

Cartouche Editorial Team/ Équipe éditoriale de Cartouche
Monica Rivers
GIS Technician
Abercrombie, NS B2H 5C6
E-mail: monicarivers.46@gmail.com

Gordon Campbell
Centre of Geographic Sciences
Lawrencetown, NS B0S 1M0
Email: gordon.fraser.campbell@gmail.com

Co-ordinator, National Map Exhibit/ Coordonnateur de l'exposition cartographique nationale
Janet Mersey
Associate Professor
University of Guelph
Department of Geography
Guelph, ON N1G 2W1
E-mail: jmersey@uoguelph.ca

Barbara Petchenik International Children's Map Competition/ Compétition internationale Barbara Petchenik de cartes dessinées par des enfants
Karen VanKerkoerle
Cartographic Section
Geography Dept., SSC, Western
London, ON N6A 5C2
E-mail: kvankerk@uwo.ca

Student Representative/ Représentant des étudiants
Gordon Campbell
Centre of Geographic Sciences
Nova Scotia Community College
E-mail: studentrep1@cca-acc.org

Webmasters
Monica Lloyd
E-mail: monica.lloyd@nscc.ca
Byron Moldofsky
E-mail: treasurer@cca-acc.org

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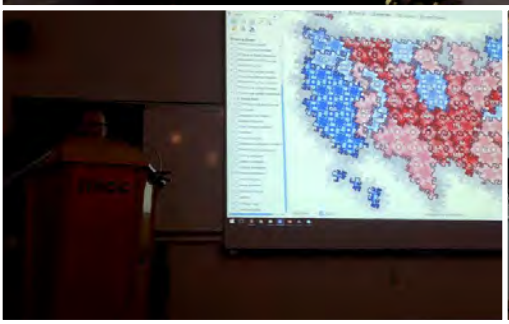
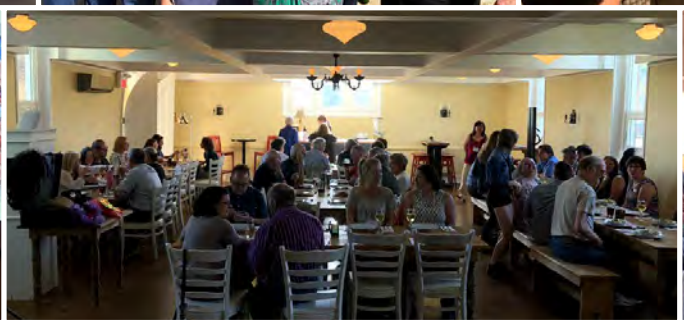
2018 CCA Conference Photos

Lawrencetown, NS

Photos provided by Monica Lloyd