Christopher Belanger

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EDUCATION

University of Ottawa
Postdoctoral Fellowship, 2022
MBA, 2021

University of Toronto
PhD, Philosophy of Modern Physics, 2015
BSc Hon, Physics and Mathematics, 2007

EMPLOYMENT EXPERIENCE

Ottawa Neighbourhood Study, Data Scientist, Sept. 2020 - Present.
- Spearheaded a geospatial data-science project in collaboration with the City of Ottawa to collect, process, and analyze data about rental apartment availability and affordability, including making data available via an application programming interface (API) for City of Ottawa use in research and service delivery.
- Led collection and analysis of geospatial and administrative data about food retailers for a comprehensive study of inequities in Ottawa's food environment.

University of Ottawa Faculty of Medicine/Institut du Savoir Montfort, Postdoctoral Fellow, 2022.
- Supervised by Dr. Lise Bjerre, Institut du Savoir Montfort Chair in Family Medicine, my research focused on geospatial analysis of access to healthcare and evaluating the impacts of virtual care in Ontario.
- My research led to multiple peer-reviewed publications, including a first-authored paper in the CMAJ's Open Access Journal, and produced new methods and open-source tools.

Natural Resources Canada, Policy Advisor: Strategic Science Policy, May 2018 - Sept. 2019.
- Led the skills and diversity stream of NRCan's 2019 Medium-Term Planning (MTP), delivering an evidence-based cross-Department plan that the Deputy Minister and ADMs praised for its high quality.
- Worked with executives to design and implement data-driven governance and control systems for the Canadian Council of Forest Ministers (CCFM), strengthening accountability and decision-making.

Ontario Ministry of Health and Long-Term Care,
Policy Advisor to the Assistant Deputy Minister, Senior Program Consultant Oct. 2014 - May 2018.
- Integrated data-driven analysis with direct policy and strategy advice to the ADM and Directors on primary care and home and community care.
- Led ministry negotiations on two >$30M funding agreements for electronic medical records (EMRs).
- Led oversight for Ontario's investments in EMRs for community-based clinicians.

PUBLICATIONS (PEER-REVIEWED)

Belanger, C., Carr, K., Peixoto, C., Bjerre, L.M. (2023) Distance, access and equity: a cross-sectional geospatial analysis of disparities in access to primary care for French-only speakers in Ottawa, Ontario. *Canadian Medical Association Open Access Journal*. 1(3):E434–42. https://doi.org/10.9778/cmajo.20220061

Fitzsimon JP, Belanger C, Glazier RH, et al. (2023) Clinical and economic impact of a community-based, hybrid model of in-person and virtual care in a Canadian rural setting: a cross-sectional population-based comparative study. BMJ Open 13(5). British Medical Journal Publishing Group: e069699. https://doi.org/10.1136/bmjopen-2022-069699.

Fitzsimon J, Patel K, Peixoto C, et al. (2023) Family physicians' experiences with an innovative, community-based, hybrid model of in- person and virtual care: a mixed-methods study. BMC Health Services Research 23(1): 573. https://doi.org/10.1186/s12913-023-09599-x

Buchanan S, Peixoto C, Belanger C, et al. (2023) Investigating Patient Experience, Satisfaction, and Trust in an Integrated Virtual Care (IVC) Model: A Cross-Sectional Survey. The Annals of Family Medicine. The Annals of Family Medicine. https://doi.org/10.1370/afm.2978

Cambon, J., Hernangómez, D., Belanger, C., & Possenriede, D. (2021). tidygeocoder: An R package for geocoding. *Journal of Open Source Software*, 6(65), 3544. https://doi.org/10.21105/joss.03544

Lewis, C. T., & Belanger, C. (2015). The generality of scientific models: A measure theoretic approach. Synthese, 192(1), 269–285. https://doi.org/10.1007/s11229-014-0567-2

Belanger, C. (2013). On two mathematical definitions of observational equivalence: Manifest isomorphism and reconsidered. Studies in History and Philosophy of Science Part B: Studies in History and Philosophy of Modern Physics, 44(2), 69–76. https://doi.org/10.1016/j.shpsb.2012.11.001

PUBLICATIONS UNDER PEER REVIEW

Belanger, C., Chreim, S., Bonaccio, S. The Experience of Meaninglessness at Work in the Canadian Public Service.

Belanger, C., Peixoto, C., Francoeur, S., Bjerre, L.M. Patient and provider satisfaction with a geomapping tool for finding community family physicians: A cross-sectional survey study in Ontario, Canada.

Belanger, C., Pond, G., & Boatman, M., & Mangotich, M. Road Safety in the Canadian Army: Review and Recommendations.

Mulvey, M., Belanger, C., & Bakker, D. Working it Out: Consumer Response to the Service Disruption of Gym Closures during the Pandemic.

Ménard, A., O'Sullivan, T., Mulvey, M., Belanger, C., Fraser, S. Perceptions of hospital care for persons with dementia during the COVID-19 pandemic: a social media sentiment analysis.

SELECTED PUBLISHED R PACKAGES (OPEN-SOURCE DATA SCIENCE SOFTWARE)

pseudohouseholds (2023). Creator, author.

- Given an arbitrary set of spatial regions and road networks, generate pseudohouseholds that can be used for travel burden analysis. https://cran.r-project.org/package=pseudohouseholds

tardis (2022). Creator, author.

- Text Analysis with Rules and Dictionaries for Inferring Sentiment: Measure text's sentiment with custom dictionaries and simple rules covering negations and modifiers. https://CRAN.R-project.org/package=tardis

valhallr (2021). Creator, author.

- A tidy R interface to the open-source Valhalla routing engine for vehicle routing, isochrones, and origin-destination analyses. https://CRAN.R-project.org/package=valhallr

tidygeocoder (2021). Author, Google Maps module.

- A unified R interface to several online geocoding services. https://cran.r-project.org/package=tidygeocoder

storywranglr (2021). Creator, author.

- Explore visualizations of Twitter trends with the 'Storywrangler' API. https://CRAN.R-project.org/package=storywranglr

SELECTED CONFERENCE PRESENTATIONS AND INVITED TALKS

Ménard A, O'Sullivan T, Mulvey M, Belanger C, Fraser S. Abstracts and/or Papers Read. (2023, October). Perceptions of hospital care for persons with dementia during the COVID-19 pandemic: A social media sentiment analysis. Canadian Association on Gerontology Conference, Toronto, Canada.

Lever, M., Mulvey, M., Belanger, C., Primossi, V. Crowdsourcing insights into travel accessibility: A social listening playbook. Travel and Tourism Research Association Canada Chapter Conference. (September 2023)

Belanger, C., Carr, K., Peixoto, C., Bjerre, L.M. Distance, access and equity: a cross-sectional geospatial analysis of disparities in access to primary care for French-only speakers in Ottawa, Ontario. Health Canada 2023 Colloquium on the Health of Official Language Minority Communities. (March 2023)

Bjerre, L., Belanger, C., Fitzsimon, J., Peixoto, C. "I need a family doctor!! How can I find one?" – Docmapper.ca: An interactive map to support (language-concordant) access to primary care. Trillium Primary Health Care Research Day (October 2022).

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Belanger, Christopher, Samia Chreim, and Silvia Bonaccio. “Feeding the Beast: The Experience of Meaninglessness at Work in the Public Sector.” Academy of Management Proceedings 2022, no. 1 (August 2022): 12121. https://doi.org/10.5465/AMBPP.2022.12121abstract.

Belanger, Christopher. “Scraping Data from the Web with R.” Presentation to the Public Health Agency of Canada (PHAC). (September 2021). https://github.com/chris31415926535/talk_phac_data_scraping.

SELECTED GRANTS, AWARDS, AND SCHOLARSHIPS

- **2020 Pierre Maurer Metropolitan Life Scholarship:** For achieving the highest average grade of uOttawa’s intensive MBA cohort.
- **2020 MBA Alumni Association Award:** For a data science project in support of the Ottawa Food Bank.
- **2020 James F. Roache Award:** For the highest outstanding ethical standards in uOttawa’s MBA program.
- **2011 Ontario Graduate Scholarship**
- **2009-2010: SSHRC Doctoral Fellowship**

SELECTED DATA-SCIENCE AND ANALYTICS PROJECTS

“Social Astronomy,” a Web Application for Social Media Netnography and Analytics.

- Interactive online software for collecting and analyzing posts from the social media site Reddit, enabling analysts to rapidly and iteratively generate and test hypotheses. Full-stack application using SolidJS frontend, backend analytical APIs written in node.js and R Plumber, and elasticsearch.

Geospatial Inequities in Travel Times to Primary Care and Mental-Health Care in Renfrew County.

- With Renfrew County and the *Institut du Savior Montfort*, this project calculated and analyzed travel times to primary health care and mental health care for residents of Renfrew County, Ontario. This project is still in development, working towards a manuscript.

Optimizing Road Inspection Routes in Kingston, Ontario.

- This applied research project, done with the Royal Military College of Canada and the City of Kingston, applied machine learning/AI and optimization techniques to large data sets, including road network data and detailed road-segment-level classifications, to develop routes that met Ministry of Transportation-mandated inspection requirements while also minimizing travel times.

Optimizing Food Bank Locations.

- Executed a geospatial data-science project for the Ottawa Food Bank to study optimal locations to minimize travel clients’ travel burden. This work, done with a co-author, won the 2020 Telfer MBA Alumni Association Award.

Creating A Twitter Bot to Find COVID-19 Vaccination Appointments.

- When COVID-19 vaccines first became available in Canada, it was extremely difficult to find appointments. As a public service I created a Twitter bot, available as an R package on GitHub, that automatically queried the Ontario provincial COVID-19 booking system and tweeted out available appointments within approximately 50km of Ottawa, Ontario. Available: https://github.com/chris31415926535/covaxr

Social-Media Analysis of Ageist Discourse on Twitter.

- Combined quantitative methods with qualitative content analysis to study big data sets of social media posts related to ageism expressed on Twitter, combining data sources from Google Trends, news articles, and Twitter. This project is still in development, working towards a manuscript.

Predicting Consumer Ratings from Review Text.

- Created a natural-language model that uses machine learning/AI techniques to predict customer review valence from plain text reviews.