|  |  |
| --- | --- |
| **­Winter 2020****COMS 5225A Critical Data Studies**Communication and Media StudiesSchool of Journalism and CommunicationJan 08, 2020 - April 1, 2020Wednesdays, 14:30 - 17:30, RB4308Dr. Tracey P. LauriaultTracey.Lauriault@Carleton.ca @TraceyLauriaultorcid.org/0000-0003-1847-2738**Office Hours:** Thursdays 13:00-16:00 | A view of a city  Description automatically generated |

### Textbook & Readings:

* See the course schedule, cuLearn and ARES for readings.

### Communication:

* Updates and course information will be posted on [CuLearn](http://www.carleton.ca/culearn) and/or emailed to you.
* Include ***COMS5225A in E-Mail subject lines.***

### Course description:

### The emphasis is learning to envision data genealogically, as a social and technical assemblage, as infrastructure and reframe them beyond technological conceptions. During the term we will explore data, facts and truth; the power of data both big and small; governmentality and biopolitics; risk, probability and the taming of chance; algorithmic culture, dynamic nominalism, categorization and ontologies; the translation of people, space and social phenomena into and by data and software and the role of data in the production of knowledge.

### This class format is a graduate MA seminar, a collaborative workshop with a Community Partner which is the *Infrastructure Canada Smart Community Challenge Team* and this year’s theme is critical data studies and smart cities.

### Assignment instructions:

* Submit to cuLearn
* Format: .doc, .docx, .rtf (NOT .pdf NOT .Pages)
* Use 12 pt. font, 1.5 line spacing, 1-inch margins and indent paragraphs
* Include page numbers, captions for figures and tables, use formatting styles
* Citation style: Chicago, Harvard, APA, footnotes are acceptable
* Include a **document header** as follows:

COMS5225A Critical Data Studies, submitted to: Dr. Tracey P. Lauriault, Assignment #, DATE, Michael Grieves, Student ID

### File naming convention:

GrievesMichael\_COMS5225\_Assignment1

### Assessment/work schedule:

|  |  |  |
| --- | --- | --- |
| 1. Weekly reading reflections – **In-Class paper submission**
 | Weekly | 30% |
| 1. Data Description and Conceptualization Assignment, 3-pages
 | Week 2 Jan. 15 | 10% |
| 1. CDS Research Paper and Poster Project
 | ***Total 50%*** |  |
| * 1. Infrastructure Canada Guest Lecture and Visit
 | Week 3 Jan. 22 |  |
| * 1. Smart City Assemblage Brainstorm – Mind map
 | Week 4 Jan. 29 | 5% |
| * 1. Poster Project Proposal – Quad Chart
 | Week 5 Feb.5 | 5% |
| * 1. DRAFT Poster Abstract – Peer Review
 | Week 7, Feb. 26 |  |
| * 1. Submit Poster Abstract (CULearn & CUIDS)
 | TBD | 5% |
| * 1. Draft Poster for In-Class Peer Review
 | Week 9 Mar. 11 |  |
| * 1. Submit draft CDS Research Paper for peer review
 | Week 10 Mar. 18 |  |
| * 1. Print Final Poster & Submit to CULearn
 | Week 12 **Mar. 30**  | 15% |
| * 1. Attend Data Day 7.0
 | Week 12 **Mar. 31**  |  |
| * 1. Submit Final Research Paper to CULearn 15-pages
 | Week 12 Apr. 1  | 20% |
| 1. In-Library Map Assignment
 | **Week 8 Mar. 4** | 10% |
| **Total** | **100%** |

### Weekly Reading Reflections (30%) (8 of 12) SUBMIT on paper in class:

Students are asked to submit weekly reflections where they critically discuss their smart city communities in relation to a weekly question, the readings, thematic readings and thematic encyclopaedia readings. Students are asked to conceptually integrate the material for that week, and to consider these in the context of their communities and are asked to identify concepts that may inform their CDS Research Paper and/or their poster project. The reflection should end with a question for the class.

* + The first week of class you will select **2 of 20** Infrastructure Canada Smart City Challenge submissions (<https://www.infrastructure.gc.ca/cities-villes/proposals-propositions-eng.html>).
		- You will also work with the call for tender for the Smart Community Challenge (<https://impact.canada.ca/en/challenges/smart-cities/challenge>) and
		- the Open Smart City Guide V1.0 (<https://docs.google.com/document/d/1528rqTjzKWwk4s2xKuPf7ZJg-tLlRK8WcMZQbicoGTM/edit>).
	+ This does not need to be a polished document; you can jot notes in the document during class, you can add sketches, images and/or diagrams and tables. It can be typed or written by hand on any medium of paper of any size!
	+ Only in class paper submissions are accepted.
	+ The objective is to build knowledge on a weekly basis to inform you final CDS Research Paper

### Data Description and Conceptualization - Due Week 2, Jan. 15, 8:00AM (10%):

Select a dataset related to this year’s theme of smart cities, and ideally one related to either of your Smart City Challenge Communities. In a **total of 3 pages** describe these data technically where a technical description generally includes the following, but do not be limited to this: consider format, sample size, headings, metadata, licences and terms of use, how are they disseminated, who is the publisher, the producing institution, data authors if there are any, methodology, dates, geography, classifications, models, methods, etc. Be sure to cite the dataset & provide the URL, cite any related documentation, you can use footnotes, images and tables if useful, but do use full citation, captions and document styles. Get to know these data. You will also conceptually frame these data according to **Kitchin's 4 remaining conceptualizations** and **identify any elements of the socio-technological assemblage**. State why you are interested in this dataset, what these might be used for, and explain what leads you to trust them or not. NOTE: Images, tables and references will not go against your page count. Think of this as a critically informed lab report.

### CDS Research paper and poster project:

Students will demonstrate their familiarity with the course material by applying critical data studies concepts and theories related to this year’s theme of smart cities. For the poster, students are to research and map out the socio-technological data assemblage of a smart city theme or topic or city or community which can be related to one or both of their smart communities or the INFC Impact call for tender or the Open Smart City Guide. The abstract and poster will be submitted and presented at the Data Day 7.0 Conference on March 31 organized by the Carleton Institute for Data Science.

Students will also write a 15-page Critical Data Studies Research Paper that incorporates the readings, their specific smart city communities, the IMPACT call for tender and the Open Smart City V1.0 Guide. When writing this paper, consider INFC as your reader, and your objective is to introduce them to a CDS approach to thinking about and governing smart communities. Images, tables and references do not go against your page count. (<http://www.studygs.net/wrtstr8.htm>)

**3.1 Infrastructure Canada Guest Lecture Week 3 Jan. 22.**

**3.2 Smart City Assemblage Brainstorm, Week 4 Jan. 29 (5%)**

Students can use Mindmap, Coggle.it, or power point or any other tool to draw out/illustrate or model the socio-technological assemblage of the data, processes and technologies discussed by INFC. You can relate this to your communities if you like. We will show these in class on Week 5.

**3.3 Poster Project Proposal,** 1-page Quad Chart, **Week 5 Feb.5 (5%)**

1. Introduce what you will examine
2. Provide two potential research questions
3. State your methodological approach and concepts you will examine
4. References

**3.4 DRAFT poster abstract for peer review, Week 7 Feb. 26** - Follow the CUIDS instructions.

**3.5 Submit Final Poster Abstract to CUIDS date TBD (5%)**

**3.6 Digital Draft of Poster for In-Class Peer Review Week 9 Mar. 11**

See CUIDS instructions. Note that a poster is a form of scholarly communication common in STEAM disciplines. Keep in mind that your poster will be somewhat different, and you will adapt it to critical data studies and your topic. Here are some useful guidelines:

* + NYU Libraries Guide: <http://guides.nyu.edu/c.php?g=276826&p=1846154>
	+ Urbana Champaign Library Guide: <http://guides.library.illinois.edu/c.php?g=347412&p=2343433>
	+ 10 Simple Rules for a Good Poster Presentation: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1876493/>

**3.7 Submit a draft CDS Research Paper for peer review Week 10 March 18**

Note that your weekly submissions are helping you create content for this research paper.

**3.8 Print poster and submit digital copy to CULearn Week 12 Mar. 30 (15%)**

If your poster is accepted for Data Day 7.0 a printout of your poster will be required and generally there is a cost to this (+/-40$). Should your poster not be accepted a digital copy only is to be submitted. Whether or not your poster is accepted does not affect your mark.

**3.9 Attend Data Day 7.0 Poster Session Week 12 on Tuesday Mar. 31**

**3.10 Submit final CDS Research paper to CULearn, Week 12 April 1, 20%.** A copy of the paper and poster will also be shared with the Director General of INFS Smart Communities Program and her team.

### In-library mapping Assignment Week 8 Mar. 4 (10%)

### Late Policy: Do not be late!

### Readings & Schedule

## Week 1 (Jan.8) – What are data? Facts? Data-based Reasoning?

|  |  |
| --- | --- |
| **Welcome!** We will get to know each other, exchange data stories, go over the plan for the term and divide the readings. If you can skim the papers for this week that would be great! We will also do a small data exercise. | **This first class will be informed by:**Couldry, Nick and Hepp, Andreas (2017) Data, Ch.7 in *The Mediated Construction of Reality*, Polity Press.Hovland, John (2011) Numbers: Their Relation to Power and Organization, Ch. 1 in Rudinow Saetan, Anne, Mork Lomell, Heidi and Hammer,Svein (eds) *The Mutual Construction of Statistics and Society*, Routledge.Kitchin, Rob, (2014) Conceptualizing Data, Ch. 1 *The Data Revolution: Big Data, Open Data, Data Infrastructures and their Consequences*, Sage: UK.Manovich, Lev (2009) Database as Symbolic Form, Ch.21 in Thornham, Sue, Basset, Caroline and Marris, Paul (eds), *Media Studies Reader, 3rd edition*, New York University Press.Porter, T. M. (1986), Statistics as Social Science, Ch.1 in *The Rise of Statistical Thinking 1820-1900*, Princeton University Press.  |
| **Thematic Encyclopaedic Readings:**Caragliu, A., D Bo, C. and Nijkamp, P. (2015) Smart Cities, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 113-117. |
| **In-Class Data Exercise** |

## Week 2 (Jan. 15) – Assemblages, Indicators and Performance Measures

|  |  |
| --- | --- |
| This week we learn what data assemblages are and explore the world of indicators. We will also prepare for the Infrastructure Canada Smart City Challenge Team coming week 3 by familiarizing ourselves with the indicators that matter in terms of your communities. | **Readings:** Hammer, Svein (2011) Governing by Indicators and Outcomes: A Neoliberal Governmentality, Ch. 4 in Rudinow Saetan, Anne, Mork Lomell, Heidi and Hammer,Svein (eds) *The Mutual Construction of Statistics and Society*, Routledge.Immervol, Herwig (2012) Minimum Income Benefits in OECD Countries, Ch.9 in Besharov, Douglas J. and Couch, Kenneth A., (eds) *Counting the Poor: New Thinking About European Poverty Measures and Lessons for the United States*, Oxford University Press. Kitchin, Rob; Lauriault, Tracey P. and McArdle, Gavin (2014) Knowing and governing cities through urban indicators, city benchmarking and real-time dashboards, *Regional Studies and Regional Science* <http://dx.doi.org/10.1080/21681376.2014.983149> |
| **Thematic Materials:**Rob Kitchin, Claudio Coletta, Leighton Evans, Liam Heaphy (2019) Creating Smart Cities, Regional Studies Association: Regions and Cities, Routledge. * Chapter 1. Introduction, Creating Smart Cities

Sassen, Saskia (2015) Cities: Capital, Global, and World,*International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), pp.585-592 <http://dx.doi.org/10.1016/B978-0-08-097086-8.74004-9> **Encyclopaedic Readings:**Bollen, Kenneth A, and Bauldry, Shawn (2015) Indicators, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 750-754. <http://dx.doi.org/10.1016/B978-0-08-097086-8.44032-8>Cutler, Tony (2015) New Managerialism and New Public Sector Management, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 770-775. <http://dx.doi.org/10.1016/B978-0-08-097086-8.28063-X>Head, Brian W (2015) Policy Analysis: Evidence Based Policymaking, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 281-287. <http://dx.doi.org/10.1016/B978-0-08-097086-8.75030-6> **Indicators**World Council on City Data <http://www.dataforcities.org/>CITYkeysindicators for smart city projects and smart cities <http://nws.eurocities.eu/MediaShell/media/CITYkeysD14Indicatorsforsmartcityprojectsandsmartcities.pdf> Jones Lang LaSalle (2017) The Business of Cities 2017: Decoding the City? <http://www.jll.com/cities-research/Documents/benchmarking-future-world-of-cities/JLL-Decoding-City-Performance-2017.pdf>Money Magazine https://money.com/collection/best-places-to-live-2019/ Government of Canada takes action on the 2030 Agenda for sustainable development <https://www.canada.ca/en/employment-social-development/programs/agenda-2030.html> KPIs for Smart Sustainable Cities <https://www.itu.int/en/ITU-T/ssc/Pages/KPIs-on-SSC.aspx>  |
| **Indicator Reference Material:** EUROSTAT Manual and Guidelines (2018) Chapters 3 & 4,*Technical Report on Statistics of Internally Displaced Persons: Current Practices and Recommendations for Improvement*, <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-18-003?inheritRedirect=true&redirect=%2Feurostat%2Fpublications%2Fmanuals-and-guidelines> Lambert, David and Atkins, Julie (2015) *New Jersey’s Manage By Data Program: Changing Culture and Capacity to Improve Outcomes, Improving Performance Series*, IBM Centre for the Business of Government­UNAids, *An Introduction to Indicators*, <http://www.unaids.org/sites/default/files/sub_landing/files/8_2-Intro-to-IndicatorsFMEF.pdf>  |
| **Week 2 - In-Class Exercise:**Examine the Vision of your smart city submissions, the impact, theory of change, KPI or performance indicator model. Does this model and its associated indicators align with the vision? What is being measured? Does it make sense? Is there anything missing? What contribution have the readings made to your understanding of what is being proposed in your submissions? |

## Week 3 (Jan. 22) - Infrastructure Canada Guest Speakers

|  |
| --- |
| **Week 3 - In-Class Indicator Exercise:**To prepare for our guests, please list a series of questions you might have about the program, about the IMPACT, and your Communities. If you think you might require any additional information for your poster or research paper, this is a good time to inquire. |

## Week 4 (Jan. 29) – Facts

|  |  |
| --- | --- |
| This week we discuss objectivity and the production of facts and whether it is possible to tell the truth! | **Readings:**Bauchspies, Wenda K., Croissant, Jennifer and Restivo, Sal (2006) Cultures of Science Ch.2 in *Science, Technology and Society*, Blackwell Publishing.Gruber Garvery, Ellen, (2013) “facts and Facts”: Abolitionists’ Database Innovations, In Gitelman, L. (ed) *“Raw Data” is an Oxymoron.* MIT Press, Cambridge, pp 89-103.Igo, Sarah E. (2007) The Private Lives of the Public, Ch. 6 in *The Averaged American: Surveys, Citizens, and the Making of a Mass Public*, Harvard University Press.Jerven, Morten (2013) Facts, Assumptions, and Controversy: Lessons from the datasets, Ch. 3 in *Poor Numbers: How we are misled by African Development Statistics and What to do About it*, Cornell University Press.National Academy of Science (2018) Executive Summary, *The Irreproducibility Crisis of Modern Science: Causes, Consequences, and the Road to Reform,* April 17, <https://www.nas.org/projects/irreproducibility_report/the_report> Rosemberg, Daniel, (2013) Data Before the Fact, In Gitelman, L. (ed) *“Raw Data” is an Oxymoron.* MIT Press, Cambridge, pp.15-41.  |
| **Thematic Reading:** Hollands, Robert G. (2008) Will the real smart city please stand up? Intelligent, progressive or entrepreneurial? In City Volume 12 (3), pp. 303-320 https://doi-org.proxy.library.carleton.ca/10.1080/13604810802479126 Luca Mora, Roberto Bolici & Mark Deakin (2017) The First Two Decades of Smart-City Research: A Bibliometric Analysis, *Journal of Urban Technology*, 24:1, 3-27, DOI:10.1080/10630732.2017.1285123 Campbell, Rebecca; Shaw, Jessica and Fehler–Cabral, Giannina (2015) Shelving Justice: The Discovery of Thousands of Untested Rape Kits in Detroit, *City & Community*, 14 (2) 2, pp.151–166. DOI: 10.1111/cico.12108**Encyclopaedia Material:**Shapin, Steven (2001) Truth and Credibility in Science, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 673-677 <http://dx.doi.org/10.1016/B978-0-08-097086-8.85039-4> **Critical Thinking Material:**CRAP Test: <https://library.carleton.ca/help/evaluating-online-information-use-crap-test> Lawton, Graham (2017) Effortless Thinking: Thoughtlessly Thoughtless: Why are the ideas that come most effortlessly to us often are often misguided, *New Scientists*, Dec. 16.Rough Guide to Spotting Bad Science: <https://www.compoundchem.com/2014/04/02/a-rough-guide-to-spotting-bad-science/>  |
| **Week 4 - In-Class Facts Exercise:**How will your Smart City Challenge submissions ensure that they deliver on their promise? How can the public they aim to serve, and Infrastructure Canada be assured that they will do what they purport to do? How to attest to the trust of their work? How should results be reported? What would you propose? Is there anything in their organizational structure that can help? Are there any ideas from the readings that can improve these submissions? How can they be more transparent? Proactive disclosure? |

## Week 5 (Feb. 5) – Categories and Social Sorting

|  |  |
| --- | --- |
| Humans like to make sense of the world by sorting things out into classifications and then measure them with indicators. This week we examine the classic Hacking’s social constructivist view of classifying and how classification is key to infrastructural thinking. | **Readings:**Criado Perez, Caroline, Invisible women: Data Bias in a World Designed by Men, Abrams Press Introduction: The Default Male pp1.-25 Being Worth Less than a Shoe, pp.128-142Bowker, Geoffrey C. and Leigh Star, Susan (2002) Categorical Work and Boundary Infrastructures: Enriching Theories of Classification, Ch. 9 in *Sorting Things Out: Classification and its Consequences*, p.285-317.Hacking, Ian, 1986, Making Up People, in *Reconstructing Individualism*, ed., T. Heller et al, Stanford, Calif.: Stanford University Press, pp. 222-236.Zuberi, Tukufu (2001) The Evolution of Racial Classification & Deracializing the Logic of Social Statistics Chapters 1 & 7 in *Thicker Than Blood: How Racial Statistics Lie*, University of Minnesota Press. pp.17-27, 123-145.  |
| **Thematic Readings:**Burrows, Roger and Gane, Nicholas (2006) Geodemographics, *Software and Class, Sociology*, 40(5): 793–812, DOI: 10.1177/0038038506067507Liang, F., Das, V., Kostyuk, N. and Hussain, M. M. (2018) Constructing a Data‐Driven Society: China's Social Credit System as a State Surveillance Infrastructure, 10(4) Special Issue: Social Media and Big Data in China, *Policy & Internet,* pp. 415-453, <https://doi.org/10.1002/poi3.183>Lyon, David (2001) Surveillant Sorting and the City, Ch.4 in *Surveillance and Society: Monitoring Everyday Life*, Open University Press.Roderick, Leanne (2014) Discipline and Power in the Digital Age: The Case of the US Consumer Data Broker Industry, Critical Sociology, 40(5) 729–746.Williams, Chris (2011) Labelling and Tracking the Criminal in Mid-Nineteenth Century England and Wales: The relationship between Governmental Structures and Creating Official Numbers in Ch. 8 in Rudinow Saetan, Anne, Mork Lomell, Heidi and Hammer,Svein (eds) *The Mutual Construction of Statistics and Society*, Routledge.**Thematic Encyclopaedic Readings:**Haslam, Nick and Abou-Abdallah, Maria (2015) Essentialism*, International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 13-15, <http://dx.doi.org/10.1016/B978-0-08-097086-8.24059-2> **Thematic Reports:**Canadian Internet Public Policy Interest Clinic (2016) On the Data Trail: How detailed information about you gets into the hands of organizations with whom you have no relationship, https://cippic.ca/sites/default/files/May1-06/DatabrokerReport.pdfCracked Labs, (2017) Corporate Surveillance in Everyday Life http://crackedlabs.org/dl/CrackedLabs\_Christl\_CorporateSurveillance.pdf |
| **Week 5 - In-Class Classification Exercise:**Are specific groups of people your challenges aim to assist? Do you think any communities are missing? How will people in the city change or be affected by this sorting? Will the city change in anyway? Alternatively, have the challenges failed to consider issues of sorting? Are there lessons from the readings that can be applied to your communities? What should your communities or INFC consider? |

## Week 6 (Feb. 12) – Administrative and Survey Data

|  |  |
| --- | --- |
| Administering people with numbers is a biopolitical and gouvernemental activity which makes up a population and a subject to govern. This week students examine state institutions and their power.  | **Readings:**Stiles P.G., Boothroyd R.A. (2015) Ethical Use of Administrative Data for Research Purposes. In: Fantuzzo J., Culhane D.P. (eds) *Actionable Intelligence*. Palgrave Macmillan, New York, <https://doi.org/10.1057/9781137475114_5> p. 125-155Fantuzzo J., Culhane D., Rouse H., Henderson C. (2015) Introduction to the Actionable Intelligence Model. In: Fantuzzo J., Culhane D.P. (eds) Actionable Intelligence. Palgrave Macmillan, New York, <https://doi.org/10.1057/9781137475114_1> p. 1-38Kitzmiller, Erika M. and Burnett, TC. The AISP Network: Three Organizational Models for Building, Using and Sustaining Integrated Data Systems, pp.169-190Curtis, Bruce (2002) The Eyes of Politics & Making Up Population Ch. 1 & 2, in *State Formation, Statistics, and the Census of Canada, 1840-1875*, University of Toronto Press.Desrosieres, Alain (2011) Words and Numbers: For a Sociology of the Statistical Argument, Ch. 2 in Rudinow Saetan, Anne, Mork Lomell, Heidi and Hammer,Svein (eds) *The Mutual Construction of Statistics and Society*, Routledge.Foucault, Michel, Governmentality, in Faubion, James D. Ed. (1994) *Power*, New York: The New Press, pp.201-222.Marks, John, 2008, Michel Foucault: Biopolitics and Biology, Chapter 4 in Morton, Stephen and Stephen Bygrave, eds. 2008, *Foucault in an Age of Terror: Essays on Biopolitics and the Defence of Society*, New York, Palgrave Macmillan, pp. 88-104.Starr, Paul and Corson, Ross (1989) Who will have the Numbers? The Rise of the Statistical Services Industry and the Politics of Public Data, Chapter 14 in Alonson, William and Starr, Paul (Eds) *The Politics of Numbers*, New York: Russel Sage Foundation, pp. 415-447. |
| **Thematic Material:**Dencik L., Hintz, A., Redden, J. And Warne, H. (2018) *Data Scores as Governance: Investigating uses of citizen scoring in public services*, Project Report <https://datajusticelab.org/2018/12/06/data-scores-as-governance-final-report-published/> Powered by Data (2019) Maximizing Impact through Administrative Data Sharing, [https://static1.squarespace.com/static/5623f0e8e4b0126254053337/t/5c40c61ac2241be9935695fe/1547748890823/Public+Briefing+Document+-+Admin+Data+-+January+2019+-+Updated.pdf](https://static1.squarespace.com/static/5623f0e8e4b0126254053337/t/5c40c61ac2241be9935695fe/1547748890823/Public%2BBriefing%2BDocument%2B-%2BAdmin%2BData%2B-%2BJanuary%2B2019%2B-%2BUpdated.pdf)Statistics Canada (2017) Canadian Survey on Disability <https://www150.statcan.gc.ca/n1/daily-quotidien/181128/dq181128a-eng.htm> SmartCities4All <https://smartcities4all.org/>UNStats (2011) Using Administrative and Secondary Sources for Official Statistics A Handbook of Principles and Practices, <http://unstats.un.org/unsd/EconStatKB/Attachment442.aspx?AttachmentType=1> Statistics Canada, *Directive of Record Linkages,* <http://www.statcan.gc.ca/eng/record/policy4-1> Justice Data Lab, <http://www.thinknpc.org/our-work/projects/data-labs/justice-data-lab/> |
| **Week 6 - In-Class Administrative and Survey Data Exercise:**What kind of administrative data will you communities have to collect? How will these data be linked? Will any group of people be monitored to assess impact? If this was a general smart city project, which administrative or automated systems should they also consider? Is there any form of cost recovery program that should be put in place? Who should own these data? And just want kind of data will your program be collecting? Will any of these data be open data? What kind of ideas might you gain from the readings to help your communities or INFC as it pertains to the collection and procurement of data? |

# **Study Break – Feb. 16 – 22**

## Week 7 (Feb. 26) – Standards

|  |  |
| --- | --- |
| Standards and interoperability are the bread and butter of data infrastructures This week students examine the control and power exerted by these unsung heroines!  | **Readings:**Edwards, Paul (2010) Standards and Networks: International Meteorology and the Reseau Mondial ch.3 in *A Vast Machine*, MIT Press.Florence Millerand, Metadata Standards: Trajectories and Enactment in the Life of an Ontology, in *Standards and their stories: how quantifying, classifying, and formalizing practices shape everyday life*, Ithaca: Cornell University Press, pp.149-177.Igo, Sarah E. (2018) Documents of Identity, Ch.2 in *The Known Citizen*, Harvard University Press.Lampland, Martha, and Star, Susan Leigh, (2009) Reckoning with Standards, *Standards and their stories: how quantifying, classifying, and formalizing practices shape everyday life*, Ithaca: Cornell University Press, pp.3-35Sismondo, Sergio (2009) Standardization and Objectivity, Ch. 12 in *An Introduction to Science and Technology Studies*, John Wiley & Sons. |
| **Thematic Reading:**Rob Kitchin, Claudio Coletta, Leighton Evans, Liam Heaphy (2019) *Creating Smart Cities*, Regional Studies Association: Regions and Cities, Routledge. * Chapter 3. Politicising smart city standards

Merricks White, James (2019) On the difficulty of agreeing upon a universal logic for city standards, City, 23:2, 245-255, DOI: 10.1080/13604813.2019.1615765 Sustainable cities and communities — Indicators for smart cities <https://www.iso.org/obp/ui/#iso:std:iso:37122:ed-1:v1:en>**Thematic Material:**GODAN <https://www.godan.info/working-groups-list>IATI <http://www.aidtransparency.net/>IEEE Standards Activities on Smart Cities<https://standards-stg.ieee.org/content/dam/ieee-standards/standards/web/documents/other/smartcities.pdf>OECD (2018), "IoT measurement and applications", OECD Digital Economy Papers, No. 271, OECD Publishing, Paris, <https://doi.org/10.1787/35209dbf-en>**.**OGC Smart City Domain Working Group <https://www.opengeospatial.org/projects/groups/smartcitiesdwg>Open Corporates Data standard for company registers – Open Corporates <https://transparencee.org/analysis/data-standard-for-company-registers-open-corporates/> Open Corporates <https://opencorporates.com/info/about> Research Data Alliance <https://www.rd-alliance.org/> |
| **Week 7 - In-Class Standards Exercise:**Does your submission refer to any standards or specifications? What of the Open Smart Cities Guide and the IMPACT? If so which ones and for which kinds of technologies, processes or data? What other standards do you think should be considered? Based on the readings what purpose do standards serve? How could they serve or what issues might standards have in your communities? Why do you think standards are so powerful? |

## Week 8 (Mar. 4) – Mapping & Indigenous Knowledge

|  |  |
| --- | --- |
| This class takes place in **the library.** Students will examine maps depicting data pertaining to issuers related to Canada’s Indigenous communities from a post-colonial lens. We will also discuss intellection property and data colonialism. | **Readings:**Harley, J. B. (1989). Deconstructing the Map. *Cartographica*, 26 (2), pp.1-20. DOI: 10.3138/E635-7827-1757-9T53Kitchin, Rob; Lauriault, Tracey and Wilson, Matt (2017) Chapter 1, *Understanding Spatial Media*, Sage: London.Peluso, N.L (1995). Whose Woods are These? Counter-Mapping Forest Territories in Kalimantan, Indonesia. *Antipode*. 4. 27: 383–406. doi:10.1111/j.1467-8330.1995.tb00286.x.Phillips, Gwen (2017) *Keynote: Indigenous Data Sovereignty and Reconciliation, Keynote*, Data Power 2017 Conference, <https://www.youtube.com/watch?v=4I_3figC3B0> Sparke, Matthew (1998) A Map that Roared and an Original Atlas: Canada, Cartography, and the Narration of Nation, *Annals of the Association of American Geographers*, Volume 88, Issue 3:463–495, DOI: 10.1111/0004-5608.00109. |
| **Thematic reading:**Couldry, Nick and Mejias, Ulises A. (2019) The Cost of Connections: How Data Is Colonizing Human Life and Appropriating it for Capitalism, Standford University Press.* Chapter 3. The Coloniality of Data Relations pp.83-114
* Chapter 5. Data and the Threat to Human Autonomy pp.153-184
* Chapter 6. Decolonizing Data pp.187-211

**Thematic Encyclopaedic Readings:**Anderson, Jane E. (2015) Indigenous Knowledge and Intellectual Property Rights, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), pages 769-778 <http://dx.doi.org/10.1016/B978-0-08-097086-8.64078-3> Philip, Kavita S. (2015) Indigenous Knowledge: Science and Technology Studies, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 779-783. <http://dx.doi.org/10.1016/B978-0-08-097086-8.85012-6>  |
| **Reference Material:** First Nations Information Governance <https://fnigc.ca/ocapr.html> Traditional Knowledge Open Licensing Proposal <https://cippic.ca/en/TK_Open_Licensing_Proposal> GCRC Atlases <https://gcrc.carleton.ca/index.html?module=module.gcrcatlas_atlases> Scassa, T., Taylor, D.R.F. and Lauriault, T., 2014, Cybercartography and Traditional Knowledge: Responding to Legal and Ethical Challenges, Developments in the Theory and Practice of Cybercartography: Applications and Indigenous Mapping (Modern Cartography Series: Volume 5), Taylor, D.R.F. and Lauriault, T.P. (associate editor), Amsterdam, ElsevierAporta, C., Kritsch, I., Andre, A., Benson, K. Showshoe, S., Firth, W. and Carry, D., 2014, The Gwich'in Atlas: Place Names, Maps, and Narratives, second edition), Taylor, D.R.F. and Lauriault, T.P. (associate editor), Amsterdam, ElsevierLaidler, G., Elee, P., Ikummaq, T., Joamie, E. and Aporta, C., 2010, Mapping Sea-ice Knowledge, Use, and Change in Nunavut, Canada (Cape Dorset, Igloolik, Pangnirtung), SIKU: Knowing our Ice, Documenting Inuit Sea-ice Knowledge and Use, Krupnik, I., Aporta, C., Gearheard., S., Laidler, G. and Kielsen, L., Dordrecht, DE, SpringerDodge, Martin and Rob Kitchin (2001) *The Atlas of Cyberspace* Chapters 1 Mapping Cyberspace & 2 Mapping Infrastructure and Traffic, pages10-22, 52-55. (<http://www.kitchin.org/atlas/contents.html>) |
| **In-Class Map Assignment 10%.** In the *Map, Data and Government Information Centre* there is a map display entitled the *Evolution of the Communication Infrastructure in Canada with some maps about Aboriginal People in Canada*. The maps are organized into groups, you will be assigned a set of maps and will be provided with an in-class assignment. You will be required to consider the Harley paper and the Phillips keynote. |
| **Week 8 - In-Class Indigenous Knowledge Exercise:**You have been assigned 2 challenges for the term, one that is from an Indigenous community and one that is not. While you only have a small sample size, can you identify any qualitative differences between these? Does your submission propose to collect Indigenous knowledge and if so, what kinds of data? Also, based on this week’s readings, and thematic materials such as OCAP principles, what do you think is missing if anything, from the Indigenous submissions? And what could the non-Indigenous submissions gain? Was there any mention of sovereignty or residency? Ownership? Local and traditional knowledge? How might procurement include issues pertaining to Indigenous knowledge? What new data classifications do you think should be rethought? Was there a data governance plan? |

## Week 9 (Mar. 11) – Big Data

|  |  |
| --- | --- |
| Hype or reality? Are big data everything or nothing? Are they about controlling the future with numbers? Is this the end of science? | **Readings:**Anderson, Chris (2008) The End of Theory: The Data Deluge Makes the Scientific Method Obsolete.  *Wired Magazine* June 23. <http://www.wired.com/2008/06/pb-theory/>Kitchin, Rob. (2014), *The Data Revolution*. London: Sage.* Ch. 5 Enablers and Sources of Big Data and
* Ch.7 The Governmental and Business Rationale for Big Data, pp. 80-89.

Kragh-Furbo, Mette; Mackenzie, Adrian, Mort, Maggie and Roberts, Celia (2016) Do Biosensors Biomedicalize? Sites of Negotiation in Data Based Biosensing Data Practices in Nafus, Dawn. Eds. Quantified: Biosensing Technologies in Everyday Life, pp.5-42. Nissenbaum, Helen and Patterson Biosensing in Context: Health Privacy in a Connected World pp79-100.Roberts, Celia; Mackenzie, Adrian, and Mort, Maggie (2019) Introduction: What Does Biosensing Do? And Chapter 3 Platform Biosensing and Post Genomic Relatedness.pp.93-123. In Living Data: Making Sense of Health Biosensing, Bristol Shorts Research, pp.1-31.Pasquale, Frank, (2015) Digital Reputation in the Era of Run-Away Big Data, *The Black Box Society: The Secret Algorithms that Control Money and Information*, Cambridge MA: Cambridge University Press, 19-59.Verhoef, Peter C.; Kooge, Edwin and Walk, Natasha (2016) Data Data Everywhere, Chapter 3 in *Creating Value with Big Data Analytics: Making Smarter Marketing Decisions*, Milton Park: Routledge, 75-93. |
| **Thematic Readings:**Pentland, Alex (2014) Sensing Cities: How Mobile Sensing is Creating a Nervous System for Cities, Enabling Them to Become More Healthy, Safe and Efficient, chapter 8 in Social Physics, The Penguin Press.Public Policy Forum (2018) Change in Motion: How Canada Can Shape a Low-Carbon Future through Electric, Autonomous and Shared Transportation, Public Policy Forum in partnership with Action Canada, <https://ppforum.ca/wp-content/uploads/2018/03/Change-in-Motion.pdf> United Nations Big Data Inventory <https://unstats.un.org/bigdata/inventory/> Minish, Henry (2007) The Development of Electronic Card Transaction Statistics, Business Indicators Statistics New Zealand. <https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=NZAE2007&paper_id=83> |
| **Reference Materials:**Kitchin, R. and McArdle, G. (2016) What makes Big Data, Big Data? Exploring the ontological characteristics of 26 datasets, *Big Data and Society*, <http://bds.sagepub.com/content/3/1/2053951716631130> |
| **Week 9 - In-Class Big Data Exercise:**Based on the ontological characteristics of big data, what kind of big data will be collected in your communities and for what purpose? What rationales are provided for their collection? What kind of underlying enablers are discussed? Are there any missing? What kinds of technologies will be producing these big data and how will these be governed and by whom? How would you propose these be managed? Where there any discussions of a data trust? |

## Week 10 (Mar. 18) – Probability and Risk

|  |  |
| --- | --- |
| Is this the era of probability revisited? We will look at Hacking’s work on the Taming of Change which is an historical account of the moment when probably entered culture and students will examine how probability plays out in an era of big data and smart cities. | **Readings:**Low, Setha and MaGuire, Mark (2019) *Spaces of Insecurity: Ethnographies of Securityscapes, Surveillance and Control*, New York University Press.* McGuire, Mark & Low, Setha, Introduction: Exploring Spaces of Security pp.1-30,
* Rial, Carmen, From Panopticon to Panasonic: The Architecture of Fear in Mega-Events pp.99-121

Gonzales-Bailon (2017) Decoding the Social World, MIT Press, The Effervescence of Collective Behaviour pp.45-65 and The Social Logic of Influence, pp.71-97Crawford, Kate (2017) The Trouble with Bias - NIPS 2017 Keynote - *#NIPS2017*, <https://www.youtube.com/watch?v=fMym_BKWQzk>Donoho, David, (2017), 50 Years of Data Science, *Journal of Computational and Graphical Statistics*, 26(4) 745-766, <https://doi.org/10.1080/10618600.2017.1384734> Guzic, Keith, (2009) Discrimination by Design, Predictive Data Mining as Security Practice in the United States ‘War on Terrorism’, in *Surveillance Systems*, 7(1) pp. 1-20. <http://library.queensu.ca/ojs/index.php/surveillance-and-society/article/view/3304/3267>Ferguson, Andrew Guthrie (2017) Black Data, Blue Data and Bright Data, Ch. 7,8 & 9 in *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement*, New York University Press.Hacking, Ian, (1990) The Argument and The Universe of Chance in Ch. 1 & 23 *The Taming of Chance*, Cambridge University Press, pp.1-10 & pp.200-216.Mantello, Peter (2016) The machine that ate bad people: The ontopolitics of the precrime assemblage, *Big Data & Society* 3(2) doi:10.1177/2053951716682538 |
| **Thematic Reading:**Schlehahn, Eva, Patrick Aichroth, Sebastian Mann, Rudolf Schreiner, Ulrich Lang, Ifan D. H. Shepherd and B.L. William Wong, (2015) Benefits and Pitfalls of Predictive Policing, 2015 *European Intelligence and Security Informatics Conference*.**Thematic Encyclopaedic Readings:**Yearley, Steve (2015) Sociology and Politics of Risk, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 706-710. <http://dx.doi.org/10.1016/B978-0-08-097086-8.85019-9> Hitchcock, Christopher (2015) Probability and Chance: Philosophical Aspects, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), Pages 23-28. <http://dx.doi.org/10.1016/B978-0-08-097086-8.42163-X> Dawes, Robyn M (2001) Probabilistic Thinking, *International Encyclopaedia of the Social & Behavioral Sciences* (Second Edition), pages. 16-22 <http://dx.doi.org/10.1016/B978-0-08-097086-8.42162-8> **Thematic Reference:**Perry, Walter L.; McInnis, Brian; Price, Carter C.; Smith, Susan C.; and Hollywood, John S. (2013) *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations*; Washington D.C.: The RAND Corporation, pp. xxiii-xxiv and 1-15. <http://www.rand.org/content/dam/rand/pubs/research_reports/RR200/RR233/RAND_RR233.pdf> |
| **Week 10 - In-Class Probability and Risk Exercise:**Is there any kind of predictive analytics, AI/ML systems being proposed in your communities? Your submissions have a risk assessment, do you think this adequately covers any of the risks of predictive systems and AI/ML? Is there an assessment of who might be affected or be the target of these systems? When are these systems routine and when are they affecting humans directly? Is the issue of the black box addressed? Is there any type oversight or governance of these systems? Do you foresee any surveillance and control issues or mission creep with any of these systems? What kind of mechanism should be in place to ensure that the smart city does not become a surveillant city? |

## Week 11 (Mar. 25) – Data Infrastructure

|  |  |
| --- | --- |
| Students have looked at data infrastructure throughout the class and this week we look at large technological systems philosophically and pragmatically, one notable example being the smart city. | **Reading:** ASDI (2016) *Spatial Data Infrastructure (SDI) Manual for the Arctic*. <https://arctic-sdi.org/index.php/strategic-documents/> Dourish, Paul and Genevieve Bell, 2007, The Infrastructure of Experience and the Experience of Infrastructure: Meaning and Structure in Everyday Encounters with Space, *Environment and Planning B: Planning and Design*, V.34, pp. 414-430.Bratton, Benjamin H. (2015) The Stack: On Software and Sovereignty, Platform and Stack pp.41-74 and City Layer147-190.Moss, Mitchell, L. and Townsend, Anthony, M. How Telecommunication Systems are Transforming Urban Spaces, in Cities in the Wheeler, James O., Aoyama, Yuko and Wark Barney, Telecommunication Age: The Fracturing of Geography, pp.31-41.Edwards, Paul, Chapter 8, Making Data Global, in a Vast Machine, pp.187-227.Edwards, Paul N., Steven J. Jackson, Geoffrey C. Bowker and Cory P. Knobel, 2007, *Understanding Infrastructures: Dynamics, Tensions and Design, Report of a Workshop on History & Theory of Infrastructure: Lessons for New Scientific Cyberinfrastructures, US National Science Foundation*, accessed June 22, 2008 from <http://www.si.umich.edu/cyber-infrastructure/UnderstandingInfrastructure_FinalReport25jan07.pdf>. Hughes, Thomas P. (1989) The Evolution of Large Technological Systems, Ch.3 in Bijker, Wiebe E., Hughes, Thomas and Pinch, Trevor (eds) *The Social Construction of Technological Systems*, MIT Press.  |
| **Thematic Readings:**Graham, Steven and Marvin, Ch. 6 Urban Planning and the Technological Future of Cities, in in Wheeler, James O., Aoyama, Yuko and Wark Barney, Eds. Telecommunication Age: The Fracturing of Geography, pp.71--96.Galdon-Clavell, Gemma (2013) (Not so) smart cities?: The drivers, impact and risks of surveillance enabled smart environments, *Science and Public Policy* 40(6) pp. 717–723, <https://doi-org.proxy.library.carleton.ca/10.1093/scipol/sct070> Pallitto, Robert M. (2018) Irresistible bargains: Navigating the surveillance society. *First Monday*, <https://doi.org/10.5210/fm.v23i2.7954>.Smart Growth EU <https://ec.europa.eu/regional_policy/en/information/publications/communications/2010/regional-policy-contributing-to-smart-growth-in-europe-2020>**Thematic Materials:*** IT roadmap <https://app06.ottawa.ca/calendar/ottawa/citycouncil/occ/2011/03-08/it/TechnologyRoadmap.htm>
* **Reference Material**
* MASSTLC Big Data Cluster <http://www.masstlc.org/?page=BigData>
* MASSTech Big Data Landscape <http://massbigdata.org/industry-and-resources>
 |
| **Week 11 - In-Class infrastructure Exercise:**Do you think infrastructure in terms of the smart city is merely operational with an efficiency agenda and/or do you think infrastructures are political, cultural, social? Where are these systems currently governed in a city? What role does the public have in shaping these? Are these mentioned in urban plans? Who maintains this infrastructure in the short and long term and how do your smart communities address longevity? Is there a maintenance plan and a replacement plan? How can cities benefit from the ASDI and should they consider SDIs? Do your communities have a Technology Roadmap and how does the smart city fit in? |

# **Tuesday March 31 Data Day 7.0**

## Week 12 (Apr. 1) – From Critical Theory to Action

|  |  |
| --- | --- |
| It is the end of term; students have been working very hard! This week student will discuss observations derived from watching two ‘data’ documentaries We will discuss activism and the engaged scholarship your professor has been involved with. And, what is to be done in our datafied worlds! | **Readings:**Gonzales-Bailon (2017) Decoding the Social World, MIT Press, The Designing Policy and Action, pp.147-169Nash, Terry, (1995) *Who's Counting? Marilyn Waring on Sex, Lies and Global Economics*, National Film Board of Canada, <https://www.nfb.ca/film/whos_counting/> 60 Minutes, *The end of privacy "The Data Brokers: Selling your personal information*" <https://www.youtube.com/watch?v=qAT_ina93NY>  |
| **Reference Material:**Stop LAPD Spying Coalition <https://stoplapdspying.org/> Elliot, Patricia W. and Hepting, Daryl H. (eds) *Free Knowledge: Confronting the Commodification of Human Discovery*, University of Regina Press.Goldstein, Brett and Dyson, Lauren (eds.) (2013) *Beyond Transparency: Open Data and the Future of Civic Innovation*, Code for America Press.Lauriault, T. P., Bloom, R. and Landry, J-n. (2018) *Open Smart Cities Guide*, <https://www.opennorth.ca/open-smart-cities-guide> Milan, Stephania (2013) *Social Movements and their Technologies: Wiring Social Change*, Palgrage Macmillan.Ratto, Matt and Boler, Megan (eds.0 (2014) *DIY Citizenship: Critical Making and Social Media*, MIT Press.Weigend, Andreas (2017) *Data for the People*, Basic Books.……many others. |
| **Week 12 - In-Class Critical Perspectives Exercise:**Constructive critical thought is difficult, and it takes work. What would be a way to infuse critical perspectives in the governance of smart cities and your communities specifically? We covered quite a bit of ground in the class, what did we miss and what would you add, and what might you recommend to INFC and your communities? |

## Exams April 13 – 25

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Grading:** Standing in a course is determined by the course instructor, subject to the approval of the faculty Dean. Final standing in courses will be shown by alphabetical grades. The system of grades used, with corresponding grade points is:



**Approval** of final grades: Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by an instructor may be subject to revision. No grades are final until they have been approved by the Dean.

**Carleton** E-mail Accounts : All email communication to students from the Communication and Media Studies Program will be via official Carleton university e-mail accounts and/or cuLearn. As important course and University information are distributed this way, it is the student’s responsibility to monitor their Carleton and cuLearn accounts.

**Statement on Plagiarism:** The Carleton University Senate defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas, or work of others as one’s own”. This can include the following:

• Reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the source;

• Submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;

• Using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;

• Using another’s data or research findings;

• Failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;

• Handing in "substantially the same piece of work for academic credit more than once without the prior written permission of the course instructor in which the submission occurs."

You should familiarize yourself with Carleton University’s policy on Academic Integrity, which can be found by following the link below:

<http://www.carleton.ca/studentaffairs/academic_integrity/docs/Academic_Integrity_Policy.pdf>

**Additional** Student Support: The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at carleton.ca/csas.

**Requests** for Academic Accommodation: You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

**Pregnancy** obligation: Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

**Religious** obligation: Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

**Academic** Accommodations for Students with Disabilities: If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

**Survivors** of Sexual Violence: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

**Accommodation** for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

**For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline**