

**MUNK SCHOOL OF GLOBAL AFFAIRS**  
**University of Toronto**

**COURSE OUTLINE**  
**2014-15**

- COURSE: JMG 2020H: Big Data and Global Cities
- INSTRUCTORS: Dr. Enid Slack, Institute on Municipal Finance and Governance,  
Munk School of Global Affairs, 1 Devonshire Place, Room 304N  
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- Dr. Mark Fox  
Mechanical & Industrial Engineering Department  
40 St. George St., Room 8114  
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- FORMAT: Mondays, 12 noon to 3:00 p.m.  
Munk School of Global Affairs, 315 Bloor St. West, Room B019
- TEXTBOOK: Provost, Foster, and Tom Fawcett (2013) *Data Science for Business* (Sebastopol, CA:  
O'Reilly Media Inc.)

**Course Description**

As urban populations grow, global cities need to provide basic services (e.g. water, sanitation, public safety, transit) and address the negative externalities associated with rapid growth (e.g. pollution and congestion). And, ultimately, they need to find the fiscal resources to pay for the services. This course will set out a basic political economy framework to understand the problems faced by global cities and show how Big Data can be used to help solve those problems. The course will provide an introduction to the concepts that underlie Big Data – open, unified, linked, and grounded data – as well as data analytics (statistics, pattern recognition, and machine learning). Examples will be taken from municipal fiscal health. Students will work with data to address specific urban problems in global cities.

**Evaluation**

Assignment 1	(Due on September 29)	10%
Assignment 2	(Due on October 20)	10%
Assignment 3	(Due on November 17)	10%
Assignment 4	(Due on November 24)	20%
Presentation	(December 1)	10%
Exam	(December 8)	30%
Class participation		10%

### **1. Introduction: What are Global Cities? What is Big Data? (September 8)**

- Glaeser, Edward. 2011. *The Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* Penguin Press, Introduction.
- Sassen, Saskia. 2006. *Cities in a World Economy*, Third edition, Pine Forge Press, Chapters 1 and 2.
- Yusuf, Shahid. 2013. "Metropolitan Cities: Their Rise, Role, and Future." In Roy W. Bahl, Johannes F. Linn, and Deborah L. Wetzel (eds.) *Financing Metropolitan Governments in Developing Countries*, Cambridge, Mass: Lincoln Institute of Land Policy.
- Cukier, K. and Mayer-Schoenberger, V. 2013. "The Rise of Big Data," *Foreign Affairs*, May/June, pp. 28-40.
- Fox, Mark. 2013. "City Data: Big, Open and Linked", *Municipal Interfaces*, November.

### **2. Problems with Data; Introduction to Data Analytics and Rapidminer 5 (September 15)**

- Textbook, chapters 1 and 2.
- Rapidminer User Manual, chapter 1

### **3. More on Global Cities; Financing Services in Global Cities (September 22)**

- Taylor, Zack. 2011. *Lies, Damned Lies and Statistics: A Critical Examination of City Rankings Studies*. Report prepared for the Intergovernmental Committee on Economic and Labour Force Development in Toronto (ICE) ([http://www.icecommittee.org/City\\_Rankings\\_Report.pdf](http://www.icecommittee.org/City_Rankings_Report.pdf)).
- Bahl, Roy. 2010. "Financing Metropolitan Areas." In *United Cities and Local Governments, Local Government Finance: The Challenges of the 21<sup>st</sup> Century*, Second Global Report on Decentralization and Global Democracy, Barcelona: UCLG, pp. 309-332.
- Bird, Richard and Enid Slack. 2013. "Metropolitan Public Finance: An Overview," in *Financing Metropolitan Government in Developing Countries*, edited by Roy W. Bahl, Johannes F. Linn, and Deborah L. Wetzel, Cambridge, Mass.: Lincoln Institute of Land Policy, 2013, ch. 6.
- Slack, Enid. 2013. "International Comparison of Global City Financing," Report to the London Finance Commission (<http://www.london.gov.uk/sites/default/files/LFC%20International%20comparisons.pdf>).

### **4. Process of Data Analytics; Classification (September 29)**

- Textbook, chapters A, 3,4, and 5

### **5. Rapidminer 5 Hands On (October 6)**

- Rapidminer User Manual, chapter 2,3, and 4
- Bring laptop to class with Rapidminer loaded

### **Thanksgiving (October 13)**

### **6. Clustering, Characterization, Market Basket Analysis (October 20)**

- Textbook, chapter 6
- Han, J., and Kamber, M., (2001), "Chapter 5: Concept Description: Characterization and Comparison", *Data Mining: Concepts and Techniques*, Morgan Kaufmann Pub. Co., pp. 179-224.
- Han, J., and Kamber, M., (2001), "Chapter 6: Mining Association Rules in Large Databases", *Data Mining: Concepts and Techniques*, Morgan Kaufmann Pub. Co., pp. 179-224.

## 7. Open Data and Open Government (October 27)

- Yu, Harlan and David Robinson (2012) “The New Ambiguity of ‘Open Government,’” *UCLA Law Review Discourse*, 178. (<http://www.uclalawreview.org/?p=3663>)
- Fiscally Standardized Data Base (FiSC) <http://www.lincolninst.edu/subcenters/fiscally-standardized-cities/search-database.aspx>
- Ontario Ministry of Municipal Affairs and Housing, Municipal Financial Information Return and Municipal Performance Measures (<http://oraweb.mah.gov.on.ca:7778/fir/Welcome.htm>)
- Alberta Municipal Financial and Statistical Data [http://www.municipalaffairs.alberta.ca/municipal\\_financial\\_statistical\\_data.cfm](http://www.municipalaffairs.alberta.ca/municipal_financial_statistical_data.cfm)
- OECD. 2012. *Revenue Statistics, 1965-2011*
- OECD. 2011. “General Government Accounts: Government expenditure by function,” *OECD National Accounts Statistics* (database)
- IMF. 2012. *Government Finance Statistics Yearbook*.

## 8. Fiscal Health of Cities (November 3)

- Merk, Olaf and Claudia Hulbert. 2014. “Fiscal Health of Cities: An International Comparative Overview as Seen by a Credit Rating Agency.” (Draft).
- Slack, Enid, Almos Tassonyi and David Grad. 2013. “Fiscal Health of Ontario Large Cities: Is There Something to Worry About?” (Draft)
- Kloha, Philip, Carol S. Weissart and Robert Kleine. 2005. “Developing and Testing a Composite Model to Predict Local Fiscal Stress.” *Public Administration Review*, 65 (3): 313-23.
- Municipal fiscal health, indicator background data: <http://www.mah.gov.on.ca/AssetFactory.aspx?did=6052>

## 9. What is a Good Model -- Visualization (November 10)

- Textbook, chapters 7 and 8
- Found, Adam. 2012. “Economies of Scale in Fire and Police Services in Ontario,” *IMFG Papers on Municipal Finance and Governance* No. 12.
- Côté, André and Michael Fenn. 2014. “Approaching an Inflection Point in Ontario’s Provincial-Municipal Relations,” *IMFG Paper 18*. ([http://munkschool.utoronto.ca/imfg/resources/search-result-resources/?type\\_name=10&topic\\_res\\_name=-1&year\\_name=2014&searchsubmit.x=18&searchsubmit.y=12](http://munkschool.utoronto.ca/imfg/resources/search-result-resources/?type_name=10&topic_res_name=-1&year_name=2014&searchsubmit.x=18&searchsubmit.y=12)).

## 10. Semantic Web, Linked Data, Mining Crowds (November 17)

- Fox, Mark. 2013. “City Data: Big, Open and Linked”, *Municipal Interfaces*, November.
- Berners-Lee, T., Hendler, J., and Lassila, O. 2001. “The Semantic Web”, *Scientific American*, May.
- Heath, T., and Bizer, C. 2011. *Linked Data: Evolving the Web into a Global Data Space*, Morgan & Claypool Pub. pp. 1-8.
- Wiseman, R. 2013. “Canadian Governments’ Reference Models: Using Reference Models for Government Improvement.”
- Yu, J., Benatallah, B., Casati, F., and Daniel, F. 2008. “Understanding Mashup Development,” *IEEE Internet Computing*, Sept/Oct, pp. 44-52.

## 11. Global City Indicators (November 27)

- McCarney, P. L., (2013), “Why Cities? Why Metrics? – Tracking Cities in the 21st Century” *Global Cities Institute Working Papers*, Vol. 1 No. 1, pp. 1-32, University of Toronto.
- Fox, M.S., (2013), “A Foundation Ontology for Global City Indicators”, *Global Cities Institute Working Papers*, Vol. 1 No. 3, University of Toronto.

## 12. Student Presentations (December 1)