

## **CP 101 Introduction to Urban Data Analytics (4 credits)**

### **Course Description**

This course (1) provides a basic intro to census and economic data collection, processing, and analysis; (2) surveys mapping techniques in planning; (3) demonstrates the uses of real-time urban data and analytics; and (4) provides a socio-economic-political context for the smart cities movement, focusing on data ethics and governance.

### **Synopsis**

CP 101 introduces students to the systematic analysis of urban data in its institutional context, with a special focus on the smart cities movement. Recognizing that defining this context relies on critical thinking with regard to economic, social, and environmental outcomes, this course explores what, precisely, stakeholders value in conceptualizing “smart” urbanity. Fundamentally we will place the smart cities construct at the intersection of data and governance. Accordingly, this course will give students a foundation in systematic approaches to collecting, analyzing, modeling, and interpreting quantitative data used to inform robust research, and, ultimately, urban planning practice and policymaking. Beyond instruction in urban data science and analytics, students will be introduced to theory and critical discourses on topics such as big data, open data and e-governance. Instructors will expect students to engage with technical and theoretical - with particular focus placed on *ethical* - considerations associated with these subjects in lecture and laboratory sections.

The course will be structured following 3 modules:

#### ***Module 1: Introduction to Data Science for Planners***

During this module students will be introduced to the smart cities construct and associated topics, and will explore fundamental data applications in urban planning. They will be instructed on sourcing data, analyzing data via statistical testing, and presenting data through written reports and visualizations. In Module 1, students will gain skills in working with Census and economic data, statistical testing, and static data visualization. The deliverable for this module will be a descriptive profile of a Bay Area neighborhood.

#### ***Module 2: Mapping the City***

In the course’s second module, students will learn different tools to make maps. We will gain an understanding of the basic elements of maps, how to map with online programs and geographic information systems software (ArcGIS), and how to construct story maps. Students will produce a story map as the product for this module.

### ***Module 3: Big Data and Smart Cities***

In the course's final module, students will use knowledge acquired in earlier modules to explore urban data science in the context of smart cities. Classes will cover topics such as big data, open data, and smart cities, and civic hacking; and students will gain skills in real-time and crowd-sourced data collection and use, as well as in interactive data visualization. As the final project for the class, students will use novel sources of data to answer a research question of their choice.

### **Prerequisites**

CP 101 is open to all upper-division urban studies majors and smart cities minors; others can enroll with the permission of the instructor. No prior statistics coursework is assumed. This class provides a foundation to pursue further undergraduate data science courses at UC-Berkeley. For Urban Studies CP 101 satisfies one of the four additional City Planning courses for Upper Division Urban Studies Core. For the City Planning minor, CP 101 satisfies one of the four additional City Planning courses for Upper Division courses under List 1. For SED, CP 101 can count as an Upper Division outside SED major for Fall 16 admits and later. Fall 15 and prior SED admits as well as Sustainable Design minor students can petition for it to fulfill a requirement.

### **Course Requirements**

All computer assignments will involve the use of data and software available in or through the DCRP Computer Lab. Students are expected to know how to use the Windows operating system, as lab instruction will be given on computers running Windows. However, students may certainly use the Macintosh OS on personal computers. If you are unfamiliar with either Windows or DCRP's lab, you are encouraged to take advantage of the CED's library services ([Environmental Design Library Website](#)) or consult with course instructors during office hours.

Students will be expected to have a working knowledge of the Microsoft Office Suite - specifically Excel, PowerPoint, and Word - for this course. Students are welcome to explore the use of free, open software interfaces, such as the R language for statistical computing, the [RStudio](#) software package; and the [QGIS project](#); however, please check with the graduate student instructor before using any alternative software. Labs will be offered to introduce students to Excel, American FactFinder & Social Explorer, ArcGIS, CartoDB, story-mapping software, and open data portals.

### **Grading & Assignments and Reading**

Students will be expected to read a number of articles/chapters/etc. prior to lecture and lab sessions. For ten sessions, students are asked to submit responses online on the course bCourse site. Students will also be expected to attend and actively participate in class and lab. They will take a midterm exam and complete three group projects, as well as a final presentation. Grades will be assigned as follows:

Assignment 1 (Neighborhood Profile): 20%

Assignment 2 (Story Map): 15%

Assignment 3/Presentation: 20%

Midterm Exam: 35%

Reading Responses: 5%

Class Participation: 5%

### ***Reading Responses***

Students are expected to submit 10 short (200-250 word) responses to the readings online on the course bCourse site. Only the class sessions marked with a \* are available for commentaries; these are the sessions with more theoretical or critical readings, rather than technical texts. The responses should not be simple summaries of the readings, but reactions to the concepts and analyses presented. Responses should be posted by midnight the day before class (e.g., February 1 for February 2 class).

### ***Assignments***

All assignments will be conducted by groups of two students (though students may petition the instructor to expand the group to three). In the first two assignments (Neighborhood Profile and Story Map), students will explore the phenomenon of neighborhood change through in-depth analysis of census and economic data, as well as story-mapping. The Neighborhood Profile will be a Word document of 8-10 pages, plus appendices. The Story Map will consist of an interactive online map, with 3-5 pages of explanatory text.

For the third assignment, students will explore a research question of their own choosing, using big data and/or open data portals, as well as visualization techniques learned in class. This deliverable should include both an online project and a narrative of 15-20 pages, including references. Students will submit a one-page description of their research question and approach in the beginning of April and work closely with the instructors to develop a methodological approach. The semester will culminate with short (12-15 minute) presentations of Assignment 3 (during lab sessions).

### ***Exam***

There will be a comprehensive midterm examination held after the second module to assess student learning of course topics. The exam will consist of two parts: an in-class quiz (definitions and short answers) based on the class readings and lectures, and an in-lab quiz on map-making, based on the lab exercises and assignments.

### ***Attendance and Class Participation***

Students are expected to attend *every* class lecture and lab section. If for some compelling reason a student must miss a lesson or lab, they should alert the instructor ahead of time and may be asked to provide documentation of excuse after the fact. In addition to attending, students are expected to actively contribute to class discussions and ask questions. Participation will be evaluated by instructors based on a combination of attendance, and observed engagement and participation.

## Course Materials

CP 101 has three required books and one optional book, in addition to a course reader.

### Required

Townsend, Anthony M. 2013. *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia*. W. W. Norton & Company.

Wheelan, Charles. 2013. *Naked Statistics: Stripping the Dread from the Data*. W. W. Norton & Company.

Schwabish, Jonathan. 2017. *Better Presentations: A guide for Scholars, Researchers, and Wonks*. Columbia University Press.

### Optional

Ratti, Carlo, and Matthew Claudel. 2016. *The City of Tomorrow: Sensors, Networks, Hackers, and the Future of Urban Life*. Yale University Press.

We expect you to purchase the books at the student store, or via an online book seller. The reader will be available for purchase at Krishna Copy, 2595 Telegraph Avenue (at Parker).

Lecture slides and other course materials will be posted on the CP 101 bCourses site.

## Office Hours

Prof. Karen Chapple ([chapple@berkeley.edu](mailto:chapple@berkeley.edu)): Wed 11 AM-1 PM, 312A Wurster  
GSI Alex Garbier ([garbier@berkeley.edu](mailto:garbier@berkeley.edu)): TBD

## Statement on Academic Integrity

Any test, paper or report submitted by you and that bears your name is presumed to be your own original work that has not previously been submitted for credit in another course. You may use words or ideas written by other individuals in publications, websites, or other sources, but only with proper attribution. If you are not clear about the expectations for completing an assignment or taking an exam, be sure to ask a course instructor.

You should also keep in mind that as a member of the campus community you are expected to demonstrate integrity in all of your academic work and be evaluated on your own merits. The consequences of cheating and academic misconduct — including a formal discipline record and possible loss of future opportunities — are not worth the risks.

## Statement on Accommodations for Students with Disabilities

If you have been issued a letter of accommodation from the [Disabled Students Program \(DSP\)](#), please see the course lead instructor as soon as possible to work out the necessary

arrangements. If you need an accommodation and have not yet seen a Disability Specialist at the DSP, please do so as soon as possible.

If you would need any assistance in the event of an emergency evacuation of the building, the DSP recommends that you make a plan for this in advance. (Contact the DSP access specialist at 643-6456.)

### **Statement on Scheduling Conflicts**

Please notify course instructors by the second week of the term about any known or potential extracurricular conflicts (such as religious observances, graduate or medical school interviews, or team activities). We will try our best to help you with making accommodations, but cannot promise them in all cases.

### **Course Schedule - Readings & Assignments**

The course schedule/readings are outlined below.

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## ***Module 1: Introduction to Data Science for Planners***

### ***Wednesday, January 18: Introduction to Smart Cities\****

Townsend (2013) "Introduction" pg. 1-18 & Chapter 2, "Cybernetics Redux"; pg. 57-92

Hardy, Quentin. 2016. "Technology Is Monitoring the Urban Landscape." The New York Times, July 20. <http://www.nytimes.com/2016/07/21/us/technology-is-monitoring-the-urban-landscape.html>.

#### *Optional:*

Hollands, Robert G. 2008. "Will the Real Smart City Please Stand up?: Intelligent, Progressive or Entrepreneurial?" *City* 12 (3): 303–20. doi:10.1080/13604810802479126.

Ratti and Clauden (2016) Part I, "The City of Tomorrow (and Today)"; pg. 3-39

### **Lab 1 (optional): Introduction to Excel**

### ***Monday, January 23: Data Fundamentals for Planners\****

Townsend (2013) Chapter 3, "Cities of Tomorrow"; pg. 93-114

Boyd, Danah, and Kate Crawford. 2012. "CRITICAL QUESTIONS FOR BIG DATA: Provocations for a Cultural, Technological, and Scholarly Phenomenon." *Information, Communication & Society* 15 (5): 662–79. doi:10.1080/1369118X.2012.678878.

Neruda, Pablo, and Margaret Sayers Peden. 1986. "Ode to Numbers." *The Massachusetts Review* 27 (3/4): 464–66.

Bostic, Raphael. 2014. "'Narrative' and 'Vehicle': Using Evidence to Influence Policy." Pp. 342-355 in *What Counts: Harnessing Data for America's Communities*. San Francisco, CA: Federal Reserve Bank of San Francisco and the Urban Institute.

Wheelan (2013) Chapter 7, "The Importance of Data"

### **Wednesday, January 25: Metadata: Understanding the US Census**

Macdonald, Heather. 2006. "The American Community Survey: Warmer (More Current), but Fuzzier (Less Precise) than the Decennial Census." *Journal of the American Planning Association* 72 (4): 491–503. doi:10.1080/01944360608976768.

Alba, Richard. 2015. "The Myth of a White Minority." *The New York Times*, June 11. <http://www.nytimes.com/2015/06/11/opinion/the-myth-of-a-white-minority.html>

U.S. Bureau of the Census, TO. 2009. "A Compass for Using and Understanding American Community Survey Data." [SKIM] <https://www.census.gov/content/dam/Census/library/publications/2009/acs/ACSResearch.pdf>

### **Lab 2: Excel Basics - Formulas and Generating Charts**

#### **Monday, January 30: Using Census Data**

*Introduce Module 1 Assignment*

Bureau, U. S. Census. 2016. "American FactFinder." <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

"Social Explorer." 2016. <http://www.socialexplorer.com/>

Zuk and Chapple (2015) Case Studies on Gentrification and Displacement in the Bay Area. Executive Summary, pp. 1-9, plus case study of your choice [http://www.urbandisplacement.org/sites/default/files/anti-displacement\\_full\\_report\\_11.15.pdf](http://www.urbandisplacement.org/sites/default/files/anti-displacement_full_report_11.15.pdf)

*Optional:*

Glenn, Ezra Haber, and Maintainer Ezra Haber Glenn. 2016. "Package 'acs.'" <http://ftp.hup.hu/pub/CRAN/web/packages/acs/acs.pdf>.

### **Wednesday, February 1: Intro to Statistics for the American Community Survey**

Wheelan (2013) Chapters 2 & 3, "Descriptive Statistics" and "Descriptive Deception"

### **Lab 3: Accessing Census Data via American FactFinder**

### **Monday, February 6: More on Statistics**

Wheelan (2013) Chapters 4, 8, & 11, "The Central Limit Theorem", "Correlation", "Regression Analysis"

#### *Optional:*

Wheelan (2013) Chapters 9, 10, & 12; "Inference", "Polling," "Common Regression Mistakes"

### **Wednesday, February 8: Introduction to Economic Data and the Longitudinal Household-Employment Data**

Cortright, Joseph, and Andrew Reamer. 1998. *Socioeconomic Data for Understanding Your Regional Economy: A User's Guide*. Economic Development Administration, US Department of Commerce. [Available on bCourse site: SKIM Chapters 2 and 3]

#### *Optional:*

Abowd, John M., John Haltiwanger, and Julia Lane. "Integrated longitudinal employer-employee data for the United States." *The American Economic Review* 94.2 (2004): 224-229.

### **Lab 4: Accessing Census and Economic Data via Social Explorer**

### **Monday, February 13: Static Data Visualization**

Few, Stephen. 2012. *Show Me the Numbers: Designing Tables and Graphs to Enlighten*. 2nd ed. USA: Analytics Press. [Lots of pictures, quick reading!]

Few (2012) Chapter 3 pg. 39-60 "Differing Roles of Tables and Graphs", Chapter 4 pp. 53-60 "Fundamental Variations of Tables" Chapter 5 pg. 67-79 "Attributes of Pre-attentive Processing & "Applying Visual Attributes to Design", Chapter 6 pg. 101-135 "Graph Design Solutions", Chapter 11 pg. 257-270 "Displaying Many Variables at Once", Chapter 13 pg. 295-306 "Telling Compelling Stories with Numbers", Appendix A "Table and Graph Design at a Glance" pg. 309-310

Tufte, Edward R. 1983. *The Visual Display of Quantitative Information*. Graphics Press. Chapter 2, "Graphical Integrity".

Optional:

Check out Piktochart for infographics, [www.piktochart.com](http://www.piktochart.com)

And the whole Tufte book is great – especially check out Chapter 1, “Graphical Excellence.”

**Wednesday, February 15: Neighborhood Data and Indicators\***

Kingsley, G. Thomas, Claudia J. Coulton, and Kathryn L.S. Pettit. 2014. *Strengthening Communities with Neighborhood Data*. Washington, DC: Urban Institute. Pp. 73-114, Chapter 3 “Data and Technology,” Pp. 135-148.

Coulton, Claudia. 2014. “Using Data to Understand Residential Mobility and Neighborhood Change. Pp. 244-259 in *What Counts: Harnessing Data for America’s Communities*. San Francisco, CA: Federal Reserve Bank of San Francisco and the Urban Institute.

Goldstein, Ira. 2014. “Making Sense of Markets: Using Data to Guide Reinvestment Strategies.” Pp. 75-87 in *What Counts: Harnessing Data for America’s Communities*. San Francisco, CA: Federal Reserve Bank of San Francisco and the Urban Institute.

Urban Displacement Project, [www.urbandisplacement.org](http://www.urbandisplacement.org) [SKIM]

Optional:

Kingsley, G. Thomas, Claudia J. Coulton, and Kathryn L.S. Pettit. 2014. *Strengthening Communities with Neighborhood Data*. Washington, DC: Urban Institute. Pp. 135-148 Chapter 4 “A Framework for Indicators and Decisionmaking,” and Pp. 283-339 Chapter 7 “Advances in Analytic Methods for Neighborhood Data.”

Chapple & Zuk, “Forewarned: The Use of Neighborhood Warning Systems for Gentrification and Displacement,”

<https://www.huduser.gov/portal/periodicals/cityscpe/vol18num3/article5.html>

**Lab 5: Accessing Local Employment-Household Dynamics Data** (note: no lab on Friday Feb 17).

**Monday, February 20: NO CLASS!!**

*Assignment #1 due Wednesday February 22!!!*

## **Module 2: Mapping the City**

### **Wednesday, February 22: Spatial Data & GIS Fundamentals**

Monmonier, Mark. 1996 Chapters 1, 2, 3, 4, and 10 *How to Lie with Maps*. University of Chicago Press.

Additional GIS mapping information: <http://www.icsm.gov.au/mapping/overview.html>

### **Lab 6: CartoDB Part I**

### **Monday, February 27: Volunteered Geographic Information (VGI) (guest speaker: Geoff Boeing)\***

Jiang, Bin, and Jean-Claude Thill. 2015. "Volunteered Geographic Information: Towards the Establishment of a New Paradigm." *Computers, Environment and Urban Systems*, Special Issue on Volunteered Geographic Information, 53 (September): 1–3. doi:10.1016/j.compenvurbsys.2015.09.011.

Zook, Matthew, Mark Graham, Taylor Shelton, and Sean Gorman. 2010. "Volunteered Geographic Information and Crowdsourcing Disaster Relief: A Case Study of the Haitian Earthquake." *World Medical & Health Policy* 2 (2): 6–32. doi:10.2202/1948-4682.1069.

#### *Optional:*

Elwood, Sarah, Michael F. Goodchild, and Daniel Z. Sui. "Researching volunteered geographic information: Spatial data, geographic research, and new social practice." *Annals of the Association of American geographers* 102.3 (2012): 571-590.

Boeing, Geoff, and Paul Waddell. 2016. "New Insights into Rental Housing Markets Across the United States: Web Scraping and Analyzing Craigslist Rental Listings." *Journal of Planning Education and Research*.

### **Wednesday, March 1: Introduction to Story Mapping\***

#### *Introduce Module 2 Assignment*

Al-Kodmany, Kheir. "Visualization tools and methods for participatory planning and design." *Journal of Urban Technology* 8.2 (2001): 1-37.

#### *Optional, helpful for thinking about examples:*

Peattie, Lisa. "Representation." In *Planning: Rethinking Ciudad Guyana*. Ann Arbor, MI: University of Michigan Press, 1987, pp. 111-152. ISBN: 0472080695.

Some examples to review:

- Displacement in the Bay Area: [www.antievictionmappingproject.net](http://www.antievictionmappingproject.net) and <http://www.antievictionmap.com/#/narratives-of-displacement/>
- Mapping Segregation in DC: <http://jmt.maps.arcgis.com/apps/MapJournal/?appid=061d0da22587475fb969483653179091>
- Somerville Community Map: <http://archive.somervillecdc.org/communitymap/>
- City of Words DC: <http://maps.google.com/gallery/details?id=zfi7hbGPyckg.ktCoxcliDDS0&hl=en>
- Gangs of Los Angeles (2015): [http://maps.google.com/gallery/details?id=zMC7fcRop6s.koD9cCcyHJ\\_0&hl=en](http://maps.google.com/gallery/details?id=zMC7fcRop6s.koD9cCcyHJ_0&hl=en)
- NY Map of Restrooms, <http://m3.mappler.net/nyrestroom/>
- Atlas for a Changing Planet: <http://storymaps.esri.com/stories/2015/atlas-for-a-changing-planet/>
- Katrina +10: A Decade of Change in New Orleans: <http://story.maps.arcgis.com/apps/MapSeries/index.html?appid=597d573e58514bdbbeb53ba2179d2359>

You can find more examples at the Google My Maps Gallery:

<http://maps.google.com/gallery?hl=en> and check out ESRI's gallery for more ideas: <https://storymaps.arcgis.com/en/gallery/#s=0>

**Lab 7: CartoDB Part II** (Note: no lab on March 3 due to CED Circus)

**Monday, March 6: Participatory Mapping** (guest speaker Erin McElroy, Anti-Eviction Mapping Project)\*

Parker, Brenda. "Constructing Community through Maps? Power and Praxis in Community Mapping." *Professional Geographer*, 58:4, (2006): 470-484

Norwood, Carla, and Gabriel Cumming. "Making maps that matter: Situating GIS within community conversations about changing landscapes." *Cartographica: The International Journal for Geographic Information and Geovisualization* 47.1 (2012): 2-17.

Optional:

Ringas, Dimitrios, and Eleni Christopoulou. "Collective city memory: field experience on the effect of urban computing on community." *Proceedings of the 6th International Conference on Communities and Technologies*. ACM, 2013.

**Wednesday, March 8: Power, Place and Mapping\***

Harley, J.Brian. "Maps, knowledge, and power" (Chapter 8). In Henderson, George and Waterstone, Marvin. *Geographic thought: a praxis perspective*, 1988. 129-148.

Throgmorton, James. "Planning as Persuasive Storytelling in a Global-Scale Web of Relationships" *Planning Theory* 2.2 (2003): 125-151

Dolores Hayden. Part I - Chapter 2 and Chapter 10. *The Power of Place: Urban Landscapes as Public History*. MIT Press, 1995.

**Lab 8: Story Mapping** with Social Explorer, StoryMapJS (<https://storymap.knightlab.com/>), and Google My Map

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## **Module 3: Big Data and Smart Cities**

### **Monday, March 13: Introduction to Big Data\***

Batty, M., K. W. Axhausen, F. Giannotti, A. Pozdnoukhov, A. Bazzani, M. Wachowicz, G. Ouzounis, and Y. Portugali. 2012. "Smart Cities of the Future." *The European Physical Journal Special Topics* 214 (1): 481–518. doi:10.1140/epjst/e2012-01703-3.

Batty, Michael. 2013. "Building a Science of Cities." Chapter 1, pp.13-45 in *The New Science of Cities*. Cambridge, MA: MIT Press.

#### *Optional:*

Foster, Ian, Rayid Ghani, Ron S. Jarmin, Frauke Kreuter, and Julia Lane. 2017. "Introduction." Pp. 1-19 in *Big Data and Social Science: A Practical Guide to Methods and Tools*. Boca Raton, FL: Taylor & Francis Group.

### **Wednesday, March 15: Big Data – and Ethics -- for Planners\***

Schweitzer, Lisa. 2014. "Planning and Social Media: A Case Study of Public Transit and Stigma on Twitter." *Journal of the American Planning Association* 80 (3): 218–38. doi:10.1080/01944363.2014.980439.

Crawford, Kate, and Jason Schultz. 2014. "Big Data and Due Process: Toward a Framework to Redress Predictive Privacy Harms." *BCL Rev.* 55: 93.

Zwitter, A. 2014. "Big Data Ethics." *Big Data & Society* 1 (2). doi:10.1177/2053951714559253.

#### *Optional:*

Koonin, Steven E. and Michael Holland. 2014. "The Value of Big Data for Urban Science." Pp. 137-152 in *Privacy, Big Data, and the Public Good*. New York: Cambridge University Press.

Ratti and Clauden (2016) Part II, Chapter 4, “Big (Urban) Data”; pg. 43 – 56; Chapters 5 & 6, “Cyborg Society” & “Living Architecture”; pg. 57 – 87, Part III, “Senseable City”; pg. 91-130.

## *Assignment #2 due Wednesday March 15!!!*

### **Lab 9: Arc GIS**

**Monday, March 20: Complex Urban Modeling Part I: Machine Learning\*** (guest speaker, Noura Howell)

Foster, Ian et al. 2017. “Machine Learning.” Pp. 147-186 in *Big Data and Social Science: A Practical Guide to Methods and Tools*. Boca Raton, FL: Taylor & Francis Group.

Perry, Walt L. 2013. *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations*. Santa Monica, CA: RAND.

### **Wednesday, March 22: In-Class Midterm**

*Introduce Module 3 Assignment*

### **Lab 10: In-Lab Midterm**

**Week of March 27-31: NO CLASS, SPRING BREAK!!**

### **Monday, April 3: Introduction to Projections**

Myers, Dowell, and Alicia Kitsuse. 2000. “Constructing the Future in Planning: A Survey of Theories and Tools.” *Journal of Planning Education and Research* 19 (3): 221–31.

U.S. Census Bureau Reports: “Projections of the Size and Composition of the U.S. Population: 2014 to 2060” & “2014 National Population Projections: Methodology and Assumptions”; <http://www.census.gov/population/projections/publications/>

#### *Optional:*

“Lesson 8: The Cohort Component Population Projection Method — MEASURE Evaluation.” 2016. <http://www.cpc.unc.edu/measure/resources/training/online-courses-and-resources/non-certificate-courses-and-mini-tutorials/population-analysis-for-planners/lesson-8/lesson-8-the-cohort-component-population-projection-method>

Plan Bay Area (2013), Chapter 2 “The Bay Area in 2040”  
[http://files.mtc.ca.gov/pdf/Plan\\_Bay\\_Area\\_FINAL/2-The\\_Bay\\_Area\\_In\\_2040.pdf](http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/2-The_Bay_Area_In_2040.pdf)

## **Wednesday, April 5: Interactive Visualizations**

*Proposal for Assignment 3 due*

Hemmersam, Peter, Nicole Martin, Even Westvang, Jonny Aspen, and Andrew Morrison. 2015. "Exploring Urban Data Visualization and Public Participation in Planning." *Journal of Urban Technology* 22 (4): 45–64.  
doi:10.1080/10630732.2015.1073898.

Anderson, Meghan Keaney. 2016. "12 Complex Concepts Made Easier Through Great Data Visualization — ReadThink (by HubSpot)." Medium. June 27.  
<https://readthink.com/12-complex-concepts-made-easier-through-great-data-visualization-c94950277fed#.lqiyxpvba>.

Explore additional interactive visualizations here:

<http://polygraph.cool/history/>

<http://goodcitylife.org/chattymaps/index.html>

<http://hubcab.org/#13.00/40.7219/-73.9484>

<http://218consultants.com/interactive-suitability-map/> (Look at all 3 interactive maps)

<https://ourworldindata.org/a-history-of-global-living-conditions-in-5-charts/>

<http://www.urban.org/features/vision-equitable-dc>

and of course, <http://www.urbandisplacement.org/>!

*Optional:*

Foster, Ian et al. 2017. "Working with Web Data and APIs." Pp. 23-70 and "Information Visualization." Pp. 243-263 in *Big Data and Social Science: A Practical Guide to Methods and Tools*. Boca Raton, FL: Taylor & Francis Group.

**Lab 11: WebScraping 101** using Import.io

**Monday, April 10: Open Data & Using Portals** (*guest speaker Steve Spiker, Urban Strategies Council*)\*

Townsend (2013) Chapter 4, "The Open-Source Metropolis"; pg. 115-141

Lohr, Steve. 2016. "Website Seeks to Make Government Data Easier to Sift Through." *The New York Times*, April 4. <http://www.nytimes.com/2016/04/05/technology/datausa-government-data.html>.

Spiker, Steve. 2013. "Oakland and the Search for the Open City." Pp. 105-124 in *Beyond Transparency: Open Data and the Future of Civic Innovation*. San Francisco, CA: Code for America.

Johnson, Jeffrey Alan. 2014. "From Open Data to Information Justice." *Ethics and Information Technology* 16 (4): 263–74. doi:10.1007/s10676-014-9351-8.

*Optional:*

Goerge, Robert. 2014. "Data for the Public Good: Challenges and Barriers in the Context of Cities." Pp. 153-172 in *Privacy, Big Data, and the Public Good*. New York: Cambridge University Press.

**Wednesday, April 12: Presenting Data**

Schwabish, Jonathan. 2017. Chapter 1 "Theory, Planning and Design"; Chapter 4 "The Text Slide"; and Chapter 5 "The Data Visualization Slide"; in *Better Presentations: A Guide for Scholars, Researchers, and Wonks*. New York: Columbia University Press.

Tufte, Edward, R. 2003. *The Cognitive Style of PowerPoint*. Graphics Press.

Doumont, Jean-luc. 2005. "The Cognitive Style of PowerPoint: Slides Are Not All Evil." *ResearchGate* 52 (1): 64–70.

Parker, Ian. May 28, 2001. Absolute Powerpoint: Can a software package edit our thoughts? *The New Yorker*. <http://www.newyorker.com/magazine/2001/05/28/absolute-powerpoint>

*Optional:*

Schwabish, Jonathan. 2017. Chapter 2 "Color" and Chapter 8 "Presenting" in *Better Presentations: A Guide for Scholars, Researchers, and Wonks*. New York: Columbia University Press.

Additional presentation tips:

<http://gradschool.unc.edu/academics/resources/postertips.html>

<https://policyviz.com/better-presentations/>

**Lab 12: Accessing and Using Open Data Portals and Big Data**

<http://datausa.io/>

<https://data.sfgov.org/>

<http://www.vitalsigns.mtc.ca.gov/>

<https://nycopendata.socrata.com/>

### **Monday, April 17: Defining Smart Cities in Theory and Practice\***

Batty, M. 2016. "How Disruptive Is the Smart Cities Movement?" *Environment and Planning B: Planning and Design* 43 (3): 441–443. doi:10.1177/0265813516645965.

Shelton, Taylor, Matthew Zook, and Alan Wiig. 2015. "The 'actually Existing Smart City.'" *Cambridge Journal of Regions, Economy and Society* 8 (1): 13–25. doi:10.1093/cjres/rsu026.

Wiig, Alan. "The empty rhetoric of the smart city: from digital inclusion to economic promotion in Philadelphia." *Urban Geography* (2015): 1-19.

#### *Optional:*

IBM Smart Cities website,

[http://www.ibm.com/smarterplanet/us/en/smarter\\_cities/overview/](http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/)

### **Wednesday, April 19: Smart Institutions & e-Governance (guest speaker TBD)\***

Townsend (2013) Chapter 7, "Reinventing City Hall"; pg. 194 - 225

Jessop, Bob. 2002. "Liberalism, Neo-Liberalism and Urban Governance: A State Theoretical Perspective." *Antipode* 34 (3): 452–72.

Noveck, Beth Simone. 2015. *Smart Citizens, Smarter State: The Technologies of Expertise and the Future of Governing*. Harvard University Press.; Chapter 1 & Conclusion, "From Open Government to Smarter Governance", pg. 1 - 43; "Conclusion: The Daedalus Project", pg. 267 - 275

Also look over: <https://smartcitizen.me/>

### **Lab 13: Presentations Week I**

#### **Monday, April 24: Civic Hacking and Equity\* (guest speaker TBD)\***

Townsend (2013) Chapter 5 selection, "Tinkering Toward Utopia"; pg. 159 ("Sociability") - 169 & Chapter 6 selection, "Have Nots" pg. 172 ("ICT4D") - 193

Barns, Sarah. "Mine your data: open data, digital strategies and entrepreneurial governance by code." *Urban Geography* 37.4 (2016): 554-571.

#### *Optional:*

Ratti and Clauden (2016) Part IV, "Looking Forward"; pg. 133-149.

Townsend (2013) Chapter 10, "A New Civics for a Smart Century"; pg. 282 - 320

**Wednesday, April 26: The Inclusive Smart City\***

Zook, Matthew. 2016. "Crowd-sourcing the Smart City: Using Big Geosocial Media Metrics in Urban Governance." Unpublished paper.

Shelton, Taylor, Ate Poorthuis, and Matthew Zook. "Social media and the city: Rethinking urban socio-spatial inequality using user-generated geographic information." *Landscape and Urban Planning* 142 (2015): 198-211.

**Lab 14: Presentations Week II**

*Assignment #3 due Friday May 5!!!*