

BEYOND CENSUS DATA: USING  
OPEN DATA TO UNDERSTAND  
COMMUNITIES AROUND PUBLIC  
LIBRARIES

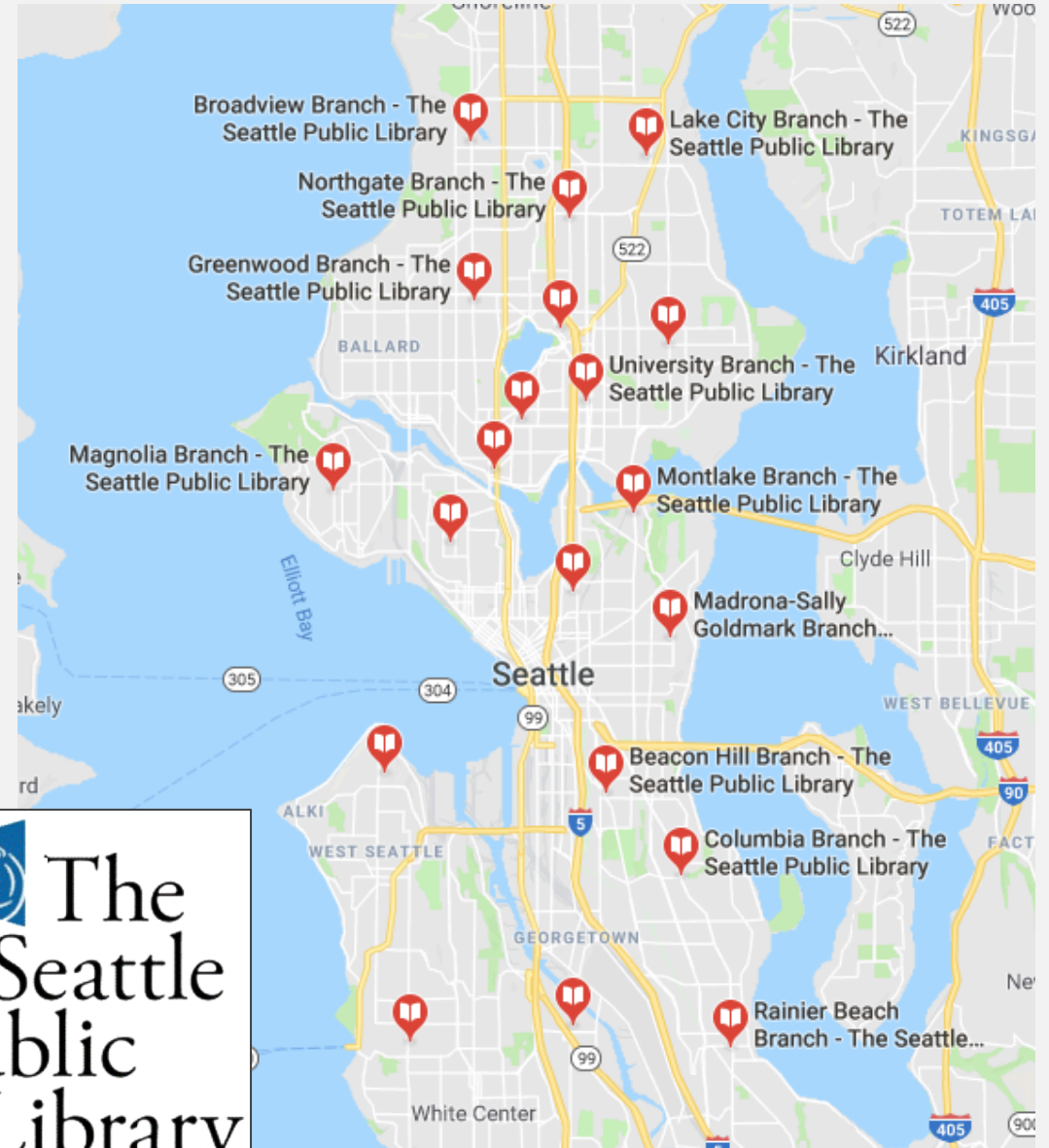
Sponsor: Seattle Public Library

Intern: Karalyn Ostler



# SEATTLE PUBLIC LIBRARY (SPL)

- Public library system serving Seattle
- 27 Locations
- 6 regions
- Variety of services and outreach programs
- Note: Separate library system than King County Library System
- SPL Mentor: David Christensen, Data Analysis Lead



## PROBLEM STATEMENT

- How can a large public library system like Seattle Public Libraries use external open data to help inform staff about the needs of the community to better plan services and outreach?
- How can open data be transformed into materials that are accessible and easy to understand?

## PROJECT GOALS

- Identify data needs of SPL frontline staff
- Identify relevant open datasets related to Seattle and SPL
- Create materials using selected datasets for use by SPL staff

## ASSESSING DATA NEEDS: INTERVIEWS

- Interviewed two SPL Regional Managers
  - Northeast Region: Francesca Wainwright
  - Southeast Region: Wei Cai
- Findings:
  - More granular data
  - Age
  - Income
  - Language Spoken at home
  - Private Schooling versus Public Schooling

## SEARCH FOR SUITABLE OPEN DATA

- Local Data:
  - City of Seattle Open Data portal
  - Washington State Open data portal
- Data.gov
- Packaged Data in R
- US Census Bureau



# CENSUS DATA



- Ways to Get Data:
  - API
  - American FactFinder

- Types of Data:
  - Censuses
    - Decennial Census
    - Economic Census
    - Census of Governments
  - Surveys
    - American Community Survey (ACS)
    - Demographic surveys
    - Economic surveys
    - Sponsored surveys

A screenshot of the American FactFinder search interface. The top navigation bar includes the United States Census Bureau logo, the "AMERICAN FactFinder" title, and a map of the United States with a magnifying glass over Kansas. Navigation links include MAIN, COMMUNITY FACTS, GUIDED SEARCH, ADVANCED SEARCH (highlighted), and DOWNLOAD CENTER. A "Feedback FA" link is also present. Below the navigation bar, a search instruction reads: "Search - Use the options on the left (topics, geographies, ...) to narrow your search results". On the left, a "Your Selections" box shows "Your Selections' is empty" with "load search" and "save search" links. Below this, a section titled "Search using the options below:" lists five categories: Topics (age, income, year, dataset, ...), Geographies (states, counties, places, ...), Race and Ethnic Groups (race, ancestry, tribe), Industry Codes (NAICS industry, ...), and EEO Occupation Codes (executives, analysts, ...). Each category has a right-pointing arrow. On the right, a section titled "To search for tables and other files in American FactFinder:" contains three numbered steps. Step 1: "Enter search terms and an optional geography and click GO". It shows a search form with "topic or table name" and "state, county or place (optional)" input fields, a "GO" button, and a help icon. Below the input fields are radio buttons for "topics" (selected), "race/ancestry", "industries", and "occupations". Step 2: "Next, select Geographies (states, counties, cities, towns, etc.)". It lists "Topics, Race and Ethnic Groups, Industry Codes, EEO Occupation Code" and states that these are added to "Your Selections" and the search results are updated. Step 3: "Select one or more Search Results and click View".

# MAPS

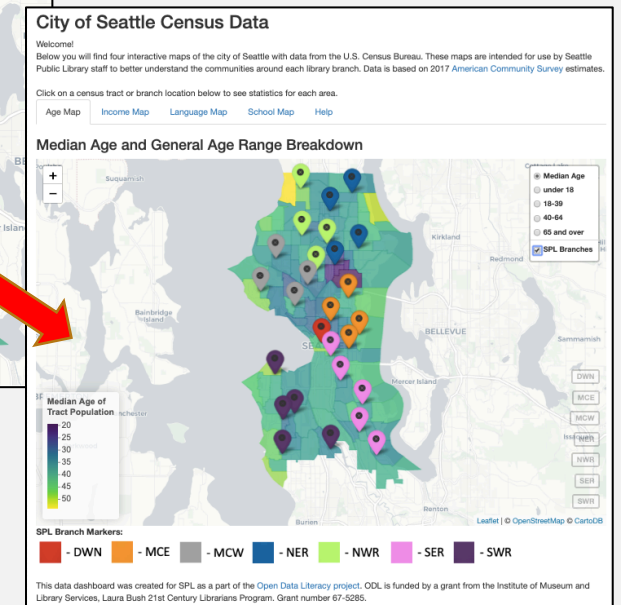
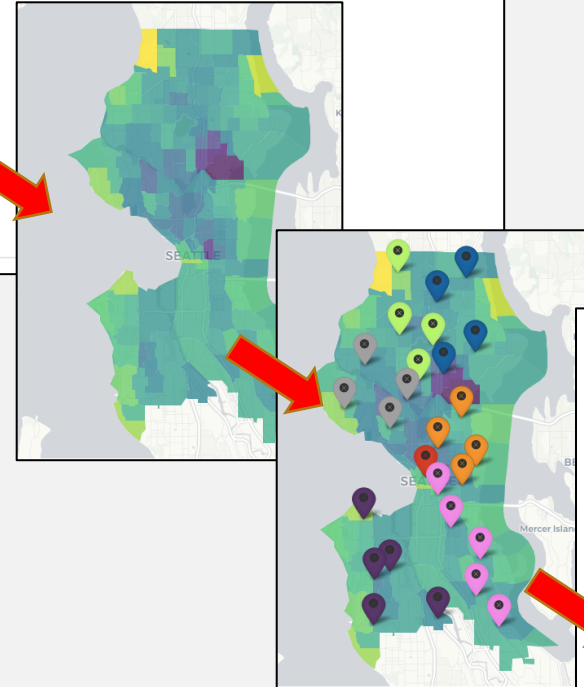
- R and Rstudio
- Download 2017 ACS data via API
- Leaflet package: Create interactive maps
- Shiny: Create application for data dashboard
- Shinyapps.io: upload dashboard to URL for sharing

Simple feature collection with 19502 features and 5 fields (with 49 geometries empty)  
 geometry type: MULTIPOLYGON  
 dimension: XY  
 bbox: xmin: -122.5281 ymin: 47.0844 xmax: -121.0659 ymax: 47.78058  
 epsg (SRID): 4269  
 proj4string: +proj=longlat +datum=NAD83 +no\_defs  
 First 10 features:

	GEOID	NAME	variable	estimate	moe
1	53033000100	Census Tract 1, King County, Washington	B01001_001	7963	529
2	53033000100	Census Tract 1, King County, Washington	B01001_002	4117	397
3	53033000100	Census Tract 1, King County, Washington	B01001_003	220	110
4	53033000100	Census Tract 1, King County, Washington	B01001_004	384	130
5	53033000100	Census Tract 1, King County, Washington	B01001_005	259	140
6	53033000100	Census Tract 1, King County, Washington	B01001_006	125	86
7	53033000100	Census Tract 1, King County, Washington	B01001_007	92	67
8	53033000100	Census Tract 1, King County, Washington	B01001_008	50	41
9	53033000100	Census Tract 1, King County, Washington	B01001_009	13	21
10	53033000100	Census Tract 1, King County, Washington	B01001_010	176	70

geometry

1	MULTIPOLYGON	(((-122.2965 4...
2	MULTIPOLYGON	(((-122.2965 4...
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4	MULTIPOLYGON	(((-122.2965 4...
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# MAP DASHBOARD

- URL: <https://kostler.shinyapps.io/SPL-Seattle-Census-Data/>
- Browser based
- Hosted by Rstudio
- Interactive
- Code easily modified:
  - Update with yearly census data releases
  - Add new data layers
  - Different city or library system

## City of Seattle Census Data

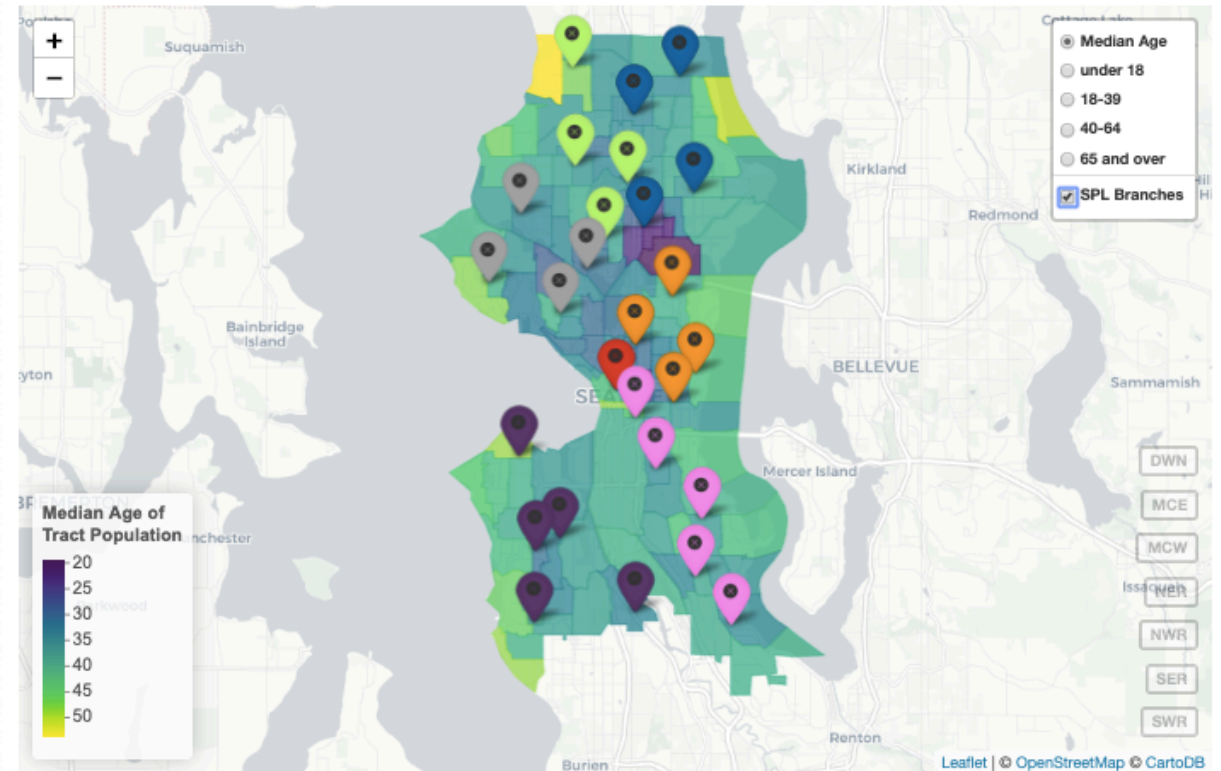
Welcome!

Below you will find four interactive maps of the city of Seattle with data from the U.S. Census Bureau. These maps are intended for use by Seattle Public Library staff to better understand the communities around each library branch. Data is based on 2017 [American Community Survey](#) estimates.

Click on a census tract or branch location below to see statistics for each area.

Age Map   Income Map   Language Map   School Map   Help

### Median Age and General Age Range Breakdown



SPL Branch Markers:

DWN - MCE - MCW - NER - NWR - SER - SWR

This data dashboard was created for SPL as a part of the [Open Data Literacy project](#). ODL is funded by a grant from the Institute of Museum and Library Services, Laura Bush 21st Century Librarians Program. Grant number 67-5285.

## COMPARISON WITH INTERNAL DATASET

- Dataset: SPL Borrower Data
  - Divided by branches
  - # of active uses of card by age of borrower
- Age Statistics
  - Average age of borrower at Branch
  - Percentage Breakdown:
    - Under 18
    - 18-39
    - 40-64
    - Over 65

### Central Library

	SPL	Census
Average Age	40.2	35.8
Under 18	4.0%	5.9%
18-39	52.1%	56.6%
40-64	34.5%	26.5%
Over 65	9.4%	11.0%

# FINAL RESULTS

- Dashboard with data about the community
  - Available publicly via <https://kostler.shinyapps.io/SPL-Seattle-Census-Data/>
  - Four interactive maps of census data and SPL branches
- Short report for each region
  - Available datasets found
  - Stats for each branch on topics
- Documented code
  - Available via GitHub repository: <https://github.com/OpenDataLiteracy/SPL-KO>
  - Easily adapted by other library systems

# SUSTAINABILITY



- Open file types and softwares
  - R and Rstudio
    - Preferred programming language for sponsor
    - Good visualization packages



- GitHub Repository
  - All Code
  - Publicly available

- U.S. Census Bureau Data
  - Federally maintained
  - Consistent formatting and data releases
- Dashboard on shinyapps.io
  - Can easily be modified for future years' data
  - Hosted by RStudio



## CHALLENGES

- Keeping the project scale manageable, very easy to try and do too much
- First time creating maps, especially interactive maps
- Keeping things simple with visualizations, not overwhelming users

## NEXT STEPS FOR SPL

- Distribute the maps and reports for use by staff
- Share maps with SPL Foundation, in annual reports about demographics served by SPL, or even in policy advocacy (e.g. Library Levee that just passed)
- Add other datasets to maps
  - School district data, low-income housing
- Update when 2018 ACS data or 2020 Census data available
- Collect feedback from frontline staff about maps and reports
  - Are they helpful? How could they be improved?

## NEXT STEPS FOR ODL

- For this project:
  - Write journal article about project
  - Create Binder instance for R Notebook in GitHub Repo
  - Directed Field Work or Capstone
- In general:
  - Data Science/Coding and Librarians
    - Using Open data and open data software in an everyday workflow