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**Introduction and Scope**: The use of data science as a tool to advance academic fields and add to the robustness of research studies is well known and well documented. Recently, data science has been coupled with traditionally social science fields to add quantitative support for qualitatively studied concepts in academia or to promote advocacy work outside academia. The field of environmental justice has been one of those fields that has benefitted from data science support1. However, the use of ‘big data’ and data science for a field fraught with academic and political stigma can be difficult2. In order to provide a foundational study for the use of data science coupled with EJ issues at Bren, we propose a study looking at the historical implementation and impacts of fracking in California, a study prompted by the proposed Cat Canyon Oil Development Proposal in northern Santa Barbara county near Sisquoc and Santa Maria3. Not only is this proposed project a threat to the ecological health of the surrounding area, an environmental justice issue exists due to threat to drinking water and air quality for the local low-income communities.

A preliminary research project will combine [CalEnviroScreen](https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30) (version 3.0), a publicly available environmental justice screening tool developed by the State of California Environmental Protection Agency4, with other open source datasets on fracking site information.

**Key Preliminary Research Questions:**

1. How do certain statewide indicators of population characteristics by census tract (ex. low-income, communities of color, language barrier) from CalEnvironScreen v.3.0 correlate with the California’s Department of Conservation [Well Finder Locations](https://www.conservation.ca.gov/dog/Pages/WellFinder.aspx) and/or the number of [Earth Justice](https://earthjustice.org/features/campaigns/fracking-across-the-united-states)’s fracking [accidents](https://www.google.com/maps/d/u/0/viewer?mid=1k5UjLbXk4oxCyfCM7xwUSgj8aDg&ll=39.17836426815684%2C-98.48509310000003&z=5) since 2010?
2. Are there any instances of high rate of compliance violations as noted by the EPA’s Enforcement and Compliance History Online ([ECHO](https://echo.epa.gov/tools/data-downloads#exporter)) Exporter database with CalEnvironScreen’s highest scoring census tracts; i.e. the highest level of disadvantage per tracts in terms of pollution burden and vulnerability?
3. Are there disproportionate use of harmful chemicals at fracking sites as defined by New York State’s [Department of Environmental Conservation](https://frackinginjurylaw.com/dangerous-fracking-chemicals/) located near at risk or communities of color and low income communities according to the registered with the [FracFocus Database](http://fracfocus.org/data-download)?

Other non-fracking specific datasets can be explored with the CalEnvironScreen to explore any other issues with using open access data. For example:

USGS Hydrological Response to Climate Change ([California Basin Data](https://ca.water.usgs.gov/projects/reg_hydro/basin-characterization-model.html))

USGS Coastal flooding hazard ([CoSMos](https://www.sciencebase.gov/catalog/item/5633fea2e4b048076347f1cf))

USGS Future water Demand ([Water Projections](https://www.sciencebase.gov/catalog/item/5ae0ebbae4b0e2c2dd2ea420))

USGS Land Use Change ([CA 4th Climate Assessment](https://www.sciencebase.gov/catalog/item/587fb408e4b085de6c11f389))

LA County Green Space ([Parks and Recreation](https://egis3.lacounty.gov/dataportal/tag/parks/))

Results will be presented in easy to understand visuals to be shared with the Bren Environmental Justice Club and other members of the UCSB student body to be used for advocacy.

Additionally, one of the best places to introduce these concepts of quantitative environmental justice to young environmental professionals is during their early courses in higher education. Bren is a perfect place to provide students the exposure to this growing topic of conversation in an easy to understand and tangible setting. A major hurdle to this potential is the simple lack of access to a centralized location for EJ related data sets to be worked with. Along with that is a clear example of an EJ-focused research project by a Bren student using the variety of technical skills taught at this institution. This need can be easily remedied through a well-documented and easily accessible collection of EJ-focused datasets at the fingertips of Bren students and faculty.

**Deliverables (subject to change)**:

1. Fracking Project Rmarkdown (for teaching purposes)
2. Outreach Material (final report, visualized data, Shiny app,etc.)
3. A complete list of vetted and easily accessible datasets for use by students and faculty, with particular application for ESM 206 and 244

**Citations:**

1Davis JA, Burgoon LD (2015) Can Data Science Inform Environmental Justice and Community Risk Screening for Type 2 Diabetes? PLoS ONE 10(4): e0121855. <https://doi.org/10.1371/journal.pone.0121855>

2Alice Mah (2017) Environmental justice in the age of big data: challenging toxic blind spots of voice, speed, and expertise, Environmental Sociology, 3:2, 122-133, DOI:

10.1080/23251042.2016.1220849

3Hahn G, Silva A.L. (2019) Not Again: Protect Santa Barbara From Cat Canyon Oil Development. *Daily Nexus* 6 Apr. 2019. <http://dailynexus.com/2019-04-06/not-again-protect-santa-barbara-from-cat-canyon-oil-development/>

4OEHHA. CalEnviroScreen 3.0. 2017. <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>. Accessed 7 Jun 2017.