

Jackson Maxfield Brown

Research Statement

Research Interests and Experience

I believe that the best method for government IT offices to create meaningful, impactful, and equitable technology is through open collaboration with the communities they serve. In doing so, they and their communities can build civic technology that enables all members of the public the capability to have a more active role in their government.

I am deeply interested in understanding how open collaboration can help municipalities efficiently and effectively deliver public information (i.e. government policy changes, event information, crisis alerts, etc.) to diverse communities through the use of direct-to-populace information systems. I want to understand how technological interventions such as technology use in public meetings, the release of public data collections, and more, can bridge divides of community, class, and race. I am especially interested in scaling solutions to these problems to the local municipality level to better understand what general methodologies succeed or fail in particular social and economic contexts.

I initially became interested in direct-to-populace information systems during my time as Nicholas Weber's Research Assistant. While working with Prof. Weber, I studied government transparency, information access, and software sustainability. Together we created the initial prototype of "Council Data Project," a system that aims to be a general solution for governments to hold more accessible meetings [15]. Since then, I have continued to lead the development of Council Data Project which has grown to become an application utilized by community members, activists, and journalists alike for following council action and historical event data discovery.

While working as a Research Engineer at the Allen Institute for Cell Science, I built tools for data curation and reproducible research, and coordinated the development of multiple terabyte-scale image processing pipelines [14, 16, 18]. Most notably, I continue to lead the development of the institute's open source core image reading and writing library that is utilized by scientists and engineers from over twenty-five public institutions and private industry [17].

In my current position as a Data Engineer at Numina, I continue to grow my expertise in building and managing data pipelines while additionally gaining new proficiencies in IoT and distributed data collection systems for transportation and public space analysis.

My work reflects my research interests: government transparency, information access, and open infrastructure for science and government. As I believe governments should adopt practices that allow for open development on core infrastructure, I want to utilize civic technology, and research how technology shapes the shared interactions between a community and a

government. And through this research I want to understand not only the implications of technology use in the public sector, but additionally how we can use technology for breaking down barriers to public participation, increasing information and technology access, and bridging divides between communities.

Potential Projects

Comparative Study Measuring Engagement Through Technology Mediation

Understanding the mechanisms by which municipalities utilize technology to facilitate public engagement is incredibly difficult due to differences in record-keeping and a lack of standardization for communicating and sharing files. This makes comparing strategies employed by different municipalities and determining the impact of those strategies on public engagement even more difficult. In council deliberation and public comment during a meeting, there exists no set standard for data storage or retrieval regarding who was present, what was discussed, or how deliberation occurred when comparing across municipalities [10, 20].

For example, in the United States, the decision of which languages government entities support is commonly decided by the US Census Bureau's "language-spoken-at-home" statistic [23]. To this end, governments make web resources available in multiple languages and much research has been done on creating accessibility frameworks for governments to use to enable more equitable access to government resources [1].

However, an allocation problem emerges in deciding which and how many resources to make available in multiple languages. Open meetings laws provide the populace a right to access meetings conducted by government bodies. In utilizing open meetings data (audio, video, and transcription) we can understand how different municipalities directly address language barriers in their meetings and how they attempt to solve or systematically ignore these problems through their use of technology and policy.

Further, the COVID-19 pandemic has explicitly forced many municipalities to employ technology for civic engagement in the council deliberation and public comment process. In utilizing the existing infrastructure created by Council Data Project there exists a unique opportunity to create a dataset to compare meeting data from multiple municipalities council deliberations and public comments from pre, in, and post-pandemic.

Notably, there are express differences in how in-person and remote deliberation occur. When physically together, the Seattle City Council will occasionally "clear the chamber" when the council members feel public testimony has become unproductive [6]. However, when utilizing technology for public engagement, the Seattle City Council established rules for unmuting and muting public testimony during each public commenter's call-in-period, making it impossible for commenters to interrupt proceedings [7]. In this case, technology mediates the meeting by only allowing one individual to speak at a single time and imposes strict time requirements on each public commenter's testimony.

Utilization of this dataset, which details who speaks in meetings, as well as how, and when, would lead to a better understanding of how different municipalities utilize technology for deliberation pre-, in, and post-pandemic. Additionally, by leveraging the work of Jacobi and Schweers' analysis of Supreme Court testimony and oral argument, we can understand the power dynamic between council members to each other and to public commenters [21]. This work would serve as a basis for understanding how age, gender, socio-economic status, etc. affects who chooses to directly participate in public discourse, and how they do so under each public engagement model (in-person versus remote, and, the various municipal governing models) [12].

By studying the effects that technology is currently having on civic engagement we can then aid municipalities and councils to address the systemic problems discovered and proactively build systems that enable a more inclusive democratic process.

On-Device Synthetic Data Generation

Internet-of-Things (IoT) infrastructures allow for the collection of data for analysis of urban spaces on a scale never seen before [4]. These data collections created from large, city-scale, IoT infrastructures have been used to study urban air quality, traffic detection, urban space use, and more [2, 3, 5, 8, 9]. As more and more industries and governments are turning towards using these technologies for data-driven policy creation and governance, we must first understand the limits of these technologies and where they can be harmful to a community. Issues of sensor and data security, public right to privacy, and freedoms of data access loom as these infrastructures and data collections are commonly created to monitor and analyze our shared environments [11].

In many cases, to resolve the issues inherent in storing data that contains personally identifiable information (PII), edge-computing is used to capture, process, and store only the metrics of data captured by a sensor instead of the unprocessed data points [19]. Further, after the anonymization of data, some data collections additionally use differential privacy systems to only allow access to the aggregations of metrics and not the metric collections themselves [22]. In this way, metric aggregation is in place to protect public privacy.

Other methods for removing PII from large data collections involve creating synthetic datasets based off of the correlations and distributions of the attributes in the private dataset [13]. While synthetic dataset generation in most cases requires access to the entire private dataset, it has the explicit benefit of creating a dataset that is statistically similar in value, shape, and format to the private dataset -- unlike metric aggregation. This allows collaborators to build models and tools using similar data to the data available to the maintainers of the data collection itself, allowing for more open collaboration and development.

Data from large IoT backed data collections have already shown their immense value in scientific research and government infrastructure, however they bring with them privacy implications that must be solved. Currently, these infrastructures commonly limit either who has

access, or what data individuals are allowed to access, from the produced data collections. On-device synthetic data generation could serve as a method for deploying IoT infrastructures that allow for open collaboration in the development of data-driven policy and governance. In opening up these data collections to more teams and individuals, we can create a more inclusive and equitable data-driven policy creation and governance process.

Professional Aspirations

Ultimately I want to serve the public by creating spaces for open collaboration in the development of new technologies that proactively support and enable civic participation, encourage data-driven public policy and planning, and create more opportunities for every member of our community. I believe I can best achieve these goals through an academic career or as part of a technology office in a local or state government.

To that end, the UW Information School offers a unique opportunity to achieve my aspirations. With connections to the Center for an Informed Public, UW Urban Analytics, UW eScience Institute, UW DataLab, as well as local and state governments, the UW Information School offers an ideal environment to conduct my proposed research and the potential to contribute to solutions that help to bring about a better world.

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