

# Laura W. Dozal

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## EDUCATION

PhD Student, iSchool, Current; Minor in Statistics and Data Science

Certificate in Computational Social Science

*Exp. Spring 2024, University of Arizona, Tucson Arizona*

Master of Arts in Communication, Culture, and Technology

*Georgetown University, Washington, D.C. 2016*

Bachelor of Arts in English Literature; Minor in Communication

*St. Edward's University, Austin Texas 2012   **Recognition:** Dean's List, 2010*

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## EXPERTISE

Network Analysis • Machine Learning • Computational Social Science • Computer Vision • Data Mining • Information Diffusion • Predictive Modeling • Classification • Regression • Clustering • Hypothesis Testing • Bayesian Analysis • Gaussian Models • Recursive and Convolutional Neural Networks • Dimensionality Reduction • Multiclass Classification • Multilevel Modeling • Natural Language Processing • Word Embeddings • Visual Frames • Social Movements •

**Programming Languages / Tools:** R - tidyverse, ggplot2, Survival, bnlearn • Python - NumPy, pandas, matplotlib, scikit-learn, py-torch, spaCy, TensorFlow, keras • Jupyter, Spyder • SQL • OpenCV • LaTeX • Git/Github • Javascript, D3.js, HTML • ArcGIS • Tableau • Anaconda • InDesign • Open Refine • UX analysis and research

**Bilingual:** Fluent in English and Spanish Languages

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## PUBLICATIONS and CONFERENCES

**-Mixed Methods Framework for Understanding Visual Frames in Social Movements**, ASIS&T Conference, Long Paper, October 2023

**- Posit::Conf2023**, Opportunity Scholar, September 2023

**-Mixed Methods for Understanding Visual Frames in Social Movements**, International Conference on Computational Social Science (IS2C2), Poster, Chicago, July 2022

**-Extracting Space Situational Awareness Events from News Text**, Language Resources and Evaluation Conference (LREC), May 2022

**-Street Art as Visual Information: Mixed Methods Approach to Analyzing Community Spaces**, ASIS&T Poster, Salt Lake City, 11/2/2021

**-Detecting the Spread of Propaganda Bias Online: Comparing HAN and BERT Models**, TPRC Conference, Paper Presenter, 4/15/2021

**-Data Visualization - Old North Pilgrimage Project**, Permanent Installation, Georgetown University, 4/21/2016

**-Network Installations - An Art Technology**, Paper Presenter, PCA/ACA 06/09/2015, STGlobal Conference, DC 11/2015

**-Street Art Dialogue**, Gnovis Journal, December 18, 2014 (Peer Reviewed Publication)

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## EXPERIENCE & RESEARCH

### Data Science Experience

**R4R (Roots for Resilience) Dissertation Fellowship, 2023 Cohort | University of Arizona Data Science Institute, Tucson, AZ, 08/2023 – Present**

- Created and maintained a data management Plan for Open Science using FOSS framework in collaboration with CyVerse. Use of Data Pipelines, DataOps, and Open Data Science for Big Data.

**EXPERIENCE & RESEARCH (Data Science Experience Continued ...)****LEADING Data Science Fellowship 2023 Cohort - University of Rochester, Remote 06/2023 – Present**

- Lead creation of a Data Pipeline to collect and analyze bibliometric data from University of Rochester Researchers. Estimated 500K+ elements in collected a processed data using trend analysis and OLS regression to understand researchers' behavior for publishing data. Use trend analysis methods including regression, time series analysis, and conformal prediction analysis for future publication behavior.

**Data Science Grad Assistant | University Analytics & Institutional Research, UA, Tucson, 08/2021 – Present**

- *NLP Sentiment Analysis*: Analyze 4M+ student course survey responses using Natural language processing to identify sentiment, word frequencies and word synonyms for curriculum in various departments on campus. Increase faculty participation in curriculum review across schools on campus.
- *Machine Learning - Churn Analysis*: Spearheaded the Women in Science and Engineering Retention report project which uses survival and churn analysis. These analyses review churn or dropout rates of 37K+ students over ten years. The analysis incorporates machine learning applications including decision tree and random forest models along with other time-based statistical methods. I Identified student financial, cultural, academic, and demographic characteristics that either debilitate or foster success towards graduating college. Increased awareness across university departments to enable discussion and student experience development.
- *Dashboard Creation - Analytical Problem solving*: Using automated and qualitative approaches, I developed End-to-end application of tuition and headcount dashboard visualizations and analysis using R and SQL. Create aggregated data tables from an internal Oracle data warehouse that include descriptive statistics and inflation information of campus-wide Net Tuition Revenue (NTR). The dashboard is used by leaders and policy makers on campus to make informed decisions.

**Computational Tools and Thinking - Teaching Fellow University of Texas Austin, 06/2022 - 7/2022**

- Developed ten, two-hour lesson plans for a computational tools and thinking survey course that covered R, Python, Social Network Analysis, Design Theory, and coding best practices. Taught to a wide range of experience levels that included 25 high achieving undergraduate students from STEM and Social Sciences.
- Held office hours to support outside research and enabled the development of a 20-month research design process. Participated in community building activities with other distinguished fellows as well as with our students. Maintained mentor level contact with students to aid in coding and analysis applications for research.

**Data Science Ambassador | University Arizona Data Science Institute, Tucson 08/2021 – 08/2022**

- Data Science community support and resource for the CSS certificate and iSchool.
- Data Carpentries Instructor as of 2/14/2022 -Live coding instructor and helper for Data Analysis and Visualization with R for Social Scientists, Introduction to Python, Open Refine, and other data science skills.
- Created and Organized Projects in Progress. Fostered a Data Science community environment for researchers on campus to collaborate and share projects ideas and progress. Helped consult 3 - 5 projects over the span of two semester (over 20 researchers) using data science methods monthly.
- Helped organize Stanford-based Women in Data Science satellite conference and led the Computational Social Science panel as an organizer and moderator. April 2022 event had around 400 participants on and offline.

**Data Analyst Research Assistant | Arizona Medical Education Research Initiative, UA, Tucson, 01/2021 – 08/2021**

- *Multivariate Statistical Analysis* Applied statistical analysis an inference to survey and collected data to review and test the University of Arizona's Medical School's performance for future accreditation. Types of data include survey data, archived data, and collected government data from large data systems. Used both R and Python to apply analysis of variance, chi-square tests, validation checks, regression, and correlation analysis.
- *Program Use*: Worked with Power BI, Excel, R and Python to clean, manage, transform, analyze, iterate, and visualize data. Created reports from various sized data sets using statistical analysis and visualization.

**EXPERIENCE & RESEARCH** (Data Science Experience Continued ...)**Research Analyst | Security Analysis Co-Lab. University of Arizona, Tucson, AZ, 03/2020 – 9/2021**

- Lead data management and repository infrastructure foundation for survey data from every state in El Salvador. Prepared and analyzed a randomized control treatment to schools in high crime areas. Applied simple statistics, hypothesis testing, and regression analysis to collected data of large-scale survey instrument roll-out.
- Assisted with grant proposal writing, coordinated with government and community collaborators to identify research parameters and methodology. Used a logical framework and theory of change to compose project.

**Survey Data Manager | Minerva Project: University of Arizona, Tucson, AZ, Summer 2021**

- NSF Grant funded project: Contributed to maintenance of a pipeline for 8k+ unique and personalized surveys in English, Spanish, Pashto and Dari. Applied data cleaning, wrangling, and statistical analysis to a databank of crowd-sourced history of armed conflict in Afghanistan and Colombia for the US Department of Defense.
- Troubleshooted and applied forensic analysis to problem solve issues in the pipeline and iterate over processes for optimization. Assessed project state and automate forecasting of coverage to establish future project needs.
- Completed Time Series visualizations for dynamic datasets by reformatting and manipulating data in R to show the territorial control by Criminal Organizations.

**Data Science Research**

**Dissertation Research: Image Analysis, Fall 2022 - Present** *Data Mining*: Collected thousands of social movement images and metadata including comments, likes, hashtags, URLs, and automated descriptions from Instagram using the Instaloader package to classify into narrative frames using deep model feature learning and sentiment analysis.

**Knowledge Graph/Ontology Research: Final Project, 2022** Reviewed knowledge graph and Ontology methods for visual storytelling, semantic attention, and image classification for final paper. Particularly, methods of scene graph applications, which represent relational knowledge that can be modeled with symbolic data from texts or knowledge graphs. Explored Knowledge graph use of the semantic web was explored to understand image processing

**Information Retrieval Research: Final Project, 2022** With a partner, researched the historical implications of a proposed model for information retrieval of video and texts simultaneously in a hierarchical cross-model format, “Hierarchical Cross-Modal Graph Consistency Learning for Video-Text Retrieval” (2021) by Jin et al.. We found that the article’s historical roots had a wide breadth of topics as well as a depth of history. The main topic we decided to focus on was video and text retrieval which includes methods for historical roots and contemporary applications of hierarchical models, temporal segmentation algorithm, bidirectional recursive neural networks (Bi-RNN), cosine similarity as a loss function, and self-attention features.

**TPRC Conference, Publication, 4/15/2021** *Deep Models*: With partner, compared two natural language processing models on a dataset composed of labeled propaganda data. We reviewed off the shelf BERT model and the Hierarchical Attention Network (HAN) model and found they both provide different accuracy levels, with BERT maintaining better results. The main fault of the HAN model is that it was not able to account for the unbalanced aspect of our data which was labeled in a binary (propaganda - 1, not propaganda-0).

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**LEADERSHIP**

**AI Steering Committee, University of Arizona, 2023 - Present**

**PhD Community Liaison (University of Arizona iSchool) 2021 - Present**

**Data Carpentries Instructor** – Lead coding workshops in R, Python, Open Refine, and data science skills 2022 –Present

**NLP Reading Group UofA, 2019-Present**

**ASIS&T SIG – Visualization, Sound, and Image: Secretary Chair 2021-2022**

**WiDS-Tucson (Women in Data Science), Panel Sessions Organizer, Data Blitz Committees 2021 -2022**

**Data Science Ambassador**- Data Science liaison for the CSS certificate and iSchool, Datathon Organizer 2021 – 2022

**Lecturer-ESOC211:** Collaboration in Online Communities 2019 – 2021

**RezBaz** - Presenter & Moderator, Network Analysis 2021; R Visualization 2021 and 2022

**iSchool** Colloquium, Organizer: Moderated Lectures, led school-wide Faculty Research Blitz 2020 – 2021

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## PROFESSIONAL EXPERIENCE

### **Instructor – *University of Arizona School of Information***

**Tucson, AZ, 08/2019 – Present**

- Instructor for ESOC 130 – Computational Thinking and Doing. Introduction to python topics including functions, lists, classes, and logic. Provide computational theory for problem solving with algorithms and other computational models.
- Instructor for ESOC 211 – Collaborating in Online Communities. The class focuses on what humans do, how they present themselves, and how they do the work of collaboration in online contexts by considering how people create a sense of community, maintain group connections, and cooperate with one another to bring about a particular outcome. Students learn online collaboration skills, and alternative thinking processes on how to approach online communities. introduced digital tools such as Lucid Chart, Adobe Spark, and digital content methods such as user personas, metadata, and SEO. They also learn genre analysis and visual rhetoric.
- Instructor for ESOC 300 – Digital Storytelling and Culture. The class focuses on how story, audience engagement, narrative structure, and digital mediums has been harnessed to understand how stories are essential to our experience as humans. Students complete a semester-long project incorporating elements of community, identity, memory, and perspective.

### **Community Outreach and Program Coordinator – *Lutheran Social Services of the Southwest K-12 Refugee Education (AmeriCorps State Member)***

**Tucson, AZ, 08/2016 – 08/2019**

- Arizona Serve State Member working with the non-profit organization, LSS – K-12 Refugee Education CENTER, by providing academic support, empowerment, and leadership skills to refugee students in Tucson, Arizona. Provided assessment and outreach for Tucson schools with large refugee student populations by developing a database to track and identify community resources and partnerships. Connected students to local academic advancement resources.
- Created a sustainable measurement process to identify the impact of LSS-SW Education services based on student survey and school-based data. Produced a report of the year's work, updated Refugee Youth Services Handbook, and share with stakeholders. Kept LSS-SW a primary education resource for Tucson refugees.
- Helped students with website creation and create lesson plans and workshops to help students get better acclimated to using digital files and performing research on the internet. Used web design best-practices and maintained a website showcasing student work that expresses themselves and their stories of refugee immigration. Review communication apps for students and teachers.

### **Digital Content Specialist – *Tetakawi***

**Tucson, AZ, 08/2016 – 05/2019**

- Conducted field research on the Mexican labor market for advisory services branch. Provide report editing, and data check to research findings. Researched industry resources on economic, regulatory and policy events in Mexico and U.S. trade relations on company website.
- Worked with SEO, Google analytics and CMS platforms for web optimization. Create content using design and basic principles for blogs, e-books, white-papers, infographics, graphics, and market reports. Spearheaded UX research and design for website re-branding. Including wire-framing, prototyping, testing, surveying, and content creation.

**PROFESSIONAL EXPERIENCE (Continued ...)****Web Designer / Content Management - *McCourt School of Public Policy, Georgetown University*****Washington, D.C. Summer 2016**

- Applied design thinking consulting to help the marketing, IT, and communications director transition to new a website platform. Solved Problems with coding elements using bootstrap and Drupal platforms. Applied UX design methodology and analysis. <https://mccourt.georgetown.edu/>. Applied quality assurance review and web design best practices for multiple website projects.

**Teaching / Research Assistant - *Georgetown University*****Washington, D.C. 08/2015 – 07/2016**

- **Fundamentals of Technology:** Worked with a team of TAs and professors to implement syllabus and in- class participation. Led breakout discussion sessions to guide students with leadership and interpersonal skills as they develop an understanding of the material. Maintained a strong understanding of course content to answer questions on technology assessment and guide students on assignments, project development and exam instructions.
- **Content Analysis Research:** Applied data management skills to review data sets and reports. Developed analytics guide to further the study. Used the predictive analytics software, SPSS, to clean and create multiple databases to observe content and survey records. Applied critical thinking and analysis to data. Created annotated bibliographies, and edited reports.

**Digital Experience Intern – *Archives of American Art, Smithsonian Institution*****Washington, D.C. Summer 2015**

- Implemented website development, quality assurance, design research for logo redesign. Audited and managed website content for transition to the Drupal platform. Coordinated with staff for Drupal trainings and social media initiatives. Researched website best practices and current art news. Coordinated social media strategies with team. Created SEO metadata. Awarded the Horowitz-Fraud Minority Scholar. <https://www.aaa.si.edu/>

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**COURSEWORK AND CERTIFICATIONS****Introduction to Computer Vision**, Computer Science, Fall 2023**Theory of Statistics** School of Statistics, Spring 2023**Advanced Data visualization** - Computer Science – Spring 2023**Text Analysis Pedagogy Institute** – JSTOR & University of Arizona, Summer 2022**Introduction to Artificial Intelligence**– School of Information, Spring 2022**Bias in Information Retrieval Systems (Graduate Seminar)** – School of Information, Spring 2022**Probabilistic Graphical Models**, Computer Science – Spring 2022**Theory of Probability** – School of Statistics, Fall 2021**Visual Epistemologies of Media and Technology (Graduate Seminar)** - School of Information, Spring 2021**Applied Social Network Analysis**– School of Information, Spring 2021**Social Movements and Collective Action** – School of Sociology, Fall 2020**Neural Networks**– School of Information, Fall 2020**Bayesian Models and Inference**– School of Information, Fall 2020**Human Rights and Technology** – School of Information, Fall 2020**Intro to Machine Learning**- Electrical and Computer Engineering, Spring 2020**Micro-dynamics of Political and Organized Criminal Violence** – Government and Public Policy, Spring 2020**Science, Health, Engineering Policy, and Diplomacy**; Sustainable Development for the Americas Conference, Fall 2019**UofA Computational Social Science Certification Program**, 2019**User Experience and Design**- Springboard Certification, 2017**Presenting Data and Information**- Edward Tufte, 2016