Geospatial Analysis Portfolio

Katherine M. Yut

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Contents

Cover Letter

Dear NASA,

I am writing to express my interest in the Program Scientist position at NASA and outline my qualifications, which firmly position me as an outstanding potential team member. With a background in data wrangling, geospatial analysis, and the art of data visualization, I possess strong problem-solving abilities coupled with a knack for coding, making me an ideal candidate for data-driven endeavors.

During my tenure as a GIS & Energy Data Analyst at the University of Texas, Bureau of Economic Geology, I have honed comprehensive skills in GIS, coding, and effective communication. My track record includes successfully utilizing tools such as ArcMap and R to perform intricate subsurface research, develop peer-reviewed literature, and present findings.

My experience as a Viticulture Research GIS Intern at E. & J. Gallo Winery has equipped me with the proficiency to manage large datasets, automate satellite data acquisition, and employ statistical techniques to drive decision-making. Collaborating with cross-functional teams, I contributed to optimizing wine grape yield and quality through informed irrigation strategies, solidifying my dedication to translating data into impactful solutions.

While a remote sensing intern with NASA DEVELOP, I conducted thorough literature reviews, collected training data, deployed classification models, and performed site suitability analyses. My role demanded a keen eye for design as I created compelling visuals while ensuring adherence to stringent style guidelines. I excelled at developing workflows using ArcGIS, ENVI, Idrisi Terrset, and Google Earth Engine despite unforeseen challenges. Thriving in a collaborative environment, my team and I effectively communicated complex scientific concepts to both technical and non-technical audiences.

My educational background, consisting of a Master of Arts in Economics and Big Data, a Bachelor of Arts in Economics and Big Data, and a Bachelor of Science in Geographic Information Science, demonstrates my curiosity, rapid learning capability, and unwavering commitment to acquiring expertise across domains. My skill set includes RStudio, R, ESRI ArcMap, QGIS, Google Earth Engine, ENVI, GitHub, Java, JavaScript, SQL, and Python.

Driven by a genuine passion for data analysis, I am eager to contribute my insights, skills, and efficiency to the team. Thank you for considering my application. I look forward to the opportunity to discuss how my experiences align with your vision during an interview.

Best,

Katherine (Katy) Yut

Katherine M. Yut

Geospatial Data Analyst

Expert in geospatial and statistical analyses using R. Passionate about data visualization. Seeking to solve interesting problems while growing geospatial Python skills.

Work History

2022-05 – Current **GIS & Energy Data Analyst**
University of Texas, Bureau of Economic Geology*, Austin, TX*

- **Analyzing (50%):** Utilizing ArcMap to aid in oil & gas research.
- **Coding (40%):** Leveraging R to clean and manipulate data tables, solve problems, and draw conclusions.
- **Communicating (10%):** Publishing research findings as papers, posters, and presentations.

2020-06 – 2020-12 **Viticulture Research GIS Intern**
E. & J. Gallo Winery*, Modesto, CA*

- **Coding (35%)**: Managed expansive file structure and folder organization; automated data acquisition using R.
- **Analyzing (35%)**: Processed/analyzed data; built multivariate linear model; completed remote sensing analysis in Google Earth Engine.
- **Storytelling (25%)**: Assisted with irrigation decisions to improve wine grape yield and quality; presented findings in slideshow.
- **Fieldwork (5%)**: Assisted with Trimble GPS in situ data collection, berry sampling, and other vineyard tasks.

2019-05 – 2019-08 **Remote Sensing Intern**
NASA DEVELOP*, Pocatello, ID*

- **Solo research (30%)**: Conducted literature review; collected training data, built classification models, completed site suitability analyses.
- **Visualizations (30%)**: Designed figures, maps, and slideshows; adhered to strict style guidelines.
- **Team research (20%)**: Brainstormed; collaborated; developed workflow in ArcGIS, ENVI, Idrisi Terrset, and Google Earth Engine; delegated tasks; tackled unexpected setbacks.
- **Communication (20%)**: Wrote tutorial to reproduce workflow; collaborated with partners; conveyed complex science to lay audience.

Research

2019-04 Kelley, S., **Yut, K.**, Kulkarni, R., & Gaffin, D. (2019). Avoidance of rosemary oil by scorpions. Journal of Arachnology.

Education

2016-08 – 2021-05 **Master of Arts: Economics and Big Data**
Bachelor of Arts: Economics and Big Data
Bachelor of Science: Geographic Information Science
University of Oklahoma – Norman, OK
Summa cum laude

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linkedin.com/in/katherine-yut/

Skills

RStudio, R: Writing functions, making packages, documenting code; Programming interactive html servers with responsive graphics using R shiny.

ESRI ArcMap

QGIS, Google Earth Engine, ENVI, GitHub, Java, JavaScript

Big Data statistical processing, analysis, and modeling

SQL, Python

Statistics; Quality control and multivariate normality checks; Principal Components, Factor, and Bayesian analyses; Ordinary and weighted least squares linear regression.

Creating timely deliverables and communicating effectively

Curiosity, organization, multitasking, and focus

Recognition

- Phi Beta Kappa Honor Society
- Outstanding Junior
- National Merit Scholar Finalist

References

The following individuals are happy to vouch for my character and data analysis capabilities:

1. Katie Smye
   Bureau of Economic Geology | Research Associate
   katie.smye@beg.utexas.edu | (512)-471-6775

2. Brent Sams
   E. & J. Gallo Winery | Research Scientist
   sams.brents@gmail.com | (209) 568-9317

3. Kirsten de Beurs
   Wageningen University | Chair & Professor
   kdebeurs@gmail.com | +3 (131) 748-2219

Sample Work

Bureau of Economic Geology

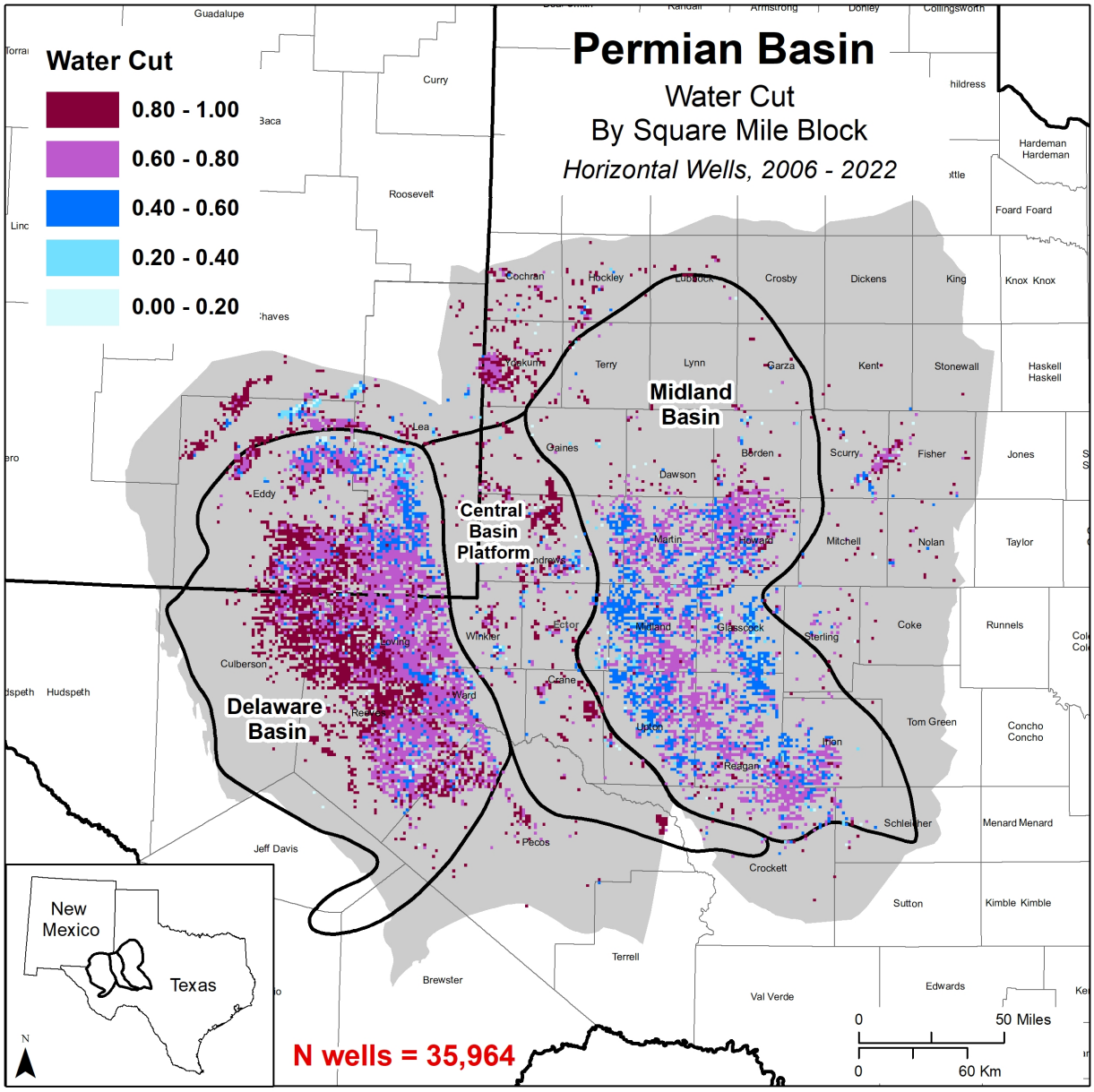


Figure 1: Map of Water Cut (Produced Water / Produced Oil + Produced Water) for all horizontal wells in the Permian Basin, aggregated on square mile blocks. Created in ArcMap using data from IHS Enerdeq.

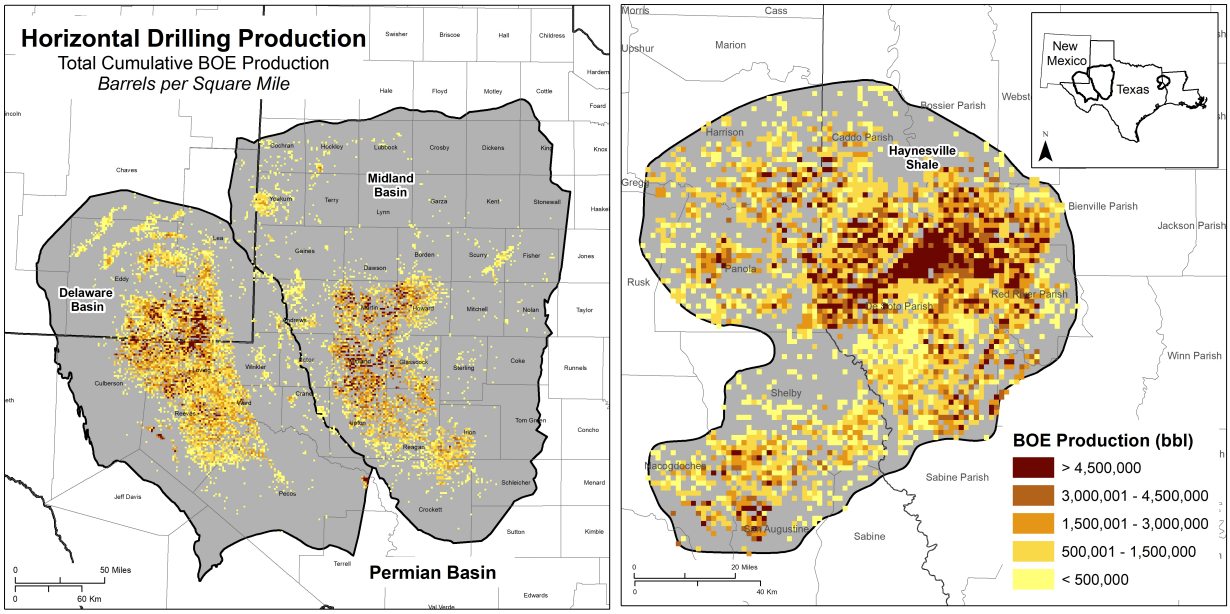


Figure 2: Map of total cumulative production of oil and gas production, in barrels of oil equilvalent, for all horizontal wells in Delaware, Midland, and Haynesville, aggregated on square mile blocks. Created in ArcMap using data from IHS Enerdeq.

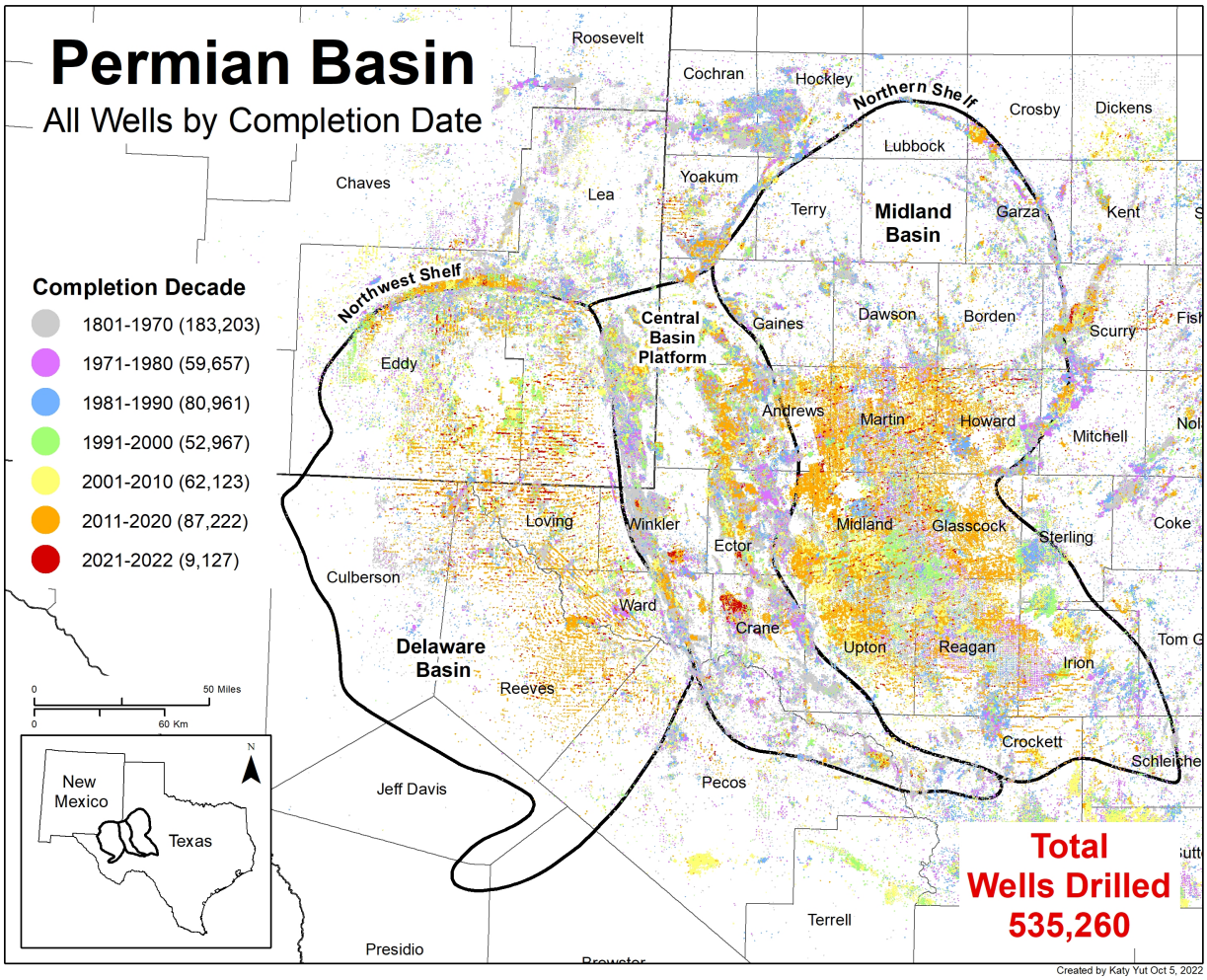


Figure 3: Map of all wells drilled in the Permian Basin region, colored by decade completed. Created in ArcMap using data from IHS Enerdeq.

Internships

E&J Gallo Winery (2020)

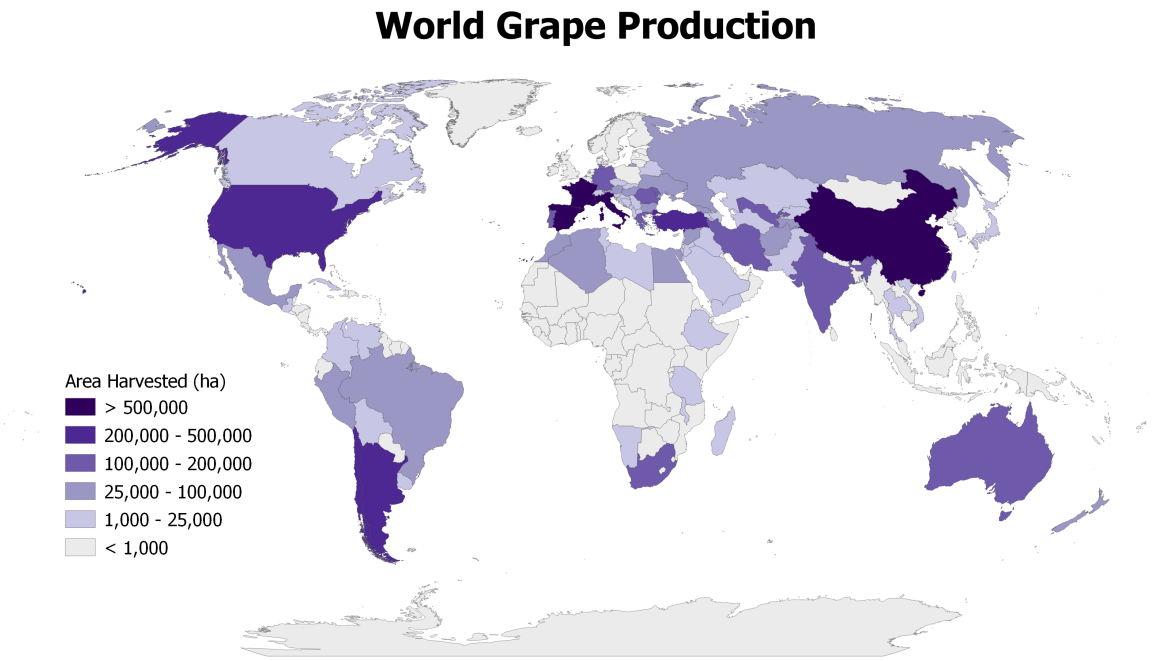


Figure 4: World map of grape production by country. Map requested and produced within one business day. Created in QGIS.

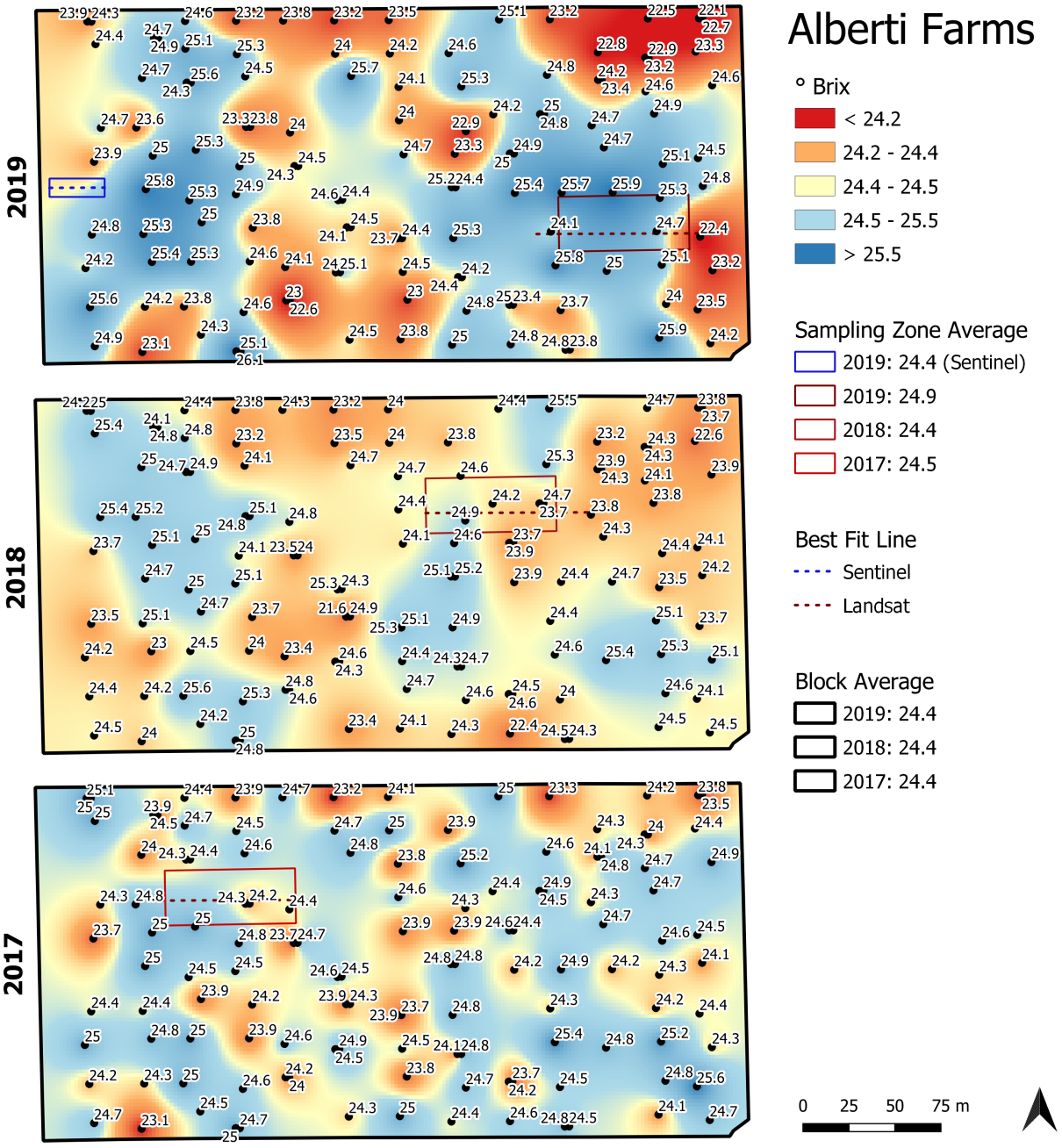


Figure 5: Kriging interpolated Brix (i.e., grape sugar content) values for 2017, 2018, and 2019 across a single block with sampling algorithm solutions for both Landsat and Sentinel imagery. Created in QGIS.

NASA DEVELOP (2019)

Forecasting Red Spruce Restoration Using NASA Earth Observations to Support Decision Making in the USFS Monongahela National Forest

ABSTRACT: In the Monongahela National Forest (MNF), situated in the Allegheny Highlands of West Virginia, extensive logging and mining practices have significantly altered the structure and composition of flora and fauna over the past two centuries. To aid red spruce restoration, this study mapped current and historical stands and identified non-native stands... Read full abstract here.

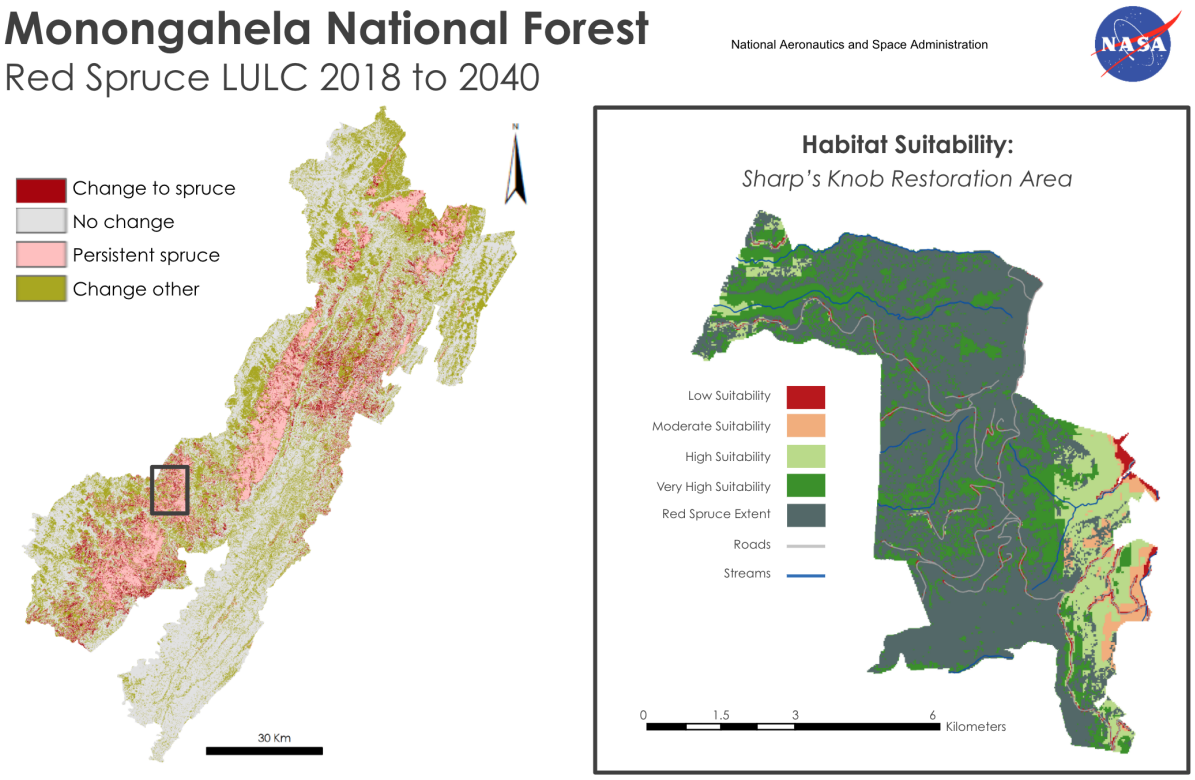
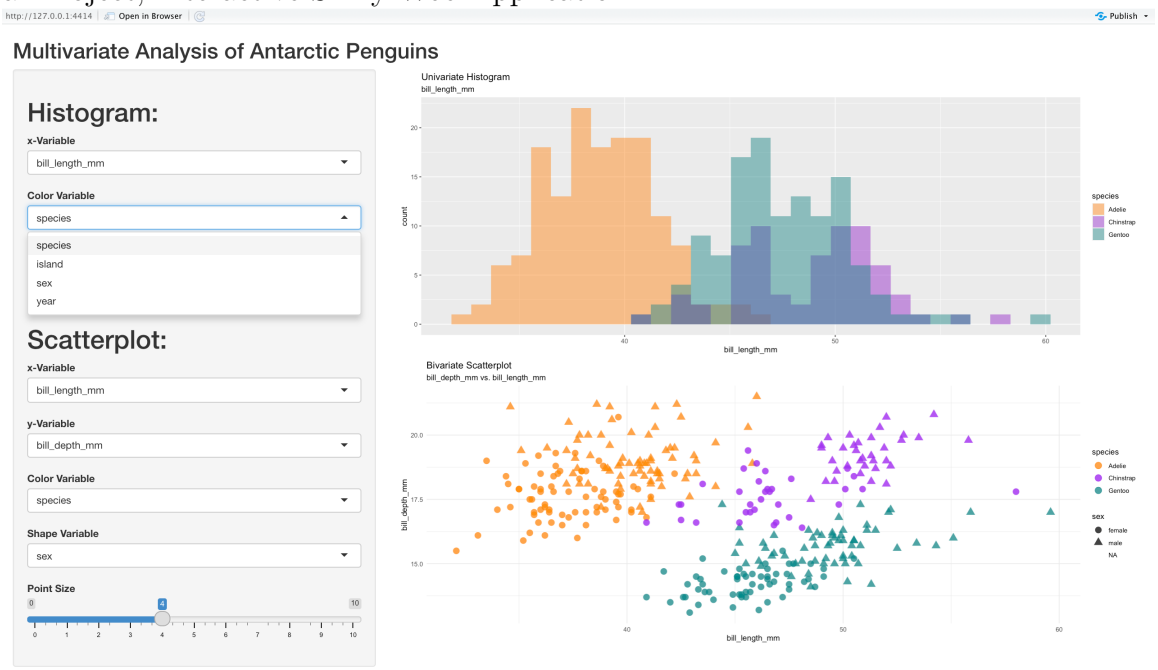


Figure 6: Land classification change using Classification Tree Algorithm in Idrisi Terrset (left). Site suitability analysis created in ArcMap (right).

Coursework

Advanced Applied Statistics

Final Project, Interactive Shiny Web Application



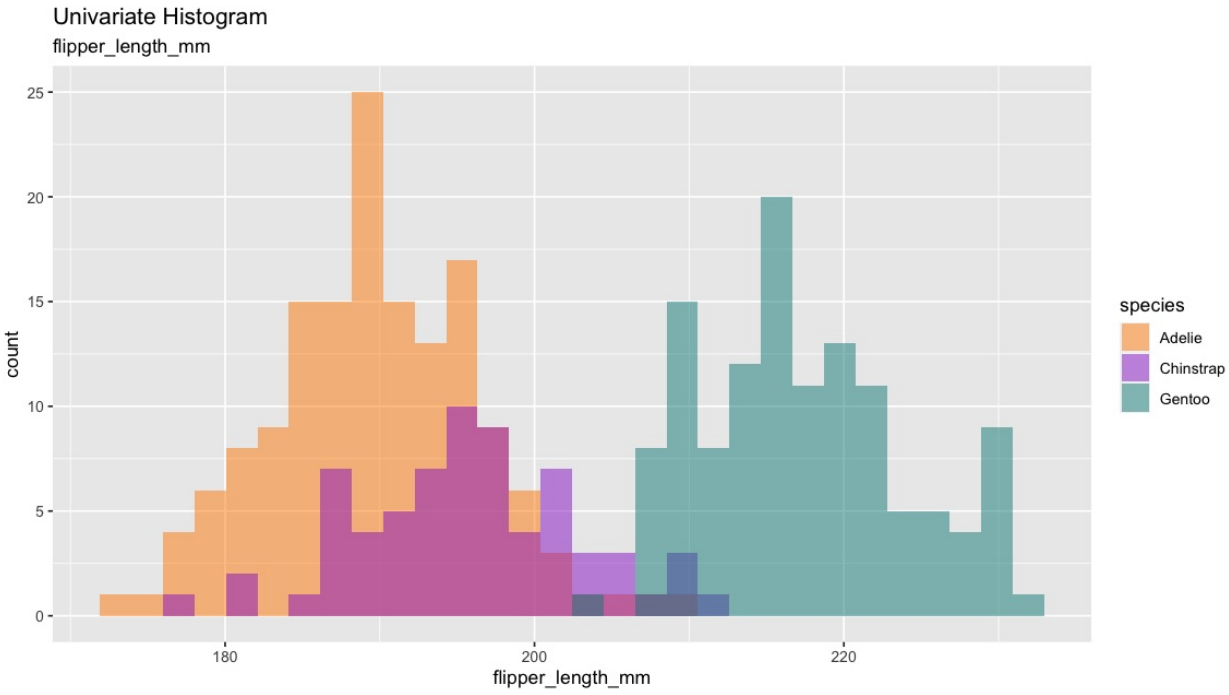


Figure 7: Interactive shiny web application (top). Histogram of penguin flipper length (in millimeters), colored by species (bottom). Created in RStudio.

Advanced GIS Final Project

Spatial Analysis of Oklahoma Homicide Rates

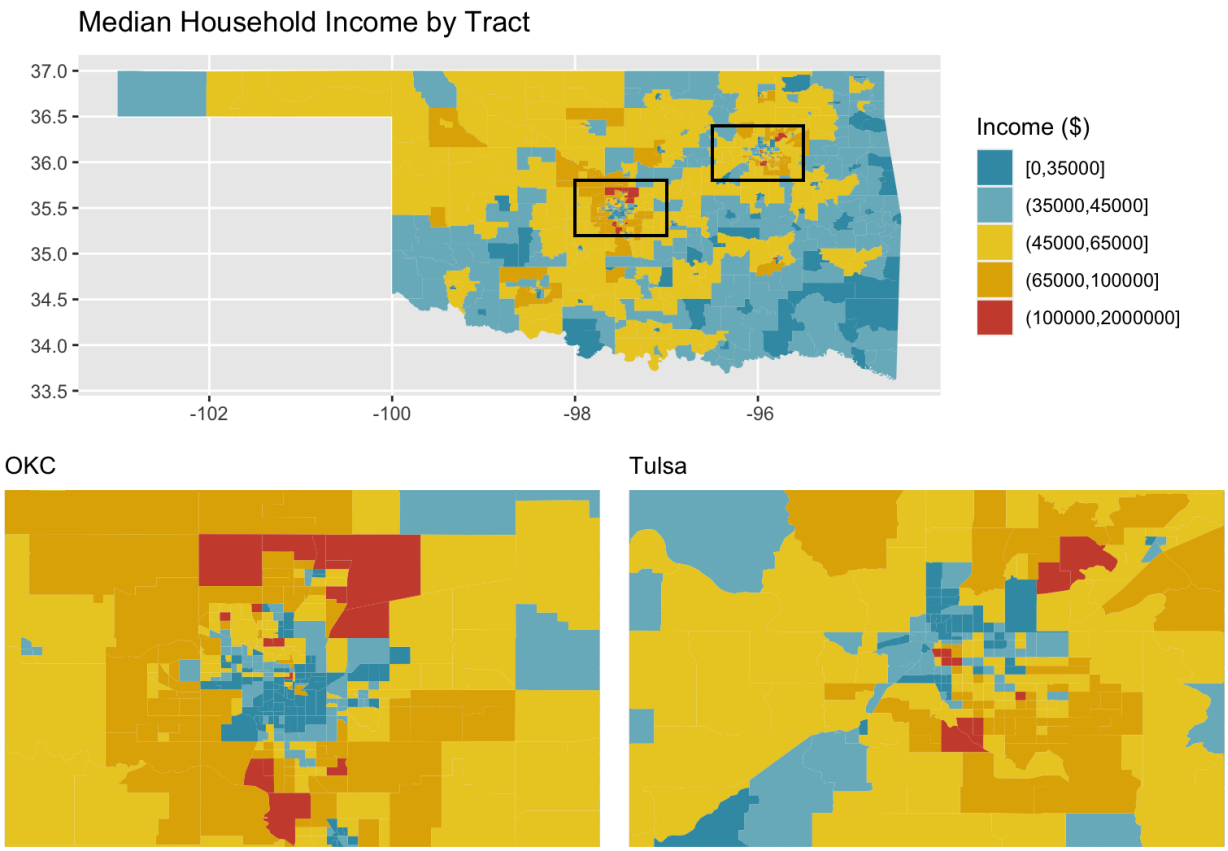


Figure 8: Map of median household income by US Census tract in Oklahoma, with inset maps of Oklahoma City (left) and Tulsa (right). Created in RStudio. See the full project here.

Capstone: Geoinformatics Seminar

Remote Sensing Analysis of Tashkent, Uzbekistan:
Classification Algorithms in Relation to China's Belt and Road Initiative

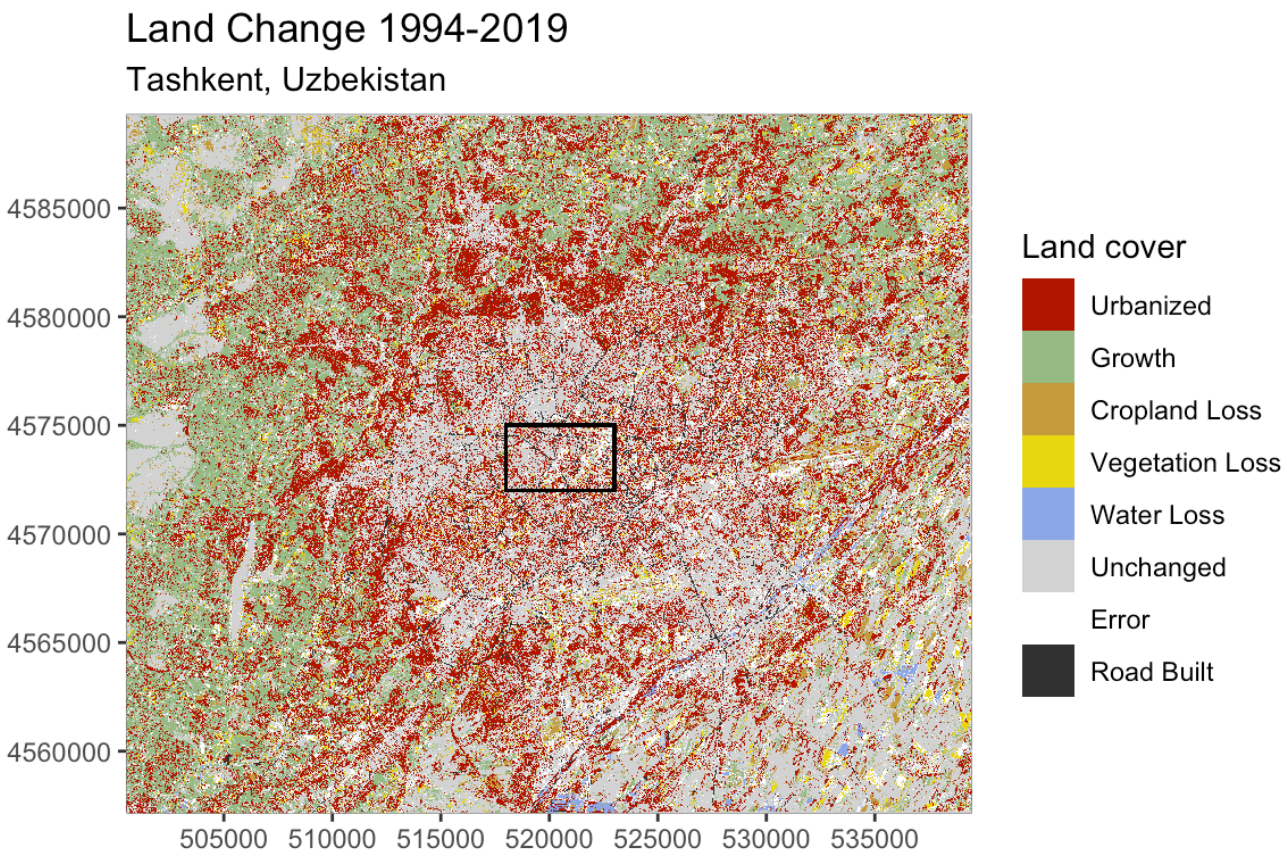


Figure 9: Land change model output showing wildland-urban interactions in Tashkent, Uzbekistan for the past two decades. Created in RStudio. Read the final paper here and see the full project here.

Relevant Coursework

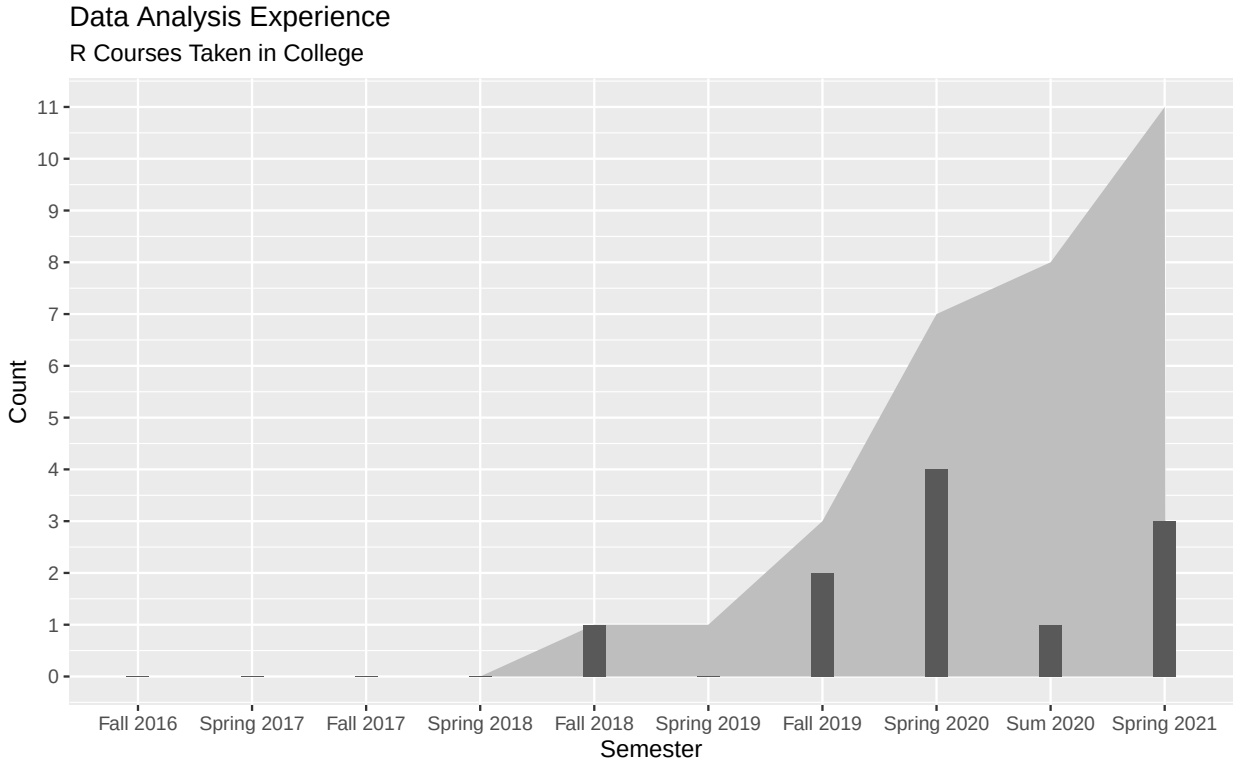


Figure 10: Time series by semester showing cumulative (light grey) and count (dark grey) of RStudio data science classes taken. Created in RStudio using ggplot2.

Course Name	Grade	Semester
Econometrics	A	Fall 2018
Spatial Statistics	A	Fall 2019
Stats for Decision Making	A	Fall 2019
Advanced GIS/Spatial Analysis	A	Spring 2020
Managerial Econ II	A	Spring 2020
Geoinformatics Capstone Seminar	A	Spring 2020
Bayesian Econometrics	B	Spring 2020
Intro to Math Stats	A	Summer 2020
Text Analytics	A	Spring 2021
Advanced Applied Stats	A	Spring 2021
Research in Economic Problems	Pass	Spring 2021

Table 1: Table of each RStudio data science class and the grade earned. Created in RStudio using kableExtra.