Jarrod Burges, GIT

Fullerton, California, 92835

jarrod.burges@rutgers.edu | jarrodburges@outlook.com

jarrod-burges.github.io

Education

Ph.D. in Earth and Planetary Sciences   **Expected May 2030**

Rutgers University – New Brunswick

      Thesis Advisor: Dr. Shaunna M. Morrison

B.Sc. in Geology and Computer Science   **December 2024**

California State University, Fullerton

      Thesis Title: "GeoCORK: An improved workflow for geochronology data management"

      Thesis Advisor: Dr. Kathryn Metcalf

Research Interests

Utilizing machine learning to solve geological questions using big data. Specific interests in developing models to understand geochemical or optical petrographic micro-signatures to extract new insights previously difficult to be seen. Developing geoscience cyberinfrastructure to support researchers ability to quickly analyze data.

Certifications

- California Geologist-in-Training (obtained October 2024)

Publications

2. **Burges, J.** and Metcalf, K., 2024, GeoCORK: Part 2. Technical specifications for future software development and expansion (in preparation, submission April 2025)

1. Metcalf, K. and **Burges, J** 2024, GeoCORK: Part 1. An improved workflow for geochronology data management (in preparation, submission April 2025)

Technical Skills

- Programming languages: Python, SQL, R, Java, and C++
- Development Suite: JetBrains Suite, RStudio, and GitHub/Git
- ArcGIS and ArcMap
- Microsoft Office Suite
- Adobe Creative Cloud Suite: Illustrator, Sign, Photoshop, Premiere Pro
- Other: Linux (Ubuntu and Raspbian), Windows OS, Mac OS

Research Experience

Undergraduate Honors Thesis   **October 2022 - Present**

Title: GeoCORK: An improved workflow for geochronology data management

- Full-stack development in Python, SQLite3, and PyQt6
  - 52 data tables to store all geological, geochronological, and researcher specific data
  - Only 3 tables store U-Pb data; allows for future methods to be implemented with ease
- Automatic importing and filtering by any data metric within the database.
- Assisted exporting to existing formats (detritalPy, DzStats, IsoplotR)
- Custom tags allow for user-defined customization.

Field Assistant   **July 2023**
Tibet, China
- Four (4) weeks through rural Tibet, China, collecting data to assist in creating four balanced cross-sections.
- Assisted with field collection of samples, data, and geological interpretations.

ArcMap/GIS Update for University Police 911 Dispatch Center   **February 2023**
California State University, Fullerton
- Assisted in updating the Computer Aided Dispatching Software (CAD) utilized by the on-campus 911 emergency call center.
- Observed outdated maps, roads, and labels for various buildings, streets, and university property.
- Utilized ArcGIS and ArcMap to update all outdated georeferenced objects and satellite imagery.
- Improved accuracy of calls for service by being correctly labeled for dispatchers to assist with officers responding to calls.

Teaching & Advising

Undergraduate Teaching Assistant   **Fall 2023**
Geology 303A | Earth Materials
- Assisted the professor and graduate TA with lecture/lab learning sessions for twenty-five (25) students.
- Acted as in-class mentor to sophomore and junior-standing geology students.
- Conducted a one (1) hour seminar-like lecture on Artificial Intelligence (AI) for the geological field. Topics focused on entry-level concepts, including the methodology behind AI algorithms, their geological uses, and current projects being developed by researchers.

Professional Experience

Staff Geologist and Database Analyst   **May 2024 - Present**
EEC Environmental
Orange, California
- Prepared comprehensive geological reports and presentations for clients and internal stakeholders.
- Conducted detailed sampling and data collection to support environmental projects.
- Managed geological databases in Microsoft Access and SQL Server, ensuring accurate and efficient data storage, retrieval, and integrity.
- Created and maintained comprehensive metadata documentation for all database systems.
- Monitored and evaluated drilling operations, providing real-time geological interpretations for later data analysis.
- Ensured compliance with environmental regulations across multiple states and company standards during fieldwork and data analysis.

Community Service Officer (CSO)   **June 2022 - Present**
University Police
California State University, Fullerton
  CSO Supervisor   **June 2023 – Present**
- Overseeing supervisor of thirty-five (35) student CSOs.
- Creating and ensuring adherence to all policies and procedures from within our division or our superiors in the sworn command staff.
- Implementing new strategies to improve the program.
- Creating schedules, managing payrolls, and enacting disciplinary actions.
  CSO Field Training Officer (FTO)   **August 2022 – June 2023**

- Responsible for providing on-the-job training and mentorship to new student CSOs.
- Guide and evaluate trainees' performance, teach them proper procedures and protocols, and ensure their readiness for independent duty through hands-on training and assessment.
- Assigned special duties, which included outreach, event planning, and facilitating staffing levels.

Community Service Officer (CSO)   **June 2022 – August 2022**

- Student-only non-sworn position within the CSUF Police Department that focuses on community engagement, public safety, and support services.
- Provided a safe environment to the campus community by:
    - Patrol assigned areas, lock up campus after all classes conclude, respond to non-emergency calls, and engage with the community to address concerns.
- Act as a visible presence to assist with crime prevention initiatives and as a liaison between the student community and law enforcement.

Lab Assistant (Winter Temp)   **December 2022 – January 2023**

GMU Geotechnical

Rancho Santa Margarita, California

- Conducted comprehensive soil analyses to state and federally regulated procedures.
- Analyses included Atterberg limits, maximum density curves, moisture contents, R-values, grain size sieve analysis, and soil classifications.
- Maintained accurate records with in-place filing systems.

Professional Service

Student Representative   **October 2023 – Present**

Geological Society of America (GSA)

Division of Geoinformatics and Data Science (GIDS)

- Provide student-related insight into the administration and operation of the Geoinformatics and Data Science division of GSA.
- Assisted in the facilitation of technical sessions at conferences.
- Managed the GIDS website.

Relevant Coursework

Geology 481A (Geology Field Camp I) – Grade: A-

- One week studying and mapping 2 mi^2 Poleta Folds, Deep Springs Valleys, CA – Produced final report with map and two cross-sections
- One week studying and mapping 10 mi^2 Devil's Punchbowl, Mono-Inyo Craters, CA – Produced final report with map and two cross-sections
- Three days studying and mapping Rock Creek Lake, John Muir Wilderness, CA – Produced final report with map and one cross-section (Completed with other's notes due to injury sustained first day)
- One week shadowing and studying industry hydrogeology through Orange County and Riverside County Watershed

Geology 510T (Graduate Topics in Geology - Ore Deposit Models) – Grade: A

- Created a gradient boosting machine learning mineral prospectivity map for Mississippi-valley type deposits (Pb & Zn).
- Acquired knowledge of various deposit models and associated geologic structures.

Computer Science 483 (Machine Learning) – Grade: B+

- Focused on the mathematics behind machine learning algorithms.
- Topics included posterior priors, distributions, and hyperparameter tuning.

Computer Science 481 (Artificial Intelligence) – Grade: B-

- Focused on the theory and concepts behind machine learning algorithms, artificial intelligence, and their distinct definitions.
- Topics included pruning methods, searching algorithms, ethics, game theory, and discrete math.

Geology 456 (Geophysics) – Grade: B-
- Focused on the methods of geophysical surveys.
- Topics included seismograms, electrical resistivity, gravity, and multi-method report analysis.

Computer Science 375 (Introduction to Data Science) – Grade: B-
- Focused on the applications and usage of the statistical coding language, R.
- Topics included visualization of data, introductory machine learning techniques, and standard statistical packages, dylpr and tidyselect.

General Classes Taken:

Geology:
- Earth Materials
- Igneous and Metamorphic Petrology
- Sedimentology and Stratigraphy
- Geologic Field Techniques
- Structural Geology
- Volcanology
- Hydro and Surface Processes
- Earth History

Other Science:
- General Chemistry 1 & 2
- Calculus Physics 1 & 2
- Mathematical Structures 1 & 2

Computer Science:
- File Structures and Databases
- Computer Communications
- Computer System Architecture
- Compilers and Languages
- Software Engineering
- Modern Software Deployment
- Python
- Operating Systems
- Professional Ethics in Computing
- Data Structures
- Algorithm Engineering
- Computer Org. and Assembly Language

Selected Awards

- Natural Sciences and Mathematics Inter-Club Council Travel Award ($750), California State University, Fullerton (November 2024)
- Armstrong-Butcher Undergraduate Geology Conference Travel Award ($500), California State University, Fullerton (November 2024)
- Undergraduate Research Opportunity Center (UROC) Travel Award ($500), California State University, Fullerton (November 2024)
- Armstrong-Butcher Undergraduate Geology Conference Travel Award ($500), California State University, Fullerton (September 2024)
- Cordilleran Section Student Travel Award ($375), Geological Society of America (September 2024)
- Armstrong-Butcher Undergraduate Geology Conference Travel Award ($500), California State University, Fullerton (May 2024)
- Undergraduate Research Opportunity Center (UROC) Travel Award ($750), California State University, Fullerton (May 2024)
- Cordilleran Section Student Travel Award ($600), Geological Society of America (May 2024)

Meeting Abstracts

10. **Burges, J.** and Metcalf, K., 2024, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Abstract V23B-3335 presented at 2024 American Geophysical Union Annual Meeting, Washington, DC, 9-13 December.

9. **Burges, J.** and Metcalf, K., 2024, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Abstract 59-4 presented at 2024 Geological Society of America Annual Meeting, Anaheim, California, 22-25 September.
8. **Burges, J.** and Metcalf, K., 2024, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Abstract 38-2 presented at 2024 Geological Society of America Joint Cordilleran and Rocky Mountain Section Meeting, Spokane, Washington, 15-17 May.
7. **Burges, J.** and Metcalf, K., 2024, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Presented at Southern California Geological Society May 2024 Meeting, Fullerton, California, 6 May.
6. **Burges, J.** and Metcalf, K., 2024, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Presented at 2024 Department of Geological Sciences Research Day, Fullerton, California, 3 May.
5. **Burges, J.**, and Metcalf, K., 2024, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Abstract 411 presented at 2024 National Conference of Undergraduate Research, Long Beach, California, 8-10 April.
4. **Burges, J.**, and Metcalf, K., 2023, DESKTOP APPLICATION TO MANAGE AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Abstract 46-6 presented at 2023 Geological Society of America Annual Meeting, Pittsburgh, Philadelphia, 15-18 October.
3. **Burges, J.**, Metcalf, K., and Goffman, M., 2023, PYTHON PROGRAM TO INPUT, SORT, VIEW, AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Abstract 9-11 presented at 2023 Geological Society of America Cordilleran Section Meeting, Reno, Nevada, 16-19 May.
2. **Burges, J.,** Metcalf, K., and Goffman, M., 2023, PYTHON PROGRAM TO INPUT, SORT, VIEW, AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Presented at 2023 College of Engineering and Computer Science Student Innovation Expo, Fullerton, California, 5 May.
1. **Burges, J.**, Metcalf, K., and Goffman, M., PYTHON PROGRAM TO INPUT, SORT, VIEW, AND STORE DETRITAL ZIRCON GEOCHRONOLOGICAL DATA IN A SQL DATABASE: Presented at 2023 Department of Geological Sciences Research Day, Fullerton, California, 5 May.

References

Kathryn Metcalf, Asst. Professor of Geology
California State University, Fullerton

Patrick Phelps, Asst. Professor of Geology
California State University, Fullerton

Shaunna M. Morrison, Assoc. Professor of Geology
Rutgers University–New Brunswick

Professional
Anthony Renteria, Corporal, University Police
California State University, Fullerton