Arthur Koehl

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Research Interests

fluvial geomorphology; river science; computational methods for earth surface analysis.

Education

PhD **University of California, Davis**, PhD in Hydrologic Sciences — Expected Sept. 2027
- Advisor: Dr. Gregory Pasternack
- Dissertation: "Mapping River Valleys: Algorithms, Geometry, and Process"
- Focus: River valley geomorphology, surface processes, geomorphometry

B.A. **University of California, Davis**, B.A. in History and Economics — 2018
- Minor: Computer Science
- Honors: Highest Honors (History), Department Citation (History)
- Thesis: "Digital History of the Malgré-Nous: French men and women in the German Wehrmacht and Waffen-SS during the Second World War"

Research Experience

Pasternack Lab, UC Davis, PhD Student — 2022–present
- Developing DEM-based methods to delineate valley floors in mountain catchments.
- Quantifying valley confinement and its control on river types across the SF Bay Area.
- Developing methods for segmentation of branching shapes, such as fluvial zones (channels, floodplains, corridors, floors).
- Test controls on valley width in the Oregon Coast Ranges.

Pinter Lab, UC Davis, Graduate Student Researcher — Spring 2026
- Mapped geomorphic change in proglacial river valleys using multi-temporal satellite imagery, aerial imagery, and DEMs.

Dahlke Lab, UC Davis, Graduate Student Researcher — Fall 2025
- Mapped surface-water conveyance infrastructure across the San Joaquin Valley for groundwater recharge suitability modeling.

Governor's Salmon Recovery Office, Washington State, Geospatial Consultant — 2025
- Produced a statewide valley-floor and floodplain dataset (10-m resolution; 185,000 km^2) to prioritize salmon habitat restoration and inform flood risk assessment.
- Developed DEM-based algorithms for delineating flood-inundation extents.

DataLab, UC Davis, Staff Research Data Scientist (2018–2022); Graduate Student Researcher (2022–2023) — 2018–2023
- Technical lead on Getty Foundation- and NEH-funded projects applying computer vision and NLP to historical corpora.
- Applied geospatial and NLP methods in collaborative research across hydrology, medicine, and digital humanities, contributing to 4 peer-reviewed publications.
- Supervised teams of undergraduate and graduate researchers.

Field Experience

NSF Advanced Studies Institute – Trentino and Bolzano, Italian Alps — 2026
Proglacial stream field methods: drone imagery, LSPIV, sediment and vegetation surveys, channel cross-sections and hydraulics, biofilm, and turbidity.

Wrangell Mountains Field Studies – McCarthy, AK — 2023
Seven-week field program in glacial field methods, Wrangell–St. Elias National Park (University of Maine and Wrangell Mountains Center): glacial and proglacial geomorphology, landscape reconstruction, and vegetation plot surveys. Extended backcountry expeditions on and near glaciers.

Publications

Delineation of Valley Floors in Mountain Catchments from Digital Elevation Models
A. Koehl, M. Oskin, G.B. Pasternack
(In preparation for *Earth Surface Dynamics*)

Species Restoration Models Using Basin-Scale Metrics
C. Gengo, S. Yarnell, **A. Koehl**, D.A. Kelt, R. Lusardi
(In preparation for *Ecological Modelling*)

Who Serves Where: A Geospatial Analysis of Access to Endocrine Surgeons in the United States and Puerto Rico 2024
M.M. Alterio, M. Tobias, **A. Koehl**, A.L. Woods, K.S. Sun, M.J. Campbell, C.E. Graves
10.1016/j.surg.2023.06.055 (*Surgery*, 175(1), 32–40)

Project Quintessence: Examining Textual Dimensionality with a Dynamic Corpus Explorer 2023
S. Pizelo†, **A. Koehl**†, C. Nagda, C. Stahmer
digitalhumanities.org/dhq/vol/17/3/000709/000709.html (*Digital Humanities Quarterly*, 17(3). † Co-first authors, equal contribution)

A geospatial analysis of abortion access in the United States after the reversal of Roe v Wade 2023
M.M. Alterio, R. Von Davies, M. Tobias, **A. Koehl**, J.H. Tang, D. Kopp
10.1097/AOG.0000000000005329 (*Obstetrics & Gynecology*, 142(5), 1077–1085)

Bright and blind spots of water research in Latin America and the Caribbean 2021
A.J. DeVincentis, H. Guillon, R.D. Gomez, N.K. Patterson, F. Van Den Brandeler, **A. Koehl**, J.P. Ortiz-Partida, L.E. Garza-Diaz, J. Gamez-Rodriguez, R. Goharian, S. Sandoval
10.5194/hess-25-4631-2021 (*Hydrology and Earth System Sciences*, 25(8), 4631–4650)

Awards

Jastro-Shields Graduate Research Award 2024, 2026
College of Agricultural and Environmental Sciences, $6000

Hydrologic Sciences Graduate Group Fellowship 2023
UC Davis; two quarters, tuition and stipend

Most Innovative Thesis 2017
Department of History, UC Davis

NSF Graduate Research Fellowship Program, Honorable Mention 2017

Presentations

Proglacial Stream Systems in a Changing Climate: Val Martello and Val di Sole, North-Central Italian Alps – San Francisco, CA 2026
Poster, American Geophysical Union Fall Meeting

Where to Cut? Partitioning Branching Shapes in River Floodplains – Sacramento, CA 2026
Oral, FOSS4G North America

Network-Scale Patterns of Valley Confinement and Widening in the Oregon Coast Range – Vienna, Austria 2026
Poster, European Geosciences Union (EGU) General Assembly

Valley Floor Delineation in Digital Elevation Models: Comparative Analysis of Methodologies Applied to the SF Bay Area – Davis, CA 2025
Poster, 7th International Symposium on River Science

Measuring Confinement and Impact on River Types in the SF Bay Area – Yosemite Valley, CA 2025
Poster, Northern California and Northern Nevada Geomorphology Symposium

Can Partially Confined and Unconfined River Valleys with Complex Configurations be Automatically Extracted from DEMs? – Washington, D.C. 2024
Poster, American Geophysical Union Fall Meeting

A Method for Extracting Valley Floors from DEMs – Santa Cruz, CA 2024
Poster, Northern California and Northern Nevada Geomorphology Symposium

Quintessence: A Dynamic Explorer for the EEBO-TCP – Virtual 2021
Oral, Shakespeare Association of America Conference; with C. Stahmer, S. Pizelo

Project Showcase: Archive-Vision – Los Angeles, CA 2020
Invited, Getty Foundation Joint Workshop, Getty Center; with C. Stahmer

Earth Science Software

ramify
Python. Segmentation and measurement of branching shapes: centerlines, hierarchical space partitioning, and width. PyPI · GitHub

vfmap
Python. Valley-floor delineation from DEMs, combining slope-based region growing with reach-specific flood-fill thresholds. PyPI · GitHub

Digital Projects

English Broadside Ballad Archive 2015–2023
Developer. Backend infrastructure.

archive-vision 2015–2022
Technical lead. Computer vision (C++) for tracking image reuse in early modern printed corpora; Getty Foundation-funded.

Quintessence 2018–2020
Co-lead. Dynamic corpus explorer for Early English Books (GitHub).

wateReview 2019
Data scientist. Visualization dashboard for Latin American and Caribbean water research.

Malgré-Nous 2017–2018
Creator. Digital history archive.

For other major projects, see arthurkoehl.com

Teaching

ESM 100: Introduction to Water Science Fall 2026
Teaching Assistant

HYD 143: Ecohydrology Winter 2026
Teaching Assistant

GEL 136: Ecogeomorphology Spring 2025
Teaching Assistant

GEL 035: Rivers of California Fall 2024
Teaching Assistant

IST 008: Adventures in Data Science 2021, 2022
Co-Instructor

Workshops: DataLab, UC Davis

OCR and Working with Messy Text Data 2022
Instructor

Python Basics (four-part series) 2021
Co-Instructor

Intro to Natural Language Processing 2021
Co-Instructor

Intro to Text Mining for Health Data 2020, 2021
Co-Instructor

Data Carpentry: R for Ecology 2019
Co-Instructor

Skills

Programming: Python, R, C++

Geospatial & Remote Sensing: Terrain and DEM analysis; multi-temporal imagery analysis; image classification and segmentation

Software Development: Python and R package development (uv, Poetry, pkgdown); open-source release and documentation

Scalable Computing: Shared Linux compute servers (100s of cores, TB-scale memory); parallel and reproducible workflows (joblib, Snakemake, Bash)

Platforms: QGIS, ArcGIS Pro, Google Earth Engine