

# Melissa A. Foster

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## EDUCATION

**Humboldt State University, BA in Geology** **2003**

**Humboldt State University, MS in Geology** **2010**

- Worked with Harvey M. Kelsey, PhD, on geomorphic mapping and analysis of knickpoint distribution from LiDAR-derived digital elevation models (DEMs) and field data. Research focused on tributaries of the South Fork Eel River. Thesis title: Knickpoints in the South Fork Eel River.
- Research culminated in publication (see below).

**University of Colorado at Boulder, PhD in Geology (in progress)** **2010-present**

- Work with Robert S. Anderson, PhD, focusing on regolith and soil production rates using cosmogenic radionuclide dating in conjunction with landscape evolution models.
- Process samples to isolate beryllium from quartz for cosmogenic radionuclide dating
- Research interests include: timing of deposition and abandonment of fluvial terraces along the Front Range in Colorado, Quaternary dating methods, modeling geomorphic processes (using Matlab), analysis of LiDAR data using GIS, soils geomorphology, timing the development of soil horizons, and production of regolith from bedrock.

### Relevant Coursework

|                           |                        |                            |
|---------------------------|------------------------|----------------------------|
| Quaternary Dating Methods | Fluvial Processes      | Advanced Geomorphology     |
| Quaternary Field Methods  | Hillslope Processes    | Neo-Tectonics              |
| Quaternary Stratigraphy   | Geochronology          | Stratigraphy/Sedimentation |
| Structural Geology        | Hydrology/Hydrogeology | Modeling Surface Processes |
| Geologic Field Mapping    | Geomechanics           | Mineralogy/Petrology       |

## PROFESSIONAL EXPERIENCE / CREDENTIALS

**Professional Geologist-in-Training (GIT #120)** **2006-present**

- This is a national certification through the Associated Board of Geologists (ASBOG). I plan to take the “Practice of Geology” exam in the fall of 2012 to obtain my full Professional Geologist (PG) standing.

**Staff Geologist, Pacific Watershed Associates (Arcata, CA)** **2007-2010**

- Designed and implemented erosion-control plans for industrial timberland sites to reduce the input of fine sediment into stream systems. Erosion-control projects involved stream restoration, road-decommissioning or road-upgrading, and landslide mitigation.
- Oversight of heavy equipment during road-upgrading and road-decommissioning projects.
- Grant writing for restoration projects (2 funded projects for ~\$500,000 through the California Department of Fish and Game). Projects aimed to reduce fine sediment into the South Fork Eel River, CA. Emphasis on fine sediment reduction was to protect salmonid habitat.
- Project management for erosion surveys and erosion-control implementation projects including budget management, logistics, and oversight of field technicians.

- Geologic Field Technician, Pacific Watershed Associates (Arcata, CA) 2005-2007**
- Conducted erosion and sediment-source inventories on industrial timberland, public lands, and private lands. Erosion inventories include field mapping of erosion sites and data collection to quantify potential erosion sources. Monitoring and mapping of in-stream erosion and road-related erosion.
  - In-stream water quality testing for turbidity and dissolved oxygen levels at a superfund landfill site.
  - Erosion monitoring of fill-slopes at a superfund landfill site.

- Soils Laboratory Technician, Humboldt State University Special Foundation 2004-2005**
- Worked under the supervision of Raymond (Bud) Burke, PhD. Processed soils for the USGS (Dave Miller at Menlo Park) for particle size analysis, bulk density, and carbonate concentrations.

## **FIELD EXPERIENCE**

- Teaching Assistant- Humboldt State University 2009-2010**
- Assisted with the field methods course as well as the six week field-camp course at Poleta Folds in southern California. The field classes aim to teach students to map geologic stratigraphy, use basic tools such as Brunton compasses and survey equipment, use stereoscopes for aerial photo analysis, create geologic cross sections, and interpret tectonic history and depositional environments.

- Teaching Assistant- University of Colorado at Boulder 2009-2011**
- Taught the introductory geology lab course; this course is designed to be a “stand-alone” class, without an associated lecture. Field instruction included taking students to sites around Boulder to observe basic geologic rock types, examples of unconformities, in situ fossils, geologic mines, evidence for depositional environments, examples of glacial deposits, and evidence of erosion.

- Graduate work 2007-2012**
- Current field work includes describing soils and collecting samples from regolith and saprolite from the Boulder Critical Zone Observatory (CZO) for cosmogenic radionuclide testing. Soils descriptions are used to compare soils geomorphology with absolute dating techniques. Performing field reconnaissance along fluvial strath-terraces, adjacent to the Front Range, to identify sites for soils geomorphology studies in conjunction with OSL dating.
  - Surveyed rivers and streams tributary to the South Fork Eel River using a stadia rod and level to compare field results with longitudinal profiles extracted from LiDAR-derived DEMs. Performed extensive in-stream mapping to identify and verify knickpoint features and peculiarities such as stream diversions and anthropogenic changes to stream profiles. Mapped lithology adjacent to knickpoints to determine if there was a lithologic control on knickpoint locations.

## **AWARDS, GRADUATE SCHOOL**

- Colorado Scientific Society student research grant recipient (2012). Grant contributed monetary funds to pursue OSL dating on Front Range terraces.
- University of Colorado Geological Sciences graduate student research grant recipient (2012). Grant contributed monetary funds to pursue OSL dating on Front Range terraces.
- Nominee, Patricia O. McConkey Award for outstanding graduate thesis, Humboldt State University (2010).
- Geological Society of America student grant recipient (2009). Grant contributed monetary funds to support my MS research.

- National Center of Airborne Laser Mapping (NCALM) Seed grant recipient (2008). Grant paid for the acquisition of 40 km<sup>2</sup> of LiDAR data, to create high-resolution digital elevation models (DEMS).

## PUBLICATIONS

- **Foster, M.A.** and Kelsey, H.M., 2012, Knickpoint and knickzone formation and propagation, South Fork Eel River, northern California, *Geosphere*, v. 8, no 2, p.1-14, doi: 10.1130/GES00700.1.

## PRESENTATIONS

### Talks

- **Foster, M.A.** and Kelsey, H.M., 2010, Knickpoints in tributaries of the South Fork Eel River, northern California, (abs., *invited speaker*) Geological Society of America Abstracts with Programs, vol. 42, no.5, p.154.

### Posters

- **Foster, M.A.**, Anderson, R.S., Dühnforth, M., Kelly, P.J., 2011, Constraining regolith production over long timescales: interpreting in situ <sup>10</sup>Be concentrations on an evolving landscape, (abs.) American Geophysical Union Fall Meeting Suppl., Abstract EP23C-0776.
- **Foster, M.A.** and Kelsey, H.M., 2009, Investigation of knickpoint propagation in tributaries to the South Fork Eel River, northern California, using 10-m and LiDAR-derived digital elevation models, (abs.) American Geophysical Union Fall Meeting Suppl., Abstract H51A-0753.
- **Foster, M.A.**, Montoya, D.S., Kelsey, H.M., 2009, Comparison of channel geometries in tributaries located above and below a knickpoint on the South Fork Eel River, northern California, (abs.) Geological Society of America Abstracts with Programs, vol. 41, no. 7, p.623.
- Kelly, P.J., Anderson, S.P., Anderson, R.S., Blum, A., **Foster, M.A.**, Langston, A.L., 2011, Subsurface evolution: weathering and mechanical strength reduction in bedrock of lower Gordon Gulch, Colorado Front Range, (abs.) American Geophysical Union Fall Meeting Suppl., Abstract EP43C-0713.
- Leroy, T.H., Weaver, W.E., Hagans, D.K., **Foster, M.A.**, 2007, Stream crossing decommissioning: common mistakes and how to avoid them, (abs.) Salmonid Restoration Federation 2007 Fall Meeting Suppl.