

Geology of Mountains & Basins Research

Forest Inventory and Analysis

- **Dr. Brenda J Buck**
- Professor
- Department of Geoscience
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- Website: <https://unlv-fia.github.io/UNLV-FIA-Group/index.html>



Expertise

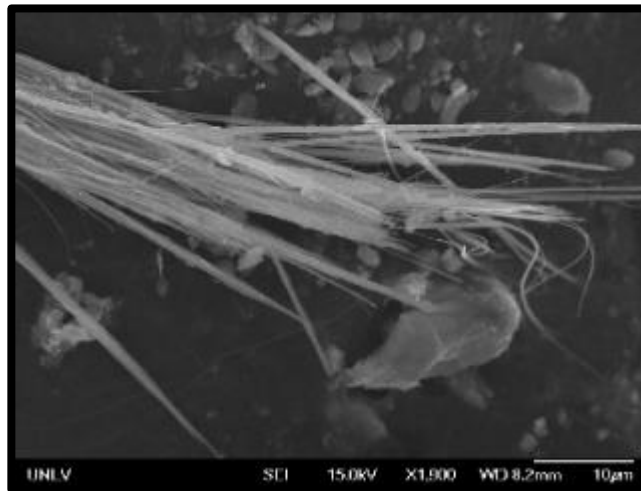
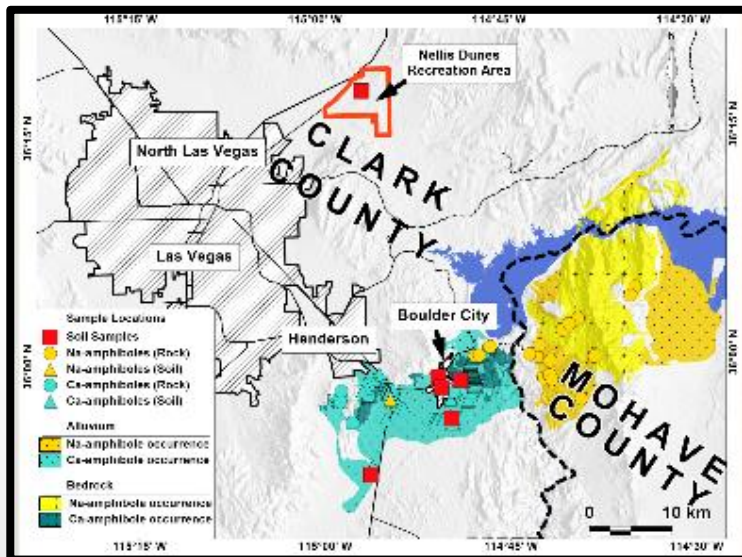
- University partner to USDA-FIA. Area of emphasis is information management research and development to optimize the storage, delivery, and display of forest inventory data.
- The support we provide helps policy makers, land stewards and non-governmental groups base decisions and assessments related to the health, diversity, and productivity of U.S. forests and grasslands on scientifically credible information.

Medical Geology

- **Dr. Brenda J Buck**
- Professor
- Department of Geoscience
- Email: Brenda.Buck@unlv.edu

Expertise

- Expertise: Health effects of mineral dust; Asbestos; Heavy Metals; Soil Science/Geology



Basin Analysis and Tectonics

- **Dr. Erin Donaghy**
- Assistant Professor
- Department of Geoscience
- Email: erin.donaghy@unlv.edu

Expertise

- Forearc basin processes
- North America Cordilleran tectonics
- Strike-slip basin evolution
- U-Pb zircon geochronology
- Oceanic plateau collision



Geochronology and Thermochronology

- **Dr. Cody Colleps**
- Assistant Professor
- Department of Geoscience
- Email: cody.colleps@unlv.edu
- Website: www.CoCoGeo.com

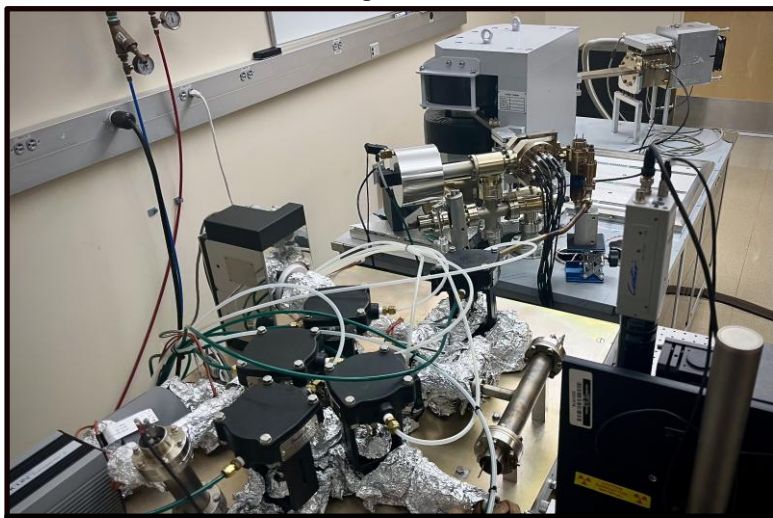
Expertise

- Noble gas-based thermochronology
- Geochronology
- Tectonic and climatic interactions
- Deep-time erosional processes
- Himalayan geology
- Irradiation of geological materials

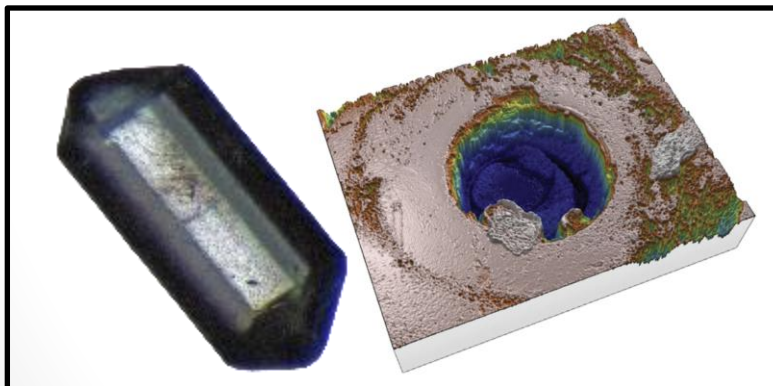


What drives crustal exhumation, and how do distinct erosional events impact Earth's dynamic systems?

Nevada Isotope Geochronology Laboratory (NIGL)



Isotopx NGX-600 Mass Spectrometer for $^{40}\text{Ar}/^{39}\text{Ar}$ Dating



Laser Ablation (U-Th)/He Dating of Apatite and Zircon

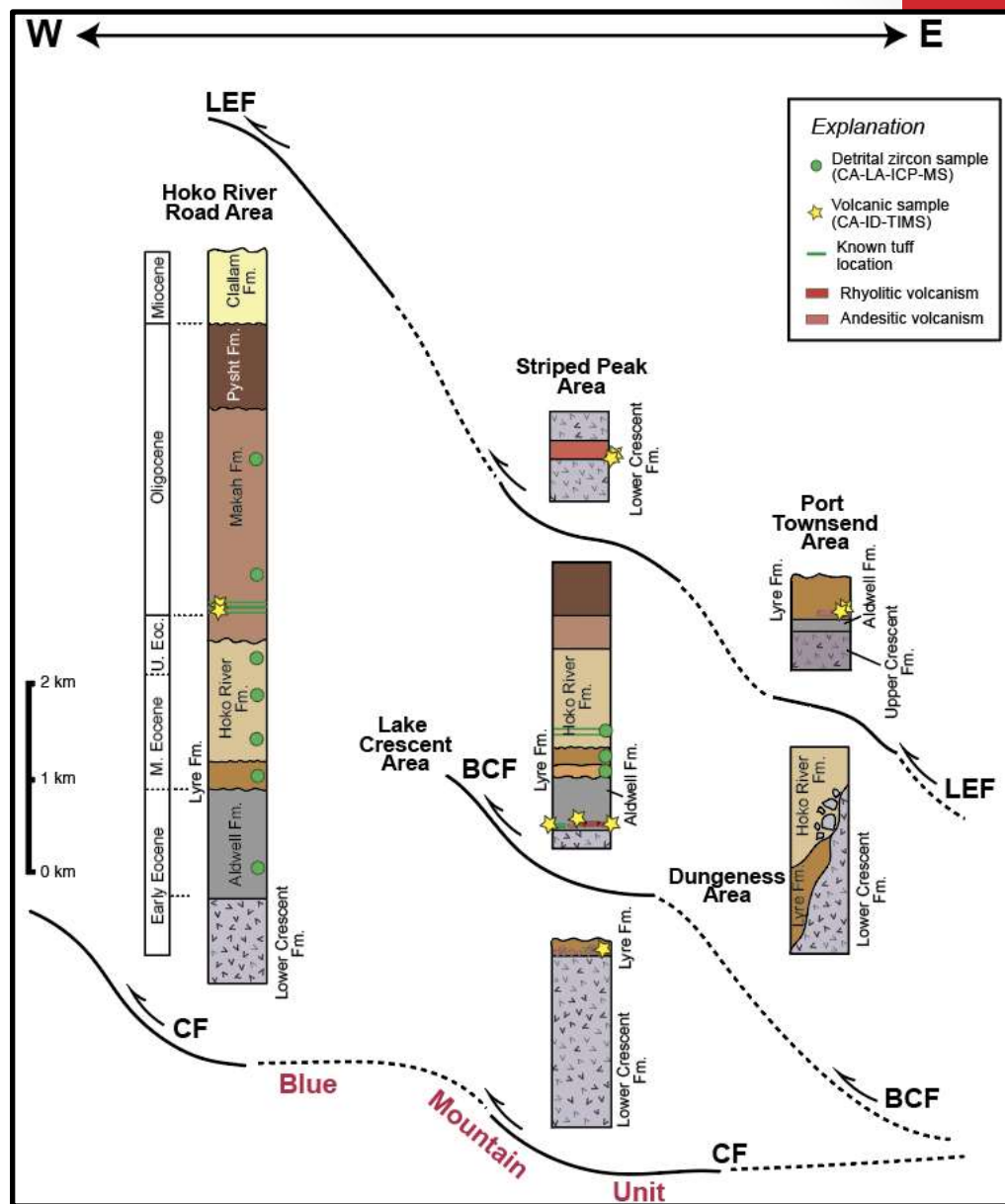
We develop and apply novel analytical dating techniques to obtain high-resolution insight into crustal exhumation across multiple temporal and spatial scales.

Greater Himalaya of Northwest India



My group uses the sedimentary record to tackle large-scale tectonic questions by integrating both field and analytical methods

- Measured stratigraphic sections and lithofacies mapping are used to reconstruct depositional environments
- U-Pb detrital zircon geochronology to determine sediment provenance
- Establish a high-precision chronostratigraphy for regional stratigraphic correlations



Sedimentary Geology

Dr. Ganqing Jiang

Professor

Department of Geoscience

Phone: (702) 895-2708

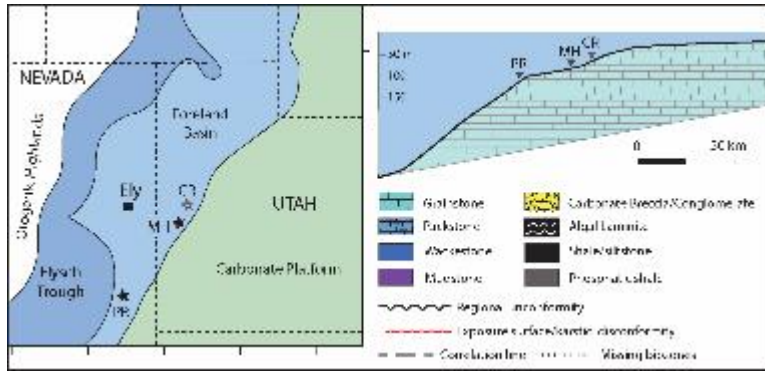
Email: Ganqing.Jiang@unlv.edu

Expertise:

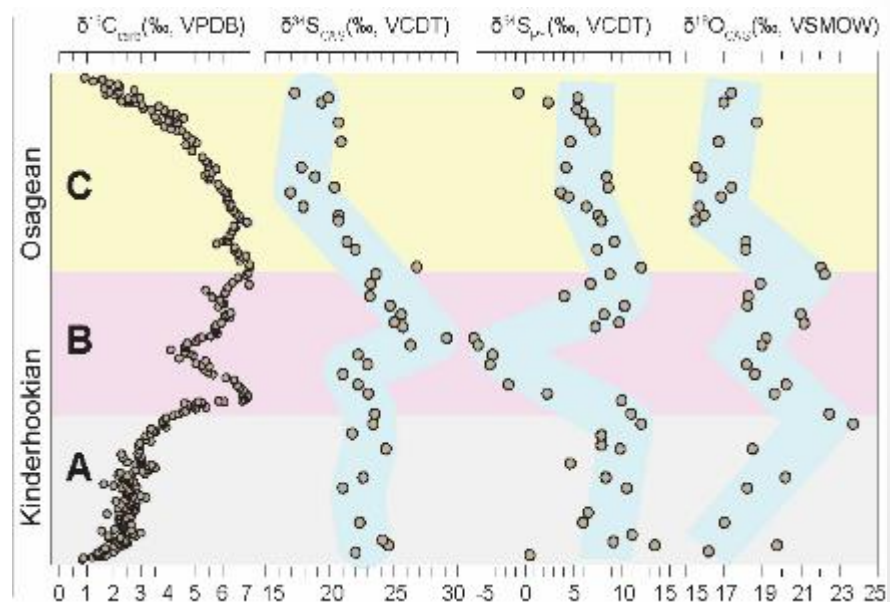
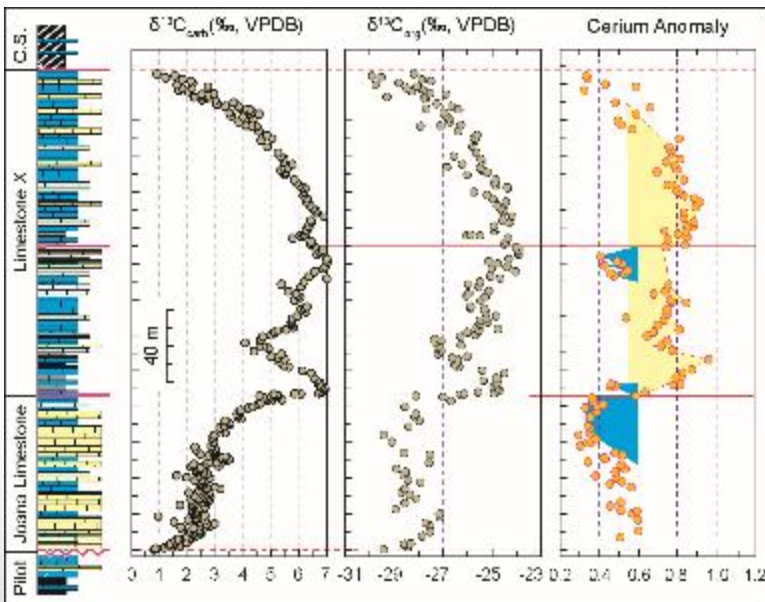
Sequence and chemostratigraphy

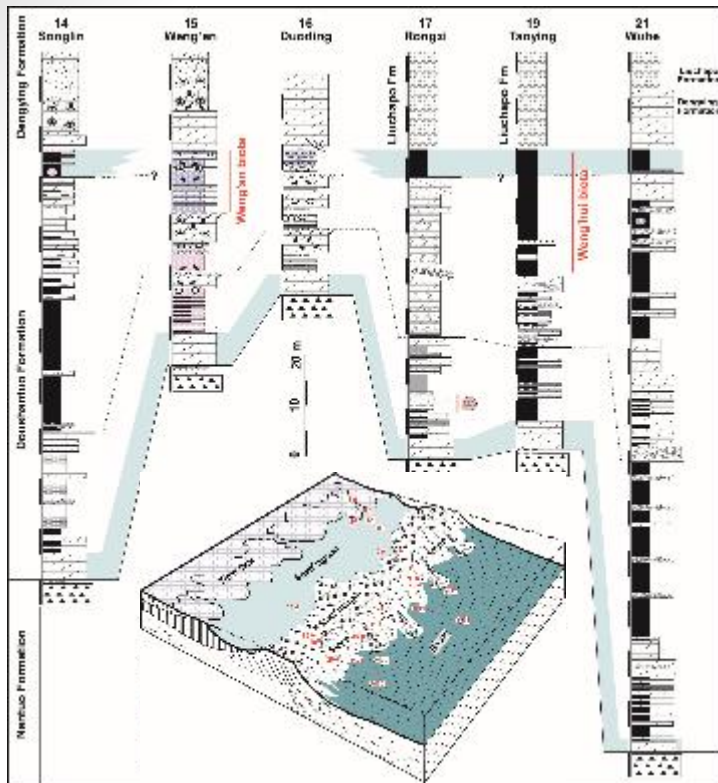
sedimentology

Carbonate diagenesis

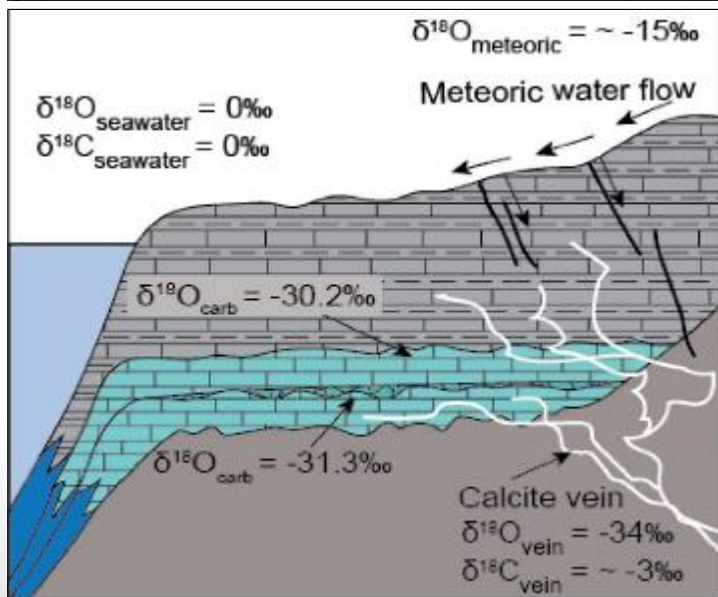


- Sequence and chemostratigraphy
- Paleogeographic reconstruction
- Applications of stable isotopes and rare earth elements
- Paleoenvironmental change across major perturbations of the carbon cycle and mass extinctions





- Basin analyses and paleoceanography
- Fluid migration and carbonate diagenesis
- Tracing fluid migration in sedimentary basins using stable isotopes and trace elements
- Carbonate aquifer



Hydrology

Dr. Michael Nicholl

Department of Geoscience

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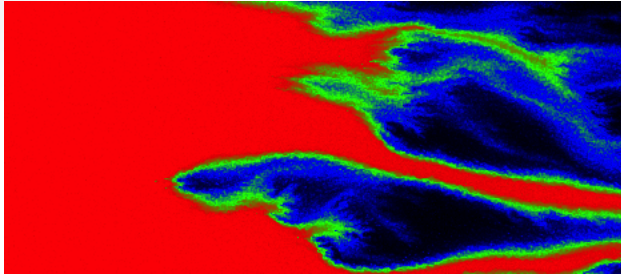
Expertise:

Unsaturated zone hydrology

Fractured rock hydrology

Environmental fluid mechanics

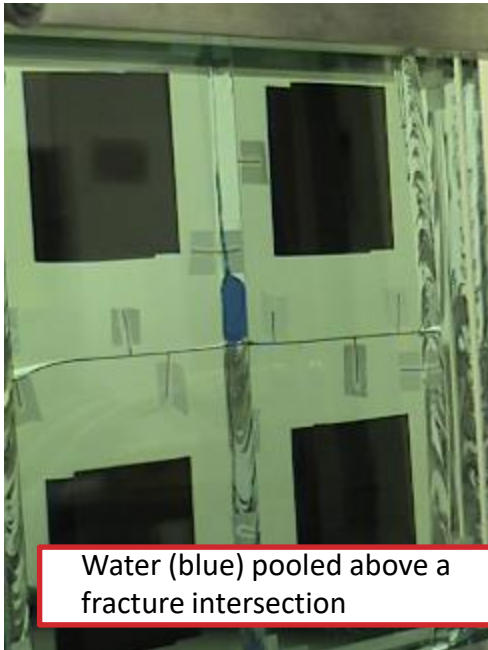
Fractured Rock Hydrology



False color image of a miscible displacement experiment in a single fracture



Field mapping of fracture networks
blue dye (right foreground) is from an infiltration test



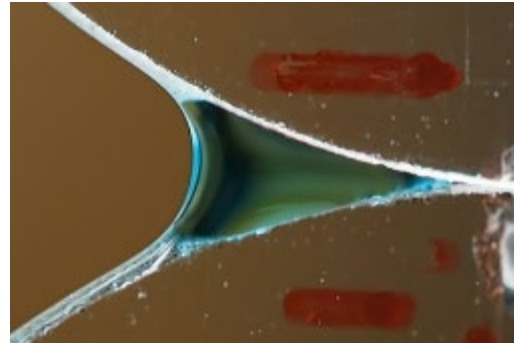
Water (blue) pooled above a fracture intersection



Isothermal flow across a single rock fracture (matrix-to-matrix flow)

- ❑ Two-phase flow and transport in fractured rock
- ❑ Laboratory experimentation, field mapping, numerical simulations
- ❑ Contaminant transport, geothermal energy, enhanced petroleum recovery

Unsaturated Porous Media



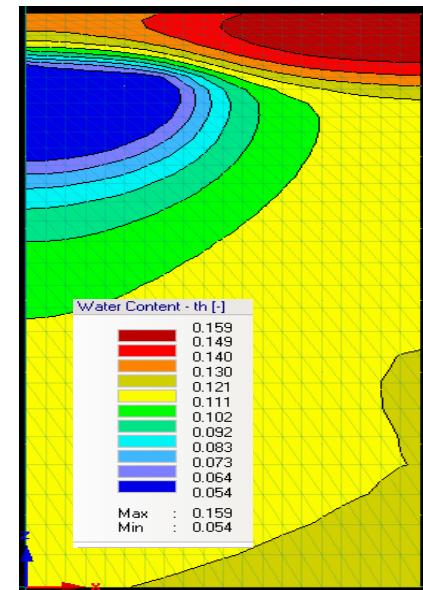
Millimeter-scale transport experiment



Hydraulic conductivity of a rock slab



Sampling Chloride as a proxy for root-driven horizontal flow



2D simulation of root-driven transport

- ❑ Challenging existing conceptual models for unsaturated and two-phase flow
- ❑ Design and execution of critical laboratory/field/numerical experiments

Fluids and Magmas in Ore Systems

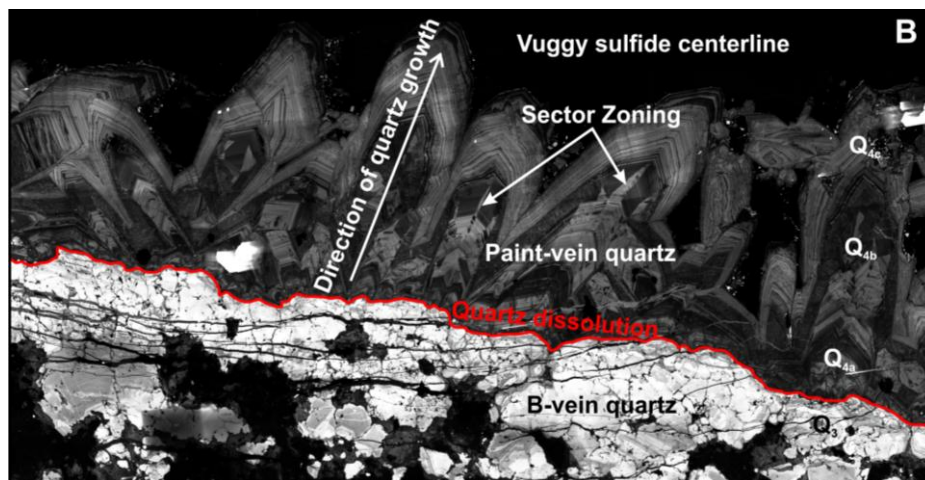
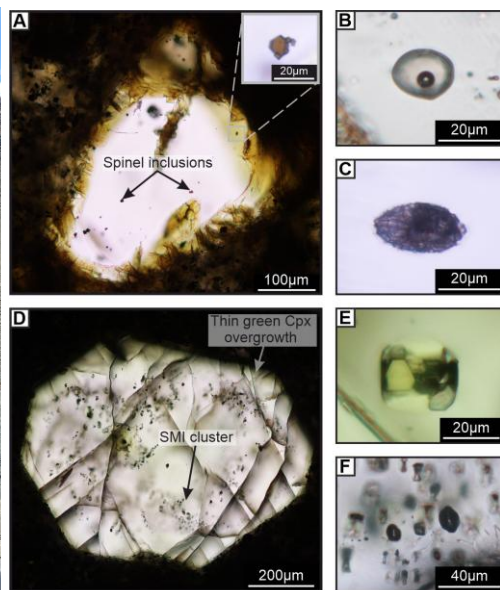
- **Dr. Michael Schirra**
- Assistant Professor
- Department of Geoscience
- Email: michael.Schirra@unlv.edu



Expertise

- Economic Geology (with focus on porphyry Cu-Au, epithermal Au, intrusion-related Pb-Zn-Ag deposits)
- Fluid and Melt Inclusion Petrography and Micro-Analysis
- Igneous Petrology (with focus on magma ore-fertility)
- Mineral Exploration (vector minerals for mineralization)
- LA-ICP-MS analyses and method development

Understanding ore-forming processes at the translithospheric scale with the help of inclusions



Inclusions are the only way to directly sample paleo-fluids and –melts that have produced ore deposits. By integrating detailed petrography, state-of-the-art micro-analysis techniques and geochemical modelling, my research group investigates the fundamental principles of ore deposit formation.

