# GEOC5089 ME5089 Exploration Geochemistry

# COI, NURE ASSIGNMENT, Update

**INSTRUCTOR**—Dr. Virginia T. McLemore

FALL 2023

### Lectures on my web site

### https://geoinfo.nmt.edu/staff/mclemore/Fall20 23ExplorationGeochemistry.html



# Slips, Trips, and Falls

ANITA APPAH SEPTEMBER 26,2023

# What are they?

Slips: they occur when there is little or no traction between the footwear and the walking surface. Trips: happen when a person's foot hits an object or steps down to a lower, uneven surface.

Falls: happen when one stumbles and fall too far off their center balance.



# **Injury Statistics**







**Fatal Injuries:** In 2020, **805** workers died in falls, and 211,640 were injured badly enough to require days off of work. According to Injury Facts

#### 850 cases recorded in 2021 from CFOI and SOII



### Common Causes and Risk Factors

#### **SLIPS:**

- Wet spills
- Dry product spills
- Weather hazards
- Loose, unanchored mats and rugs
- Concrete, ceramic tile, or marble floors
- Newly waxed floors
- Sloped or uneven walking surfaces
- Wet, muddy, greasy shoes
- Ramps or planks without skid- or slip-resistant surfaces
- Metal surfaces
- Climbing ladders



# Trips

- Clutter on the floor
- Obstructed view
- Poor lighting
- Misshapen, wrinkled carpets or mats
- Uncovered cables, wires, hoses, and extension cords
- Open drawers, cabinets, doors, etc.
- Uneven walkways
- Unmarked steps or ramps
- Missing floor tiles and bricks
- Damaged steps
- Irregular, improper, or non-uniform steps



# Falls

- Weak or damaged ladders
- Ledges without proper railing
- Carrying heavy objects
- Failure to use guardrails on scaffolding
- Unprotected edges
- Unsafely positioned ladders
- Misused fall protection and height access equipment



### Slips, Trips and Falls Hazards

- Sprains and strains When a person slips or trips and tries to catch themselves or regain balance, they may twist or stretch their muscles or ligaments
- Fractures and broken bones Falling from a height or landing forcefully on a hard surface
- Contusions and bruises Impacts with the ground or objects during a fall can cause contusions, commonly known as bruises.
  These result from damaged blood vessels beneath the skin, leading to discoloration, pain, and swelling.
- Head injuries Falls that involve striking the head on a hard surface can cause traumatic brain injuries (TBIs).
- Cuts and lacerations Falls may involve contact with sharp or rough objects, leading to cuts and lacerations.
- Back and spinal cord injuries (SCI) Falls that involve landing on the back or experiencing a jarring impact can cause damage to the spine, such as herniated discs, spinal fractures, or spinal cord injuries.
- Neck injuries sometimes a result of spinal injuries or damage to the muscles, ligaments, or tendons in the neck.

# How to prevent Slips, Trips and Falls

- Practice good housekeeping
- Provide adequate lighting in walking areas
- Install safety signs
- Clean spills immediately
- Make sure proper footwear is worn
- Maintain and improve floor quality
- Implement safety plans and protocols



# References:

- <u>https://www.nsc.org/work-safety/safety-topics/slips-trips-and-falls#:~:text=Hazards%20in%20the%20Workplace,2020%2C%20according%20to%20Injury%20Facts.</u>
- <u>https://safetyculture.com/topics/slips-trips-and-falls/#:~:text=OSHA's%20primary%20standard%20for%20slip,equip%20workers%20with%20proper%20ladders.</u>

### CONFLICTS OF INTEREST TRAINING

OFFICE OF RESEARCH COMPLIANCE

September 6, 2023



### NMT Conflicts of Interest in Research Policy

- Purpose: "to protect the integrity, trust and respect of New Mexico Tech, its academic community and its research activities."
- [The policy] "is designed to inform investigators of their disclosure responsibilities, provide an efficient method for making disclosures, and facilitate effective identification and management of conflicts of interest."



### NMT Conflicts of Interest in Research Policy

- Most conflicts can be successfully resolved without impeding research activities.
- Conflicts of interest are inevitable in modern research universities and do not imply any impropriety on the part of the investigator. A conflict of interest may exist despite the highest standards of conduct and candor.
- Disclosing the required information at the earliest possible time will afford the best protection of an investigators interests.



### **Conflict of Interest Definition**

**Conflict of interest** means a situation associated with an investigator's participation in NMT research where it reasonably appears, on an actual or potential basis, that:

- 1. The investigator's significant financial interest could directly and significantly affect the design, conduct or reporting of NMT research activities; or
- 2. The investigator's situation could directly and significantly compromise their professional commitments or allegiance to NMT.



### **Examples of Conflicts of Interest**

- Accepting gratuities or special favors from companies doing business or sponsoring one's research at the University.
- Accepting over scale honoraria for lectures at companies whose economic or political interests are affected by an investigator's research.
- Performing evaluative research for a company in which the investigator has a financial interest.
- Negotiating on behalf of the University for the purchase of materials from a company in which you have a financial interest.
- Holding office or membership on a board or committee of an entity supporting your University research.
- Holding equity interests, including stock options, in an entity which supports your University research.



### Investigator

**Investigator** means the principal investigator, the co-principal investigator and any other person (including faculty, staff and students) who is responsible for the design, conduct or reporting of NMT research. Any individual responsible for a task that could have a significant effect on the research design, conduct or Reporting is considered to be an investigator, even if the individual does not have sole or primary responsibility for the task or the research.



### Institutional Responsibilities

- Develop and implement a Conflict of Interest Policy, (COI). Form Committee.
- Educate and train NMT employees and students about their responsibilities under the NMT COI Policy.
- Collect and screen Disclosure Forms for COI's. Refer COI's to Committee.
- Maintain confidentiality of personal information.
- Enforce the COI Policy and any Management Plan, implementing sanctions when appropriate.
- Comply with the research sponsor's requirements for reporting conflicts of interest
- Maintain records as required.



### **Committee Responsibilities**

- The Committee may be a resource for general information.
- Provide screening guidelines for compliance personnel.
- Accept referrals.
- May develop guidelines for analysis of COI's.
- Identify and analyze conflicts.
- Develop management/mitigation plan with individual investigators, and their PI if possible.
- Determine conflict resolution.



### **Investigator Responsibilities**

- Comply with all Disclosure Requirements, initial and ongoing. When a proposal is submitted to Sponsored Projects Administration Annually, during the first month of the Fall academic year. Within 30 days of any change
- Cooperate with any investigation.
- Comply with Management and/or Mitigation plans.



#### **Research Ethics @NMT: Conflicts of Interest**

What are the risks of sponsorship bias?

Must researchers avoid all conflicts of interest?

This workshop examines the well-documented phenomenon of sponsorship bias and the ethical issues raised by financial conflicts of interest. Facilitated by Professor of Ethics Chris ChoGlueck (CLASS), this interactive lecture features smallgroup discussions and case studies on managing the negative influences of money on research. It is free and open to all members of the broader NMT community.

<u>What</u>: "Conflicts of Interest & Sponsorship Bias" <u>When</u>: Thursday October 19, 12:30 to 2:00 pm <u>Where</u>: MSEC 103



# Topics under COI (bold still to cover)

- Collaborative research
- Conflict of Interest (personal, professional, and financial), including Conflict of Commitment
- Data acquisition and analysis, scientific rigor and reproducibility
- Data confidentiality, management, sharing, and ownership
- Export controls (includes disclosure and reporting requirements)
- Human Subjects, animal, and safe laboratory practices
- Mentor/mentee responsibilities and relationships
- Peer review
- Research misconduct and questionable research practices
- Research security risks
- Responsible authorship and publication
- Safe research environments, laboratory safety, biosafety
- Secure and ethical data use, contemporary ethical issues in biomedical research
- Scientist as a responsible member of society

# **Ethics and Plagiarism**

- Ethics—code which guides conduct
- includes not cheating, falsifying information, or plagiarizing
- Plagiarism—Latin word for "kidnapper"
- presentation of someone else's ideas or words as your own
- deliberately if you copy a sentence from a book and pass it off as your writing, or if you summarize or paraphrase the ideas of someone else without acknowledging your debt
- accidentally if you carelessly forget quotation marks around the words of another writer or mistakenly omit a citation for the ideas of another because you are unaware of the need to acknowledge the idea.

### Lectures by Professor of Ethics Chris ChoGlueck

- Everyone in my class or on Federal contracts must fill out the COI form
- <u>NMT Research Conflict of Interest Policy: New Mexico Tech</u> web site
- <u>https://www.surveymonkey.com/r/ZRHPBCV</u> actual form

* 1. Please check all that apply as related to your institutional responsibilities at New		
Graduate Student		
Non-Sponsored Research		
Public Service		
✓ Sponsored Research	Annual Financia	l Conflict of Interest Disclosure 2023/2024
✓ Faculty	4. IRB	
✓ Teaching		
Institutional Committee Membership	1. Are you required	t to submit this disclosure to fulfill Institutional Review Board (IRB) submission requirements?
Administrative Appointment	🔿 Yes	
✓ Staff	No 🕑 No	
Undergraduate Student		
Other (please specify)		Prev Next
* 2. Please describe the subject area and focus of your research activities.		
economic geology		

\*An investigator's institutional responsibilities are defined as an investigator's professional responsibilities on behalf of the institution, which may include for example: activities such as research, research consultation, teaching, professional practice, institutional committee membership, and service panels.

1. Do you, your spouse, domestic partner, and/or dependent children have any of the financial interests described below that are related to your institutional responsibilities\*?

#### Please check all that apply:

- Aggregated salary, royalties or other payments, such as consulting fees and honoraria, other than through NMT, that are expected to total more than \$10,000 over the next 12 months.
- Equity interests in a single entity, such as stocks, stock options and other ownership interests that are more than \$10,000.
- Equity interests in a single entity, such as stocks, stock options and other ownership interests that represent more than a 5% ownership interest.

Intellectual property rights, such as patents and copyrights, or royalties from these rights, other than through NMT.

Prev Next

7. Outside Employment, Agreements and Memberships

\*An investigator's institutional responsibilities are defined as an investigator's professional responsibilities on behalf of the institution, which may include for example: activities such as research, research consultation, teaching, professional practice, institutional committee membership, and service panels.

#### 1. Do you have any of the following that are related to your institutional responsibilities?

#### Please check all that apply:

- An agreement with one or more private parties that could appear to give them preferential treatment over a government funding agency or other sponsor of the project (e.g. first delivery of project data).
- An agreement to receive financial benefits from the research beyond what is described in the proposal budget submitted to NMT.
- Outside employment that could appear to cause a potential conflict with this research, or raise questions about your professional commitments in undertaking the research or your primary allegiance to NMT.
- A position as a director, officer, partner, trustee, manager or employee of an outside entity that conducts business in an area related to the research.

#### 10. COI Certification

\* 1. By checking yes, I agree to abide by New Mexico Tech's Conflicts of Interest in Research policy and associated procedures. In submitting this disclosure, I certify that the information provided is true to the best of my knowledge. I supply this information for confidential review by New Mexico Tech, and for such other limited purposes as are required by law, regulation, or contract. I do not authorize release of any of it for any other purpose.



\* 2. I understand and agree that if there is a material change (an acquisition of a significant financial interest) to this information, I must submit a new disclosure within 30 days of that change.

Ves, I understand.



# Hours

- Federal regulations allow you only to work 40 hrs week
- If you are a full time student—you are only allowed to work 20 hrs a week
- If you have another paying job—you have to account for those hours and your total hours working for NMT and the other job has to be 20 hrs or less

# If you have a conflict of interest

- You need to disclose it on the form
- Contact the NMT COI person and the committee decides on how to manage the COI

# Training

- NMT requires 8 hrs within a year
- Safety lectures in my classes count (0.5 hr each)
- Document your training
  - Note on calendar
  - Keep separate file
  - My lectures on web site
- Lectures 2 and 4 (sampling), 5 (BreX) count, 7 (COI)
  - Most everyone in the class should have 5-7.5 hours of training already (depending on attendance)
  - I will include additional topics to cover the remaining training
  - Not in my class—can come to class for first 0.5 to 1 hr for rest of semester or see Lectures by Professor of Ethics Chris ChoGlueck or attend other lectures or training sessions

# RESOURCES

- Data Management: Fact sheet on current policies by federal agencies, such as DoD and NSF (compiled by Mikell Coleman, 10/22)
- Data Management and Sharing Fact Sheet.pdf (nmt.edu)
- Implicit Bias: Useful tools and resources, including bias calculators, recommended readings, and suggested strategies for admissions, hiring, mentoring, and more (compiled by Isabel Morris and ADVANCEGeo, 11/22)
- Microsoft PowerPoint Resources ResearchEthicsSeries Implicit Bias Nov2022 (nmt.edu)
- Authorship: Case study, resources, and template, including authorship scenarios to facilitate team discussions, followed by selected research on bias & team culture in authorship practice (created by Kendra Cheruvelil et al.), as well as authorship policies & statement examples
- <u>Case Study: Ethics & Team Power Dynamics in Authorship Decisions | Online Ethics</u>

### Questions

#### EXPLORATION GEOCHEMISTRY GEOC5089 ME5089

#### Stream Sediment Geochemical Survey of Gouap-Nkollo Prospect, Southern Cameroon: Implications for Gold and LREE Exploration

#### AUTHORED BY SOH TAMEHE LANDRY, GANNO SYLVESTRE, KOUANKAP NONO GUS DJIBRIL, NGNOTUE TIMOLEON, KANKEU BONIFACE, NZENTI JEAN PAUL

Review Presentation by Ernest Brakohiapa

September 26, 2023

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#### Purpose

- To have information on the geochemical dispersion of the metal elements (especially gold) at Gouap-Nkollo prospect
- to provide a useful guide for future exploration strategies
- to discover new gold potentials in the southern part of the country

#### Introduction

- Stream sediments sampling is widely used for regional geochemical survey for mineral exploration and environmental studies.
- Geochemical maps have been constructed using stream sediment geochemical data over the world to identify possible sources of anomalous element concentration
- Stream sediment technique has contributed to discovery of many ore bodies around the world.
- Stream sediment sampling for gold exploration is less used in Cameroon

#### The Study Area

- Gouap-Nkollo prospect is in southern Cameroon
- Covers an area size of 120km<sup>2</sup>
- Falls within the tropical rain forest with equatorial climate
- the drainage system over the areas is a dendritic network with the proliferation of many smaller stream channels.

#### The selection of the area is based on two main factors:

- 1. the lithology which consists of quartzite crosscut by pegmatite tourmaline-quartz vein.
- *2. the presence of visible gold grain in pan concentrate and the existence of small-scale alluvial gold mining operations*

#### **Geological Settings**

- The Gouap-Nkollo prospect belongs to the Lower Nyong unit which corresponds to the NW corner of the Congo Craton in South-Cameroon
- The unit is of Palaeoproterozoic age and is a well-preserved granulitic unit of the West Congo craton resting as an Eburnean nappe on the Congo Craton
- The Lower Nyong Unit is associated with charnockite formation
- It is constituted of both Archean and Paleoproterozoic materials associated with iron formations, greenstone and biotite hornblende gneisses



**Figure 1:** Geological map of South-West Cameroon showing the location of Gouap-Nkollo prospect within the Lower Nyong Unit



Figure 2. Geological sketch map of Gouap-Nkollo prospect

### Methodology

#### Sampling and Preparation

- Systematic stream sediment sampling using topographic maps 1:5,000
- Forty-five (45) stream sediments were sampled
- GPS coordinates of each sample were quickly recorded
- Active stream sediments were collected along stream beds of the area using a pick, a panning dish, a stainless steel sieve and collection pan (a –80 mesh sieve size)
- samples were sieved on site in order to provide a sample of suitable weight for assay
- Clean polyethylene bags were used in samples before it was transported to the laboratory.
- The sample bags were carefully labeled with permanent markers to avoid mix up
- simultaneous site surveys carried out in order to provide specific information relating to the geology of the sampling point

#### **Analytical Methods**

- 10 samples which yielded visible gold in pan concentrate were selected for chemical analysis.
- The analyses were performed at OMAC Laboratories (Alex Stewart Assayers Group), Ireland
- The chemical analysis involved the use of BLEG (Bulk Leach Extractable Gold) and ICP/MS (Inductively Coupled Plasma/Mass Spectrometry)
- 47 elements were analyzed with emphasis on Al, Ca, Fe, K, Mg, Na, PAg, Au, B, Co, Cr, Cu, Mn, Ni, Ti, Zn, Ce, La Th, U and Zr.

#### **Results and Discussion**

#### **Field Survey**

- twenty (20) sampling sites showed visible gold grain in pan concentrate.
- The sampling sites with visible gold in pan concentrate are located downstream of quartzite with quartz-tourmaline vein, dominated by silification and sericitization hydrothermal alteration.
- This results shows that the gold mineralization in Gouap-Nkollo prospect could be related to the quartz-tourmaline vein.



Figure 3. Stream sediment sampling map showing gold field survey results

#### **Geochemical Survey**

Samples	Ti	Fe	Al	Mg	Mn	Ca	K	Na	Р
BPS002	0.5078	2	2.7	0.34	0.0286	0.38	0.15	0.08	0.059
BPS003	0.3511	1.72	1.7	0.05	0.0196	0.02	0.11	< 0.01	0.08
BPS004	0.2462	1.69	1.18	0.12	0.0178	0.03	0.17	< 0.01	0.049
BPS004B	0.131	3.59	3.51	0.96	0.0303	0.04	0.89	< 0.01	0.042
BPS005	0.3729	1.56	0.84	0.12	0.0312	0.05	0.05	< 0.01	0.012
BPS005B	0.3038	0.88	0.82	0.01	0.0207	0.01	0.03	< 0.01	0.034
BPS006	1.7941	7.74	1.62	0.08	0.096	0.1	0.04	0.01	0.039
BPS006B	0.86	2.02	0.89	0.04	0.0544	0.09	0.06	0.02	0.009
BPS007	0.5498	1.33	1.02	0.05	0.0373	0.09	0.07	< 0.01	0.031
BPS007B	0.3847	1.35	3.01	0.05	0.024	0.07	0.14	< 0.01	0.029
Minimum	0.131	0.88	0.82	0.01	0.0178	0.01	0.03	< 0.01	0.012
Maximum	1.7941	7.74	3.51	0.96	0.096	0.38	0.89	0.08	0.08
Mean	0.55014	2.39	1.73	0.18	0.03599	0.09	0.17	0.04	0.04
Standard deviation	0.47987	2.01	0.99	0.29	0.02365	0.11	0.257	0.04	0.021

#### Table 1. Statistical distribution of major elements (wt%)



Figure 4. Histogram of mean values against major elements (wt%)

#### Source of the Stream Sediment and Mineralization Potential

To enhance the data presentation and interpretation

- symbol maps were generated for Au, Cr, Mn, and Ti superimposed on a drainage map of the study area.
- The 4 elements show high values in the same sampling site
- The sample with high Au values corresponds to the tourmaline-quartz vein crosscutting the quartzite which is the main lithology of the area
- The geochemistry of the stream sediments has revealed that the source of sediments collected in the stream bed is the surrounding rocks



**Figure 6.** Graduated symbol plot for (a) Au, (b) Cr, (c) Mn and (d) Ti scores (ppm) superimposed on the drainage map of the Gouap-Nkollo prospect.

#### **Recommendation for Future Exploration Strategies**

- Owing to the high concentrations of Fe and Al as the dominant major elements, as well as high concentrations of Mn, P and Ce as the dominant trace and rare earth elements, it is recommended that a more comprehensive survey of stream sediments should be carried out
- detailed geophysical and geochemical surveys are needed for possible mineralization of gold.
- detailed geological mapping to evaluate the possible mineralization zones and potential mineable areas as this will help in determining the level, quantity and quality (tonnage) of mineralization in place

#### Conclusion

- 1. Fe and Al are the dominant major elements in the stream sediments. Fe indicates the possible occurrence of ferromagnesian minerals while Al indicates that the stream sediments are enriched in aluminosilicate minerals such as feldspar and mica.
- 2. High concentrations of titanium probably indicative of ilmenite mineralization while the presence of manganese and chrome might indicate the potential of ferrous metals mineralization. Cerium, Lanthanum and Thorium concentrations are indicators of monazite mineralization
- 3. Occurrences and indicators of Fe, Co, Mn, Ti, Au, Ce, La, Pb and Th mineralization's were discovered. Gold has some interesting concentrations which merit more detailed investigation.
- 4. The element distribution patterns and chemical composition is greatly influenced by the local geology of the area and the geochemistry of the stream sediments originated from their surrounding rocks.
- 5. Future exploration work will be focused on the northern part of the Gouap-Nkollo prospect, where some anomalous concentrations of Au were observed.

#### **Presenter's Critique**

#### **Positive:**

- Reason for selected area stated
- Good infographics
- Laboratory where analysis conducted mentioned
- Good referencing

#### Negative:

- Samples collected were limited to small number
- The writing of Cameroon was not consistent. (French/ English spelling)
- No mention of the software used





### NURE ASSIGNMENT

# NURE

- Re analysis of NURE stream sediment samples in the southwestern New Mexico
- <u>Reanalysis of Selected Archived NURE-HSSR Sediment and Soil</u> <u>Samples from Arizona, California, Idaho, Montana, Nevada, New</u> <u>Mexico, and Utah - ScienceBase-Catalog</u>



## Divide into teams of 4 members

- Evan is TA and will assist all 4 groups
  BOLD IS TEAM LEADER
- Team 1—Identify Copper Anomalies
  - Isabella, Kyle, Anita, ?
- Team 2—Identify Uranium Anomalies
  - ?, Zohreh, Jakob, ?
- Team 3—Identify REE Anomalies
  - Eric, ?, ?, ?
- Team 4—Identify Li Anomalies
  - ?, Mark, ?, ?
  - May need to look at NURE water analyses
- Make sure each team has 1 member with GIS experience and student with access to Bureau computers

### Datasets needed

- NURE data <u>Reanalysis of Selected Archived NURE-HSSR Sediment and Soil Samples</u> from Arizona, California, Idaho, Montana, Nevada, New Mexico, and Utah - ScienceBase-<u>Catalog</u> just New Mexico
- New Mexico Mines Database (in folder in google drive)
- New Mexico Mining Districts (shapefiles in google drive)
  - nmmd\_13nov05.gdb
  - <u>https://geoinfo.nmt.edu/publications/maps/resource/24/</u>
  - https://geoinfo.nmt.edu/repository/index.cfml?rid=20170001
- Information on original samples (Evan will compile)
- Geologic map (Evan)
- Evan discuss loGas next week
- Mark access to ArcGIS and IoGas on Bureau computers
- Other data





# Deliverables—due Nov. 7

- Basic statistics (IoGas)
  - Mean, average, range, etc
  - Probability plots
  - histograms
- Identify the anomalies
  - Do they make geologic sense
  - What recommendations for follow-up studies
  - · What types of deposits could be there
- GIS map package of data
- Short written report
  - Procedures (include how samples were collected and analyzed)
  - Statistics
  - Results
  - Maps
- Presentations on Nov 7

# Zuni project

# Zuni Mountains study progress

summary	number
sediment	81
pan con	2
rocks	37
mineralized rock	50
dump	4
tailings	1
slag	1
total	176

- Sediments to be sieved
- Sediments to be dried
- Sediments to be shipped
- Rock samples to be shipped
- One set of ALS samples shipped
- 2 sets shipped to USGS









- 2 batches of samples (rocks, sediments) received by USGS and are being processed
- Will submit 1 more batch of sediments and 1 more batch of rocks
- Areas 1 and 2
  - Finished sampling—private land
- Areas 3-5
  - Examine maps and decide if we missed areas