

ORE SOLUTIONS

NEWSLETTER OF **CODES** CENTRE FOR ORE DEPOSIT AND EARTH SCIENCES

> SPRING 2026 **No.55**

THE TALLEST POPPY: DR OWEN MISSEN



Dr Owen Missen pictured on a windswept day at Granville Harbour in October 2025, during the post-SEG field trip: "Despite the wild ocean, we enjoyed showing participants this outcrop of granite and its associated tourmaline orbicules on the wild West Coast!" Owen says he is humbled to have been chosen as a Tasmanian 2026 Young Tall Poppy Science Awards recipient.

CODES/Earth Sciences environmental geologist Dr Owen Missen is used to the digs about his height – he's actually 198 cm tall (6 ft 6 in) – but they came thick and fast after his recent success when he was chosen as a Tasmanian 2026 Young Tall Poppy Science Awards recipient. Congratulations Owen!!

The awards, which are run by the Australian Institute of Policy & Science (AIPS), recognise early-career

researchers who have demonstrated their commitment to intellectual and scientific excellence, and a track record in outreach and community engagement. They are all about achieving a "more publicly engaged scientific leadership in Australia".

Owen attended a national AIPS Science Summit and gala dinner in Sydney on 11 September to acknowledge the achievements of all of the 2026 Young Tall Poppy Science Awards recipients from each state.

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FROM THE DIRECTOR

Professor David Cooke reflects on the achievements of CODES and Earth Sciences staff and students, and in particular acknowledges Owen Missen's recent Young Tall Poppy Science Award. He also acknowledges the spirit of collaboration across CODES research areas around emerging technologies and the sharing of geoscience data.

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This award reflects Owen's achievements in research into critical minerals as well as his extensive geoscience outreach activities. He said of the award: "I love sharing the wonder of minerals and geology with wide audiences, and I hope that this award will lead to more opportunities to inspire young people to choose careers in geosciences. Being a researcher today is no longer about hiding away in a lab and producing a paper every now and again; it's about both being good at what you do and also sharing it with the wider world. Scientists cannot be seen to be lecturing from the ivory tower. Engaging with people both from within and beyond our own field is very important."

"This is my first major award and this recognition of my efforts across research and outreach is very humbling," he added.

Owen explains that his research centres around "what happens when rocks contact water from rain or groundwater". He says: "Acid generation and metal release is particularly common around mines, so understanding the process of dissolving minerals is important, not just to help protect the environment,

but also to find new ways to process the minerals. As a society we need to source metals in a more environmentally sustainable way, as we move away from burning fossil fuels (oil and gas), to renewable energy alternatives like solar panels, wind turbines and battery-powered vehicles.

"I have described, named and published descriptions of six new minerals, mostly tellurium-oxygen minerals found in surface environments. This work helps me, and other environmental scientists, understand how elements move around surface environments, allowing the production of cycling diagrams that link all the different processes together and help to locate contamination."

Since joining CODES, as well as his research and outreach, Owen has enthusiastically undertaken regular radio and podcast interviews. Most recently he spoke at the National Science Week Community Talk at UTAS titled 'Building a common understanding of rare-earth elements'. And on a lighter note, he is also one of the lead organisers for the worldwide Mineral Cup (in which mineral lovers vote for their favourite mineral to determine which mineral will be crowned Champion with 'bragging rights' as the best mineral of the year).



The five 2026 Tasmanian Young Tall Poppies Science Award recipients (L-R): Tori Graham, Harriet Goodrich, Brooklyn Fraser, Rutger de Zoete and Owen Missen. Tori and Harriet are holding the Tasmanian joint overall winner glass trophies.



Director of CODES, Professor David Cooke, acknowledges Owen Missen's Young Tall Poppy Science Award from the Australian Institute of Policy & Science, as well as the hard work that Owen has done to achieve this award.

This is a wonderful, very well-deserved recognition of Owen and his stellar achievements. He has established himself as a rising star during this early phase of his career at CODES, embracing all aspects of his role with passion, dedication and enthusiasm – qualities he conveys readily to colleagues, students, collaborators and the broader community.

Owen is a terrific advocate for science communication, regularly contributing to outreach and student engagement activities. He is a key part of the coordination team of the annual online 'Mineral Cup' competition as a fun and engaging way of promoting the fascinating science of mineralogy to a broader audience. He is also actively involved in the Geological Society of Australia – Tasmania branch in which he acts as the Treasurer, and in the Mineralogical Society of Tasmania, where he shares his enthusiasm for mineralogy with others fascinated by minerals and mineral prospecting.

Owen's impact as a research leader and supervisor in the Regional Research Collaboration project has also been exemplary. He is one of the most popular, supportive and impactful members of our team. I look forward to seeing Owen continue to make major contributions to our science and to our connections with the broader community for many years to come.

IN PATAGONIA: UNLOCKING THE MYSTERIES OF THE LITHOSPHERE



Left: Juan Afonso undertaking fieldwork in Patagonia in May 2026. Right: Another member of the team is shown placing one of the sensors into the ground.

Associate Professor Juan Afonso (Earth Sciences) is the leader and coordinator of the international collaborative passive seismic experiment called PatagoniARRAY (imaging and modelling the Patagonian lithosphere). Here he is pictured (above) during a recent field campaign (May 2026) in Santa Cruz, Argentina, to deploy 100 seismic sensors as part of a dense array associated with the project.

CODES WELCOMES A NEW COHORT OF GLOBETROTTING PHD STUDENTS

This year saw six recent and newly arrived PhD students get into their stride with their research, which covers many topics from economic geology projects in Zambia, Chile and Tasmania to volcanic processes to meteorites.



VERITY KAMENIAR-SANDERY

Supervisors: Lejun Zhang, Robert Scott, Thomas Rodemann (CSL), Jessica Stromberg (CSIRO)

Project title: *Mount Lindsay and Mount Livingstone tin-tungsten-magnetite deposits, Tasmania: Hyperspectral mineral mapping, paragenesis and geochemical characterisation*

Funding: Critica; UTAS

Verity's PhD project focuses on the Mt Lindsay and Mt Livingstone Sn-W-B-Fe skarn deposits, proximal to the southeast margin of the Meredith granite in western Tasmania. This study is in collaboration with Critica, CSIRO

and Mineral Resources Tasmania. The project aims to investigate the complex mineralogy of the more Mg-rich, but poorly researched Mt Livingstone skarn and the Fe-rich and more researched Mt Lindsay skarn to produce a model to predict which of the many skarns around the Meredith granite contain economically strategic (Sn) and critical (W) mineralisation.

Some of the key planned outcomes of this study are: 1) to resolve ambiguities from the lack of published academic research by integrating detailed paragenetic, multiple geochemical techniques and hyperspectral data; 2) to produce a detailed analysis of alteration and ore mineralogy for 3D models of both skarn deposits; and 3) provide detailed analysis of ore mineral trace element chemistry to increase understanding of Mt Lindsay and Mt Livingstone ore paragenesis and chemistry.

"I'm very honoured to be given this opportunity to be working with such an amazing team of supervisors for my PhD. This project has given me the opportunity to further my development and expertise as a geologist and I look forward to adding to the world's ocean of geological knowledge."



MAËLYS MOULIN

Supervisors: Martin Jutzeler, Rebecca Carey

Project title: *Modelling submarine explosive eruptions*

Funding: Australian Research Council; UTAS

Maëlys Moulin's PhD research investigates the physical processes associated with submarine explosive volcanism, with a focus on three complementary projects. Her first project involves wet tumbling experiments to investigate how pumice clasts abrade during subaqueous transport, expanding on existing dry tumbling experiments in the literature to explore the role of water in abrasion dynamics. Early results on pumice abrasion provide novel insights into subaqueous transport mechanisms.

Her second project aims to characterise the physical and mechanical properties of hydrothermally altered rocks from Brothers Volcano, New Zealand, using drill cores recovered during IODP Expedition 376.

Her third project will use these measurements to develop numerical models for submarine volcanic edifice collapse, contributing to improved hazard assessment at submarine arc volcanoes globally. In her first year, Maëlys has set up a novel experimental apparatus, carried out her tumbling experiments, submitted a sample request to the Kochi Core Center in Japan, and applied for ANZIC CORE funding to support her laboratory work in Strasbourg, France. Her research involves close collaboration



Verity Kameniar-Sandery attended the annual National Virtual Core Library workshop hosted by the CSIRO in Perth in April 2026. She is pictured here with Till Gallagher (centre) and Jake Moltzen, who also attended and are both CODES graduates.



Maëlys Moulin pictured on a field trip to the Poás Volcano, Costa Rica, prior to starting her PhD at CODES in February. This active volcano has one of the largest craters in the world.

with international partners at the University of Strasbourg and the University of Vermont.

"I am loving my time at UTAS and in Hobart; the research community is incredibly supportive and the science is endlessly exciting. Getting to work on submarine volcanoes, from lab experiments to international collaborations, has been a dream. I can't wait to see where the next few years take me!"



GABRIELLE O'TOOLE

Supervisors: Francisco Testa, Rebecca Carey, Andrew Tomkins (Monash University)

Project title: *From CAIs and AOAs to chondrules: Tracing the formation and evolution of the Solar System's earliest solids using synchrotron science*

Funding: UTAS

Gabby's PhD research investigates the chemical and thermal evolution of the earliest Solar System solids found in chondritic meteorites. Her work focuses on calcium aluminium inclusions (CAIs), amoeboid olivine

aggregates (AOAs), Wark-Lovering (WL) rims and chondrules. Together, these meteoric components preserve a chronological record of nebular redox conditions, dust-gas interactions and parent body metamorphism, offering insight into the processes that shaped the first planetary materials. Although these components have been studied for decades, many aspects of their formation remain unresolved – particularly those requiring micron and sub-micron measurements beyond the capabilities of conventional laboratory instruments.

To address this, Gabby will combine AMICS/SEM mineral mapping and EMPA mapping with synchrotron-based techniques such as XFM and XANES to identify oxidation state, fine-scale microstructures, and major/trace element distributions. This integrated approach aims to provide new constraints on nebular redox conditions, refractory element behaviour, and early thermal episodes recorded in CAIs, AOAs and chondrules.

Her research follows the chronological evolution of Solar System materials: beginning with CAIs and AOAs which capture the earliest condensation environment, moving to WL rims which record changing nebular conditions, and finally examining chondrules to test whether their diverse textures reflect distinct precursor reservoirs or different melting and cooling histories.



Gabby O'Toole taking part in the recent Beaker Street science festival in Hobart. She is pictured in the Hope & Anchor pub with examples of meteorites and chondrules ready to explain their significance to festivalgoers.



Will Sinclair is seen here collecting samples of New Caledonian serpentinite at Mont Dore mine in New Caledonia during a field trip in 2025.

"I am very excited to be continuing my extraterrestrial research at CODES; I truly love what I do and the people I work with so I am super excited for what the next few years will bring me!"



WILLAM SINCLAIR

Supervisors: Rebecca Carey, Sebastien Meffre

Project title: *Eocene to Miocene tectonics of the SW Pacific margins*

Funding: UTAS

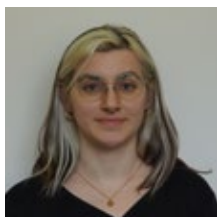
Will's PhD research aims to refine the Eocene-Miocene tectonic evolution of the SW Pacific through an integrated synthesis of geological data from offshore and onshore settings. The Eocene marked a time of major plate reorganisation in the region, which resulted in changes in plate motion, basin formation, strike slip deformation, arc volcanism and the initiation or reconfiguration of subduction systems. Will's regions of particular interest are the Solomon Islands, eastern Coral Sea and the Norfolk–Three Kings Ridge region, as they represent major gaps in our knowledge of this time period, and may provide clues as to the intricacies of the tectonic processes involved in the formation of these regions.

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Will employs a wide range of techniques to understand a variety of sample types including dredge rocks, submarine drill cores and legacy outcrop samples. Utilising igneous and metamorphic petrology, geochronology, geochemistry, biostratigraphy, sedimentology and geophysics, Will strives to create holistic models and interpretations to test competing tectonic models of the region.

His research will not only provide further constraints on the tectonic history of the SW Pacific but will support future marine and terrestrial sampling campaigns by refining our understanding of the initiation, reconfiguration and cessation of complex arc-back arc systems.

"Returning to CODES following my Honours project has been one of the best decisions of my life! Not only is it a place where adventure and excellence are encouraged and celebrated, but it is full of support from all directions. I am proud to consider myself a CODES PhD candidate."



GIULIA SORRENTE

Supervisors: Sheree Armistead, Robert Scott, Jeff Oalman

Project title: *Tectonic and climatic controls on sediment-hosted Cu-Co mineralisation in the Central African Copperbelt*

Funding: DECRA (Sheree Armistead)

Giulia's project is focused on the Central African Copperbelt in Zambia, the largest sediment-hosted Cu-Co district in the world. Supervised by Dr Sheree Armistead, Dr Robert Scott and Dr Jeff Oalman, this project is part of Dr Armistead's DECRA fellowship. It aims to identify the tectonic settings required for fluid circulation capable of mineralising critical metals, providing predictive criteria to target sedimentary basins prospective for sediment-hosted deposits.

Lumwana in the Domes Region in Zambia will be the focus of the first part of her project. Unlike the other classical sediment-hosted deposits within the Katanga Supergroup, the mineralisation here seems to occur in the basement rocks; however, the exact protolith is uncertain. To address this, Giulia will use integrated U-Pb geochronology on detrital zircons, and other minerals such as rutile, apatite and monazite, to constrain the host rock provenance. Furthermore, she will study the Cu-associated hydrothermal alteration and kyanite crystallisation to determine if they occur pre-, syn- or post-metamorphism. This will be tested by integrating microstructural petrography of kyanite-bearing shear zones to establish paragenetic timing, with fluid inclusions to characterise the ore-forming fluids. Ultimately, this research will improve genetic and exploration models for non-traditional copper deposits in complex metamorphic terrains globally.

"This PhD at CODES gives me the opportunity to specialise in the field that I love, through field courses and workshops, while building a strong network by meeting and working with many industry partners. I'm incredibly enthusiastic and I can't wait to see where this project will take me."



MAURICIO VALAREZO CUENCA

Supervisors: Rebecca Carey, Lejun Zhang, Francisco Testa, Yamila Cajal

Project title: *Exploring deep explosion mechanisms in magmatic-hydrothermal systems and their role in copper and critical metal mineralisation*

Funding: Australian Research Council; UTAS

Mauricio's PhD research examines how magmatic-hydrothermal breccias form in porphyry copper deposits, using the Río Blanco-Los Bronces district in central Chile as a case study.



Giulia Sorrente (right), with CODES Honours student Ariann Spencer, working in Zambia on the Fishtie drillcore, a deposit owned by First Quantum Minerals. FQM are supporting fieldwork for Ariann.



Mauricio Valarezo Cuenca (left) with colleagues before heading into the field on horseback during mineral exploration work in Ecuador's Miocene metallogenic belt in 2023.

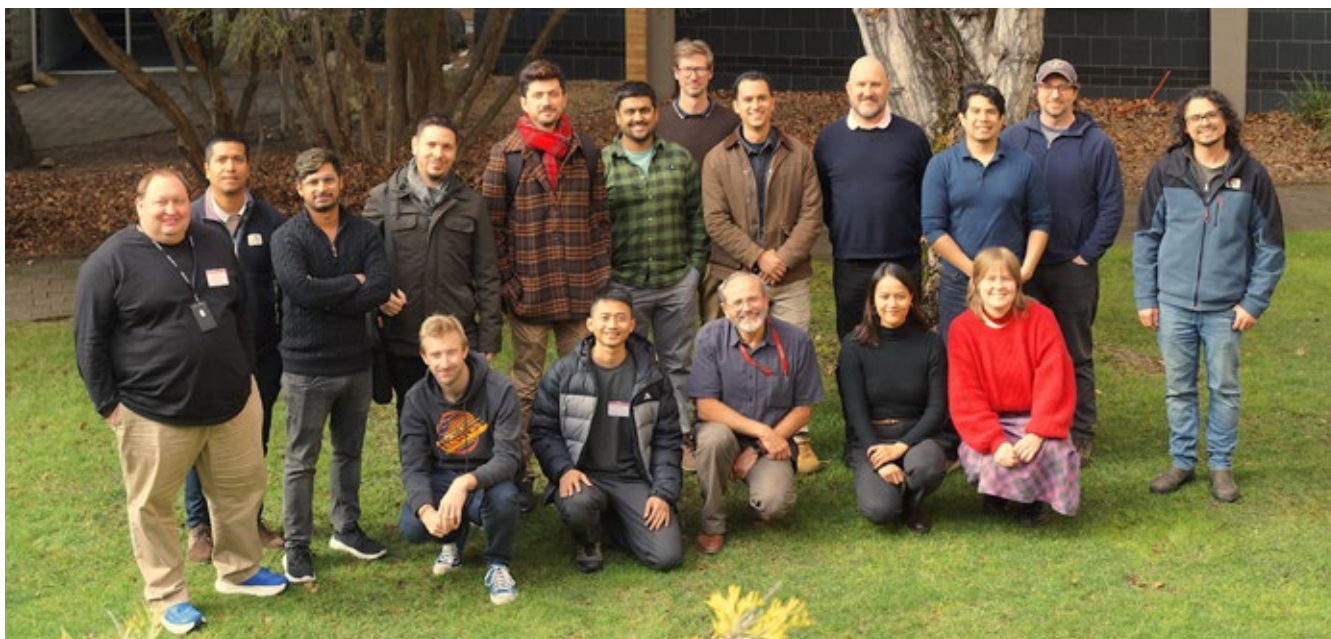
Breccias play a key role in many porphyry systems because they can focus hydrothermal fluid flow and host high-grade copper mineralisation. Their formation is also closely linked to the metallogenic evolution of these systems. Yet, we still lack a clear understanding of how changes in fluid pressure interact with the mechanical properties of host rocks to generate different breccia styles.

Mauricio is investigating how fluid composition, phase state and pressure evolve during brecciation, and how lithology and hydrothermal alteration influence rock strength and fracture behaviour. These fluid and rock properties will be integrated into numerical simulations to test how different conditions control fracture development and breccia geometry.

The simulated patterns will then be compared with natural breccias from Río Blanco-Los Bronces to identify which conditions best reproduce the observed features. Ultimately, this work aims to improve our understanding of where mineralised breccias form and to provide useful geological criteria for exploration in porphyry copper systems.

"I'm very glad to be part of CODES. Collaborating with researchers from different disciplines has broadened how I think about ore-forming processes and shaped the way I approach my research."

EARTHBANK EVENT BRINGS IMAGING AND GEOCHEMICAL COMMUNITIES TOGETHER



Participants in the recent AuScope EarthBank Workshop on Geochemical, Geochronological and Mineralogical Imaging and Laser Raman, held at UTAS, pictured in the CODES Rock Garden in the first week of August. Dr Allan Gomes (back row with red scarf) was the organiser of this event for UTAS/CODES.

Dr Allan Gomes, Postdoctoral Research Fellow, EarthBank, reports on a successful EarthBank workshop held at UTAS in early August.

CODES recently hosted the AuScope EarthBank Workshop on Geochemical, Geochronological and Mineralogical Imaging and Laser Raman, bringing together researchers, technical staff and students from across Australia to discuss advances in microanalytical imaging technologies and data management.

EarthBank is a national AuScope initiative that aims to improve the discovery, accessibility and reuse of geoscientific data. The platform supports the archiving and integration

of a wide range of analytical datasets, making geochemical and imaging data more accessible to researchers, government agencies and industry partners. The workshop was supported through EarthBank funding.

Held over three days at the Sandy Bay campus, the workshop attracted approximately 25 participants from universities and companies across Australia. The event was jointly organised by UTAS, Adelaide University and AuScope EarthBank, with significant involvement from the world-renowned Centre for Ore Deposit and Earth Sciences (CODES) and the CODES Analytical Laboratories.

Presentations covered a broad range of techniques, including Raman spectroscopy, laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS), mineralogical imaging and workflows for digital data management. Participants also had the opportunity to visit laboratories within the School of Natural Sciences and the Central Science Laboratory at UTAS.

One of the outcomes of the final discussions was a proposal to establish a broader Australian imaging community to facilitate communication and collaboration between researchers working in mineralogical imaging and related analytical fields. Several working groups were also proposed to help coordinate activities and explore opportunities for future collaboration and data integration with EarthBank.

The workshop was very well received by attendees and generated positive discussions throughout the event. Its success reflects the growing interest in advanced imaging technologies applied to Earth Sciences and the importance of developing community-driven approaches to managing and sharing complex geoscientific datasets.

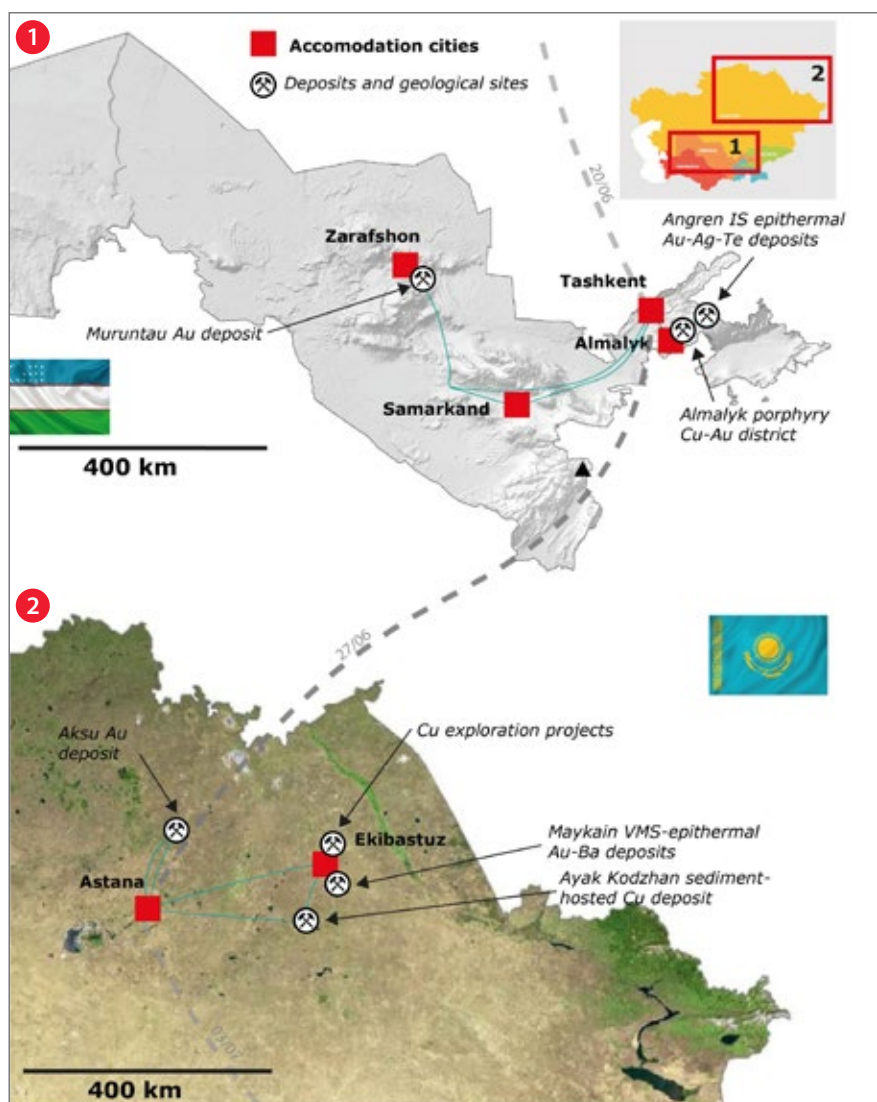


Dr Bhavik Lodhia presenting at the workshop. He is the Deputy Director of AuScope EarthBank and a Senior Research Fellow at Curtin University.

THE CODES SEG STUDENT CHAPTER IN CENTRAL ASIA



Kazakhstan: A visit to the Ayak-Kodzhan Cu deposit at the Fonet Er-tai AK Mining facility.



Regions visited in Uzbekistan (top) and Kazakhstan (bottom) including some of the geological sites, such as the Maykain VHMS and the Muruntau mine.

Exploring the Central Asian Orogenic Belt: A CODES-UTAS SEG Student Chapter adventure to Uzbekistan and Kazakhstan... CODES PHD student Poliana Vidal Salgado shares her experiences of this well-organised and informative field trip.

From 20 June to 3 July, ten students from CODES and Earth Sciences, including undergraduate, Honours and PhD students, embarked on an exciting geological journey across Uzbekistan and Kazakhstan, alongside experienced geologists from sponsoring companies from around the world. The two-week field trip to the Central Asian Orogenic Belt (CAOB) gave students the opportunity to explore one of Asia's most important metallogenic provinces, known for its diversity of world-class Cu-Au-Mo and polymetallic deposits and challenging terrains and cultural barriers.

WORLD-CLASS DEPOSITS OF UZBEKISTAN AND KAZAKHSTAN

The first week focused on several of Uzbekistan's most important mining districts. At the Almalyk porphyry Cu-Au district, participants examined one of Central Asia's most significant copper-producing regions and gained insights into the geological characteristics of large-scale porphyry systems.

A major highlight was the visit to the Muruntau gold deposit, recognised as one of the largest gold deposits in the world. To the surprise of all, we were the very first Western group to see part of their deepest drill core, extending to more than 4,000 m and intersecting gold mineralisation where it intersects the Murun Granite. The group had an impressive view of the approximately 4.5-km-wide open pit, observed ongoing mining operations and examined recently drilled core. The visit also included a guided museum tour, where students viewed historical geological maps and 3D models of the region while also experiencing the cultural heritage of the area.

The second week took the group to Kazakhstan, where the geological focus shifted towards a diverse range of $\text{Cu} \pm \text{Au} \pm \text{Mo}$ and polymetallic deposits. Participants visited the Maykain gold-barite VMS deposit and the Ayak Kodzhan sediment-hosted copper deposit, providing valuable examples of contrasting deposit types and ore-forming processes.

The field trip continued with visits to copper exploration projects around Ekibastuz and concluded with the Aksu Au deposit. Across these sites, participants examined outcrops and drill core, visited mining and exploration facilities, and discussed geological interpretations and exploration strategies with local geologists.

One of the most rewarding aspects of the trip was bringing together students from diverse academic backgrounds and giving many of them their first opportunity to experience an operating

drill rig, examining freshly drilled core, or standing beside a large open pit. These moments provided a tangible connection between geological concepts learned at university and their application in the real world.

LEARNING BEYOND THE DEPOSITS

The CAOBS has a complex geology; however, it was the language and communication that created the adventure and the challenge on this trip. Between phone calls, WhatsApp messages and letters to the Ministry of Mining Industry and Geology of Uzbekistan, the organisation of this field trip was pulled together through the support of local and internationally engaged geologists. With more than 20 people involved in organising the trip, the Student Chapter relied on the SEG – through the guidance of Dr Anna Fonseca (SEG VP for Regional Affairs) assisted by Ali Sholeh (SEG Regional VP for North Eurasia) and Dr Zeb Zivkovic from CODES. Collaboration between the University of Tasmania, the University of Pisa (Tashkent branch) and the Navoi State University of Mining and Technologies was also key to ensuring the field trip ran smoothly.

The assistance of local student Asal Matsinova from the University of Pisa was particularly valuable in helping bridge the language barrier. We also gratefully acknowledge the assistance of our Kazakhstan participants Oleg Oblassov, Yerkebulan Kussain, Timburek Medeo, Ansar Alzhanov and Dauren Baltynov, whose translations, local knowledge and support were invaluable throughout the trip.



Uzbekistan: The SEG CODES Student Chapter was the first Western group of geologists to view part of one of Muruntau's deepest and most significant drillholes, which record gold mineralisation in the Besapan Formation at its contact with the Murunski Pluton granite at depths exceeding 4,000 m.



Kazakhstan: Supergene copper mineralisation in a trench near Ekibastuz.

We gratefully acknowledge the support of our sponsoring companies: First Quantum Minerals, B2Gold, Barrick Mining Corporation, Erdene Resources, Freeport-McMoRan, Mawarid Mining, Pallas Resources, Rio Tinto and Teck Resources, and our partner universities. Their contributions, expertise and logistical support made this field experience possible.

Alongside the geological program, participants experienced the rich historical and cultural heritage of Uzbekistan and Kazakhstan. By combining world-class mineral deposits, practical geological experience, technical discussions and international collaboration, the field trip provided an unforgettable opportunity to explore one of the world's most important metallogenic belts and to experience Central Asian geology and culture.



Uzbekistan: The group pictured at the University of Pisa (Tashkent branch) after having visited impressive geological museums and listened to presentations by students from both UTAS and the University of Pisa.

WHERE ARE THEY NOW?

Dr Indrani Mukherjee arrived in Tasmania from India in 2014 to undertake her PhD at CODES and is now a senior lecturer at the University of New South Wales, where she combines her love of teaching with her own research – and as many geoscience outreach opportunities as she can manage.

ACADEMIA IS THE HAPPY PLACE FOR THIS GEOSCIENTIST



DR INDRANI MUKHERJEE

Senior Lecturer at the School of Biological, Earth and Environmental Sciences at the University of New South Wales

PhD completed at CODES in 2017 on 'Pyrite trace element geochemistry of black shales of the "Boring Billion" period (1800–800 Ma): Implications for evolution of the atmospheric oxygen and complex life' (supervised by Professor Ross Large, Professor Sebastien Meffre and Dr Jacqueline Halpin)

What is your current job/employment and your work responsibilities?

I am currently a Senior Lecturer at the School of Biological, Earth and Environmental Sciences at the University of New South Wales (UNSW). My role involves both research, including research supervision (undergraduate, Honours and PhD projects), and teaching. I am also passionate about geoscience outreach and actively engage in a variety of school and university-level outreach activities.

What are the things you enjoy most about this role/when did you start it? Describe the range of things that you do in your role.

I joined UNSW in January 2023. Surprisingly, I enjoy research supervision the most! I currently have a really great bunch of undergraduate–Honours students and PhD researchers. I really enjoy working with them on a variety of different projects. Up until my current role, my entire focus had been on my own career trajectory. However, since I started working with my students that focus has shifted. I feel very proud of their achievements and it's just so wonderful to see them evolve. I also really enjoy teaching – especially first-year students.

As with most academics, it's a typical desk job. But every now and then, I visit drill core libraries for sampling and analytical laboratories for geochemical analyses. No matter how fancy the various techniques get, for me, I don't think anything will beat basic petrography using a standard optical microscope. There is something very

exciting about having that first look under the microscope of the rocks you have just collected.

I have also recently taken up the UNSW Faculty of Science Theme Lead – Blue-sky discovery role. I have really enjoyed working in this role as it brings together researchers from different science backgrounds. There have been several collaborative projects and initiatives that I have been involved in including representing our school. The role has helped me gauge geoscience awareness in the upper echelons of the Faculty of Science and has really made me think of creative ways of improving our discipline's visibility.

How did you get there/your past roles and how they shaped your path?

I have always known I wanted to be in academia and so all my past roles have been what you'd typically expect someone to have (PhD followed by postdoctoral positions). One of the biggest decisions of my life was to move to Australia from India for a PhD and this decision really did strongly shape my career so far. Moving to a new country that is so vastly different to the one I belong to was both an enriching and challenging experience.

My exposure to CODES, its research environment and culture really prepared me well for the next steps in my career. My time at CODES included my PhD and postdoctoral researcher years and being a lecturer for a very short time, and so I gained a range of skills that are now super handy in academia. I also think interacting with colleagues and friends from different nationalities helped immensely to develop strong interpersonal skills.



Dr Indrani Mukherjee (left) and Maresa Moustakis (Honours student from UNSW) analysing pyrite from the Mediterranean Sea using the LA-ICP-MS facilities at the CODES Analytical Laboratories during a recent visit to Tasmania. Indrani says that, although they are smiling, these pyrites were the hardest and most challenging to analyse to date!

These skills are useful in an academic setting, especially when working in teams and interacting with students.

Your career highpoint/greatest achievement to date/source of greatest satisfaction as a geologist?

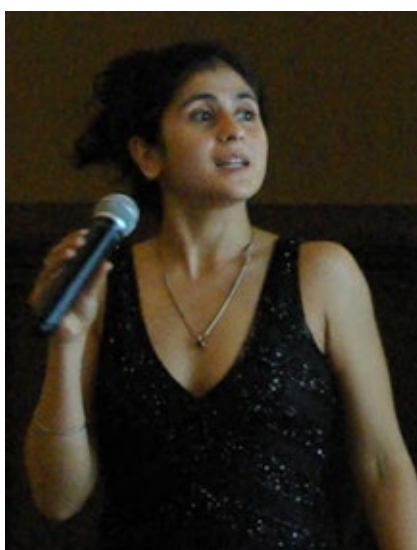
My source of satisfaction as a geologist these days is when I teach first-year undergraduate students and am able to change their perception of our discipline. Normally, I have ten weeks with them and a quick online poll usually gives me some idea about how they feel about geology in week 1. By the time it's week 10, the majority of them develop a more nuanced understanding of our discipline. That has also translated into excellent student evaluation reports and higher student numbers in second- and third- year courses (relative to prior years). I don't think I have attained greatest satisfaction by any means or attained a career highpoint. Much to do and work on!

What did you specialise in at CODES and how did CODES help you to get where you are? What did you enjoy most about CODES?

At CODES, I specialised in pyrite trace element geochemistry using the Laser Ablation Induction Coupled Plasma Mass Spectrometry (LA-ICP-MS)

technique. I have mostly focussed on this specific technique for the majority of my career, and it has allowed me to dabble across various sub-disciplines within geology (mineral exploration, early Earth and astrobiology).

CODES taught me the value of generating good-quality datasets and their various applications. I consider myself very lucky to have had such an excellent training in such a widely used in-situ technique at a world-class laboratory. CODES has also been a



Indrani pictured in 2021 at a CODES Geology Dinner moderating one of the amusing challenges set for students and staff during the evening.

fantastic place to develop industry contacts that were helpful while I was there and now. I really enjoyed the random chats in the tearoom (minus/plus biscuits) – both geology and non-geology flavoured. I think tearoom culture was quite an enriching experience in many ways and most importantly, a great whinging spot (haha). And I am good at that.

Words of wisdom for up-and-coming geologists graduating from CODES?

- Know your mentors!
- Persistence is key in academia
- Hone your communication skills

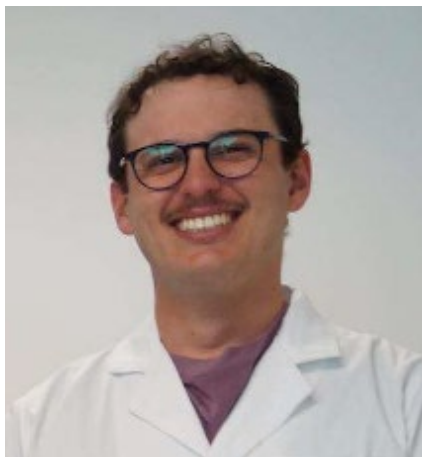
Little-known facts about you?

There are only two kinds of people in the world – those who live to eat and those who eat to live. I love food and proudly belong to the former category.

Editor's comment

In 2022–2023 Indrani was named as one of Australia's Superstars of STEM by Science and Technology Australia, a program that strives to increase the visibility of women in science and technology roles. The role reflected her passion for outreach in the geoscience space.

CHILDHOOD DREAMS LED JACK TO GEOSCIENCE CAREER



DR JACK WARD

Dr Jack Ward is an Assistant Laboratory Analyst in the world-renowned CODES Analytical Laboratories, and he is currently seconded to ScopeIR in the role of Senior Geoscience and Mineral Analytics Specialist. He explains here what drew him into the world of rocks, the evolution of the Earth and, eventually, his twin passions: tectonics and geodynamics.

When did my passion for geology start? When I reflect on that question, I realise that I have been interested in geology, in some form or another, for most of my life. During primary school, when I wasn't exploring the outdoors as a 'free-range' (AKA adventurous, and perhaps slightly feral) child in Far North Queensland, I remember poring over the DK Books *Children's Space Encyclopedia*. I was fascinated by the processes happening on Earth, as well as the very existence of the huge masses of gas, rock and ice that make up our solar system. Of course, I didn't appreciate that I could be paid to study the Earth; I just thought planetary processes were pretty cool at the time.

In high school, I was fortunate enough to study geology for three years. I thoroughly enjoyed those classes, especially the field trips throughout Far North Queensland to collect samples for the school's fledgling rock collection. It was during those classes that my childhood curiosity developed

into a clear ambition: I wanted a career in geology (thank you, Mr Mootel!).

After graduating from high school, I made the pilgrimage to Brisbane and enrolled in the University of Queensland's Bachelor of Advanced Science program. The degree required me to complete semester-long undergraduate research projects, one of which I undertook under the supervision of Dr Charlie Verdel. In my third year, Charlie took me on a multi-week field trip to the eastern Amadeus Basin in the Northern Territory. There, I assisted with field mapping, collected carbonate samples for trace element analysis, and drilled cores for palaeomagnetism studies.

During my undergraduate studies, I faced the problem of being interested in everything. Geophysics? Awesome. Geochemistry? Super cool. It wasn't until I worked with Charlie that I truly appreciated how the many aspects of geoscience that I had grown to love came together under the umbrella of 'tectonics and geodynamics'.



Jack presenting his research, which explores how geodynamic processes can lead to the formation of giant porphyry ore deposits in island arcs, to a packed audience at the 2025 SEG conference in Brisbane.



Jack sitting atop the eastern flank of the Limbla Syncline (Northern Territory), which is made up of carbonate rocks deposited between the Neoproterozoic 'Snowball Earth' glaciations. He was collecting samples of the carbonate rocks, from which he extracted trace element compositions to identify periods of atmospheric oxygenation that occurred more than 600 million years ago.

This appreciation naturally translated into an Honours project with Charlie and Dr Matt Campbell, in which I collected REE data from Neoproterozoic carbonate successions in the Amadeus Basin (Northern Territory), Adelaide Rift Complex (South Australia) and on King Island (Tasmania) to reconstruct the secular oxygenation of Earth's atmosphere. Although I enjoyed all aspects of this project, the most impactful part was spending time in the lab, performing detailed geochemical analyses of the rocks I collected (from which I had drilled powders weighing only a few grams each). The fact that the chemistry of these samples could tell the story of tens of millions of years of climatic evolution that took place more than 500 million years in the past was extremely humbling and opened my eyes to the power of microanalysis.

I certainly felt the strong pull of a career in mineral exploration after finishing my undergraduate studies, but I decided to further pursue my passion for tectonics and geodynamics

by enrolling in a PhD, supervised by Professor Gideon Rosenbaum and Associate Professor Teresa Ubide. In my PhD research, I integrated geochemical and geophysical data to unravel how complex subduction processes, such as slab tearing and the interaction of slabs with the mantle transition zone, can generate 'anomalous' volcanism and giant porphyry ore deposits. Unfortunately, COVID-19 meant that I couldn't perform any fieldwork, but I still spent an appreciable amount of time in the lab collecting EPMA and LA-ICP-MS data.

A highlight of my PhD was working under Joel Blake and Matt Campbell at Rio Tinto, and I extend a sincere thank you to everyone in the Brisbane exploration office for making me feel so welcome. Alongside learning important exploration geology skills, my time at Rio Tinto afforded me the opportunity to see how my research could be integrated into exploration workflows.

After finishing my PhD, I joined CODES Analytical Laboratories. I am thoroughly enjoying my time at

CODES, and I especially appreciate the encouragement and support from Jeff Oalman, Dave Cooke, Lejun Zhang and Sheree Armistead to pursue my research interests. I am certainly still interested in the influence of large-scale geodynamic processes on ore deposit formation (and, admittedly, still a little 'free-range' at heart), but my time at CODES has exponentially grown my appreciation of mineral chemistry as an exploration tool.

With this in mind, I would like to sincerely thank Dave, Jeff and Lejun for allowing me to work as part of the Amira P1249 project and for giving me the freedom to perform R&D related to mineral chemistry vectoring and fertility techniques. I have long admired CODES' innovative research, especially its real-world applications, and I am extremely grateful for the opportunity to contribute to that legacy. Technical interests aside, I have found a sense of belonging in the CODES community. I consider myself very lucky to be working here, and I hope to do so for many years to come!

TRACKING TECTONICS, CLIMATE AND COPPER IN THE CENTRAL AFRICAN COPPERBELT



Fieldwork in Zambia (L–R): CODES PhD student Giulia Sorrente, Honours student Ariann Spencer, Dr Sheree Armistead and George Aldiss (First Quantum Minerals) in the Bwana Mkubwa pit near Ndola in northern Zambia.

Dr Sheree Armistead's DECRA project, 'The interplay of tectonics and climate on critical minerals in deep time' continues apace. Here she gives an update about a recent trip to Zambia for fieldwork – accompanied by two students.

This year marked the first official field season of my ARC DECRA fellowship, with fieldwork in Zambia alongside Honours student Ariann Spencer and PhD student Giulia Sorrente. We were

hosted by First Quantum Minerals, who generously organised access to drill core in the Central African Copperbelt.

The DECRA links tectonics and mineralisation across scales – from global plate reconstructions to regional basin architecture, down to mineral-scale geochemistry. Our Zambian fieldwork focused on Neoproterozoic 'Snowball Earth' successions and how climate extremes, tectonics and basin

evolution combined to concentrate copper and cobalt ore. Ariann's Honours project is building age constraints on the host stratigraphy using detrital zircon and carbonate geochronology, which will help pin down the basin's relationship to the wider Katangan Supergroup.

It's exciting work, made possible by strong industry collaboration, and I'm looking forward to continuing it over the next few years.

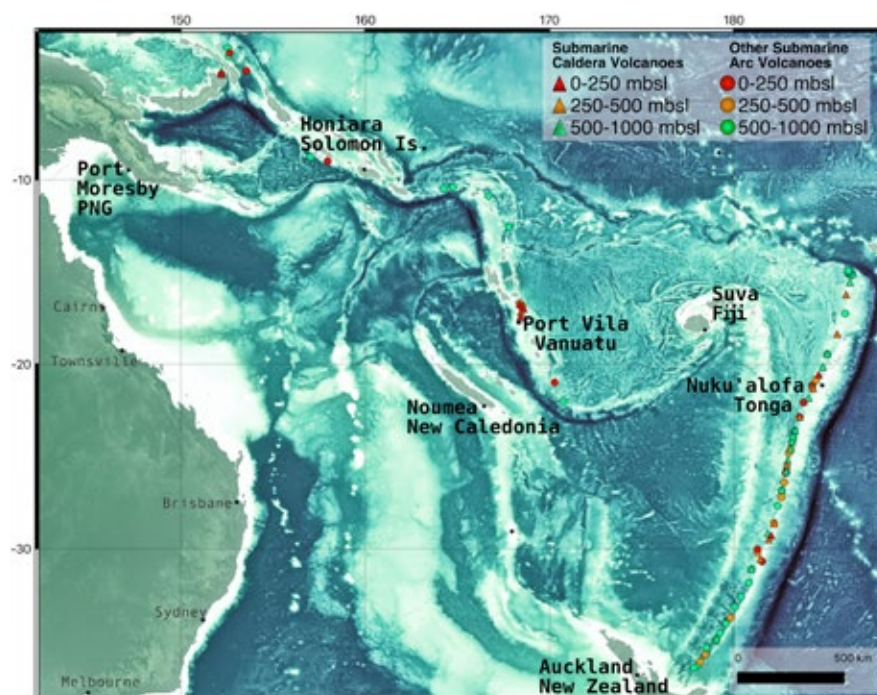
RESEARCH INTO TSUNAMI RISK FOR AUSTRALIA

Associate Professor Rebecca Carey has been successful in being awarded funding to assist with a major research project into potential volcanic tsunami sources close to Australia.

Volcanic eruptions can generate tsunamis through processes including caldera and volcanic flank collapse, pyroclastic flows entering the ocean, and submarine landslides triggered by volcanic activity. Compared with earthquake-generated tsunamis, these sources are less well understood and are not yet systematically represented in Australian tsunami hazard assessments, despite their potential to affect Australian coastlines and territories.

Funded by Natural Hazards Research Australia (NHRA), Project T9-A2 *Understanding tsunami risk to Australia from volcanic sources* is addressing this gap by developing a comprehensive assessment of potential volcanic tsunami sources across Australia's region of interest, from the South-West Pacific to the Southern Ocean.

The project is compiling a database of potentially tsunamigenic volcanoes and volcanic regions using global datasets, published research and expert knowledge. Potential sources are being characterised according to their location, volcanic setting and activity, possible tsunami-generating mechanisms, and maximum credible



Distribution of potential volcanic tsunami sources being assessed in NHRA Project T9-A2 across Australia's region of interest. The project considers volcanic sources from the South-West Pacific to the Southern Ocean to identify and characterise credible tsunami-generating scenarios that could affect Australia.

tsunami potential. This provides a systematic basis for identifying and prioritising volcanic sources that may pose a tsunami hazard to Australia.

Selected credible scenarios will then be investigated using high-resolution numerical tsunami modelling, extending to the 100 m water-depth contour around Australia and its territories. The modelling will quantify potential tsunami amplitudes and

provide information on the likelihood and relative significance of different volcanic sources.

The project will strengthen Australia's evidence base for tsunami hazard assessment and support NHRA's objective of reducing the impacts of natural hazards through research that informs national risk reduction, preparedness and emergency management.

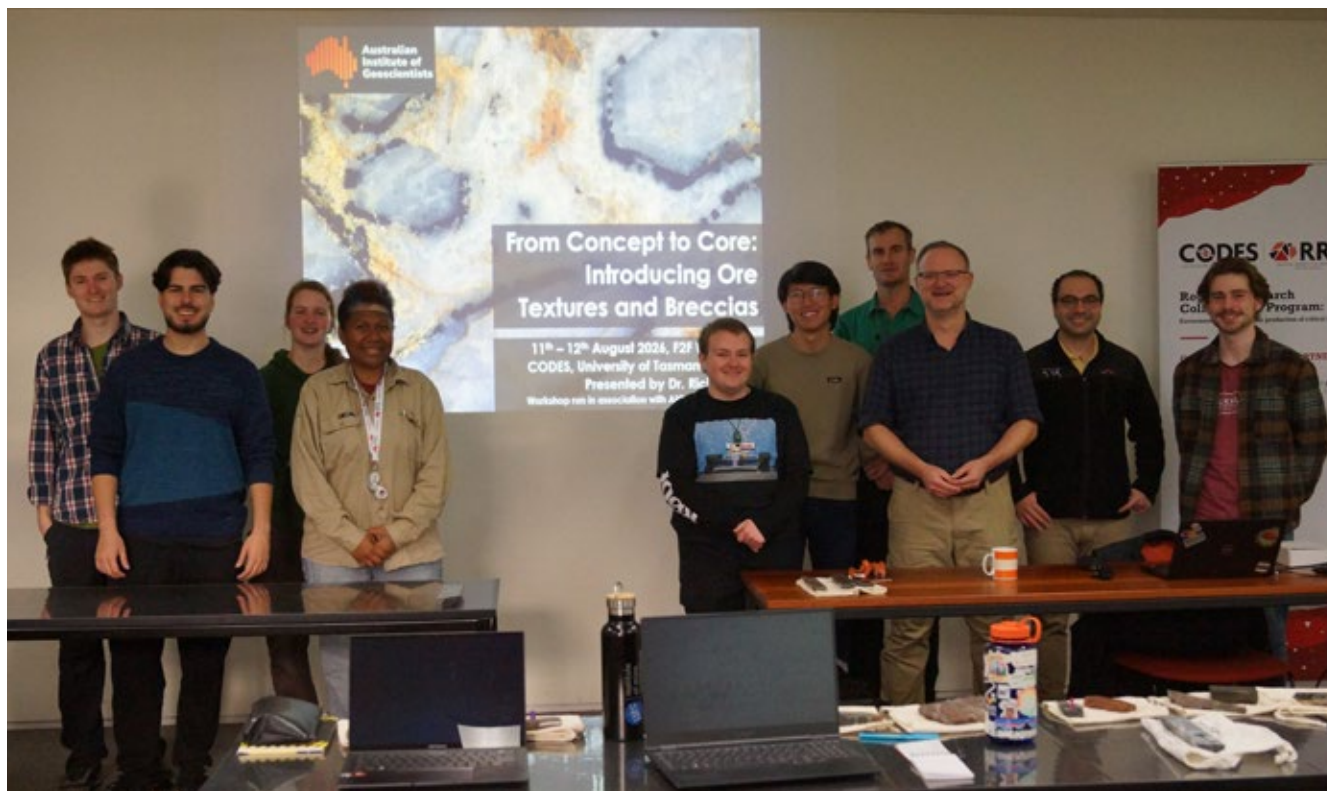
CODES STRENGTHENS RESEARCH TIES WITH PERU

On Saturday 25 July CODES Director Professor David Cooke and postdoctoral fellow Yamila Cajal attended the Peru Independence Day celebrations at the Kingborough Community Hub. His Excellency Vitaliano Gallardo, the Ambassador of Peru to Australia, visited CODES in late 2025 acknowledging the ties between CODES and Peru in the areas of geological exploration and training. In a further strengthening of relations, CODES was invited to take part in the celebrations at Kingborough. CODES PhD students Billy Beas and Victor Torres were singled out for mention by the Ambassador for continuing the well-established tradition of Peruvian geologists undertaking higher degrees at CODES for their professional development, which has been helping to uplift geological exploration and mining in Peru for over three decades.



Dr Yamila Cajal; Her Excellency the Honourable Caroline Wells, Governor of Tasmania; His Excellency Vitaliano Gallardo, the Ambassador of Peru to Australia; and Professor David Cooke at the Peru Independence Day celebrations on 25 July 2026.

WORKING IT OUT: ORE TEXTURES AND BRECCIAS



Participants of the breccia workshop run in August by Dr Richard Lilly in association with the Australian Institute of Geoscientists and hosted by CODES. L-R: Finn McCallum-Packham (Honours), Matthew Bristow (third year), Jaida Flynn (Honours), Olive Ponyalou (PhD), London Elliot (second year), Jason Sze (Honours), Ben Jones (industry), Dr Richard Lilly, Emrecan Yurdakul (PhD) and Flynn Robertson (third year)

On 11 and 12 August, Dr Richard Lilly, a former senior exploration geologist, held a breccia workshop at CODES, in association with the Australian Institute of Geoscientists. The workshop was attended by keen students from second year to PhD level. Titled 'From concept to core: Introducing ore textures and breccias' it ran across two days, and included an introduction to concepts including alteration mineralogy, infill textures and breccia textures. Richard shared his knowledge from years of experience across industry and academia, delivered with his quirky sense of humour and excellent PowerPoint effects.

Highlights included examining hand samples from the Mt Isa Inlier, numerous detailed case studies, and viewing the additional breccia samples provided from CODES by Professor David Cooke.

Jaida Flynn



Workshop participants get down to the business of identifying ore textures and breccias during the workshop run by Dr Richard Lilly in August.



In June the UTAS Island of Ideas series of public talks featured a discussion on critical minerals with speakers (L-R): Associate Professor Lejun Zhang from CODES, CODES PhD student Angela Isaura Santos Costa, MMG Geology Superintendent Corey Jago and Chief Government Geologist at Mineral Resources Tasmania Dr Rebecca Sproule (photo: Laura Harper).

ISLAND OF IDEAS: CRITICAL MASS

Associate Professor Lejun Zhang reports on the successful Island of Ideas public talk on critical minerals hosted by UTAS in June.

On 24 June, more than 100 members of the community gathered at the Sir Stanley Burbury Theatre in Sandy Bay for the University of Tasmania's Island of Ideas event, 'Critical Minerals, Critical Moment'. The strong turnout reflected growing public interest in Tasmania's role in supplying the minerals essential for modern technologies and the global energy transition.

The panel brought together research, government and industry perspectives, including speakers Dr Rebecca Sproule, Chief Government Geologist at Mineral

Resources Tasmania; Corey Jago, Geology Superintendent at MMG; and CODES researchers Associate Professor Lejun Zhang and PhD student Angela Isaura Santos Costa.

The lively discussion explored Tasmania's rich critical mineral endowment, increasing global demand for commodities such as copper, lithium, nickel and tungsten, and the need to balance economic opportunities with environmental responsibility and community expectations. The panel also highlighted the vital roles of geoscience research, industry collaboration, technological innovation and education in enabling responsible mineral exploration and development.

The event highlighted CODES' internationally recognised expertise in critical mineral research and its important role in connecting science, industry and the community. It also reinforced the exciting opportunity for Tasmania to draw on its mineral resources, research strengths and skilled workforce to contribute to a more responsible and sustainable global future.

This event is available for viewing on YouTube via the UTAS website:

www.utas.edu.au/about/events/island-of-ideas

CODES ON THE CONFERENCE CIRCUIT

Presenting research through talks and posters at the major geology and geoscience conferences around the world continues to play an important role in the careers of both staff and students at CODES. Networking and collaboration with peers are equally important. Here's a selection of events that staff and students have recently attended:

PDAC 2026

1–4 March 2026, Toronto, Canada

Professor David Cooke and Dr Paula Montoya attended the Prospectors & Developers Association of Canada convention in Canada earlier this year. It is a huge event and this year attracted more than 32,000 participants from across the globe.

David was able to meet with representatives of several mining companies and research institutions to discuss potential future collaborations and projects.

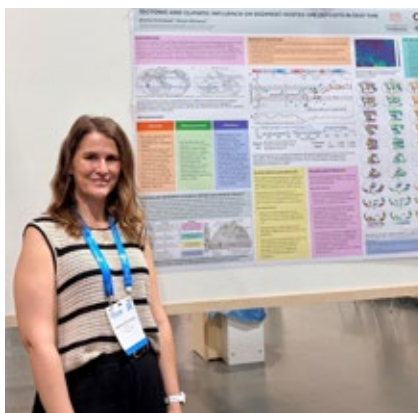
EGU GENERAL ASSEMBLY 2026

3–8 May 2026, Vienna, Austria

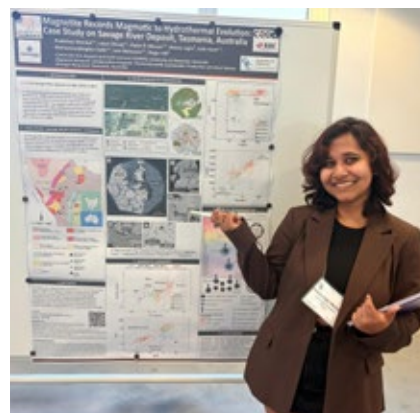
Dr Sheree Armistead and CODES PhD student Pratichee Mondal attended the European Geosciences Union (EGU) 2026 General Assembly where both showcased their research to a large global audience (there were more than 22,000 attendees from 125 countries this year).

Sheree's poster was titled 'Tectonic and climatic influence on sediment-hosted ore deposits in deep time' while Pratichee gave a presentation about her research in western Tasmania; it was titled 'Magmatic to hydrothermal evolution: Insights from Savage River magnetite deposit, Tasmania, Australia'.

Pratichee said: *"I love oral presentations, and EGU gave me a perfect chance to present my research a global geoscience audience. I had an amazing time and gained beneficial international exposure".*



Dr Sheree Armistead with the poster she presented at the EGU General Assembly: 'Tectonic and climatic influence on sediment-hosted ore deposits in deep time'.



CODES PhD student Pratichee Mondal with her poster at the Gordon Research Conference: 'Magnetite records magmatic to hydrothermal evolution: Case study on Savage River deposit, Tasmania, Australia'.



A large contingent of CODES staff and students attended the Gordon Research Conference in Barcelona. They are (L–R) back row: Dr Owen Missen, Vinicius da Cruz, Professor David Cooke, Damian Braize; front row: Francisco Cuadra, Yamila Cajal, Pratichee Mondal, Giovana Pimentel, Poliana Vidal Salgado, Angela Costa and Associate Professor Lejun Zhang.

GORDON RESEARCH CONFERENCE

24–29 May 2026, Barcelona, Spain

The 2026 Gordon Research Conference (GRC), 'Geochemistry at the Edge of Discovery', was preceded by a two-day Gordon Research Seminar (GRS) for early-career researchers. GRCs are small, off-the-record meetings built around discussion of unpublished work, with sessions this year ranging

from the deep roots of metallogenesis to AI and the mine of the future.

CODES was strongly represented: our director, Professor David Cooke, closed the meeting with 'Future research directions, from processes to products'; several postdocs and students presented at the GRS, where Dr Owen Missen chaired the session 'Getting the most out of mineral deposits'. Congratulations to PhD student Damian Braize who received

an honourable mention for his poster on mineral chemistry. The conference was a great opportunity to reconnect with past and current collaborators and colleagues.

EUROPEAN WORKSHOP ON LASER ABLATION 2026

7–10 July 2026, Milan, Italy

In July 2026, members of the CODES Analytical Laboratories (Dr Jeffrey Oalman, Dr Ivan Belousov, Dr Carlos Carrasco-Godoy and Dr Alice MacDonald) attended the European Workshop on Laser Ablation in Milan. Jeff presented two posters on new data reduction techniques for Rb-Sr dating of micas, and the growing collection of CODESverse web apps ('A Bayesian Approach to LA-ICP-QQQ-MS Rb-Sr Data Reduction' and 'CODESverse: Web Apps for Interrogating Geochemical and Geochronological Data Collected by LA-ICP-MS').

Ivan presented new research in a poster titled 'Dating hydrothermal alteration using hydrothermal zircon and titanite inclusions in chlorite and epidote'. Carlos gave a talk exploring new approaches to zircon U-Pb dating, titled 'The effects of repetition rate and spot size on zircon U-Pb systematics'. And Alice presented research exploring the ablation characteristics of micas ('Ablation characteristics of mica minerals and implications for LA-ICP-QQQ-MS Rb-Sr Geochronology') and co-chaired the session 'Frontiers in Isotopic and Elemental Analysis'. Prior to the conference, Jeff, Carlos and Alice visited Norris Scientific in Oxford to tour the R&D labs and discuss ongoing collaborative R&D projects with Ashley Norris.

GOLDSCHMIDT 2026

12–17 July 2026, Montreal, Canada

The Goldschmidt conference is the world's premier geochemistry conference, held annually. Named after Victor Goldschmidt, who devised the now ubiquitous 'ithophile, siderophile, chalcophile' element classification scheme, the conference brings together researchers across the entire spectrum of geochemistry. Ore deposits, planetary formation, trace elements in all lithological and environmental media, critical metal cycling, you name it... all in the same place, and often all at the same time. Ten concurrent sessions ran throughout the week except during the midday plenary lecture. Dr Owen Missen attended this year's conference and presented on biogeochemical cycling of tellurium and cobalt. He said: "It was excellent to attend my first in-person Goldschmidt conference, especially catching up with North American colleagues I hadn't seen for over five years".

SEG STUDENT SYMPOSIUM: GEOLOGY OF THE CENTRAL AFRICAN COPPERBELT

6–7 June 2026, Kitwe, Zambia

Dr Sheree Armistead attended this event while doing fieldwork in Africa. She writes:

"In June I presented an invited talk at the SEG/iCrag Student Symposium in Kitwe, Zambia, on using resistate indicator mineral chemistry to track ore-forming fluids in sediment-hosted copper deposits. It was fantastic to spend two full days immersed in talks entirely focused on the Copperbelt, and to meet so many people



Dr Owen Missen giving a talk on tellurium and cobalt at Goldschmidt in Montreal, 15 July 2026.



Dr Sheree Armistead was invited to speak at an SEG symposium in Kitwe, Zambia, in early June.

from industry alongside a brilliant cohort of students. The symposium also opened up new opportunities for collaboration with researchers based in Zambia, which I'm looking forward to following up on."

GeoSciEd X

14–16 August 2026, Adelaide

Professor Sebastien Meffre attended the GeoSciEd X conference in Adelaide. The conference brought educators, researchers and industry leaders together to share teaching strategies, strengthen collaboration and reverse declining enrolments in Earth Sciences at schools and universities in Australia and internationally.

Two former CODES PhDs spoke at the conference: Indrani Mukherjee's talk was titled 'Geoscience for a sustainable future' and Hannah Moore spoke about 'Engaging hands-on primary Earth science'.



Dr Carlos Carrasco-Godoy from CODES Analytical Laboratories speaking at the European Workshop on Laser Ablation in Milan on new approaches to zircon U-Pb dating.

CONGRATULATIONS TO SOME WORTHY WINNERS

Several CODES Honours and PhD students have recently been successful in receiving grants or funding to assist them with their studies. In addition, Dr Owen Missen was awarded a Young Tall Poppy Science Award for Tasmania (see front page article).

KAITLYN AINSCOW

GSA Endowment Fund Award

Kaitlyn writes: *"The 2026 GSA Endowment Fund Award granted me AUD\$1,000 to support my Honours research project, which aims to date Tasmanian 'Snowball Earth' deposits. This funding has allowed me to collect samples of King Island's Cumberland Creek Dolostone in order to test new carbonate dating methods on Neoproterozoic cap-carbonates. This fieldwork has been a massive success, and will hopefully allow us to expand this methodology to other Neoproterozoic carbonates in the future."*

FRANCISCO CUADRA

SEG Hugh E. McKinstry Fund

CODES PhD student Francisco Cuadra, who is researching mineral chemistry of the Nautanen IOCG deposit in Sweden,



CODES Honours student **Kaitlyn Ainscow**, with supervisor Dr Jack Ward, undertaking fieldwork near City of Melbourne Bay on King Island in mid-August.

was thrilled to receive a substantial grant from the SEG. He writes: *"I was selected to receive a student research grant from the McKinstry Fund in the amount of US\$5,000, administered by the SEG Foundation and the SEG Canada Foundation. This grant will support a targeted package of optical microscopy, SEM-EDS, and EPMA*

analyses, which together form the core analytical framework required to develop a mineralogical model, one of the key deliverables of my research. The project is based on defining representative domains through unsupervised textural clustering and subsequently characterising these domains using high-resolution mineralogical and mineral chemistry data. These techniques provide complementary information that is essential for developing a mineralogical model. By combining these data with the textural information and metallurgical proxies or responses obtained from laboratory-scale testwork, the model will ultimately contribute to the definition of geometallurgical domains."

JAIDA FLYNN

SEG Michael J. Fitzgerald Student Mapping Course in New Mexico, USA

CODES Honours student Jaida Flynn writes:

"In May, I had the opportunity to travel to Truth or Consequences, New Mexico, USA, for the SEG Michael J. Fitzgerald Student Mapping Course. The week-long mapping*



CODES PhD student **Francisco Cuadra** pictured near Nautanen in northern Sweden during fieldwork in September 2025. He has been awarded US\$5,000 from the SEG Hugh E. McKinstry Fund for assistance with optical microscopy for his PhD research.

AWARDS AND ACCOLADES



CODES Honours student **Jaida Flynn** (far left) was awarded a place on the SEG Michael J. Fitzgerald Student Mapping Course in New Mexico, USA, that took place in May 2026, and is pictured here with fellow students.

program involved three mapping exercises in different areas at the Copper Flat Porphyry-Breccia System. Exercises included mapping lithology and intrusive units, hydrothermal alteration, weathering and veining. I had a great time learning how to approach mapping at a more precise, smaller scale, and how to make detailed observations in the field. I would absolutely recommend for any students to apply for student field trips held through the SEG!"

*Yes, that is an actual town name in New Mexico. The town was renamed in 1950 after the title of an NBC radio quiz show.

ANGELIKA SCHOUTEN

GSA Endowment Fund Honorary Award

CODES Honours student Angelika Schouten has received a 2026 GSA Endowment Fund Honorary Award, worth AUD\$1,000 and is the only recipient of this award in 2026. She is stoked to be chosen for this award and writes:

"I moved down to CODES this year to complete my Honours, after wrapping up my Bachelor of Science at UQ. I love all things green and so, of course, I chose

a project centred on the mineral epidote, titled 'Testing radiogenic Sr isotopes in epidote as an exploration tool for ore systems'! My project is focused on the potential of strontium isotope ratios within hydrothermal epidote as a vectoring tool towards critical and strategic mineral-hosting porphyry and skarn deposits. I am thrilled to receive a GSA Endowment Fund Honorary Award and intend to fund a trip back to UQ for the use of their LA-ICP-MC-MS machinery with it."

EMRECAN YURDAKUL AND DAMIAN BRAIZE

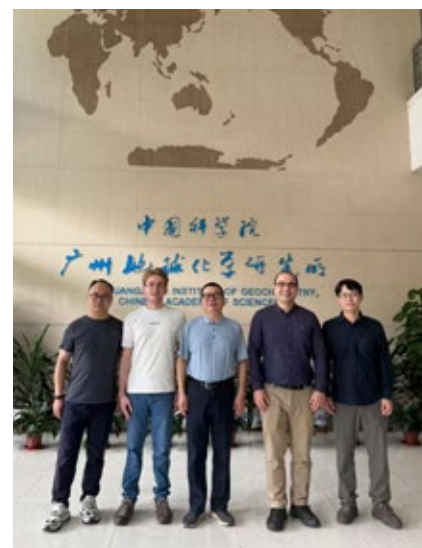
Visiting Scholarships to Guangzhou Institute of Geochemistry, Chinese Academy of Sciences

PhD students Damian Braize and Emrekan Yurdakul spent three months undertaking collaborative research at the Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (GIGCAS), under the supervision of Professor Huayong Chen, with support from Associate Professor Lejun Zhang from CODES. During their time at GIGCAS, they had the opportunity to conduct analytical work using the Institute's facilities, while also benefiting from valuable



CODES Honours student **Angelika Schouten** received a GSA Endowment Fund Honorary Award to help with her research into epidote.

cultural and knowledge exchange. The visit provided an excellent opportunity to strengthen the relationship between the two institutions and share research expertise. They concluded their visit with a strong desire to continue the collaboration between GIGCAS and CODES into the future.

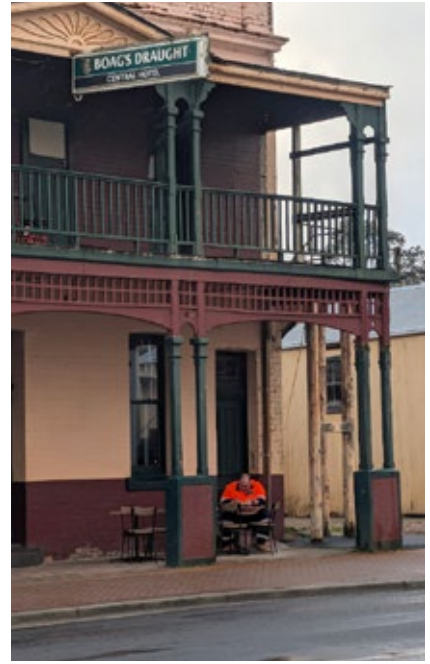


Chinese scholars: (L-R) Associate Professor Bing Xiao, CODES PhD student **Damian Braize**, Professor Huayong Chen, CODES PhD student **Emrekan Yurdakul** and Associate Professor Haoyang Zhou pictured at the Guangzhou Institute of Geochemistry at the Chinese Academy of Sciences earlier this year during Emrekan and Damian's residency in Guangzhou.

CAL HEADS OUT WEST



The CAL team pictured in the Bluestone Mines Tasmania Joint Venture Pty Ltd processing plant near Zeehan. From L-R: Laboratory Analysts Fanghua Dai and Alice MacDonald; Lead Laboratory Analyst Carlos Carrasco-Godoy; Safety Project Officer Rhiannon Terry; Technical Officer Michelle Makoundi; CAL Manager Jeff Oalman; Lapidary Technician Michele Chapple-Smith and Laboratory Analyst Elena Lounejeva.



West Coast weather: CAL Manager Dr Jeff Oalman waits patiently outside a hotel in Zeehan for the rain to clear.

Dr Rhiannon Terry outlines the importance of a recent research trip by the CODES Analytical Laboratories team to Tasmania's West Coast, where they were able to familiarise themselves with some of the materials that they analyse in the labs.

In April, the CODES Analytical Laboratories (CAL) team travelled to Tasmania's West Coast for a three-day field trip centred around a visit to Renison Bell Mine. The trip provided an opportunity to see the mining and processing operation firsthand and gain a better understanding of the broader context behind some of the analytical work undertaken in the labs.

A key focus of the trip was learning more about a Bluestone Mines Tasmania Joint Venture Pty Ltd project that Laboratory Analyst Dr Elena Lounejeva is involved with. This work involves using XRD to identify minerals in samples collected from different stages of the processing circuit, helping to provide insight into how minerals behave throughout the operation.

The team received a behind-the-scenes tour of the operation, hosted by Andrew Faccioli, Senior Plant



Lapidary Technician Michele Chapple-Smith examining cassiterite-sulphide ore extracted into buckets during various stages of processing. Elena Lounejeva will later work on these types of samples at CODES.

Metallurgist at Bluestone Mines Tasmania Joint Venture Pty Ltd. Andrew guided the team through the processing plant and provided an overview of how Renison processes underground cassiterite-sulphide ore into a clean tin concentrate for export. The tour gave CAL staff a valuable opportunity to see large-scale versions of equipment and processes that are familiar from laboratory work and research, helping to connect

analytical results with real-world mining operations.

Outside the mine site, the team explored some of the distinctive geology of Tasmania's West Coast, including visits to Serpentine Hill and the Henty Sand Dunes. A particularly wet afternoon in Zeehan, with more than 40 mm of rain falling, led to a visit to the West Coast Heritage Centre, where the team learned more about the region's rich mining history.

NEW CALEDONIA: A UNIQUE LEARNING ENVIRONMENT



Students examining coral platforms in Yaté in the southeast part of the island. These quaternary coral reefs are currently undergoing uplift as the Vanuatu/New Hebrides arc approaches New Caledonia (photo: Lilian Alizert from DIMENC).



Eddie Kenneth participating in the nightly student presentation at a hotel in Koumac in the northern part of the island (photo: Sebastien Meffre).

In late June/early July, 14 undergraduate students spent a week in New Caledonia immersed in the island's geology and gaining valuable fieldwork experience. The trip was led by Professor Sebastien Meffre, who reports here on the broad range of activities undertaken.

The 2026 UTAS geology field excursion to New Caledonia provided students with an opportunity to learn first-hand about New Caledonia's unique geology through visits to historic mine sites, ophiolite, high-pressure/low-temperature metamorphic complexes, fossil-bearing sedimentary units, pillow basalts and boninites. The trip highlighted the links between geology, environmental management and biodiversity, with field activities ranging from structural measurements in sedimentary rocks, to sediment coring in mangroves.

The success of the excursion was made possible through the generosity and expertise of our New Caledonian colleagues. We are particularly grateful to the staff of DIMENC (the national geological survey organisation), including Olivier Monge, Pierre Maurizot, Joris Boisson, Yaël Guyomard and Lilian Alizert, who shared their knowledge of regional geology, mining and natural hazards. We also

thank colleagues at the University of New Caledonia, including Christine Laporte-Magoni, France Pattier, Jean-Baptiste Parmentier, Daryl Wienclawski and Sarah Robin, who provided valuable insights into the geology, environmental management and research opportunities. Thank you also to Léna Payandi (Fond Nickel) who guided field activities and provided insights into mine rehabilitation.

For students, the trip provided hands-on experience in observing, interpreting and discussing complex geological processes in the field, while also exposing them to research and potential postgraduate pathways. The students developed field skills, scientific confidence and professional networks as well as a better understanding of the varied career pathways available in the geosciences.



Léna Payandi (Fond Nickel) explaining to students the rehabilitation strategies used in nickel laterite mines in New Caledonia (photo: Lilian Alizert from DIMENC).

EXPLORING SPAIN'S TECTONIC DOMAINS



CODES staff and students pictured in early June at the Cerro Colorado mine owned by Atalaya Mining in the Rio Tinto district of Spain during their five-day field trip to the Iberian Massif.



Poliana Vidal Salgado and Yamila Cajal underground inside the copper-rich massive orebody at the Magdalena mine in the southwestern Iberian Massif, Spain.

In early June CODES researchers and students undertook a five-day field trip to the Iberian Massif in Spain. PhD student Giovana Pimentel recounts the major areas visited and the highlights of the trip, and also thanks all those who made it such a success.

Following the Gordon Research Conference in Barcelona, a group of CODES researchers took the opportunity to continue their geological exploration across Spain, participating in a field trip through the Spanish sector of the Iberian Massif. The itinerary traversed three of the region's major tectonic domains: the Iberian Pyrite Belt (IPB) within the South Portuguese Zone (SPZ); the Ossa-Morena Zone (OMZ); and the Central Iberian Zone (CIZ). Together, these sites offered a unique opportunity to look at the interaction between tectonics, sedimentation, magmatism, hydrothermal alteration and ore-forming processes across the southwestern Iberian Massif.

Before the main excursion, part of the team travelled to Rodalquilar to visit its high-sulfidation epithermal system. The full group then met in Seville and began a journey that crossed the Iberian Pyrite Belt from south to north before moving into the granitic terrains north of the belt. The first days focused on active exploration and mining projects within the western IPB. The group then spent two days in the historic Rio Tinto district, observing outcrops, quarries and mining operations that have shaped the region's mining history over centuries.

Field activities included drill core visualisation, studying polymetallic stockwork and massive sulfide mineralisation, and even measuring the pH of the iconic Rio Tinto River.

A major highlight was the visit to Sandfire's Magdalena Operations (MATSA), the study site of CODES PhD student Poliana Vidal Salgado. Participants examined drill core from the Magdalena and Aguas Teñidas deposits and benefited from

SERIOUSLY SCIENTIFIC: BEAKER STREET FESTIVAL

This year's Beaker Street Festival in Hobart ran from 6–17 August and was once again a runaway success with a lot of people turning out to see a lot of interesting science stuff and eat and drink a lot of Tasmanian produce. And CODES staff and students were in the thick of it – right there in the Roving Scientist Bar at the Hope & Anchor.

"As a roving scientist at Beaker Street, I brought five rock samples spanning two billion years, from ancient basement schist to blue-green chrysocolla, to show festivalgoers how rocks can record ice ages, rifting basins and the copper hidden inside them."

Dr Sheree Armistead, Australian Research Council DECRA fellow

"This year at Beaker Street Festival I was part of the Roving Scientist program, which gives scientists the opportunity to communicate their research in a more relaxed, casual environment at the Hope & Anchor. This was a great opportunity to talk



A large contingent of CODES staff and students took part in the 2026 Beaker Street Festival. Pictured are (L–R): Willam Sinclair, Owen Missen, Gabrielle O'Toole (front), Jodi Fox, Sheree Armistead, Matthew Cracknell, Pratiche Mondal, Angela Costa, Karin Orth and Sophia Minter.

about my research in SW Pacific tectonics, but also a valuable chance to share local Tasmanian geological stories with the public – from continental collisions to volcanism in the Derwent – with the addition of microscopes and samples. Not only was it an incredibly enjoyable experience and a chance to chat to some remarkably enthusiastic festivalgoers, but it also helped me to hone my science communication skills, a valuable skill for any scientist."

Willam Sinclair, PhD student



Sheree Armistead and Ariann Spencer showing off their rocks.

CONTINUED FROM PREVIOUS PAGE

tech transfers between CODES and MATSA geologists. It also included an underground visit to Magdalena mine, where Poliana and Yamila Cajal had the opportunity to look at the massive sulfides from the inside.

The final stage of the trip focused on scheelite-rich skarn and IOCG-related mineralisation, as well as Sn-W stockwork systems at La Parrilla in the

OMZ/CIZ. The group concluded with a visit to lithium-bearing occurrences hosted within psammopelitic units of the CIZ.

The trip also fostered scientific collaboration through presentations by CODES PhD students Angela Costa and Vinicius da Cruz. Beyond geology, participants enjoyed networking and a memorable cultural experience

in Mérida, exploring its remarkable Roman archaeological heritage.

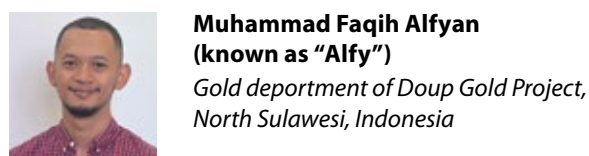
The excursion was supported and led by local geologists, Fernando Tornos, Carmen Conde, Iñigo Borrajo and Javier Rey-Samper. With their assistance, and that of Poliana, this outstanding field excursion was made possible. The CODES team extends its sincere gratitude to all of them.

CHANGING FACES

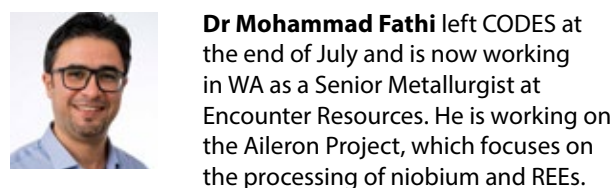
We are now well into the second half of 2026 and have welcomed two new PhD students and two new Honours students, but will be saying goodbye in the not-too-distant future to a large number of students who have reached the end of their research projects. And we also farewelled Dr Mohammad Fathi, who has moved to Western Australia after overseeing the establishment of the CODES geometallurgy lab.

PhD STUDENT	START DATE	PROGRAM	PROJECT TITLE
	Willam Sinclair 28 January 2026	Program 4, supervised by Rebecca Carey, Sebastien Meffre	<i>Eocene to Miocene tectonics of the SW Pacific margins</i>
	Gabrielle O'Toole 31 July 2026	Program 5, supervised by Francisco Testa, Rebecca Carey, Andrew Tomkins (Monash)	<i>From CAIs and AOAs to chondrules: Tracing the formation and evolution of the Solar System's earliest solids using synchrotron science</i>

NEW MASTER OF ECONOMIC GEOLOGY STUDENT



DEPARTURES



POSTGRADUATES MOVING ON UP

The following PhD students have recently submitted their theses for examination:

	Alfredtina Appiah <i>Pathways to production: Magnesite deposit at Prospect Ridge, northwest Tasmania</i>		Angela Costa <i>Tungsten skarn mineralisation at Grassy, King Island, Tasmania: Implications for magmatic-hydrothermal sources, ore genesis, and exploration</i>
	Isaac Evinemi <i>Deep learning-driven ore deposit models</i>		Emmanuel Dogara Musa <i>Pathways to production for critical metals: Kara W deposit, western Tasmania</i>
	Jaime Osorio <i>Porphyry to lithocap transition: Insights from the Valeriano Cu-Au deposit, northern Chile</i>		Markus Staubmann <i>Geology, geochemistry and geometallurgy of the GRE46 epithermal gold deposit, Cowal District, NSW</i>
	Victor Torres <i>Geology, genesis and geometallurgy of Cu-Au-Ag mineralized tourmaline breccia pipes at Soledad, central Peru</i>		

HONOURS STUDENTS

Two new Honours students (mid-year starters) have commenced their research projects:



Will Dullard
*Remote mapping
of legacy mine sites*



Colin Smith
*Metal accumulation
potential of Tasmanian
plants for phytoremediation*

VISITORS



Nina Buchanan from Lakehead University visited CODES between May and July 2026 to do analytical work for her Masters project. She worked mainly alongside Dr Mike Baker.



Bronwyn Davies is a consultant who worked, with Rebecca Carey's input, in late July on assessing the feasibility of a proposed submarine power cable in Tonga.

REMEMBERING GARRY DAVIDSON



Vastly outnumbered: the 14-strong student team for the 2026 Garry Davidson Memorial Footy Match were in the orange Hi Viz (with some in multicoloured strip), while the much smaller staff team of seven went for basic black! **Standing (L-R):** Finn McCallum-Packham, Willam Sinclair, Eric Koon, Jaida Flynn, Chris Allen, Jason Sze, Jeremy Southwell, Damian Braize (obscured), Lara Sivwright, Shouchun Yu, Sophia Minter Mike Baker, Owen Missen, Ivan Belousov and Martin Jutzeler. **Kneeling (L-R):** Will Dullard, Ariann Spencer, Colin Smith, Matt Cracknell, Sheree Armistead and Sebastien Meffre. (Photo: Helen Scott)

The 2026 Garry Davidson Memorial Footy Match

Karin Orth writes: "Garry would have enjoyed the touch football match played in his honour on the lower sports grounds at Sandy Bay on 4 September. The All-Blacks staff team surged ahead of the enthusiastic Hi-Viz students' team in the first half and managed to defend their lead for most of the second half. The game ended in a three-all draw. For the first time, the prized unicorn trophy will not belong to the staff and will be shared in 2026."

Please see the Garry Davidson Memorial Endowment Appeal on page 28.



Mike Baker firmly in possession.
(Photo: Carlos Carrasco-Godoy)



Ariann Spencer having taken possession.
(Photo: Carlos Carrasco-Godoy)



**A MESSAGE
FROM THE
CODES
DIRECTOR,
PROFESSOR
DAVID COOKE**

This edition of *Ore Solutions* captures what makes CODES such a vibrant community: outstanding people, ambitious research, distinctive training and a strong international outlook.

Congratulations to Owen Missen on receiving a 2026 Tasmanian Young Tall Poppy Science Award. It is wonderful recognition of both his research achievements and his commitment to sharing geoscience with the wider community. Owen's success is a major highlight for this year and, together with the range of student awards and grants featured in this issue, reflects the quality and enthusiasm of the next generation coming through CODES and Earth Sciences.

Our students continue to make us proud. We have welcomed a diverse new cohort of PhD researchers, while a substantial group of candidates are approaching

completion. Their experiences this year have taken them from Tasmania to Central Asia, Zambia, China, Europe and North America through fieldwork, conferences, collaborative research and specialist training. The SEG Student Chapter field trip to Uzbekistan and Kazakhstan is an excellent example of what can be achieved by our students, who conducted significant and effective fundraising to make the trip happen, and for the opportunities that arise for such excursions through CODES' international networks and industry partnerships. A big thank-you to Poliana Vidal Salgado and the SEG Student Chapter executive for doing such a great job organising this ambitious and highly impactful excursion. We look forward to the potential research and training collaborative opportunities that can potentially arise from this excursion.

That same spirit of collaboration is evident across our research. This edition highlights work spanning sediment-hosted copper systems, volcanic tsunami hazards, advanced geochemical imaging and analytical innovation, together with strong

CODES representation at major international conferences. The recent EarthBank workshop hosted at UTAS also demonstrates the value of bringing national researchers, technical specialists, government and industry together around emerging technologies and shared geoscience data to shape the next steps in data aggregation and management.

It is also wonderful to see our former CODES students continuing to make an impact. This issue highlights Indrani Mukherjee's impactful and impressive career and her ongoing commitment to research, teaching and geoscience outreach.

Finally, I encourage our community to support the Garry Davidson Memorial Endowment appeal. Growing Garry's legacy into an enduring scholarship is a fitting way to help future generations of Earth scientists thrive.

I hope you enjoy this edition and celebrating these achievements with us.

David Cooke

GROWING GARRY'S LEGACY

As you would remember, the **Dr Garry Davidson Memorial Prize** in Earth Sciences was established through the generosity of Garry's family and friends in his memory after his passing in 2017.

The prize honours the profound impact Garry had on the many students he educated, encouraged, entertained and inspired with his irrepressible love of geology, and has been awarded to ten students since it was established.

We would now like to grow the prize fund to create an endowed scholarship which would provide ongoing support to future Earth Sciences students and

ensure their passion and potential are not limited by financial barriers.

Our aim is to raise enough to endow a scholarship for perpetuity and provide a commencing student with \$5,000 per year for the term of their undergraduate degree. To do this we need to raise an additional \$120,000.

We ask that you join with us and donate to make this vision a reality. Every gift – whether large or small – will help us reach our goal. All donations are tax deductible in Australia.

You can donate using the **online form** or if you like to discuss your gift, please contact the University of



Tasmania Advancement Office by phone +61 3 6226 1920 or email **University.Giving@utas.edu.au**

Thank you!

See the item on page 27 about the 2026 Garry Davidson Memorial Footy Match.