



University of
St Andrews | FOUNDED
1413

SCHOOL OF EARTH & ENVIRONMENTAL SCIENCES

Newsletter Number 21
Winter 2022



Stay in touch

We are always looking for updates from members of the School, past and present. It is a delight to continue to hear from friends many years after they physically left St Andrews, so do keep in touch. Similarly, we also encourage our more recent alumni to stay in touch and send us updates (new job, got married, finished a PhD, opportunities for current students, etc).

Write to us

School of Earth & Environmental Sciences
University of St Andrews
Bute Building, Queen's Terrace
St Andrews
KY16 9TS

WEBSITE www.st-andrews.ac.uk/earth-sciences/
EMAIL earthsci@st-andrews.ac.uk
EDITOR Batzi Fischer (sf67@st-andrews.ac.uk)

Find us on social media

 [EarthSciStA](#) |  [earthscista](#) |  [earthsci_sta](#)

The editorial deadline for this issue was 01 December 2022

FRONT PAGE Professor Richard Bates was recently on field work in Sudan, conducting geophysical surveys of the Nuri pyramids and Jebel Barkal. Amongst other things, he was looking for a missing pyramid. Photo © R Bates

WELCOME FROM THE HEAD OF SCHOOL

PROFESSOR RICHARD WHITE

Since our last School magazine, life in the School has been slowly returning to normal with staff and students getting back into the lecture theatres, the teaching laboratories, and into the field. Something that we have all greatly appreciated, as the novelty of online teaching was certainly running very thin. Importantly, our keystone overseas field excursions have started running again and a very happy cohort of 4th year students recently returned from seeing active orogenesis in the Alps. Several of our groups are soon heading over to Spain to learn how to map in the case of the second year students, and to study both mining and environmental issues in Rio Tinto for our third year and taught MSc students.

The school has continued to evolve and grow over this time, and we have seen a healthy rebound in student numbers over the last few years. This year our first-year courses have the highest number of students we have had in decades, prompting of course the chaos of trying to find a lecture theatre big enough. But having an oversupply of students is a problem that we are quite happy to have, especially given the struggles that many Earth Science schools face worldwide in attracting students. Over the summer we resumed our summer schools, and were glad to welcome students (mostly) from the USA coming to learn about earth sciences in the world-class outdoor laboratory that is Scotland.

Now that the School has its own space and has established much more of its own identity, we continue to look to update our teaching infrastructure. Underpinned by some very generous donations we were able to replace our petrological teaching microscopes and now turning our eye to updating our field teaching capabilities via new portable analytical equipment, such as chemical testing meters and air quality meters, all combined with GPS-enabled tablets to give our students experience with modern digital field methods. As always we always appreciate any alumni support for improving our teaching infrastructure.

On top of our growth in students the school recently went through the rather involved Research Excellence Framework (REF) assessment process. Unlike in previous years where the School was part of a larger submission with

Geography, this year we went in to our own unit of assessment in Earth Sciences. For a relatively small school we did incredibly well! In overall performance we were in the top ten in the UK and number 1 in Scotland. We did particularly well in research outputs, being 3rd in the UK for the top rank of publications judged “world-leading in terms of originality, significance and rigour” beating even one of our Oxbridge competitors. The school also stood out as particularly successful within the University coming in at second place both overall and in outputs. The staff can be particularly proud of their work here and it’s good to see the outstanding quality of the research done in the school being recognised. Special thanks of course have to go out to Tony Prave, Richard Bates, and Tim Raub who did much of the work building this submission together.

As you are all aware our former colleague and editor-in-chief of this magazine, Richard Batchelor, passed away last year. Richard’s devotion to the school over the years cannot be underestimated and he was held in great esteem by all here, and was the school contact for many of the alumni. You will see a significant obituary to Richard in the following pages.

In September two of our staff, Aubrey Zerkle and Mark Claire, left us and moved back to the USA for family reasons amongst others. We wish them both the best in their future pursuits. The school will be soon embarking on permanent replacements for them. And we are excited to welcome new colleagues this year. With the comings and goings of staff including one on maternity leave, one on a temporary reduction in hours and another with some teaching buyout, we have a number of temporary teaching focussed positions, hence a number of new colleagues including Onyedika Igbokwe, Leanne Staddon, James Barnett and Luke Bridgestock who are all doing a great job in keeping the wheels turning while we fill positions and await the return of colleagues.

I wish everybody the best for a wonderful 2023.

Prof Richard White
Head of School

NEWS FROM THE SEES COMMUNITY

On the following pages, you will find short news and updates on things that have happened to the people at the School of Earth & Environmental Sciences since the last newsletter came out. And to our large family we don't only count staff, we also include postgraduates, undergraduate students and of course our alumni.

If you have any news or updates that you would be willing to share with us, please don't hesitate to get in touch:

sf67@st-andrews.ac.uk

STAFF and POSTDOC NEWS

What our members of staff have been up to recently

Awards...

Congratulations to **Arola Moreras Marti (PhD 2020, now Postdoc)** for winning this year's **Geochemistry Group Postdoctoral Medal**. The medal is awarded each year to a postdoctoral researcher employed on a temporary contract at an institution in GB/Ireland who has published outstanding research in a peer-reviewed journal within the field of geochemistry. Arola received it for a paper in which she and her co-authors investigate sulphur isotopes from hydrothermal pools in Iceland and a hypersaline spring in Canada. These sites are potential analogues to environments on Mars, and the study shows that sulphur isotopes can be used as biosignatures and thus be used to detect past life on Mars directly or on returned samples.

Moreras-Marti A, Fox Powell M, Stueeken E, Di Rocco T, Galloway T, Osinski GR, Cousins CR, Zerkle AL (2021) Quadruple sulfur isotope biosignatures from terrestrial Mars analogue systems. *Geochimica et Cosmochimica Acta*, 308, 157–172.

Congratulations to **Mike Byrne**, who has been admitted to the Royal Society of Edinburgh, Young Academy of Scotland!

Congratulations to **Hana Jurikova** for winning the European Geosciences Union (EGU) *Outstanding Young Scientist Award* in Biogeosciences.

...and Funding

Congratulations to **Nicky Allison** and **Adrian Finch** for each securing a St Andrews Global PhD studentship through St Leonard's College. Adrian's studentship is co-supervised with alumnus **Prof Henrik Friis (PhD 2009)** from the University of Oslo. The project will embark on *The search for green technology metals — how fluids make or break critical metal deposits*. Nicky's studentship is co-supervised with Dr Matthew Kosnik (Macquarie University) and will investigate *The impact of warming and ocean acidification on mollusc shells*.

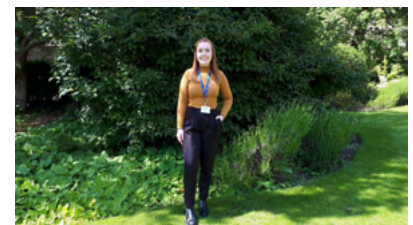
New Hires

Lynn Daley joined as the new GeoBus Education Coordinator. She has a BSc in Earth Science, an MSc in Wildlife Management, and is a qualified teacher who has taught science and geography in Ireland and Scotland. She has also taught field courses in geology, geography, environmental science and biology in Scotland, England, and Ireland. As well as working directly with students for more than 20 years, she has also designed and led a wide range of professional learning courses for teachers, sharing tried and tested ideas to inspire and engage learners of all ages.



Lynn Daley

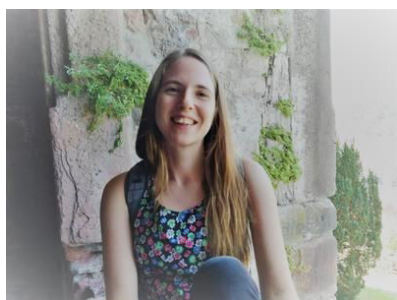
Lauren Urquhart is our new GeoBus Education Assistant. She graduated from the University of Dundee in 2017 with a First Class Honours degree in Geography and Environmental Science. Since, she has gained over four years of experience working in both the public and third sectors, engaging and educating people of all ages and backgrounds on climate change and sustainability. Lauren is a keen baker and enjoys a wander at the beach with her dog, Angus!



Lauren Urquhart

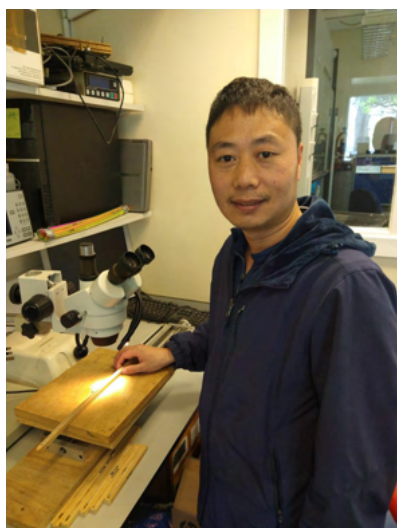
Joanne Boden is a new postdoc working with Eva Stüeken. Joanne is interested in the co-evolution of Earth and life over timescales of hundreds of millions of years. She studies this using bioinformatic tools (such as phylogenetic analyses, bayesian molecular

clocks, microbial culture, genome assembly and gene-tree-species-tree reconciliation) to recover signals of past life in microbial genomes. Much of her research in the past has used cyanobacteria as model organisms, but here at SEES she is now broadening this field to look at the utilisation of phosphorous molecules by diverse bacteria and archaea spanning the entire tree of life.



Joanne Boden

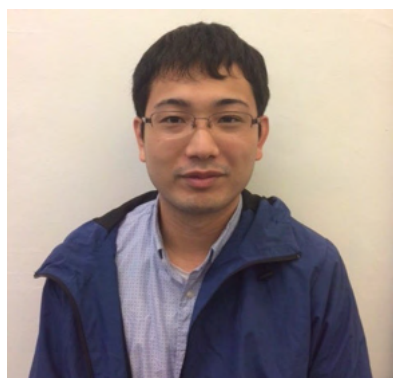
Yonghong Zheng is visiting SEES for 12 months to work in the tree-ring lab with Rob Wilson. Here, he will be applying Blue Intensity methods to a suitcase worth of conifer tree samples to measure relative wood density for climate reconstruction. Yonghong had previously visited St Andrews in 2019 for a summer field course we ran for students and their supervisors from Wuhan.



Yonghong

Yoshiaki Endo is back. Yoshi already visited our School for six months from Sep 2019 to March 2020 (!), just after completing his PhD

at Tokyo Tech. He has now received a prestigious fellowship from Japan, which will allow him to spend two more years here at St Andrews. Yoshi arrived in March, and is working on a project to incorporate his experimental work on pressure and temperature dependent SO₂ absorption cross-sections into atmospheric models. He and Mark Claire hope to be able to fully predict both modern and ancient sulphur mass-independent fractionation (MIF) signals!



Yoshi Endo

Rory Abernethy is the new dendrochronology lab technician. Rory did his BSc here, and has just finished an MSc by research on dendrochronology in the same lab, so he is hitting the ground running.



Rory Abernethy

Leanne Staddon has joined us as Associate Lecturer (maternity-cover for Claire Cousins). Leanne has a background in geology (MSci Leicester), petrology (PhD Bristol), and planetary science (postdoc Portsmouth), and recently she was in Houston working on a cool piece of Mars. Since her arrival, meteorites get even more of a mention during the communal coffee breaks – much to our other enthusiasts' approval.



Leanne Staddon

Nathan Rochelle-Bates is now working as Research Assistant with Eva Stücken. Nathan's research has focused on reconstructing volcanically influenced palaeoenvironments. He is interested in the sediments and chemical precipitates that form in volcanically-influenced aqueous environments, like hot springs and alkaline lakes, as well as the alteration and mineralization that occur after deposition. He is also interested in unravelling the influence of microbial activity on sedimentation and alteration in these settings. At SEES he now develops methods for N isotopic analysis.



Nathan Rochelle-Bates

Graeme MacGilchrist has joined the school on a prestigious UKRI Future Leaders fellowship, which at the end will roll into a full academic position. Graeme is an oceanographer and climate scientist. His research is concerned with understanding how climate-relevant tracers, such as heat and carbon dioxide, are taken up by, stored within, and transported around the ocean. This is achieved by a combination of atmosphere-ocean exchange, the large-scale ocean circulation, turbulent ocean dynamics, and biogeochemical processes. He's

interested in understanding the impact of these processes on the marine environment as well as Earth's climate more broadly. After a PhD at the University of Oxford, where he worked with Helen Johnson and David Marshall, Graeme spent 4 years as a post-doc at Princeton University, working with Jorge Sarmiento, Stephen Griffies, and others.



Graeme MacGilchrist

Kristeen Barker joined the main office to take up Kirsty Stokes' position. In her past life Kristeen was an international marketer in the drinks industry working in the whisky, wine & beer sectors(!). She then took a career break to have two boys who are now teenagers. She returned to work 5 years ago working in a local school in Learning Support. She says she likes nothing more than walking her beloved and incredibly handsome Golden Retriever (Lockie) on the beautiful Fife beaches and also enjoys playing golf here in St Andrews.



Kristeen Barker and Lockie

Onyedika Anthony Igbokwe has joined us as a lecturer in GIS for the next few years. Onyedika has a background in structural geology and geoinformatics and was previously based at Ruhr-University in Bochum (Germany), from where he obtained a PhD for studying natural fracture networks in carbonate rocks.



Onyedika Igbokwe

Departures

Kirsty Stokes from the front office team has decided to spend more time on the fun things in life and has taken early retirement. Her help with all the finance and other admin will be sorely missed, but we understand that her young Dachshund Winnie does sound appealing.

Aubrey Zerkle and **Mark Claire**, have decided to move back to the US for a range of reasons. They finished with us at the end of August, and having been here since 2012 they will be missed as colleagues and friends. Whilst building their new lives in back in the US, both will be affiliated with Blue Marble Space Institute of Science. Aubrey has also taken up science writing, and her output can be found on websites such as EOS.org and SciWorthy - and also collated on her own content website aubreyzerkle.contently.com or on twitter [@azerkle](https://twitter.com/azerkle). Aubrey has also just taken over the role of Editor in Chief at Sciworthy.

Promotions

After the pandemic put a halt on it, **Prof Rob Wilson** has finally held his inaugural lecture on the 6th of April this year (a good while after he had been promoted); Rob gave a talk on *Serendipity and Arboreal Happiness*. A recording of the lecture can be watched here:

www.youtube.com/watch?v=RN-n3o0eZBU



Rob in a rare state of motion: still (and not running)

The most recent round of promotions again saw several SEES members move up ranks:

Will Hutchison is now a Principal Research Fellow,

Catherine Rose was promoted to Senior Lecturer,

Nick Gardiner is now also a Senior Lecturer,

Nicky Allison has been promoted to Reader,

as has **Mike Byrne** (directly from Lecturer!).

Congratulations to all of them!

Family affairs

Will Hutchison and his partner **Tess** welcome **Anastasia Margaret Hutchison**. Tess and baby both recovered well and they are all adjusting to a fun new life as a family of four.



Anastasia Hutchison

Sami Mikhail and **Claire Cousins** welcome daughter **Leila**. First-born **Jacob** wasn't happy initially with **Leila** swanning into his territory without prior permission. However, after only a few hours he was offering up toys and cuddles to his sister.



Leila Mikhail

Mike Byrne and his partner **Gemma** happily announce the arrival of **Niamh Maria Fay-Byrne** to their family of now five. Mum and baby girl are both happy and doing well.



**Father Mike and daughter
Niamh**

POSTGRADUATE NEWS

Updates from our growing postgraduate (PhD and MSc) community

Vivas

Congratulations to **Oliver Herbort**, who obtained his PhD earlier in the year. Oliver was co-supervised between our School and the School of Physics and Astronomy. His interdisciplinary research combined geology and astrophysics to model the time evolution of atmosphere structures. Oliver is now an ARIEL post-doctoral fellow at the Department of Astrophysics at the University of Vienna.

Congratulations to **Rory Abernethy (BSc 2020)**, who has passed his MSc by research viva with flying colours at the end of February. He is working now as technician in Rob Wilson's dendrochronology laboratory.

Congratulations also to **Molly Trudgill**. Molly passed her PhD viva in August after a geochemical tour de force of a thesis, developing and applying new boron isotope methods to major environmental changes in the geological record. Her steady nerve in the lab no doubt came in hand for the mid-viva fire alarm! Molly is moving to France to work with former SEES postdoc Will Gray at the *Laboratoire des Sciences du Climat et de l'Environnement (LSCE)*.

Congratulations to **Kris Sokol**, who passed his viva at the end of September. Kris used, amongst other techniques, detailed petrography, high field-strength element geochemistry, and oxygen isotopes to interrogate and understand fenitisation of sedimentary country rock around alkaline intrusions in Greenland.

Congratulations to **Filippo 'Fil' Formoso**, who passed his viva also at the end of September. Fil worked on experimental petrology and *made*

upper mantle rocks, which he then analysed using NMR spectroscopy to study the speciation and incorporation of fluorine (and nitrogen) in mantle minerals.

Congratulations to **Laura Crick**, who passed her viva in December. Laura defended a thesis entitled *Ice and Fire: Understanding volcanic histories from sulfur isotopes in ice cores*, looking especially at the Toba eruption.

Awards

The MSc Geochemistry and MSc Strategic Earth Resources students from the academic year 2021/2022 graduated on the 29.11.2022.

Elizabeth Maerz (MSc Geochemistry) and Freddie Mitchell (MSc SER) were awarded prizes for the most impressive dissertations of their cohorts, Dominic Skeat (MSc SER) was awarded a prize for the best field performance, and Skyla White (MSc Geochemistry) was awarded the prize for the best performance overall.

Congratulations to the prize winners, and to all graduates - it was a pleasure to have here for the past year!!



The quality of submissions was very high, however your application stood out. We were particularly impressed at your initiative to discuss the topic with other geologists working in the industry and your ideas for the future of mining. The entire team at SGZ Cononish would like to say congratulations and wish you all the best for your MSc Strategic Earth Resources at St Andrews.

New arrivals

Anna Szeter is working on a co-tutelle PhD project between St Andrews and the University of Oslo. Supervisors are Adrian Finch in St Andrews and alumnus Henrik Friis (PhD 2009) in Norway. Anna is working on the petrology and petrogenesis of the Ivigtut Deposit in South Greenland, which was once the world's only source of cryolite, used in the smelting of aluminium. She is coming to us after a masters in Applied Mineralogy and Gemmology at the AGH University of Science and Technology in Krakow and a B Eng in Mining and Geology.



Anna Szeter

Current taught MSc (Strategic Earth Resources) student **Amy Walsh** has been awarded this year's *ScotGold SGZ Cononish St Andrews bursary*. Amy was presented with the award at the MIS trust networking event. SGZ geologist Rachael Paul, part of the selection committee, commented:

Celeste Smith is supervised by Will Hutchison and Andrea Burke, and for her PhD she will be looking to provide greater insight into past volcanic activity and climate forcing potential of major eruptive events using data derived from ice core and tephra analysis. Specifically, she will focus on

massive mystery eruptions in the ice core archive – events where we know there was a colossal sulphur emission, but we don't yet know the exact volcanic source. Most recently, Celeste worked as a catastrophe analyst in the insurance sector assessing the hazard and risk of volcanoes and earthquakes in relation to the built world. Prior to that, she received her BSc degree in Earth and Environmental Science and the Science in Society Program (double major) at Wesleyan University in Connecticut. There, she also had the opportunity to join the department's volcanology and geochemistry lab, and studied degassing at active volcanic lakes in the US and Italy. This experience provided the foundation for her interest in how volcanoes affect the Earth on a global scale.



Celeste Smith

Josh Duffield received his BA + MSci in Physics from the University of Cambridge in 2018. For the last few years he has been working at the

UCL Quantitative Neuroscience Lab developing computational methods to detect gene RNAs in tissue slices (using Python, naturally). Here at St Andrews, Josh will be working on his PhD project supervised by Mike Byrne and will be applying numerical models to understand the physical processes controlling extreme temperatures across climate states



Josh Duffield

Megan Pelly completed her MGeol this year, including a brilliant dissertation on the causes of glacial CO₂ change. After a spell with GeoTenerife this summer keeping an eye on their volcanoes, she is starting a Carnegie-funded PhD with James Rae and Andrea Burke on ocean circulation.

Megan's project will harness hitherto under-explored geochemical tracers of circulation from the seabed, with a focus on redox sensitive elements and neodymium. She'll be making measurements in the STAiG lab and comparing them to a suite of virtual lab results from a hierarchy of models. Outside work, she'll be taking advantage of our local climate with the windsurfing club.



Megan Pelly

Qing Ma is a CSC-funded PhD student that will be with us for the next two-ish years using stable isotopes to study life and environments in Mesoproterozoic rocks from the north China craton. Here, she is supervised by Aubrey Zerkle and Catherine Rose.



Qing Ma

UNDERGRADUATE NEWS

BSc (Geology) / BSc (Env. Earth Science) / MGeol – student news

Laidlaw scholarships

Zoe Lynn and **Lola Mors** secured a Laidlaw scholarship. Both look at zircon textures and ages in Lewisian gneiss under the supervision of **Batzi Fischer**. Zoe will compare zircons from the mainland complex's Northern Region with those from the Central Region to see if they might have actually shared more history than appreciated before (and thereby further interrogate the "terrane model"). Lola will look at zircons to work towards providing a geochronology for the Iona gneisses, which have no published age; she will see if they can be correlated with the mainland complex.

Both projects will likely produce some of the first ages in the almost finished geochronology lab.

StARIS scholarships

We had three students participate in the St Andrews Research Internship Scheme (StARIS) this spring/summer:

Catriona Nicholson and **Alice Sinclair** were working over the spring with **Nicky Allison** on the role of biomolecules in coral biomineralisation. They set out to explore the impact of future environmental change on the morphology and composition of coral skeletons. This is part of a larger research project to research the roles of biomolecules in coral biomineralisation.

Annabel Long worked with **Aubrey Zerkle** to investigate whether 'snowball Earth' glaciations triggered the Great Oxidation Event, or vice versa. Annabel used the

chrome reduction method to extract pyrite-associated sulfur from 42 samples through the Hotazel and Moodrai sequence of the Postmasburg Group. These strata incontrovertibly overlie Paleoproterozoic Snowball Earth deposits in South Africa, providing an excellent opportunity to examine the relative timing of these events in a section with clearly defined stratigraphy.

We would like to include more news from our undergraduate community. So if YOU, dear students, have some news that you think would fit in here (fieldwork, internships...), please do get in touch.

CALLING FOR ALUMNI

Graduated in the last 10 years? Tell us about your career since graduation

Once per semester, or at least once per academic year, our School President (the top student representative within our school) tends to organise a careers event. One or more alumni either come in person or call in per video conference and chat about their career since graduation. Undergraduates and postgraduates appreciate hearing about different career paths and experiences with the transition from university to the working world.

Thus, we are calling for Alumni who would be willing to talk about their time after graduation!

We want to give our students first hand information on what leaving the learning environment and entering the job market is like, but also give them a feel for the diversity of career options available to both Geology and Environmental Earth Science graduates.

Did you graduate in the last 10 years?

Would you be willing to either come to St Andrews (or call in via video conference) and tell our students about your career? We are always on the look out for alumni that could give a little presentation on what they did after graduation, how they found employment, maybe changed job, and how their career evolved since then.

Please get in touch with the newsletter editor (sf67@st-andrews.ac.uk) or the School President directly (earthscipresident@st-andrews.ac.uk) if you are interested and want some more information. For the spontaneous ones: there will be one such event happening probably on the 8th of March, if you would like to contribute that, please get in touch soon.

ALUMNI NEWS

Left but certainly not forgotten - where are former students and colleagues now

News and updates

We spotted alumnus **Iain Neill (BSc 2007)** on the telly. On BBC2's Great British Rail Journeys he educated Michael Portillo on the Geology of Scotland, and especially the Highland Boundary Fault.



Iain (left) talking about the HBF with Portillo

Alumnus **Nathan Piper (Bsc 1997)**, currently head of oil and gas research at Investec, was interviewed by BBC News on the viability of sanctions on Russian oil and gas during the Ukraine invasion. www.bbc.co.uk/news/business-60656673

Gordon "Oz" Osinski (BSc 1999) has recently celebrated his 15 year anniversary of being a professor at the University of Western Ontario, Canada. He started a sabbatical on July 01 2022 true to form by spending 3 weeks conducting fieldwork on Devon Island in the Canadian High Arctic. He returned to Scotland in August 2022 to receive the prestigious Barringer Medal at the 85th Annual Meeting of the Meteoritical Society held in Glasgow (also see below).

Jacob Southey (MSc Geochem 2022) now works for British Lithium. Jacob recently wrote the following about his MSc experience at SEES: *Thinking back over the last year, while studying for a Masters degree certainly challenged me, I really enjoyed learning about a broad range of subjects in detail. Being part of a small cohort of students was rewarding, and definitely helped develop my interpersonal and communication skills. Overall, the experience has*

helped me grow as a person and definitely equipped me for the next step in my career.

You can read the full account here: geoscienceforthefuture.com/jacob-southey/



Jacob Southey

Stuart and Donald attended a symposium in Durham, where they caught up with alumna **Catriona Menzies (BSc 2008)**, who has been an Assistant Professor there since 2019.



Donald - Catriona - Stuart

SEES alumni at Meteoritical meeting

Paul Savage was part of the organising committee for the recent Group Meeting of the Meteoritical Society in Glasgow, and he spotted a lot of St Andrews Alumni playing important roles in the meteorite community:

Gordon Osinski (BSc 1999) was the winner of the 2021 *Barringer Award*, which is presented for outstanding work on impacts craters and other impact-related phenomena. He received his prize and gave his medal talk at this year's meeting.

Jess Barnes (BSc 2011) was announced as the recipient of the 2023 Nier Prize, which recognises outstanding research in meteoritics and closely allied fields by early career scientists.

Richard Greenwood was a PhD student under Colin Donaldson. He is

now at the Open University and has been part of the team analysing the new Winchcombe CM2 meteorite fall (SEES was involved in some of the isotope analyses). Richard was also part of the team analysing the material returned from Asteroid Ryugu by the Japanese Space Agency. You can watch a clip of Richard talking to the BBC about Winchcombe here: www.bbc.co.uk/news/science-environment-56326246

Caroline Smith (BSc 1998), now at the Natural History Museum London, was part of the conference organising committee and is another attendee with a big name in Meteorite research - so much that she had the asteroid (7635) *Carolinesmith* named after her.

Messages from alumni

Gavin Tolometti (BSc 2016) wrote: *I am a postdoctoral associate at Western University in Canada and I'm a 2016 graduate. I am writing to share a message that I want to spread across the world about how the ever-growing space industry is not only a path for scientists and engineers. I am promoting the message that a career in space is for everyone, even without a STEM background. I created my podcast the Diaries of Space Explorers to hear the stories of guests about how they got into the space sector and how space exploration has and continues to benefit us on Earth.*

Gavin's podcast can be found here: diariesofspace.podbean.com



Gavin Tolometti

FIELDWORK and LABORATORIES

The aspects that define our discipline

The Pacific seafloor

Hydrothermal vents are unusual habitats, where life thrives in persistent darkness on warm (sometimes hot), nutrient-rich water which is heated by geothermal activity beneath the ground. This Summer, **Dr Joanne Boden** participated in the VISIONS22 expedition onboard the Research Vessel Thomas G. Thompson, which cruised 300 miles out into the Pacific Ocean to an underwater volcano called Axial Seamount. A remotely-operated vehicle, called ROPOS, carried our fluid sampling system (aptly named the Universal Fluid Obtainer) 1,500 m beneath the sea, where Eve Farrell and Joanne collected samples of geothermally-altered water seeping out of eight different geothermal vents. Microbes were filtered out of this water, and sent back to the lab of Dr Rika Anderson, at Carleton College, where their DNA will be extracted and interrogated to find out how microscopic communities interact and evolve in diffuse flows from hydrothermal vents.



Sampling at a hydrothermal vent

Icelandic hot springs

An update from Toni Galloway (BSc 2020): “I recently carried out fieldwork in Iceland to gather samples for my PhD, which focuses on biogeochemical cycling within hot spring systems and the biosignatures produced in these environments which act as potential Mars analogues. I was joined by Joanne Boden (Postdoc in Earth and Environmental Sciences), Olivia Booker (PhD in Film Studies) as well as collaborators from the Open University. The fieldwork was really successful (including a few minor bumps), and I am looking forward to analysing the samples that we collected!”



Toni standing in front of orange/red coloured hills surrounded by warm volcanic gases and meltwater streams.

GEOBUS Outreach project

GeoBus celebrates its 10th birthday

Lynn Daley, **St Andrews**

GeoBus is the very successful educational outreach programme developed by and run from the School of Earth and Environmental Sciences since 2012. This year, on its 10th birthday, GeoBus has seen a change of staff and a change in how they run the programme. The project has been successful in attaining landmark funding for the next 4 years through sponsors NEO Energy, to 2026, and with a wealth of experience and new ideas, the new staff team (you can find out more about them in *new hires* in the staff section) are planning to make GeoBus more sustainable over the next few years. They have designed brand new professional learning courses for teachers, to provide them with ideas and build their confidence so that they can lead field trips and curriculum linked, hands-on activities for their students themselves.



Lauren and Lynn - The GeoBus Team at the SAGT Conference in Inverness

The first two GeoBus professional learning courses for teachers took place in St Andrews in September, with one concentrating on the Higher Geography syllabus and the other focussing on the Higher Environmental Science syllabus. Each course was fully booked and brought together teachers from at least eight Local Authorities across Scotland. Teachers who participated in these courses can then go on to borrow GeoBus equipment to run fieldwork with their classes. Four schools have already taken up this offer and have now found suitable field sites in their local area that they can use for years to come.



Teachers taking part in the first GeoBus professional learning course


The next professional learning course for teachers will run in early November and will provide background information and practical activities for teaching lessons relating to Earth's Forces. This course is fully booked and, thanks to funding from NEO Energy, each participant will receive a pack of resources on completion of the course, to enable them to carry out the activities with their students when back in class. The GeoBus team are in the process of developing further professional learning courses for teachers, including a day course for primary teachers. They are currently looking at options to take their teacher courses on the road over the coming year and are already booked to run courses for teachers in Fife. They are in discussions with three other Local Authorities about providing courses for teachers in their local area.

Over the last 10 years, GeoBus has built a fantastic reputation for engaging, curriculum-linked courses for students. The team are continuing this fine tradition and so far this year, they have visited schools from Inverness to the Scottish Borders. The new team are making headway for GeoBus to build from strength to strength, becoming more sustainable along the way. Here's to the next 10 years!

If you'd like to find out more about GeoBus activities, CLPL and what they are up to on the road, give them a follow and a like on Facebook, Twitter, and Instagram:

 **GeoBus St Andrews**

 **GeoBus_StA**

 **geobus_sta**

THE ALPS FIELD TRIP

The Best Field Trip in the World: This is Just a Tribute

Maddie Murphy, **St Andrews**

Much to the delight of this year's incoming fourth year students (and the staff who got to lead the trip), this August marked the return of the Alps field experience. To learn about the *Anatomy of Orogeny*, 19 students and 5 staff travelled to Milan, Italy to begin our transect of the Western Alps, starting in Mergozzo, IT and ending in Bern, Switzerland. After heading off in our three vans, we set up camp by Lago di Mergozzo, which was to be our base for the first few days. Students settled in with a swim in the lake, a group pizza dinner, and an introductory lecture by Batzi, Paul, and Tony in which the subduction story was first mentioned, and students first heard the term 'Alpine Sandwich' – the sandwiching of Adriatic, Tethys Ocean, and European crust during the Alpine orogeny.



Day 1 Anzola Sports Ground – Students are pictured walking down to the outcrop to see great examples of partial melting.

To begin unravelling this story of subduction and orogeny, Days 1 and 2 involved identifying rocks and discussing geologic processes in the Ivrea-Verbano zone, where students made and interpreted observations about metamorphic grade, indicators of shearing, and features of partial melting. We then moved on to set up camp in Quincinetto, IT, where we stayed for a few nights to explore the Sesia-Lanzo and Zermatt-Saas-Combin zones on Days 3–5. These days in the field allowed students to identify key features of subduction-zone rocks – specifically their mineralogical indicators – as well as to orientate themselves within the structure of the Alpine Sandwich. They also got to see Cervino/the Matterhorn, although sadly the sky decided to shroud Europe's most iconic peak in clouds when we stopped to take a group photo and some goofy students made a human pyramid (see picture!).



Day 3 Montestrutto – We did have some rain, here Tony explains the view from the Sesia-Lanzo across to the Ivrea-Verbano Zone of the Adriatic crust.

On Day 6 we said *Ciao* to Italy (and its lovely pizza) and drove to Martigny, CH (Bonjour, rösti!) via the Grand St Bernard Pass so students could observe the Penninic Nappes, identify metamorphosed marine sequences, and discuss the mechanics of a down-going slab. Day 7 involved observation and synthesis of rocks of the Helvetic Nappes, including a big hike up to Lac du Salanfe (on the next page) where students undertook a guided mapping exercise. Day 8 allowed the group to further cultivate their skills in identification of sedimentary features, fossils, and structural components like M-folds. We bid *adieu* to Martigny on Day 9 and travelled to Bern, CH (Hallo, schnitzell!), which became our basecamp for the last few days in the field. From Bern we drove to key outcrops on Days 9 and 10 where students were able to piece together the timing of Helvetic Nappe emplacement from erosional successions of the Swiss Flysch-Molasse basin associated with the final stages of Alpine orogeny.



Day 4 Lago Blu – Cervino (the Matterhorn) is behind the acrobatic students, just covered in clouds!

By catching the Kandersteg car train and then crossing the Simplon pass on Day 11, we returned to Mergozzo, IT, for our final night in the Alps. After one last lake swim, we had a concluding Alpine orogen debrief by our wise staff, followed by a question session to clarify any lingering confusion about the complicated geological history we all spent the last several days pondering. This productive scientific discussion was followed by one final pizza dinner to close the trip and toast this remarkably resilient and enthusiastic group of students. On Day 12 we returned to St Andrews, forever to dream of subducting slabs, orogenic sandwiches, and delicious Alpine cheese!



Day 8 Sanetsch – Students made a sedimentary log and sketched the structures they saw here in the Diableret Nappe. A discerning eye can find M-folds!



Day 7 Lac du Salanfe (c. 1925 m) – Here students are sketching the structures they observe in the Morcles Nappe (the peak in this photo is Salière, 3220 m).

REPORT FROM THE FIELD - UGs in Norway

Norway Arctic expedition: High resolution mapping of the Lillebukt Alkaline Complex (LAC).

Sarah MacDonald and Nick Mappin, **St Andrews**

Five geology students (Sarah MacDonald, Nick Mappin, Joanna Kalita, Lauren Meager, Megan Athey) supervised by Professor Adrian Finch from St Andrews School of Earth and Environmental Science set out on an exciting and challenging research expedition in July 2022, to the remote Arctic Island of Stjernøya, Norway.



On a boat

The Lillebukt Alkaline Complex (LAC) consists of nepheline syenites, and carbonatites emplaced from 560-570 Ma that then experienced the Finmarkian and Scandian phases of the Caledonian Orogeny (Larsen et al, 2018). Lillebukt Mine, owned by Silbelco Nordic AS, actively mines the nepheline that is then shipped globally for its use in ceramics and glass.

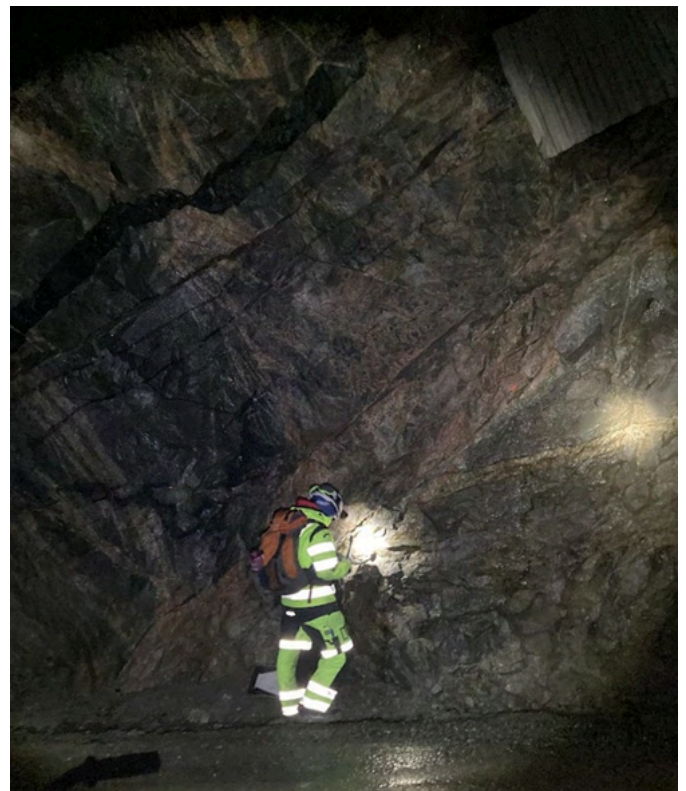


In the field

The wider area (Seiland Igneous Province) has been the focus of much research, however Stjernøya has been neglected since the 1980s. This motivated us in our decision to study the alkaline system with contemporary techniques and knowledge. As part of our mapping project, alongside traditional geologic mapping we aimed to assess the Rare Earth Element potential of a metamorphosed alkaline system.

The expedition was preceded by six months of preparations and logistics, a sizable task in itself. We had to navigate post-Brexit legislation affecting our shipment of food, equipment, and samples. Unprecedented amounts of snow and avalanche risk forced us to postpone the fieldwork a month prior to flying.

Despite stringent planning and preparation, we found ourselves to face more issues on the island. Our terrain was highly technically difficult, exposure poor and inaccessible leading to us re-evaluate our mapping area.



Mapping in the Lillebukt Mine

Following this, we were very grateful to Lillebukt Mine, who offered us assistance, accommodation, and allowed us to map the Mine. Nick, Joanna, and Lauren mapped the open pit and surrounding area, while Megan and Sarah mapped the Tunnels. We were very excited and greatly valued the experience of working in an active mine!

The expedition was a great success. Finding evidence for what we believe may be REE-enriched Fluorite, a complex and intriguing relationship between the carbonatite and syenite, offering prospects for future research. We collected over 150 samples that were shipped to St Andrews and are awaiting lab analyses!

Perhaps the most important skill we gained was resilience. It was a once in a lifetime journey that developed us as individuals and as a team. We were emersed in indigenous Sami culture, experienced mining industry, and formed friendships for life. We would like to thank the support from all our funders, St Andrews Staff, and Silbelco who made this experience possible.



Cloud inversion high in the field area



Lauren – Megan – Joanna – Sarah – Nick

OBITUARY: Richard Batchelor

13 January 1949 – 15 February 2022

Tony Prave, Ed Stephens, Batzi Fischer, **St Andrews**

It is with great sadness that we inform you of the death of Richard Batchelor who died last February after a short battle with cancer. He was 73 and, remarkably, 50 of those years were spent here at St Andrews. In fact, there is some merit in the claim that Richard was a St Andrews ‘institution’, particularly with respect to his favourite watering holes, the Criterion and Whey Pat!



Richard with visiting alumni in front of the Criterion (sent by Lesley Andrews)

For all of us though, without exception, Richard was indeed a fixture of the fabric of the School. His camaraderie, bonhomie, love of social events, singing at Burns Night suppers (yes, I know, more than a few of us would sometimes put fingers in our ears), knowledge of local Scottish geology, geo-historian, ‘corporate memory’ of the good old days—turned bad old days—returned to good old days, pit bull-like support of the School and UCU, and passion for all things geological, were what defined Richard. He was one of the few remaining stalwarts who were a direct link to the School’s past, always there to remind us of how the Department grew and manoeuvred its way through the mire of academic politics of St Andrews. In fact, the Alumni Newsletter you are now reading (he was the founding editor), and his commitment to forging and maintaining links with alumni, are owed directly to Richard’s labours in helping create the proverbial *esprit des corps*, a spirit of pride and allegiance that binds us and makes the School unique within St Andrews, if not the UK.

Many of you will remember Richard during his days as geochemical analyst and technician, a role he had through much of the latter part of the last Century. When Geology was forcibly merged with Geography in 1997, that role morphed into Richard becoming the Department’s IT guru. Then, in 2005, he was awarded a Leverhulme Research Fellowship. That was his cry of “Freedom”, allowing him to throw off the shackles of full-time employment

to pursue his love of geology. The aim of the Fellowship was to characterise zircons recovered from ash beds in the late Precambrian (Ediacaran Period in today’s geological vernacular) Southern Highland Group rocks that border the Highland Boundary Fault (Richard’s aptly named ‘Brown Beds’, one of which he is shown pointing to in the photo below).



Richard as Technician with a “geochemical” christmas tree (sent by Lesley Andrews).



Richard pointing at one of the many bentonite beds he studied (photo by Rosalind Garton)

Given Richard's inimitable zest for geology, it was no surprise that, like Dorothy in Oz or Bilbo in Middle Earth, he started down a path that went well beyond its humble beginnings to eventually encompass a research agenda involving study of almost every rock unit of Scottish geology. He expanded his portfolio of previous work of chemically characterising Ordovician bentonites in the Southern Uplands to create a geological potpourri of discoveries, ranging from unique aspects of the fossil record of Fife's Devonian-Carboniferous strata to previously unrecognised volcanic rocks scattered throughout the Proterozoic metasedimentary successions of the Torridonian, Moine and Dalradian, the rocks that define the geological muscles of the Highlands.



Richard on the *Swordsman* research vessel for his 70th birthday, surveying the coastal geology he loved so much from a different perspective

A quick scan of GoogleScholar reveals a record of 34 Scottish-centric publications. Impressively, he carried out this work whilst simultaneously, pursuing his complementary passion of conserving natural heritage, co-founding with his wife, Rosalind Garton, *geoHeritage Fife*¹ a charity that publicises Fife's geology and provides geological trail leaflets for hallmark geo-walks.



A geoHeritage Fife leaflet on the geology of Elie

Together they also organised the building of St Andrews' *Geological Wall*, which overlooks the West sands, and prompted efforts that resulted in getting a cast of the trackway of *Hibbertopterus*, a giant eurypterid found on the underside of a sandstone bed east of Maiden's Rock,

¹www.st-andrews.ac.uk/earth-sciences/outreach/geoheritage/ under this link you can also find a large number of leaflets for self-guided walks to the Geology of Fife, that geoHeritage Fife produced

to become part of the Wardlaw Museum's display collection for the public to marvel at, and thereby better appreciate the geological richness housed in Fife. And no discussion of Richard is complete without acknowledging Rosalind, herself a force-of-nature whose strength, guidance, support and intellect were what enabled Richard to, as the saying goes, do what he had to do.



Richard and Rosalind, at one of the first, socially-distanced Friday beer socials after the lockdown, held outdoors in St Salvator's quad

Through his publications and the ongoing work of geoHeritage Fife, Richard's scientific legacy is there for all who are keen to deepen their understanding of Scottish geology. Notably, one of Richard's earlier publications on the geochemical classification of granitoid rocks has been cited well over 1000 times – making it the single most-cited paper by any St Andrews geologist and one of only three Earth Science publications in the top-100 most cited publications coming out of the entire University of St Andrews (until recently it was the only one in the top-50, currently at position 51).

Chemical Geology, 48 (1985) 43–55
Elsevier Science Publishers B.V., Amsterdam – Printed in The Netherlands

48

PETROGENETIC INTERPRETATION OF GRANITOID ROCK SERIES USING MULTICATIONIC PARAMETERS

RICHARD A. BATCHELOR and PETER BOWDEN

Department of Geology, University of St. Andrews, St. Andrews KY16 9ST, Scotland (Great Britain)

(Received December 30, 1983; accepted for publication May 9, 1984)

Richard's most-cited, StA record-holding work

Richard's direct legacy to us, bound together by the bond of St Andrews, is one of a never flagging commitment to the School and a bottomless enthusiasm for geology. To Richard, our friend, colleague and fellow researcher, RIP.

For more details about Richard's earlier life and path to geology, please see the article in In-The-Loop: intheloop.newsweaver.com/intheloop/nsl0wi6if011e2ouwe24xe.

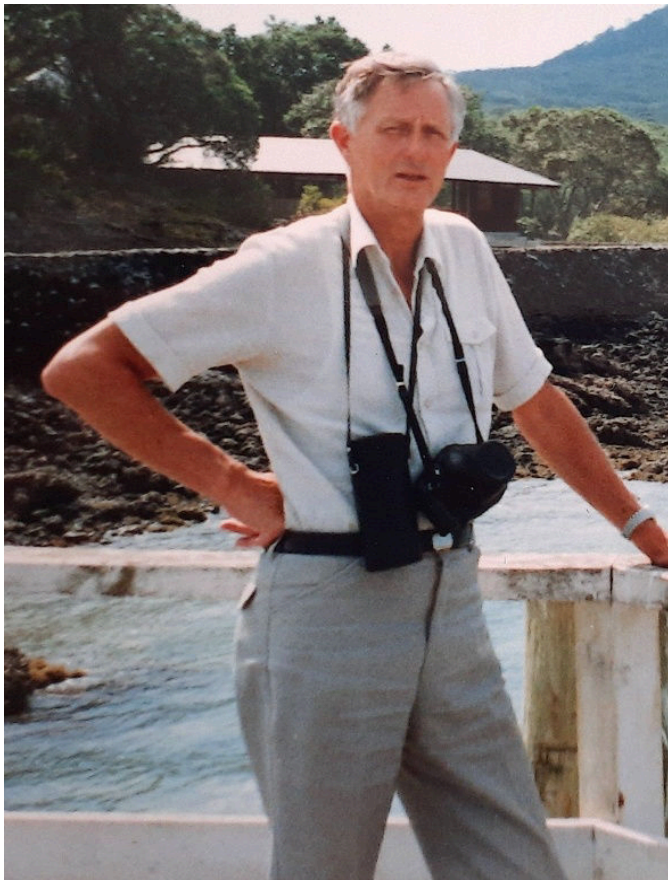
OBITUARY: Alaric Hopgood

Ed Stephens, Colin Donaldson, **St Andrews**

Dr Alaric Hopgood died in August aged 91.

Ed Stephens was a colleague of Alaric's for 30 years and has submitted the following tribute:

Originally from New Zealand Alaric studied for his BSc at the University of Auckland and came to St Andrews University in the 1960s when he joined the academic staff in the Department of Geology under Professor Charles Davidson who was also his PhD supervisor. He served the University first as Lecturer in Geology then as Reader until he retired towards the end of the millennium.



Alaric Hopgood

Alaric had wide interests in geology but his main contributions concerned the reconstruction of the structural histories of gneisses and migmatites in the Archaean and Proterozoic of the Baltic Shield. He also made significant contributions to the geology of Scotland including several papers on the geology of islands in the Inner and Outer Hebrides. Many of his papers were published with his good friend and research collaborator, Professor Don Bowes of Glasgow University who sadly also died earlier this year. Alaric's research in this area led to his 1998 publication *Determination of Structural Successions in Migmatites and Gneisses*. This monograph was the first to describe procedures for the analysis of structural relationships in these highly deformed rocks.

For his scholarship and contribution to geology Alaric was recognised by election in 1980 to a Fellowship of the Royal Society of Edinburgh.

Alaric was deeply loyal to the Department of Geology at St Andrews. With just a handful of colleagues he willingly took his share of what was a heavy academic and administrative load in mounting a full degree programme with substantial field and laboratory training components. Welcome respite came in summer vacations when he undertook field studies in Greenland and Scandinavia, although some impairment of his mobility resulting from surgery became a frustrating constraint on this activity. Many alumni of Geology at St Andrews will have been taught structural geology by Alaric and might remember his magnificent sample collection illustrating the complexities and differing styles of deformation, particularly in high grade metamorphic rocks. Indeed, more than two decades after Alaric retired his collection is still used in the undergraduate teaching course.

In the 1970s Alaric was Warden of Regs (student residence St Regulus Hall). Subsequently he settled in Blebo Craigs with his wife Jenny Green. In his retirement he supported Jenny in her tireless campaign to preserve the character of the town of St Andrews and to protect it from unsympathetic and damaging development. Without their efforts St Andrews may now have looked very different. Alaric is much missed in the School and in the wider community.

Colin Donaldson, recently retired from the School, knew Alaric both as one of his lecturers and as a colleague. He offered the following tribute to Alaric:

Alaric enjoyed leading the annual First-Year Easter field excursion to the north and northwest of Scotland, showing the nature of the ancient rocks and explaining the processes involved in their creation. Some of what he showed and elucidated was strictly beyond what the students knew about geological processes from their lecture courses but all appreciated the details that could be inferred about their origins.

Alaric was at his very best as a lecturer when he was leading undergraduate students over ground that he himself had investigated and elucidated the origin of. I think of visits that he took members of my Junior and Senior Honours classes to on Lewis and Harris, on Skye, and near Oban.

He was one of the small team of St Andrews lecturers who could turn a grey, wet day into a stimulating experience from which you said to yourself, "wow, that was wonderful, now I understand a lot better the processes that shaped the terrains that we were introduced to".

MANY THANKS, ALARIC for steering my career in science into the stimulating 45+ years that it was to become, following my undergraduate training.

We thank Alaric's step-daughter Dr Cathy Green for the photographs.

OBITUARY: Helen Munro

Gordon Osinski, University of Western Ontario, Canada

It is with a sad heart that I share the news of the passing of **Helen Munro (BSc 1999)**. Helen passed away suddenly from a brain aneurysm in August. After graduating from St Andrews, Helen worked for a few years as an analyst in the oil and gas industry before returning to school to earn a Graduate Diploma in Law. After qualifying, she worked for Dentons for 13 years, focusing on banking and finance work, with most of this time spent in the Middle East. She returned to the UK in March 2022 to become Senior Counsel at Walkers, based in Jersey.

Helen and I were class mates from the very beginning of our degrees, both starting out doing Chemistry and Geology, before both switching over to focus on what we both enjoyed the most, with Helen graduating in Geochemistry and myself in Geology. We had a very close knit year and our Friday evening sessions with a large number of our classmates in the Whey Pat became legendary - so much so that when Helen graduated, she was gifted the Munro family crest that used to hang above the bar by the Whey Pat staff! I have many more fond memories shared with Helen on our field trips (Ullapool in second year; Skye in third year; and Turkey in fourth year) as well as a few Mountaineering Club trips that I managed to convince Helen to come on. Helen's was a life cut too short.



Helen Munro



Helen (back right) in the Whey Pat

A BIT MORE ON... Chemical (Claudia Lubao)

PhD student Claudia Lubao's alter ego

Claudia Lubao, also known as **Chemical**, is a Tanzanian musician currently pursuing a practice-based PhD at the University of St Andrews working on musicalizing socio-cultural and scientific issues.



Claudia Lubao a.k.a. Chemical

Her PhD is building on a previous work of 'musicalizing heritage', of writing music which raises awareness on issues such as climate and heritage; an example of this is one of her recent songs *I Love You Africa*



Chemical - 'I love you Africa'

The music video can be viewed here:
youtu.be/-oGK7LjOoNc

Her other videos can also be viewed on youtube, where she has more than 100,000 followers; a few examples that are also using a similar approach of musicalizing heritage and using music to communicate complex concepts like climate change and its effect on communities include the following:

- Climate and Heritage
youtu.be/pHAnLsmx25A
- Bahari Yetu
youtu.be/QFd9TZYHezg
- Africa's Heritage
youtu.be/he-D4U6MUzM
- Kilwa Yetu
youtu.be/d9_usJLSqEk

In 2021, Claudia was voted to be the Best Female Hip-Hop Musician in competitive awards handed out by the Tanzania Arts Council of the Ministry of Arts, Culture and Sports. This is further testament to Claudia's position as a well-established female rapper in Tanzania.



Chemical is the best female Hip Hop artist of Tanzania

She has worked with all the eminent Tanzanian producers and uses her digital presence as artist as part of her research process. For her PhD, she is expecting to write new songs, produce a thesis, and document musical practices in the form of new recordings

and films. She has presented some of her work at the recent 16th Congress of the Pan African Archaeological Association in Zanzibar.



Another promo shoot

To see more of Claudia's work follow her on:

@ChemicalOfficial

@chemical_tz

@chemical_tz

In November Claudia participated in the launch event of the St Andrews Kaledeiscope Alumni Network, was interviewed on stage and performed one of her songs live.



Chemical performing live in the Laidlaw Music Centre

THE LAST PAGE

‘Tony Prave’ on sabbatical

Tony Prave allegedly went on sabbatical in 2022, but just before his return, Stuart went into Tony’s office and it looked like he never actually left:



‘Tony’ at his standing desk

‘Mystery’ Rock of the month

Found by PhD student Maddie Shankle’s mother on a beach in South Carolina, this rock had a lot of us puzzling over what it could be.



The mystery rock

SEES experts on YouTube

Simon Clark makes YouTube videos about ”stuff he finds interesting” - and has over 450k subscribers to his channel. He created a great video titled ”*A climate mystery: the eruption of 1809*” in which he explains to the public research on a volcanic eruption in 1809 that affected the climate. For that video he interviewed our very own **Rob Wilson** and **Andrea Burke** - who do active research on this sort of topics. In the video, Simon also calls this his favourite topic he’s ever made a video of. You can watch the video here:

www.youtube.com/watch?v=tSo7zWmE9f8



Also viewable on You Tube is a talk that **Nick Gardiner** has recently given at the Centre for Energy Ethics, in which he discusses the *energy transition* (to hopefully cleaner, more sustainable forms) and the role that *critical metals* play in that process. You can watch it here:

www.youtube.com/watch?v=wZ7TLRm_IYw

