

SGA news

December 2025
Number 57

*60th
Anniversary*



SGA news

Contents

No. 57 December 2025

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SGA News is a publication of SGA (Society for Geology Applied to Mineral Deposits) and appears twice a year.

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<http://www.e-sga.org>

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SGA NEWS – MAILBOX

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SGA COUNCIL 2026

Executive Committee (2026-2027)

President:	Patrick Mercier-Langevin (Canada)
Vice-President:	Gülcan Bozkaya (Turkiye)
Vice-President for Student Affairs:	Anna Vymazalová (Czech Republic)
Executive Secretary:	Georges Beaudoin (Canada)
Treasurer:	Hartwig Frimmel (Germany/South Africa)
Promotion Manager:	Sophie Decree (Belgium)

Chief Editors:

David Banks (UK)	MD European Office
Karen Kelley (USA)	MD North American Office
Lisard Torro I Abat (Peru)	SGA News
John Slack (USA)	Special Publications
Lisa Wasitschek (Germany)	SGA website

Regional Vice-Presidents (2026-2027)

Asia:	Shao-Yong Jiang (China)
Australia/Oceania:	Nicolas Thebaud (Australia)
Europe:	Thomas Aiglsperger (Sweden)
North Africa and Middle East:	Rabah Laouar (Algeria)
North America:	Eric Tharalson (USA)
Sub-Saharan Africa:	Filadelphia Mbingeneeko (Namibia)
South America:	Luis Fernando Páez Sinuco (Colombia)

Councillors through December 31, 2027

Elena Amplieva (Russia)
Carmen Conde (Spain)
Paolo Garofalo (Italy)
Nils Jansson (Sweden)
Crystal Laflamme (Canada)
Nicolas Saintilan (Switzerland)

Councillors through December 31, 2029

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Stefanie Brueckner (Canada)
Ismahen Chaouche (Algeria)
Cyril Chelle-Michou (Switzerland)
Krzysztof Foltyn (Poland)
Garth Graham (USA)
Ana Patricia Jesus (Portugal)
Iain Pitcairn (Sweden)
Eduardo Teixeira Mansur (Norway)
Marek Tuhy (Czech Republic)

Ex-officio members, SEG:

President: Alan J. Wilson (Anguilla)
Executive Director: Jennifer D. Craig (USA)

Ex-officio members, IAGOD:

President: Tania Martins (Canada)
Chief Treasurer/Membership Secretary: Alla Dolgoplova (UK)

Members of SGA 2025

Algeria	1	Finland	26	Norway	4
Argentina	2	France	35	Oman	1
Australia	97	Georgia	2	Panama	1
Austria	6	Germany	73	Peru	53
Belgium	11	Ghana	1	Philippines	1
Bolivia	1	Great Britain	32	Poland	28
Brazil	8	Greece	2	Portugal	12
Bulgaria	4	Hungary	1	Russia	20
Burkina	1	India	7	Saudi Arabia	1
Cameroon	6	Indonesia	3	Senegal	16
Canada	88	Ireland	9	Serbia	2
Chile	9	Italy	13	Slovakia	6
China	56	Japan	9	South Korea	12
Colombia	111	Kazakhstan	5	Sudan	1
Congo	1	Lithuania	1	Spain	32
Croatia	2	Macao	1	Sweden	30
Cyprus	1	Mail	1	Switzerland	14
Czech Republic	60	Mexico	3	Turkiye	3
Denmark	1	Mongolia	1	United States	77
Cote d'ivoirie	3	Morocco	24	Uruguay	1
Ecudaor	2	Namibia	2	Uzbekistan	1
Estonia	1	Netherlands	1	Vietnam	1
		New Gunea	1	Zambia	1
		Nigeria	6		

The SGA Mobility Grant – update

Are you in contact with an SGA member who runs a laboratory that could answer some of your research questions? The SGA Mobility Grant can help to bring you together!

SGA Council approved a maximum of 15 grants with a maximum of up to 2000 Eur each (total of up to 30 000 EUR in 1 year) and also decided that students applying for the grant have to be SGA members and at the same time their supervisors must have been SGA members for at least 3 continuous years. To be eligible applicants must have been an SGA member for at least 3 continuous years (i.e. paid up membership fees for the last 3 years). Student members are not eligible for the grant but up to 2 years of student membership can count toward the required 3 years of membership. To apply send your completed application form to the SGA Mobility Grant coordinator (thomas.aiglsperger@ltu.se).

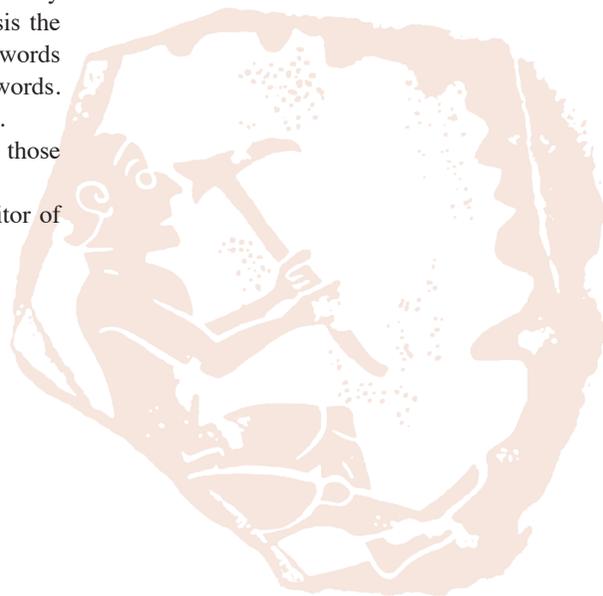
A list of laboratories and application form is available from the SGA Website.

Publication of SGA Student's Theses Abstracts

The SGA Newsletter will now publish abstracts of Undergraduate, Masters and Doctoral theses submitted by student members. A great deal of student research from around the world is undertaken, but much of this valuable work is not recognized. This is an opportunity for students to gain recognition and to publish work that may be valuable to others. For a U/G thesis the length should be approximately 300 words and for MSc or PhD thesis up to 500 words. No figures or tables can be published.

We will publish current thesis and those completed within the last 2-3 years.

Abstracts should be sent to the editor of the SGA Newsletter.



Society for Geology Applied to Mineral Deposits



19th SGA Biennial Meeting
Perth Australia

27 The University of
Western Australia
29 Aug - 2 Sep

SAVE THE DATE

- Four days of exciting technical sessions including poster sessions
- World-class economic geology experts
- Field trips to Kalgoorlie-Kambalda, Pilbara, South Australia, Tasmania, Queensland
- Short courses and workshops
- Social events for early-career and industry professionals

SCIENTIFIC THEMES

- Understanding Ore Systems, Exploration and Environment
- Tools, Data and Discovery: AI and machine learning
- Minerals for the Future: the energy transition



29th August - 2nd September 2027 | Perth, Western Australia

e-sga.org



The Society of Economic Geologists (SEG) invites you to the 2026 conference in Salt Lake City, Utah, USA, from September 30 to October 3, 2026. This event will deliver the high-quality technical content that is a hallmark of SEG conferences, including innovations, advancements, and discoveries throughout the mining chain. The program will feature a balance of applied case studies, global advances in framework geology, technical innovation, and archetypal ore deposits and geologic processes globally, while highlighting the North American Cordillera. These themes will be present throughout a vibrant slate of field trips, workshops, technical presentations, and unique conference events.

The SEG 2026 conference is focused on facilitating knowledge transfer within the economic geology community, showcasing geologic and career insight from experienced members, providing technical growth and development for mid-career geologists, and introducing a new generation to the fascinating world of economic geology. With a mix of participants from industry, government, and academia worldwide, SEG 2026 offers a unique opportunity to connect, learn, and help shape the future of economic geology.



Stephanie E. Mills
Utah Geological Survey
SEG 2026 Chair



Rachelle Boulanger
Talon Metals
SEG 2026 Chair



Jennifer Craig
Society of Economic Geologists
SEG Executive Director

SEG 2026 SESSION THEMES

- **The future of the mining workforce**
- **Orebody knowledge and deposit characterization**
- **Framework geology for ore deposits**
- **Keeping up with the commodities: Expanding terranes and targets**
- **New technology and old deposits**

Visit seg2026.org for more information.



Faculty of Sciences, University of Porto, Porto, Portugal

SCIENTIFIC SESSIONS [abstract submission Jan. 15th – Mar. 15th, 2026]

- 28 sessions on a wide range of topics related to mineral resources and innovative technologies for the energy transition: ore genesis, sustainable mining, Li/Au/W-Sn/VMS deposits, granites, fluids, and much more!
- Engaging plenary speakers!

FIELD TRIPS [opportunity to visit some of the most iconic mineral deposits worldwide]

August 24th to 30th

- Azores islands
- Geology of Vinho Verde region
- Geopark Arouca
- Eastern Iberian Pyrite Belt

September 3rd to 6th

- Argemela and Panasqueira mines
- Neves Corvo and Aljustrel mines
- Estremoz marbles
- Rare-element pegmatites
- Las Medulas



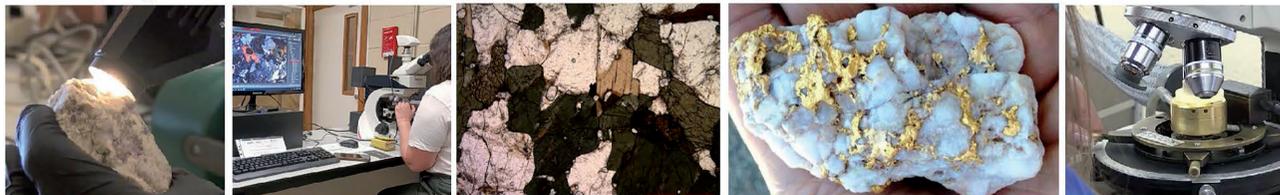
WORKSHOPS [learn from experts and the best in their fields]

August 30th

- Fluid and melt inclusions
- Exotic minerals under the microscope
- Advanced spectroscopic techniques for geological applications
- Orogenic Gold

September 3rd

- Remote sensing | AI
- Metallography of Portuguese ore deposits (W-Sn)
- Scientific Writing for Non-Native English-Speakers



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<https://iagod2026.inporto.events/>



iagod.symposium2026@gmail.com





Gordon Research Conferences Frontiers of Science

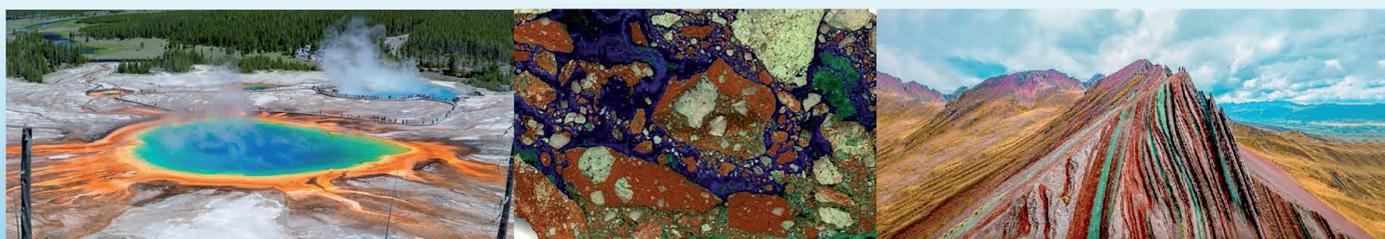
Announcing the 2026 conference on:

Geochemistry of Mineral Deposits *Geochemistry at the edge of discovery*

Rey Don Jaime Grand Hotel
Castelldefels, Barcelona, Spain

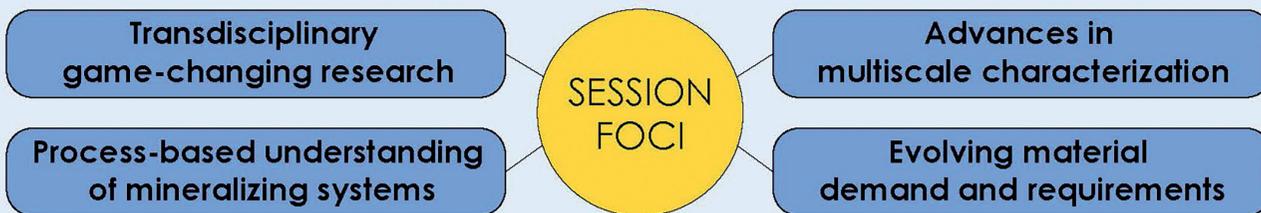
May 24-29, 2026

Chairs: Marco Fiorentini & Sarah Gordon
Vice Chairs: Katie McFall & Kevin Byrne



Disruptive Thinking and Transformational Research to Shape the Future Resource Workforce

This Geochemistry of Mineral Deposits GRC represents a chance for scientists at all career stages to come together to present, learn and discuss premier, international, cutting-edge and unpublished research advancing the field of ore deposit geochemistry. The aim is to bridge the gap between mineral systems science, mineral exploration protocols and ore processing/metallurgical extraction. In addition to premier talks, the conference has designated time for poster sessions from individuals of all career stages; afternoon free time and communal meals allow for informal networking opportunities with leaders in the field. The conference is held in a remote location to increase the sense of camaraderie and create an atmosphere of scientific community, conducive to establishing lasting collaborations and friendships.



Associated Gordon Research Seminar (GRS) - Early Career & Postgraduate



On the 23-24 May 2026, directly preceding the GRC, the GRS is specifically for early career and postgraduate students to present their research. Chaired by Sarah Shi & Rory McNab.
To attend both the GRS and GRC you must apply to both. For more information and to apply to the GRS:
<https://www.grc.org/geochemistry-of-mineral-deposits-grs-conference/2026/>

MORE INFORMATION & TO APPLY:

<https://www.grc.org/geochemistry-of-mineral-deposits-conference/2026/>





THE ROLE OF THE EXTRACTIVE INDUSTRIES IN THE ECONOMIC DEVELOPMENT OF NORTH AFRICA

 May, 31st to June, 05th
2026

 the University of
Sciences and Technology
Houari Boumediene (USTHB),
Algiers, Algeria






ICYG 2026
**XXV INTERNATIONAL CONFERENCE
 OF YOUNG GEOLOGISTS**

**14 – 17 KOSTELEČ NAD ČERNÝMI LESY
 MAY, 2026 CZECH REPUBLIC**

PROGRAMME
 14 May ICE BREAKER AND REGISTRATION
 15–16 May ORAL PRESENTATIONS
 16 May CLOSING AND AWARD CEREMONY
 17 May EXCURSION

CONFERENCE FEE 140 €
 EXCURSION FEE 30 €
REGISTRATION DEADLINE 15 FEBRUARY 2026

SGA TRAVEL GRANTS AND KEYNOTE SPEAKER PROF. SIMON JOWITT
FOR MORE INFORMATION PLEASE VISIT

icyg.eu **FACEBOOK**

CONFERENCE IS FINANCIALLY SUPPORTED BY CHARLES UNIVERSITY

We are delighted to invite you to participate in the XXV International Conference of Young Geologists (ICYG 2026), which will take place from 14 to 17 May 2026 at the Renaissance castle in Kostelec nad Černými lesy, just 40 km east of Prague, Czech Republic.

ICYG is an annual international conference for emerging geoscientists from undergraduate (BSc) students presenting their first scientific results to MSc and PhD candidates and early-career researchers.

We welcome contributions from the full spectrum of geoscience topics, including (but not limited to) general geology, economic geology and mineral deposits, environmental geosciences, geomorphology, hydrogeology, engineering geology, geophysics, geoinformatics, mineralogy, geochemistry, petrology, structural geology, sedimentary geology, and palaeontology.

Thanks to generous support from Charles University and the Society for

Geology Applied to Mineral Deposits (SGA), ICYG 2026 will offer financially accessible participation for students, including on-site accommodation and full board with pre-conference ice-breaker in local brewery, and will feature an SGA-sponsored keynote lecture by Prof. Simon M. Jowitt (Nevada Bureau of Mines and Geology) as well as SGA travel grants for selected students working in economic geology and mineral deposits.

Key dates

- Online registration opens (today): 10 December 2025
- Registration deadline: 15 February 2026
- Abstract submission deadline: 28 February 2026

For detailed information on the scientific programme, venue, post-conference excursion, fees, travel grants, and submission guidelines, please visit our conference website: www.icyg.eu.

We kindly ask you to share this invitation and the attached First Circular with your colleagues and students to ensure wide participation and a vibrant exchange of scientific ideas.

We look forward to welcoming you to the Czech Republic for an inspiring and collaborative meeting of young geoscientists.

Guide to Authors for the SGA News

David Banks; Chief editor SGA News

School of Earth and Environment, University of Leeds, Leeds, UNITED KINGDOM; editor-sga-news@e-sga.com

**As from 2026 the Chief editor of SGA News will be Lisard Torro I Abat (Peru).
All contributions to the Newsletter should be sent directly to him.**

There are three types of submission: (1) regular article; (2) reports of SGA student chapters; and (3) reports related to SGA. Regular articles should present scientific studies of the geology, mineralogy and geochemistry of mineral deposits or other topics related to mineral deposits. Reports of SGA student chapters should represent detailed description of activities. They must be reviewed by the scientific supervisor of the respective chapter prior to submission. Make sure that the field reports include the exact location (coordinates if available) of each station described. There is no restriction to the length of a contribution, but it should be concise and informative. All figures should be informative and of good quality. The language of SGA News is British English and all contributions need to be formatted as such. When submitting a text, do not include figures or tables and their captions. Present the latter at the end of the Word file and submit the figures separately, instead.

Manuscripts need to be submitted in Word. Use a normal, plain font (10-point Times) for text. Format the text as little as possible. For emphasis, use the format tools of Word (e.g., italics or capitals). Do not use the shift button for capitalizing a whole word. Do not use field functions, tab stops or other commands for indents, or the space bar. Do not insert extra lines between paragraphs; use the Word formatting tools instead. Use the table function, not spreadsheets, to make tables.

Abbreviations should be defined at first mention and used consistently thereafter. Please always use internationally accepted signs and symbols for units (SI units).

SGA News uses the style that is also used in Mineralium Deposita. Check https://www.springer.com/earth+sciences+and+geography/geology/journal/126?detail&Page=pltdci_1060362 for further information.

Figures and Tables

All figures and tables are to be numbered using Arabic numerals. They should always be cited in text in consecutive numerical order. Figures need to be submitted as separate files in jpg-format at a resolution of 300 dpi. They need to be formatted to fit the column format of SGA News: (1) 4 cm wide or (2) 8.3 cm wide for the 3-column part and 6.1 cm wide for the 2-column part. Make sure that the figures are of good quality.

Publication of SGA Student's Theses Abstracts

The SGA Newsletter will now publish abstracts of Undergraduate, Masters and Doctoral theses submitted by student members. A great deal of student research from around the world is undertaken, but much of this valuable work is not recognized. This is an opportunity for students to gain recognition and to publish work that may be valuable to others. For a U/G thesis the length should be approximately 300 words and for MSc or PhD thesis up to 500 words. No figures or tables can be published.

We will publish current thesis and those within the previous 3 years.

SGA Member Benefits

Did you realize that you are entitled to order Springer books at a special discount of 40% ?

Visit <https://www.springer.com/> for further details, to browse new books of interest and to order at the discounted rate for SGA members.

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Sign up for the Table of Contents Alert at <https://www.springer.com/earth+sciences+and+geography/geology/journal/126>
to receive an e-mail every time a new issue of the journal is published –
with an overview of the articles published.**

APPLICATIONS to SGA for meeting sponsorship must be submitted to Jan Pašava, SGA Executive Secretary. Please contact Jan Pašava for forms and further information.

Ideas and Suggestions for SGA-sponsored activities are welcome and should be addressed to Jan Pašava or any other member of the Council (see e-sga.org for list of members).

**Professor Georges Beaudoin, SGA Executive Secretary
Département de Géologie et de Génie Géologique, Université Laval,
Québec, QC, Canada**

News of the Society

Jan Pašava (SGA Executive Secretary)

Czech Geological Survey, Geologická 6, 152 00 Praha 5, Czech Republic, jan.pasava@geology.cz

Minutes of the SGA Hybrid-Council Meeting, August 3, 2025 (Green Center on Colorado School of Mines Campus, room GC 217, 9,00 – 16,00).

Stanislaw Mikulski (SGA President) welcomed all participants including Anne Thompson (SEG President) and Jennifer Craig (SEG Executive Director) and thanked K. Kelley for organizing the meeting. After that Jan Pašava (SGA ES) welcomed the Council and emphasized that this meeting marks a new era in SGA-SEG relationship. He also thanked Karen Kelley for hosting the meeting and providing great hospitality.

Roll call and Apologies:

Present: J. Craig (SEG Executive Director, ex-officio Council member), S. Decree, H. Frimmel, P. Garofalo, K.D. Kelley, T. Christie, C. Laflamme, B. Lehmann, P. Mercier-Langevin, S. Mikulski, J. Pašava, I. Pitcairn, N. Saintilan, J. Slack, A. Thompson (SEG President, ex-officio Council member), and A. Vymazalová

On-line: D. Banks, S. Petersen

Guests - present: L. Wasitschek (Assistant SGA Treasurer, for website changes)

Apologies for absence: T. Aiglsperger, G. Beaudoin, G. Bozkaya, C. Conde, A. Idrus, R. Laouar, F. Mbingeneeko, B. Orberger, D. Schlatter, G. Tourigny and X. Sun.

1. Minutes of previous Council meeting (April 1, 2025)

After checking the actions by the SGA Executive Secretary (with some of the items pending), the Minutes were unanimously approved.

2. Reports of officers on Council:

- 2.1. Report from President (Item 2-1)
- 2.2. Report from Executive Secretary (Item 2-2)
- 2.3. Report from Treasurer (Item 2-3)

Besides reporting on SGA finances, Lisa Wasitschek (Assistant of Treasurer) presented progress report on website changes including streamlining membership admission and administration process. Council

greatly appreciated progress on this important issue.

- 2.4. Report from Promotion Manager (Item 2-4)
- 2.5. Report from Chief Editor, SGA News (Item 2-5)
- 2.6. Report from Chief Editors, MD (Item 2-6)
- 2.7. Report from Chief Editor SGA Special Publications (Item 2-7)
- 2.8. Report from the Chief Editor SGA website (Item 2-8)
- 2.9. Report from the Chairman of the SGA Educational Fund (Item 2-9)
- 2.10. to 2.16 - Reports from Regional VPs: Asia - missing, Australia/Oceania - missing, Europe - missing, North Africa and Middle East – missing, Sub-Saharan Africa – missing, North America – missing, South America – presented by J.Pašava on behalf of Luis Fernando Páez Sinuco (Item 2-16)

Council expects to receive full missing reports at the next Council meeting.

After discussion, Council approved the presented reports with great thanks and suggested the following motions:

J.Pašava to finalize “Call for organizing the 20th SGA Biennial Meeting” and publish it on SGA website.

I.Pitcairn to create a Committee to propose criteria for selecting SGA Honorary Members.

SGA Council approved nomination prepared by Jan Pašava for SGA Honorary membership of David. L. Leach (USA) and nomination prepared by Bernd Lehmann for SGA Honorary membership of David Rickard (UK). They were both approved by the SGA Extraordinary General Assembly. S. Mikulski to inform both new SGA Honorary Members about their new status.

H. Frimmel/L. Wasitschek to offer a new category of membership – Senior member (without printed copy of Mineralium Deposita).

L.Wasitschek to advertise Council decision on creating a new category of SGA members who could be exempt from further SGA membership fees provided they have

reached a minimum age of 70 years and have been fully paid-up members of SGA for at least 30 years (pending motion).

L.Wasitschek with the help of SGA Council members to test and start new SGA website till the end of August 2025.

L.Wasitschek to adapt application form for SGA membership to add a box to allow members to indicate if they agree to be listed in membership directory.

S.Hagemann to put on registration form for the 19th SGA Biennial Meeting a click box to allow participants to agree to have his/her photos taken at the meeting displayed in SGA products (website, SGA News...).

David Banks to work jointly with SGA Council on the preparation of the SGA News no. 57. Council approved to continue with printing of reasonable number of SGA News. The deadline for submission of contributions for the upcoming issue of SGA News is November 30, 2025.

All Council members to consider or recommend someone for submitting main article for future SGA News.

All RVPs should provide regional conferences and student chapters with promotional material and manage/help with the booth during SGA Biennial Meetings. SGA Student Chapters can also ask directly SGA PM (S. Decree) for promotional items.

S.Decree in collaboration with H.Frimmel will look after replenishing of missing/new promotional items. S.Decree to discuss with J.Craig and A.Thompson on different types of promotional items that are of interest for members based on SEG experience.

J.Slack to continue supervising the preparation of two SGA special publications – “Uranium Deposits of Mongolia” and “Tectonics and Metallogeny of the Northern Sao Francisco Craton in Brazil”.

P. Mercier-Langevin and EF committee members to start soliciting targeted companies and key individuals for sponsorship to SGA EF in the fall 2025. These efforts will be coordinated with LOC of the 19th SGA Biennial Meeting (2027). 19th SGA biennial meeting sponsorship chair will be included as ex officio member of the EF committee.

All RVP's to encourage SGA Chapters to inform all students about possibility of publishing 300 words for undergraduate/graduate and 400-500 words for MSc and PhD theses in SGA News.

SGA Council decided that applications for SGA student membership can be accepted as long as an applicant can provide valid documentation of student status/enrollment without a time limit. L.Wasitschek to add this info to website.

SGA Council to work jointly with the SEG and IAGOD Councils towards a mutual benefit of their respective memberships.

Luis Paez to work with A. Vymazalová and other Council members to identify appropriate persons to meet the following requirements set up by Micromine Company before granting free licences for academic use only from SGA Student Chapters: (1) We need a person under the IT role, who will be responsible for managing the licenses; (2) a person in charge of the program; (3) a person responsible for evaluating the proposals coming from the members, as the only use for the licenses will be for academic purposes, such as thesis work, research programs, etc. (Luis offered to help with this, and also assist the individuals we choose as mentor). We must generate a simple report every 4 months to show that the licenses are being used.

3. The 18th SGA Biennial Meeting – update (K. Kelley)

The report was presented by K. Kelley (Item 3). The LOC received 538 registrations (297 professionals, 141 students; 26% of registrants are students). Nearly half of all registrations are in the US. But total number of countries represented exceeds 40. Many students and professionals not able to obtain visas cancelled. LOC obtained \$175,000 in donations, Coors requested to be exclusive provider of beer and hard cider products for the Welcome icebreaker - with additional wine, and non-alcoholic beverages provided by LOC. DREGS (Denver Region of Exploration Geologists Society) sponsored \$1500 for the CSM Museum Night. There were 97 oral presentations; some half days are only 3 concurrent sessions, rather than

four and 105 poster presentations. Twenty-two Keynote speakers participated in the meeting. There were 13 booths including SGA and SEG. There were 5 Plenary speakers and 7 running Field trips. Council highly appreciated the detailed report.

4. The 19th SGA Biennial Meeting – update (S. Hagemann)

The 19th SGA Biennial Meeting will be held in Perth, Australia from August 29 to September 2, 2027. Conference flyer was prepared and will be distributed at the 18th SGA Biennial Meeting in Golden (USA) and two presentations “Invitation to the 19th SGA Biennial Meeting” will be presented at the SGA GA and Closing Ceremony of the 18th SGA Biennial Meeting. The LOC/SGA2027 selected Encanta Event Management (EECW PTY LTD) to be officially responsible for organizing the SGA conference in Perth. The agreement between SGA and Encanta Event Management was signed in late July 2025 by SGA President and VP.

Council highly appreciated the presented report.

Action:

S.Hagemann to sign MOU between SGA and LOC/SGA2027, to submit for approval by SGA Council proposal for scientific and accompanied persons program and to start SGA 2027 website (in collaboration with SGA website manager).

5. The report from the Chairman of the Nominating Committee (S. Mikulski)

The report was presented by S.Mikulski (Item 5). After finalizing and Council approval, the list of nominated officers will go for SGA ballot by October 15, at the latest.

Action:

I.Pitcairn/L.Wasitschek to organize SGA ballot.

6. Status of development of SGA Student and Young Scientist network (A. Vymazalová)

The report was presented by A. Vymazalová (Item 6). In 2025 SGA has 11 active SGA Chapters: Baltic, Colombia Bogota and Bucaramanga, Erlangen, Kazakhstan, Nancy,

Peru, Prague, Senegal and re-established Morocco. In addition, 3 new SGA Chapters were established this year: Bolivia, Caldas-Colombia and China. Chapters in Russia (Moscow, NW Russia and Siberia) are kept as dormant. We keep listed as SGA Chapters: Barcelona, Cordoba, Laval, Turkey, UK, South Africa and W Australia but they are not active and did not provide reports neither lists of members. The La Plata SGA Chapter asked for re-establishment, and it was suggested to support them with EUR 500 for proposed activities. Council approved this request.

At the SGA General Assembly in Colorado there will be 7 SGA Chapter Representatives briefly presenting the Chapter.

The 18th SGA Biennial meeting Colorado, USA

Altogether 84 applications from 34 countries for travel grants, 25 applications for short courses and 33 applications for field trips were received. In total, 62 SGA students were awarded with travel grants and registration. There are a few cancellations either due to visa issues or because of some other circumstances, so we might expect to have about 50 granted students. In total for student program (including awards) SGA will spend about EUR 35 000.

Council highly appreciated the presented report.

Action:

A.Vymazalová to inform representative of the La Plata SGA Chapter on approval of both re-establishment and a budget of 500 EUR.

7. Requests for sponsorship

- The 20th Freiberg Short Course in Economic Geology “Mineral Systems and Metals Endowment of the Variscan Orogeny” (December 1-5, 2025 Freiberg, Germany) – requested EUR 2500 for student support - approved by Council
- Nordic Geological Winter Meeting (January 13-15, 2026 Turku, Finland) – I. Pitcairn and P. Eilu, SGA sponsored keynote speaker (J. Kolb) and booth – EUR 2,950 approved by Council

- Mineral Deposit Studies Group- MDSG 2026 (January 5-7, 2026 Cardiff, UK) – EUR 950 approved by Council in support of early registration fee for SGA student members
- The XXVI Bolivian Geological Congress (October 25-27, 2025) – EUR 3000 approved by Council in support of B. Lehmann (SGA keynote speaker)

8. Any other business

- The SGA Mobility Grant – update (T. Aiglsperger)
Council appreciated all efforts and thanked T. Aiglsperger and his team for looking after this important society product. Crystal Laflame will take over the position of T. Aiglsperger who was nominated for the position of RVP-Europe from January 1, 2026, if elected.
- The 10th SGA-UNESCO-IUGS-SEG Short Course on African Metallogeny (Algeria) – update (B. Orberger) – SGA received from IUGS USD 5,000 for this course

Council greatly appreciated all efforts of B. Orberger and her team who are preparing the 10th SGA-SEG-IUGS-UNESCO Short Course on African Metallogeny (May 31-June 5, 2026 Algiers, Algeria).

Call for the 20th SGA Biennial Meeting (2029) and revision of Guide for Organizing and Managing SGA Biennial Meetings (J. Pašava)

This item was presented by J. Pašava (Item 8-3). Council decided to adapt the Guide and add a new text proposed by T.Christie.

Action:

J. Pašava to publish a Call for the 20th SGA Biennial Meeting at SGA website.

- SGA-SEG collaboration (P. Mercier-Langevin, S. Mikulski, J. Pašava)

SGA Council was pleased by the active participation of both SEG President and Executive Director in the Council meeting and highly appreciated joint efforts that

resulted in the preparation and signing of the new MOU, which marks a new era in relations between the two societies.

- SGA Honorary Membership (J. Pašava, B. Lehmann)

Council enthusiastically approved both proposals for SGA Honorary Memberships.

9. Date and place of the next SGA Council meeting - venue and timing to be announced in due time.

10. Informative list of past activities

- The EGU General Assembly 2025 - session „Innovative Approaches in Mineral Exploration“ (April 27 – May 2, 2025 Vienna, Austria)
- ProEXPLO2025 (May 5-7, 2025 Lima, Peru) – E. Ferrari and Luis Fernando Paez Sinuco – SGA sponsored student awards – 1050 EUR, SGA keynote – F. Tornos, free SGA booth

Council approved that the three student winners will get free SGA membership for 2026 and that one of them who took part in the 18th SGA Biennial Meeting would get his registration fee reimbursed.

Action:

J. Pašava to inform relevant persons about Council decision.

11. Informative list of future activities

- The 18th SGA Biennial Meeting (August 3-7, 2025, Golden, Colorado, USA) – K. Kelley et al.
- The 19th MinPet meeting (September 21 to 23, 2025 Leoben, Austria) – SGA sponsored keynote speaker(s) – EUR 1,000 approved by Council
- The XXVI Bolivian Geological Congress (October 25-27, 2025) – B. Lehmann approved as SGA keynote speaker with a budget of up to EUR 3000

- XXVII SEG - SGA - UNESCO-IGCP Latin American Metallogeny Course/Curso Latinoamericano de Metalogenia SEG - SGA - UNESCO-IGCP

(4-7 November 2025 + field trips on 3 and from 8 to 10 November), Valdivia, ChContact: Dr. José Piquer (coordinador nacional), Instituto de Ciencias de la Tierra, Universidad Austral de Chile, Valdivia, Email: jose.piquer@uach.cl. A long-term support of USD 2500 approved via a joint SEG-SGA agreement; F. Tornos approved as SGA Representative on the Steering Committee for 3 years

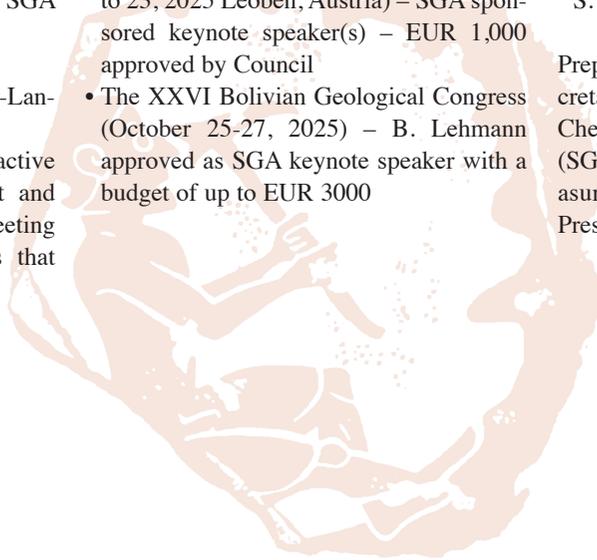
- The 20th Freiberg Short Course in Economic Geology “Mineral Systems and Metals

Endowment of the Variscan Orogeny” (December 1-5, 2025 Freiberg, Germany) – requested EUR 2500 for student support - approved by Council

- Nordic Geological Winter Meeting (January 13-15, 2026 Turku, Finland) – I. Pitcairn and P. Eilu, SGA sponsored keynote speaker (J. Kolb) and booth – EUR 2,950 approved by Council
- The 10th SGA-UNESCO-IUGS-SEG Short Course on African Metallogeny (Algeria, early 2026) – IUGS support – USD 5,000 approved by IUGS EC
- The 16th IAGOD Quadrennial Symposium (August 30 – September 2, 2026 Porto, Portugal)
- The 19th SGA Biennial Meeting (August 29-September 2, 2027 Perth, Australia) – S. Hagemann et al.

Prepared by J. Pašava (SGA Executive Secretary) In Prague, August 26th, 2025

Checked and approved by S. Mikulski (SGA President), H. Frimmel (SGA Treasurer), P.Mercier-Langevin (SGA Vice President).





Participants of the SGA Hybrid Council Meeting (August 3, 2025) in Green Center of the Colorado School of Mines, Golden, CO, USA.

Back row from left to right: S. Mikulski (SGA President), J. Pašava (SGA Executive Secretary), S. Decree (SGA Promotion Manager), J. Craig (SEG Executive Director, ex-officio SGA Council member), K.D. Kelley (Chair, LOC, 18th SGA Biennial Meeting and Chief Editor, Mineralium Deposita, North American Office), J. Slack (Chief Editor, SGA Special Publications), T. Christie (SGA Council member), A. Vymazalová (SGA VP for Student Affairs), and H. Frimmel (SGA Treasurer).

Front row from left to right: P. Mercier-Langevin (SGA Vice-President), N. Saintilan (SGA Council member), C. Laflamme (SGA Council member), A. Thompson (SEG President, ex-officio SGA Council member), and P. Garofalo (SGA Council member).

Smart Exploration Research Centre

We are proud to announce the opening of the Smart Exploration Research Centre, a centre for knowledge and innovation for exploration of critical raw materials funded from 2024-2029 by the Swedish Foundation for Strategic Research. The centre comprises a consortium in academic institutions and industry partners in Sweden and is hosted by Uppsala University. See the homepage: www.smartexploration.se for more details and contact information.

Minutes of the Extraordinary General Assembly

Jan Pašava (SGA Executive Secretary)

The meeting was opened by the SGA Executive Secretary, Jan Pašava at 14:30 (local time). Following Article VII, Section 2 of the SGA Constitution, it was found that there was no quorum reached in the room and the Executive Secretary called immediately for an Extraordinary General Assembly. Then he presented the suggested Agenda, which was approved. The Extraordinary General Assembly was attended by about 86 people and closed at 15:30 (local time).

1. Report of the President (S. Mikulski)

The President's report covered the period from the previous SGA General Assembly (August 30, 2023, Zurich) to date. The President highlighted that SGA continued to be a globally recognized society with a large membership (varying between 1100 and 1400 members during past few years, distributed in more than 60 countries), which is financially healthy and contributes to the training of the next generation of economic geologists through the SGA Educational Fund. He also emphasized the vibrant and growing student chapters and high impact factor (4.9 in 2024) for SGA's flagship scientific journal *Mineralium Deposita*, highly-ranked special publications, and cutting-edge workshops and short courses offered by SGA. He also informed about a new MoU signed between SGA and SGA which marks a new era in relationship of both societies. Widely attended, high-quality Biennial meetings have become a traditional and important part of SGA since 1991, and he invited all SGA members to the 19th SGA Biennial Meeting, which will be held in Perth, Australia August 29 to September 2, 2027. He also briefly informed about activities of the Nominating Committee, preparing a list of officers for the upcoming SGA ballot. Jan Pašava then thanked the present SGA President for his extraordinary work for SGA.

The report was unanimously approved by the Extraordinary General Assembly.

2. Report of the Treasurer (H. Frimmel)

H. Frimmel presented the financial reports for 2023 and 2024. SGA holds two accounts, one for the day-to-day running of the Society and one for the SGA Educational Fund (SGA-EF). The former account is with UBS (formerly Credit Suisse). The SGA-EF account used to be also with Credit Suisse but was moved to PostFinance, also in Switzerland, in March 2021. The balance of the SGA account brought forward from 2022 was 738,794.78 € and on 31/12/2023 it was € 37,697.52. In addition, a total of 5,004.08 € was brought forward in the SGA office accounts with the SGA Executive Secretary and the Editorial offices by the end of 2022 and of 4,972.73 € by the end of 2023. The balance of the account of the SGA Educational Fund on 31/12/2022 was 248,307.96 € and on 31/12/2023 it was 447,832.40 €. By the end of 2024, 77,758.69 € were held in the SGA account with UBS, 169,228.77 € in the SGA EF account with Postfinance, 7,728.67 € in the various SGA office accounts, and 720,000.00 € as fixed-term investments with UBS. A comparison of the end-of-year balances of both SGA accounts over the past 19 years shows that the SGA finances remain steady after a period of financial consolidation in the 2000's. All SGA financial accounts for the years 2023 and 2024 were audited by two SGA members who do not serve on Council (as per SGA Constitution). These were Prof. Dr. A. Gilg (Germany) and Prof. Dr. J. Raith (Austria) both of whom did not find any discrepancies with the accounting. J. Pašava then thanked the SGA Treasurer for keeping Society finances in such a good shape. The report was unanimously approved by the Extraordinary General Assembly.

3. Report on activities of SGA Chapters (Representatives of Chapters)

This item was coordinated by A. Vymazalová (Vice President, Student Affairs). At present, SGA has 11 active chapters and additional 3 new chapters (Bolivia,

Caldas-Columbia and China) were established in 2025, in total 21 chapters. It should be noted that student members represent over 40% of all SGA membership. Altogether, 7 representatives of student chapters briefly presented their activities and expressed their thanks for continued support by SGA Council. The report was unanimously approved by the Extraordinary General Assembly.

4. SGA Honorary Membership

This item was presented by J. Pašava, who introduced D.L. Leach, nominated by J. Pašava, and D. Rickard, nominated by B. Lehmann, for Honorary Membership. Both nominations were approved by SGA Council and also by Extraordinary SGA GA. SGA President will inform both distinguished personalities about their acceptance as Honorary Members.

5. Invitation to the 19th SGA Biennial Meeting

Steffen Hagemann (Chair of the LOC/SGA 2027) briefly invited all SGA membership to Perth, Australia, where the 19th SGA Biennial Meeting will be held from August 29 to September 2, 2027. He also encouraged audience to propose sessions/workshops/short courses and informed that a conference website will be launched in late 2025.

6. Other business

As Jan Pašava (SGA ES) decided, after 27 years on duty, to resign from his position of SGA Executive Secretary at the end of 2025, he thanked all SGA officers and membership for the opportunity he was given to volunteer for the society in such a critical role. Similarly, Bernd Lehmann decided to step down from his position of Chief Editor, MD after 26 year on duty. S. Mikulski (SGA President) thanked both officers for their long-term devoted and exemplary performance.

The Extraordinary General Assembly was closed at 15:10 CET as no other business was raised by the SGA members present.

Prepared by J. Pašava (SGA Executive Secretary) In Prague, August 26th, 2025

Checked and approved by S. Mikulski (SGA President), H. Frimmel (SGA Treasurer), and P. Mercier-Langevin (SGA Vice President)



Stanislaw Mikulski (SGA President) with Jan Pašava (SGA Executive Secretary) and Bernd Lehmann (Chief Editor, *Mineralium Deposita*) after thanking them for their long-term devoted and exemplary service to SGA.

Dear Friends and Colleagues,

After 27 years on duty and with the approaching end of my Executive Secretary position (December 31, 2025), I wish to express my deepest, most heartfelt gratitude to all of you and, specifically, to the Society for Geology Applied to Mineral Deposits (SGA) for the remarkable opportunity afforded to me, beginning in 1997 when I first served as SGA Vice President, followed shortly thereafter, in 1998, by my appointment as Executive Secretary of the Society.

My involvement with the SGA, however, truly commenced upon my return from a postdoctoral fellowship in Canada in 1993. In Prague, I had the pleasure of meeting Dr. Zdeněk Johan (at that time, Scientific Director of the BRGM/Orléans and a member of the SGA Council), who approached me about undertaking the organization of the 3rd SGA Biennial Meeting in collaboration with other Czech colleagues. In the autumn of that same year, as a newly accepted member of the SGA, I attended the 2nd

SGA Biennial Meeting in Granada. It was there that Dr. Johan introduced me to the Council with the proposal that I become the principal organizer of the 3rd SGA Biennial Meeting (scheduled for 1995), since he was in nomination to become the SGA President for the 1995–1996 term.

Working alongside fourteen Presidents, three Treasurers, five Promotion Managers, six Chief Editors of *Mineralium Deposita*, four Chief Editors of the SGA website, and countless other dedicated SGA Officers and SGA Chapter representatives, has been an immense and incredibly rewarding life experience. All individuals—many of whom became very good friends—deserve my profound admiration and appreciation. However, this was possible only thanks to the long-term support by SGA membership! I also want to thank the officers of our sister societies—the SEG and IAGOD—as well as representatives of IUGS, UNESCO, and other institutions, societies, and industry with whom I've had the pleasure of collaborating over the years.

While some might say, “If I had known the sheer volume of work involved, I would never have accepted the position!”, I have never regretted volunteering my time for the SGA. To me, the SGA became a part of my life and my family. This wouldn't have been possible without the understanding and support of my wife and children and the management of the Czech Geological Survey.

It was very difficult for me to make the decision to step down from my position, but I am confident that this was the right choice—both for me personally and for the SGA. I need to slow down, and the SGA requires renewal through fresh perspectives and new leadership. I am staying with you, guys! I am not leaving my SGA Family!

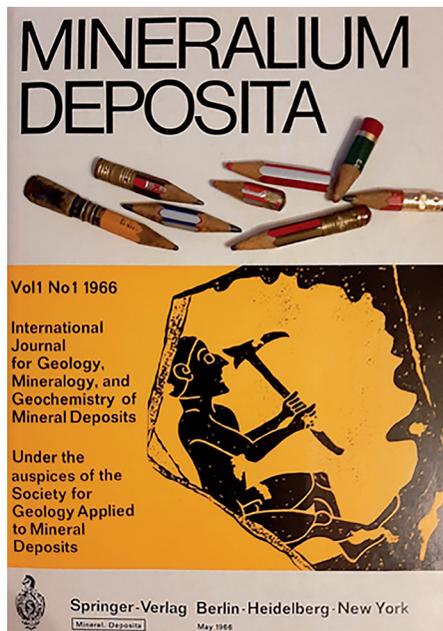
Jan Pašava
Former SGA Executive Secretary

Thank you to editors, authors and readers of Mineralium Deposita

Bernd Lehmann, Mineral Resources,
Technische Universität Clausthal,
38678 Clausthal-Zellerfeld, Germany;
bernd.lehmann@tu-clausthal.de

With the silver anniversary of my editorship now passed, I would like to thank the many people who helped edit the journal over the years, as well as our authors and readers. I would also like to thank all SGA officers for their trust and constant support over the years, and the professional staff of the publisher.

I learned about the journal through my PhD supervisor, Hans-Jochen Schneider in Berlin, who served as Editor-in-Chief of Mineralium Deposita from 1980 to 1990. At that time, editing was done entirely by pencil on paper, but the essential elements were the same as today: reading, striving to understand, and ultimately strengthening the impact of a manuscript. The first issue of Mineralium Deposita appeared in May 1966, and the then Chief Editor Paul Ramdohr in his Editorial placed his role of decision-making in the perspective of the classical Greek philosopher Heraclitus, with the awareness that everything is constantly in a state of flux (Greek: *pantha rhei*), as opposed to a more common static (or dogmatic) view of reality. This relativistic perspective provides space for uncommon ideas, as long as they are capable of sustained argument, and has been an important feature of the journal - hopefully to this day. I joined the SGA in 1987, when I returned to university after several years as an exploration geologist in Central Africa and Southeast Asia, and I joined the Mineralium Deposita editorial board in 1995. When Chief Editor David Rickard resigned in 1999, he suggested me as his successor. I was then elected in a very tight vote by the SGA Council and began my role as Chief Editor (Europe) in January 2000, together with Rich Goldfarb for the North American office. Rich resigned in 2002, and was succeeded by Larry Meinert (2003-2008), Pat Williams (2008-2012), Georges Beaudoin (2012-2022), and finally Karen Kelley (2023 onward).

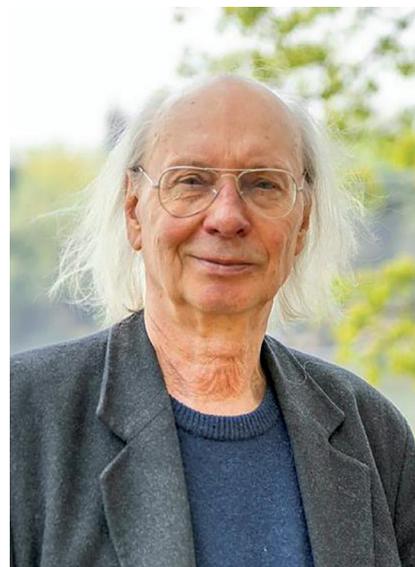


*Pencil stubs from early editing work:
Legacy Prof. H.-J. Schneider,
Chief Editor 1980-1999.*

Over the 26 years on duty, the journal changed significantly, as did the world. Some details on journal's history and performance are provided in our Editorials, referenced below. Happily, the journal is firmly established within the economic geology community and beyond, and is respected internationally for its balanced and high-quality content. The scientific success of the journal is due to the dedicated work of an editorial board of 20-30 associate editors and hundreds of referees, all working on an honorary basis. Their task is both demanding and essential: selecting approximately 80 manuscripts for publication each year from now roughly 400 submissions, and guiding them to a publishable standard.

My successor, David Banks, is an experienced editor and seasoned scientist. I am sure that he, together with Karen Kelley, will maintain the high standards of the journal and guide it toward new ideas and new perspectives. I wish them every success, and I look forward to watching the journal continue to grow.

Some information on journal history and evolution is in various Editorials, such as:



*Prof. Bernd Lehmann, April 2004.
(Photo by Prof. Yang Li in Beijing.)*



Jan Pasava in the Rockies, 2005.

Lehmann B, Beaudoin G (2015) 50 years Mineralium Deposita. *Miner Deposita* 50: 1-3.

Lehmann B, Kelley KD, Beaudoin G (2023) Mineralium Deposita: Editorial changes and journal performance. *Miner Deposita* 58: 1-3.

SGA Awards at the 18th Biennial Meeting in Golden, Colorado, USA

Jan Pašava (SGA Executive Secretary, SGA Executive Secretary, Czech Geological Survey, Prague)

As at past SGA Biennial Meetings, the Awards Ceremony was a part of the Opening Ceremony at the 18th SGA Biennial in Golden, Colorado, USA. The following SGA awards were presented during the Opening Ceremony, which was held on August 4, 2025 from 9,30 to 10,30 and attended by Karen Kelley (Chair of the LOC-SGA 2025), Stanislaw Mikulski (SGA President), Jan Pašava (SGA Executive Secretary who guided the Award Ceremony), Leendert Krol (on behalf of Krol's family) and numerous meeting participants:

The SGA-Newmont Gold Medal

The SGA-NEWMONT Gold Medal was established in 2006 to be awarded biannually primarily in recognition of a full career in performance of „unusually original work in the mineral deposit sector, which shall be broadly interpreted to encompass major contributions to (1) the science through research and (2) the development of mineral resources through mine geology, exploration and discovery. The award consists of a citation, pure gold medal, and reasonable travel and accommodation costs for attendance of the SGA Biennial Meeting.

The first recipient of this most prestigious award was Dr. Zdeněk JOHAN† (France) at the 9th SGA Biennial Meeting in Dublin, Ireland (2007).

The second recipient of the SGA-Newmont Gold Medal became Dr. Shunso ISHIHARA† (Japan) at the 10th SGA Biennial Meeting in Townsville, Australia (2009).

The third recipient of the SGA-Newmont Gold Medal became Dr. David GROVES at the 11th SGA Biennial Meeting in Antofagasta, Chile (2011).

The fourth recipient of the SGA-Newmont Gold Medal became Dr. Michel CUNNEY at the 12th SGA Biennial Meeting in Uppsala, Sweden.

The fifth recipient of the SGA-Newmont Gold Medal became Dr. Steve D. SCOTT†

at the 13th SGA Biennial Meeting in Nancy, France.

The sixth recipient of the SGA-Newmont Gold Medal became Dr. David LEACH at the 14th SGA Biennial Meeting in Quebec City, Canada.

The seventh recipient of the SGA-Newmont Gold Medal became Dr. Richard H. SILLITOE at the 15th SGA Biennial Meeting in Glasgow, Scotland, UK.

The eighth recipient of the SGA-Newmont Gold Medal became Dr. Richard J. GOLDFARB at the 16th SGA Biennial Meeting in Rotorua, New Zealand.

The ninth recipient of the SGA-Newmont Gold Medal became Dr. Lluís FONTBOTÉ at the 17th SGA Biennial Meeting in Zurich, Switzerland.

The tenth recipient of the SGA-Newmont Gold Medal became Dr. Christoph HEINRICH who was nominated by Georges Beaudoin and finally selected by SGA Council out of four proposed candidates. After introduction and explanation of the history of the medal Jan Pašava announced the awardee whose citation was presented by Georges Beaudoin. Then Christoph Heinrich, who accepted the award, presented the acceptance speech. The following citation was prepared and delivered by Georges Beaudoin (Laval University, Québec City, Canada):

Minister the President of the SGA, SGA members and delegates of the 18th SGA Biennial Meeting. On this 60th anniversary of our society, it is my honor, and my privilege to introduce the 2025 awardee of SGA-Newmont Gold medal, the highest honour of our society.

Prof. Emeritus Heinrich obtained his PhD from ETH-Zurich in 1983 before carrying post-doctoral research in Australia and New Zealand. Christoph Heinrich has been Professor of Mineral Resources at ETH-Zurich and Universität Zurich from 1994 until his retirement and being anointed Professor Emeritus. During his tenure, Prof. Heinrich

made highly significant contributions to the understanding of mineral deposits, as shown by his stellar publication record, cited over 28 000 times. This has been made possible by combining careful and detailed field and microscopic characterization of mineralization in important deposits around the world. He has been a driving force in developing in situ chemical analysis by laser-ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). These newly developed, cutting-edge techniques enabled him and his team to measure the chemical composition of fluid and melt inclusions, which provide crucial data to constrain metal transport and partitioning in magmatic-hydrothermal systems. Combining this information with carefully detailed geological observation enabled him and his students to explain key factors leading to metal deposition in magmatic-hydrothermal systems. These high-quality data have been combined with advanced numerical modelling of fluid flow and thermodynamic constraints on fluids compositions and phase relations, as in the H₂O-NaCl system critical for hydrothermal fluids, to provide enhanced and integrated understanding of geological processes forming mineral deposits.

In addition to these seminal scientific contributions, Prof. Heinrich has been a mentor that forged generations of students who are now top-level academics all around the world carrying on his legacy in the field of the magmatic-hydrothermal deposits. He has been a long term member of the of the SGA, serving on Council and the Editorial Board of Mineralium Deposita, numerous funding boards and other scientific societies.

I am joined by Fernando Tornos, Massimo Chiaradia, Jeffrey Hedenquist and Anthony Williams-Jones in presenting to you Professor Christoph Heinrich, a most worthy recipient of the SGA Gold Medal. Congratulations Stoeff!



Presentation of the SGA-Newmont Gold medal during the Award Ceremony of the 18th SGA Biennial Meeting in Golden, Colorado, USA. From left to right: Georges Beuadoin (nominator), Christoph Heinrich (recipient of the award), Stanislaw Mikulski (SGA President) and Jan Pašava (SGA Executive Secretary).

Photo by Beliee Strang.

The following acceptance speech was delivered by Christoph Heinrich:

Dear President Stanislaw Mikulski, dear George and all those who supported my nomination for this greatest award of SGA, dear friends and students: I would like to thank you all sincerely for this wonderful medal, and thank you all for being here!

Thank you, George, for your generous citation! You summarized the academic stations of my working life, I just would like to add one decisive point: Skiing together in Switzerland was a key for getting to know you and your wife Anne and daughter Caroline — before you all got too fast for me!

Medal citations tend to come across as if the person honoured was a real genius designing his career. I would like to divert a bit from that impression and emphasise that fortunate circumstances are probably more important. Call it good luck or just coincidence, call it helpful angels if you are spiritually inclined. An angel, yes, but in flesh and blood with immense energy

and patience, was my dear wife Angela: you entered my life very early on — also through a fortunate family connection — and then became my biggest support, sharing our job decisions while keeping up our family, your own jobs and our home on two different continents. Fortunate opportunities also mean, sadly, that many more people, young and old, are just as deserving of this big award as me, but missed out for no good reason. Sure, one has to pick one's chances when they come up, one has to work hard on developing opportunities, but the older I get the more I question my influence and the more grateful I am for my good fortune.

Opportunities are about people. I was particularly lucky meeting all my students and postdocs, who did most of the research work cited today, and even much of the educational contribution — by working together, teaching me and organising joint field trips, commonly with international participation though SGA and SEG student chapters. I had some active mentors like Volkmar Trommsdorff, Alan Thompson, Peter Eadington and Mike Solomon, and

I met others who helped creating opportunities that opened just in the right time for me. Andy White from Comalco, who had offered me a student geologist's job even before my PhD, was the reason why I later went back to Australia, to leave the all-too-academic Alpine petrology behind and make my first timid steps into ore deposits at CSIRO in Sydney. Later in Canberra, John Walshe was a great sounding board for ideas about granite-related and basin-hosted ore deposits, even though we hardly wrote anything together. Vic Wall had led Mount Isa Mines, the first company who supported me in Australia, to acquire Bajo de la Alumbrera in Argentina in the mid-nineties, so this became the target of my first PhD student at ETH on a porphyry copper deposit. The magmatic system around Alumbrera turned out to be an outstanding study object for many later projects by a row of students and collaborators. With Terry Seward I had worked in New Zealand for barely half a year, to get a sniff of fluid experimentation, just before he was appointed professor of geochemistry at ETH Zürich. There he helped convincing the school that ETH needs a field-oriented economic geologist, at a time that was just right for me to apply and then start to develop our new group of geologists, chemists and physicists in Switzerland some 30 years ago.

Economic geology links many interacting Earth processes with each other, it links basic physics and chemistry to field observation across all scales from single crystals to mountain belts and sedimentary basins. Field geology has always been my inspiration to identify interesting questions, and field excursions were also the entry point attracting most of the students who worked with me for their BSc, MSc, PhD and postdoc projects. Resource geology, from field to sample investigation in the lab, links basic curiosity about how Nature works with the practical needs of people on this planet, with all its complexities and potential conflicts when we try to contribute a little bit to the many critical steps from exploration targeting to the responsible management of a mine. Our science is also the basis for conveying these challenges to people outside our field of specialisation,



*Presentation of the acceptance speech by Christoph Heinrich.
Photo by Beliee Strang.*

from students in other disciplines to the public at large. Presentations at ETH and University of Geneva to a broad range of students included the famous course that Georges Beaudoin gave every year on mineral economics and exploration practice; also the focusTerra exhibition and outreach centre, which I developed with colleagues from all parts of geoscience at ETH Zurich.

The challenge of resource supply has changed from a period of panic where some people warned of immediate 'running out' of metals (which has never happened and which is counter to all geological evidence) through a period of relative complacency ('geological resources abound, science and technology just need to find and develop them'). Indeed, geological availability is not the main challenge today, but with climate change mitigation demanding a rapid timescale of reducing CO₂ emission, the rate of accessing new mineral resources at the vast scale necessary for the energy transition from fossil to renewable has come into focus. How fast can we find,

develop and market the geologically available resources, by how much do we need to speed up this rate to achieve the goal in time? Some voices say that the slow rate of mine implementation will prevent the energy transition, even if political decisions like a global CO₂ tax were implemented today. This not only calls for an increase in finding rare metals, but also for getting prepared to supply new technology with alternative materials that may be less rare. For this we need experienced and intellectually flexible field explorers and new mapping technologies, but also a deeper understanding of processes leading to the formation of resources and their global distribution. Academia needs to help preparing for future changes in exploration targeting, as the importance of what we now consider 'critical metals' may be superseded when new technology demands different commodities.

Once again, many thanks for this great Gold Medal! I suggest we all take it as a broader sign of support for all who try confronting the world's complex challenges

with scientific curiosity, but also have respect for the limitation of their personal influence.

Christoph Heinrich
August 4 2025,
Golden Colorado USA

The SGA-KGHH Krol Medal

The objective of this new award is to recognize outstanding service to the Society. The medal is to be awarded to worthy candidates at SGA Biennial Meetings and also on ad hoc basis.

This award was for the first time presented at the SGA 2015 Anniversary Meeting in Nancy. The medal is named after Gerardus L. Krol (1912-1984) who played a key role in the foundation and development of the Society and became its first President. The award consists of a medal minted from three troy ounces of pure silver, citation and reasonable travel and accommodation costs to the place of presentation of the award.

The first recipient of this award became Dr. Francis SAUPÉ from France in 2015.

The second recipient of this award became Dr. Maurice PAGEL from France in 2017.

The third recipient of this award became Dr. David LEACH from USA in 2019.

The fourth recipient of this award became Dr. Jorge MRS RELVAS from Portugal in 2021.

The fifth recipient of this award became Dr. Fernando TORNOS from Spain in 2023.

The sixth recipient of this prestigious Society award became Dr. Peter HERZIG (Germany), nominated by Jan Pašava. After introduction and explanation of the history of the award, J. Pašava announced the awardee and presented his citation. Peter Herzig, who accepted the award, presented the acceptance speech.



Presentation of the SGA-KGHM Krol Medal at the 18th SGA Biennial Meeting in Golden, Colorado, USA. From right to left: Jan Pašava (SGA Executive Secretary), Peter Herzig (recipient of the award), Leendert Krol (son of Gerardus L. Krol), Stanislaw Mikulski (SGA President).

Photo by Bellee Strang

The following citation was presented by Jan Pašava:

Mr. President, Ladies and Gentlemen,

I am honoured to present the citation of Prof. Peter Herzig – the sixth recipient of the prestigious SGA-KGHM KROL-MEDAL. This nomination was supported by Dr. David Leach (Past President), Prof. Mark Hannington (University of Ottawa) and Prof. Lluís Fontboté (University of Geneva).

I should also note that we are lucky to have Leendert Krol, the son of Gerardus Krol (the first SGA President after whom the medal was named), here with his wife today who kindly agreed to participate in this award ceremony.

Peter Herzig was born in Wesel/Rhine, Germany in 1954. After elementary and high school education, he attended the Aachen University of Technology where he studied economic geology and from which he graduated in 1983. He received his Ph.D. in 1986 from the same university after defending a thesis on „Hydrothermal Alteration and Sulfide Mineralization of the Agropkipia deposit, Troodos Ophiolite Complex, Cyprus“.

After two years on a prestigious Alexander von Humboldt Postdoctoral Fellowship at the University of Toronto in Canada (1987-1988), he returned to Aachen where he became Assistant Professor in 1989 and Associate Professor in 1992.

In 1993 he received a Full Professorship at Freiberg University of Mining and Technology where he remained until 2003 (from 1997 to 1999 he has served as Dean of this University). He was also Adjunct Professor at the University of Laval (Quebec City from 2001 to 2004) and Visiting Professor at the Southampton Oceanographic Centre (2002-2003).

In 2003 he moved from Freiberg to Kiel, where he became Full Professor at the University of Kiel and from 2004 to 2011 he was Director and CEO of the Leibniz Institute of Marine Sciences (IFM-GEOMAR). Since 2012 he has acted as Executive Director of GEOMAR Helmholtz Centre for Ocean Research in Kiel.

His scientific interests cover mineralogy, geochemistry and isotopes of marine hydrothermal systems including polymetallic hydrothermal sulfides at the seafloor and the distribution of gold and precious metals in VMS and epithermal systems.

Since 1983 he participated in 25 marine research expeditions in the Pacific, Atlantic, Indian, and Antarctic Ocean mostly as Chief Scientist. Interestingly, he was 6.000 meters below sea-level in the French submersible Nautilie. Peter Herzig is the author or co-author of more than 230 scientific publications including about 60 peer reviewed articles (3 x Nature) and 12 books and/or book contributions.

As a science manager Peter Herzig often traveled throughout the world to conferences and meetings representing GEOMAR as one of the leading ocean research and technology centers, and also since 2015, frequently as Vice-President of the Helmholtz Association. In 2017 he and his colleagues were able to negotiate a long-term research contract involving a 3.4 million Euro agreement with the Sultanate of Oman.

Due to his high international reputation he coordinated or was a member of various German and international committees, advisory and expert bodies.

For example, since 2007 he has been appointed Maritime Ambassador of the European Commission in Brussels, was a member of the Board of Governors of the German Geological Survey BGR in Hanover and since 2004 Maritime Coordinator of the Federal State of Schleswig-Holstein. He is a front person in coordinating German efforts in assessing the possibility of the commercial extraction of deep-sea raw materials.

During his teaching career he directed or co-directed many PhD theses. Peter Herzig also received numerous honors and awards (e.g., Max Planck Research Award from the Alexander v. Humboldt Foundation in 1991, Victor Moritz Goldschmidt Award from the German Mineralogical Association in 1993, Gottfried Wilhelm Leibniz Research Award from the German Science Foundation (2.5 million Euro) in 2000, and the Order of Merit of the Federal State of Schleswig-Holstein in 2010. In 2005, Peter Herzig became Elected Member of the National Academy of Science and Engineering. And in 2015 he received the First Class Order of Merit of the Federal Republic of Germany from the German President.

Peter Herzig is one of the key persons who played an important role in the development of the SGA. As an excellent scientist with a strong focus on seafloor mineral deposits he was invited to the Editorial Board of Mineralium Deposita where he served from 1992 to 1999.

In 1995 he was nominated and elected as the SGA Treasurer and served in this position until 2005, replacing Prof. Rudolf Hoell. During his ten-year term he successfully implemented a new financial policy which improved SGA's financial standing which in turn helped to make SGA internationally visible via sponsorships of various economic geology events.

From his executive position he was actively involved not only in routine SGA administration but also in the logistical support and/or co-organization of six SGA Biennial Meetings. During his term he was jointly with David Ricard (Chief Editor, MD) and Maurice Pagel (former SGA Executive Secretary) also involved in establishing new relationships with Springer Publishing House and later on actively collaborated with David Leach (SGA President) and myself (SGA ES) on the further international development of the Society.

Peter Herzig is surely one of those pillars on which SGA managed to build its success and on behalf of SGA, I would like to thank him for all his efforts in favour of SGA and congratulate him on this and other successes, wishing him all the best in his professional and private endeavours.

Thank you for your attention and welcome again to Peter Herzig and Leendert Krol.



Acceptance speech was presented by Peter Herzig. Photo by Beliee Strang.

The following acceptance speech was delivered by Peter Herzig:

Mr. President, ladies and gentlemen, dear friends and colleagues and, in particular, dear members of the Krol family!

As you can imagine, it is a great pleasure and honor for me to be here in Golden today in order to receive the 2025 Krol Medal of SGA.

According to the SGA website the Krol medal is awarded to individuals who have provided outstanding service to the development of the Society. I am not sure if I really deserve this award but I am of course very happy about this unexpected honor and I would like to thank everyone who made it possible for me to receive this medal here today and, what is equally important, to meet old friends and colleagues. In particular I like to thank Jan Pašava for nominating me and for his kind words and the Council of SGA for its decision to honor me here today on the occasion of the 60th anniversary of SGA.

As we have heard, my service to the Society dates back more than 20 years as I have been Treasurer of SGA for 10 years from 1995-2005 and a long-standing member of the Editorial Board of Mineralium Deposita.

However, in 2004, I was appointed Director and Chief Executive of the German Ocean Research Center GEOMAR in Kiel which actually was the start of a second career as a science manager, responsible for a staff of more 1.000 employees.

You may wonder how it happens that an Economic Geologist becomes head of a marine research center? It actually began after my Masters in Economic Geology at Aachen University in Germany in 1983, supervised by Günther Friedrich, whom some of you may still remember, as he was a great supporter of SGA and Mineralium Deposita. At this time, 1983, shortly after the discovery of the first black smokers at the East Pacific Rise 21°N, I got the chance to join the first exploration campaign for seafloor massive sulfide deposits in the Indian Ocean which was actually my first step from The so-called GEMINO project (Geothermal Metallogenesis Indian Ocean) consisted of 3 research cruises on the famous German research vessel SONNE between 1983-1986. As a result, after 3 cruises and 165 days at sea, we discovered evidence for a hydrothermal site near the southern Mid-Indian Ridge at the Rodriguez Triple Junction which today is an official exploration license of Germany registered at the International Seabed Authority in Jamaica.

This work at sea was followed by my Ph.D. in Economic Geology in 1986 on,



back to land, the ancient analogs of seafloor massive sulfide deposits in the Troodos Ophiolite of Cyprus.

All this finally got me to the University of Toronto as a post-doc of Steve Scott in 1987 where I met my friend and colleague Mark Hannington, who is here today as well, and who at this time, as a Ph.D. student, discovered the first grains of native gold in seafloor massive sulfides which he subsequently published in Nature and which was the beginning of Mark's remarkable career.

The research in Toronto was almost exclusively devoted to seafloor sulfides and hydrothermal systems driven by the enthusiasm and dedication of Steve Scott to whom I am still very grateful and who became a member of the Canadian Mining Hall of Fame after he passed away in 2019.

After about 2 years in Toronto and back in Germany I was appointed Chair of Economic Geology at Freiberg University of Mining and Technology in 1994, where I started my own seafloor exploration programs to the Southwest Pacific (Papua New Guinea), the Northeast Pacific (Juan de Fuca Ridge) and finally to the Bransfield Strait in Antarctica - all of them together with Mark Hannington and Ian Jonasson of the Geological Survey of Canada. All this explains how and why I slowly converted from a land-based to a seafloor Economic Geologist which, after a visiting professorship at the National Oceanography Centre in Southampton, finally got me to Kiel to become head of GEOMAR in 2004.

When I arrived in Kiel I quickly realized that the research focus was mainly on oceanography, meteorology, marine biology, marine chemistry and marine geology and that research on marine mineral resources was clearly underdeveloped. Therefore I have sent a message to Mark Hannington at the University of Ottawa asking him of what it would take to get him to GEOMAR to build up a Marine Minerals Group.

What I got back immediately was photograph of a red Porsche!

We did not get him a red Porsche but a decent salary and an excellence professorship for 6 years during which Mark build up the Marine Minerals Group and was leading a major expedition to the territorial waters of Papua New Guinea. When I retired from GEOMAR in 2020, Mark returned to his professorship at the University of Ottawa. And today the cir-

cle closes as we are both here to celebrate the 60th anniversary of SGA.

This brings me to the end of my little review and I like to finish with a quote from Mark Twain who once said:

“A good speech has a good beginning and a good ending – and both should be as close together as possible”.

In this sense, once again, thank you very much for the Krol Medal and for your kind attention!

Petre Herzig

August 4, 2025 Golden, Colorado, USA

The SGA Young Scientist Award

Originally, SGA Young Scientist Award (2003-2006) then the SGA-Barrick Young Scientist Award (2007-2015) changed back to the SGA Young Scientist Award from 2017. The award is offered biannually to a young scientist who has contributed significantly to the understanding of mineral deposits. It consists of a citation, certificate, EUR 1500 and reasonable travel and accommodation costs to the place of the Biennial Meeting for the presentation. The award is based mostly upon senior-authored papers published early in the candidate's career. To be eligible for this award, the awardee must be less than 40 years on 1st January in the year of the nomination and the respective upcoming SGA Biennial Meeting.

The first recipient of this award was Dr. Noreen VIELREICHER (Australia) – 2003

The second recipient of this award was Dr. Alexandre Raphael CABRAL (Brazil) – 2005

The third recipient of this award was Dr. Gilles LEVRESSE (France) - 2007

The fourth recipient of this award was Dr. David HOLWELL (UK) - 2009

The fifth recipient of this award was Dr. Kalin KOUZMANOV (Bulgaria) - 2011.

The sixth recipient of this award was Dr. David DOLEJŠ (Czech Republic) – 2013.

The seventh recipient of this award was Dr. Huayong CHEN (China) – 2015.

The eighth recipient of this award was Dr. Sarah DARE (Canada) – 2017.

The ninth recipient of this award was Dr. Crystal LAFLAMME (Canada) – 2019.

The tenth recipient of this award was Dr. Matthew STEELE-MACINNIS (Canada) - 2021

The eleventh recipient of this award was Dr. Clifford PATTEN (Canada) – 2023.

presented by Lluís Fontboté:

The twelfth recipient of the SGA Young Scientist Award became Dr. Cyril CHELLE-MICHOU (Switzerland) who was nominated by Massimo Chiaradia and finally selected by SGA Council out of five candidates. After introduction and explanation of the history of the award Jan Pašava announced the awardee whose citation was presented on behalf of Massimo Chiaradia by Lluís Fontboté. Then Cyril Chelle-Michou, who accepted the award, presented the acceptance speech.

The following citation was prepared and presented by Professor Lluís Fontboté

Dear President, dear SGA and SEG presidents, members, colleagues, friends.

It is with great pleasure that I introduce Cyril Chelle-Michou as the recipient of the 2025 SGA Young Scientist award.

Professor Massimo Chiaradia could not make it to Golden and has asked me to present Cyril. A personal note as introduction: I met the first time Cyril in Luleå, in northern Sweden, when he was working in mineral exploration for Boliden after Bachelor in Nancy, France and Master in Luleå. At that time I could not imagine that after moving to New Caledonia to work as geologist in a Ni-Co laterite mine, a few years later Cyril would come to Geneva to start a thesis with Massimo Chiaradia.

To have Cyril in Geneva was great and his input was extremely positive, with dynamic discussions on the formation of porphyry deposits and other topics from which arose pioneer papers coauthored with other PhD students, his participation on teaching and also in the field. For example I remember a student chapter field trip in Peru that included a visit to San Vicente MVT deposit, a deposit topic that, among others, he addresses during an invited lecture on Wednesday.

After postdocs in Lyon and Bristol, Cyril is now assistant professor at ETH Zurich



Presentation of the SGA Young Scientist Award during the Award Ceremony of the 18th SGA Biennial Meeting in Golden, Colorado, USA. From left to right: Stanislaw Mikulski (SGA President), Lluís Fontboté (on behalf of nominator - M. Chiaradia), Cyril Chelle-Michou (recipient of the award) and J. Pašava (SGA Executive Secretary).

Photo by Beliee Strang.

where he has constructed a remarkable team working on different metallogenetic aspects ((ranging from porphyry Cu deposits to MVT deposits)) and also on analytical developments. Cyril, is productive: according web of science, he has 70 publications with an h index of 27, and with his group at ETH, only since 2023, have appeared 23 publications in high impact journals. The research approach of Cyril is broad and original, and this makes him stand out as one of the most promising young scientists in the field of ore deposits. What makes Cyril rather unique are his varied interests and approaches to geological problematics, which are witnessed by his publications ranging from the field of geothermal energy, through granitic magmatism, to mineral chemistry, and large-scale processes, not to mention the main focus of his research, which are ore deposits and in particular porphyry systems. The broad approach of Cyril to Earth Sciences makes him a full-rounded ore geologist with an uncommon understanding of different metallogenetic processes which has resulted in seminal publications in the porphyry and epithermal ore deposit field.

Cyril has contributed to make significant advances in the understanding of the formation of porphyry systems through an elegant approach including fluid chemistry modeling and high-precision geochronology. Some of his and his coauthors' publications are already seminal works, like the petrochronology zircon work on the Corocochuayco deposit in Peru that he wrote during his PhD thesis. This pioneer work on combined LA-ICP-MS and Chemical Abrasion-Isotope Dilution TIMS dating on the same zircon grains has opened the road to the adoption of this combined technique in the ore deposit community.

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to the adoption of this combined technique in the ore deposit community.

Main recent achievements include quantification of magmatic-hydrothermal fluxes in ore forming systems, the role of geological processes duration on the endowment of porphyry copper and MVT deposits, and development of high-precision geochronological methods.

In conclusion, Cyril Chelle Michou has already obtained very significant and innovative results both in terms of publications and in creating a productive team. He has successfully integrated his industry experience and broad geological experience in an original and multi-varied research approach to the geology of ore deposits. The nomination group consisting of Massimo Chiaradia, Georges Beaudoin, John Dilles, Jeff Hedenquist, and Peter Weiss, is deeply convinced that he deserves the SGA Young Scientist Award and very pleased that he is receiving the award today.

And me, personally, very specially.

*Lluís Fontboté
August 4, 2025 Golden, Colorado, USA*



Acceptance speech was delivered by Cyril Chelle-Michou.
Photo by Beliee Strang

The following acceptance speech was delivered by Cyril Chelle-Michou:

Dear friends and colleagues,

I'm honoured and humbled to accept the 2025 SGA Young Scientist Award. I would like express my gratitude to Massimo Chiaradia for nominating me, to Lluís Fontboté for reading the citation, to Georges Beaudoin, John Dilles, Jeffrey Hedenquist, and Philipp Weis for supporting this nomination and to all those who have encouraged and supported me throughout the years. And thank you to the SGA Council for this recognition. In the midst of my midlife crisis, it's nice to know I still count as "young"!

My journey here has been anything but straight. It was never about pursuing a clear long-term goal, but it is largely a chain of lucky opportunities, encounters, and default choices that have brought me here today. As a kid I never dreamed of becoming a geologist. I wasn't into mineral collecting. At

university I began studying math, physics, and engineering, then switched to Earth Sciences for the outdoor work. When I started studying geology in Nancy, I promised myself I would never work on mineral resources, and few years later completed a Master's in Exploration Geosciences from Luleå — with plans for an industry career. But the 2008 financial crisis eventually sent me to New Caledonia, and then back to Europe, where the first job I could find was a PhD in Geneva. Thanks, Massimo, for taking the risk (or maybe not appreciating the risk!) and giving me four fantastic years to grow scientifically.

Like many fresh PhDs, my first thought was to leave academia but an unforeseen opportunity came up and eventually kept me in. This winding path ultimately shaped my curiosity not just about how mineral deposits form, but why their metal contents vary so dramatically across porphyry copper deposits first, and now across sediment-hosted base metal deposits. This journey

also reflects my compromises with private life that, unfortunately, remain almost unavoidable in academia.

This award reflects the work of many: mentors, colleagues, and students in Geneva, Saint-Étienne, Bristol, and now in Zurich with the MineRS group, as well as close collaborators from Chile, Peru, Italy, Morocco, the UK, and the US. You all share this honour with me.

I'd like to use this stage to share something more today. As the horizon darkens across the globe, I believe we, as mineral resource scientists, must step out of our comfort zones and engage far beyond our own community, far beyond the usual outreach. From politicians to farmers, from fellow Earth scientists to taxi drivers — people need to understand the full breadth of challenges we face if we are to secure resources responsibly and sustainably. This also means reflecting on our own community — recognising the need to broaden our perspectives, bring in voices from diverse backgrounds and disciplines, and building stronger bridges between the geological, economic, and social sciences, so that our work addresses not just the rocks beneath our feet, but the people who live with them.

Thank you to the SGA for being such a vibrant and supportive community — and to my Family, and Massimo, Lluís, Bertrand, Vincent, Anders and all those who have challenged, inspired, and cheered me on.

I wish you all a good conference.

Cyril Chelle-Michou
August 4, 2025 Golden, Colorado, USA





Presentation of the Award for the best paper in *Mineralium Deposita* during the Award Ceremony of the 18th SGA Biennial Meeting in Golden, Colorado, USA. From left to right: Stanislaw Mikulski (SGA President), Bernd Lehmann (Chief Editor, MD, European Office), George N.D. Case (recipient of the award), and Jan Pašava (SGA Executive Secretary). Photo by Beliee Strang.

The SGA Award for the Best Paper in *Mineralium Deposita*

After introduction by J. Pašava, the award was announced and presented by Bernd Lehmann, Stanislaw Mikulski and Jan Pašava:

Ladies and Gentlemen,

I have the honor to present the 2025 *Mineralium Deposita* Best Paper Award on behalf of the two chief editors – Karen Kelley and myself. This award is granted for the best paper published in *Mineralium*

Deposita in the two years, 2023 and 2024, preceding the 18th SGA Biennial Meeting. The Best Paper Award is decided jointly by the chief editors, with input from the editorial board, and consists of a certificate, 1500 Euro and travel expenses for the first author to receive the award.

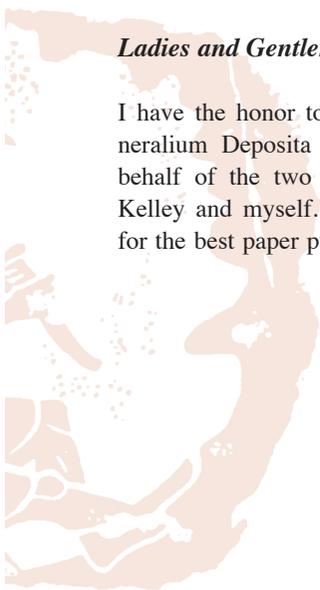
The 2025 award goes to the paper by George N.D. Case, Susan M. Karl, Sean P. Regan, Craig A. Johnson, Eric T. Ellison, Jonathan S. Caine, Christopher S. Holmdenoma, Laura S. Pianowski, and Jeffrey H. Marsh (2023)

Insights into the metamorphic history and origin of flake graphite mineralization

at the Graphite Creek graphite deposit, Seward Peninsula, Alaska, USA. *Mineralium Deposita* 58: 939-962

Congratulations, George!

Bernd Lehmann, Co-Editor Mineralium Deposita
George N.D. Case then thanked on behalf of all co-authors.





Presentation of Student Awards during the Closing Ceremony of the 18th SGA Biennial Meeting in Golden, Colorado, USA. From right to left: Anna Vymazalová (SGA VP for Student affairs), Paolo Garofalo (SGA Council member), Lucas Danjon-Guillou (Univ. of Lorraine), Iain Pitcairn (Chief editor, SGA website), Andreas Dittrich (Dittrich Consulting Peru), Jochen Kolb (University of Karlsruhe), M. Camila Sojo (Univ. of Arizona), Dalton Pell (Univ. of Nevada), Celestine Berthier (Univ. of Lorraine), Gulcan Bozkaya (SGA Council member), Jeffrey Mauk (US Geological Survey), Willa Obringer (New Mexico Bureau of Geology and Mineral Resources), Nicolas Saintilan (SGA Council member). Photo by Beliee Strang.

The SGA Awards for the Best Student Oral and Poster Presentation

In order to encourage students to participate in the SGA activities and to reward excellence in their scientific work, the Best Oral and Poster Presentations given by students were awarded.

- A Conference Student Committee was composed of the following members:
- Jochen Kolb, University of Karlsruhe, Germany
 - Gulcan Bozkoya, University of Pamukale, Turkiye
 - Jeffrey Mauk, U.S. Geological Survey, USA
 - Sam Spinks, Teck Resources, Australia
 - Crystal LaFlamme, Université Laval, Canada
 - Nicolas Saintilan, University of Alabama, USA
 - Paolo Garofalo, University of Bologna, Italy
 - Andreas Dittrich, Dittrich Consulting, Peru

Iain Pitcairn, Stockholm University, Sweden
 Anna Vymazalová, Czech Geological Survey, Czech Republic.

The Committee, based on high quality and scientific merit of the student’s presentations decided to attribute the awards to four students for oral presentations and one student for poster presentation (each of them received a certificate, 400 USD, and SGA Special Publication from Springer).

The best student oral presentations:

Dalton Pell
 Indium deportment as a component of hydrothermal mineralization, West Desert skarn deposit, UT

M. Camila Sojo
 Origin of silver enrichment in Filo del Sol porphyry-epithermal Cu-Au-Ag deposit, Cincuna District, NW Argentina

Celestine Berthier
 Crustal growth, gold fertilization and concentration in the northern Sukumaland granite-greenstone belt, Archean Tanzania Craton

Willa Obringer
 Hydrothermal Veining and Fertilization as Vectors for Hydrothermal REE Mobilization in the Lemitar Mountains Carbonate, New Mexico

The best student poster presentations:

Lucas Danjon-Guillou
 Insights from hydrothermal foot-to-fingerprints for exploration of Paleoproterozoic Au-(Cu) mineralization at the Odienné project, southern West African Craton

The 18th SGA Biennial Meeting in Golden, Colorado USA

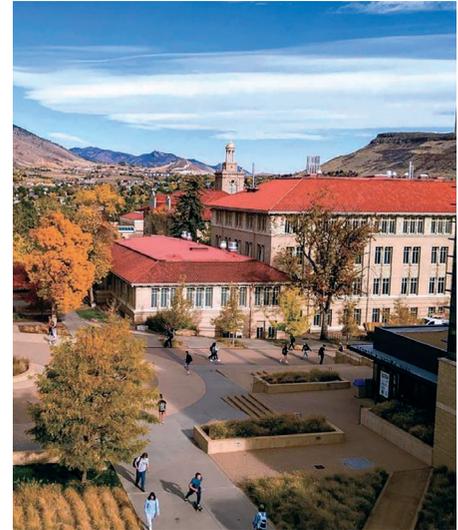
By Karen D. Kelley, USGS Mail Stop 973, Denver, CO 80401 USA

The 18th Biennial SGA Meeting took place on the beautiful Colorado School of Mines campus in Golden, CO from August 3-7, 2025. Registrations for the Conference totaled 577 (including 147 students) from 41 countries with largest groups from the US, Canada, Australia, China, Germany, and France. This was a very special meeting for two reasons: 1) it was the first ever SGA Biennial meeting held in the United States, and 2) we were celebrating the 60th anniversary of SGA!

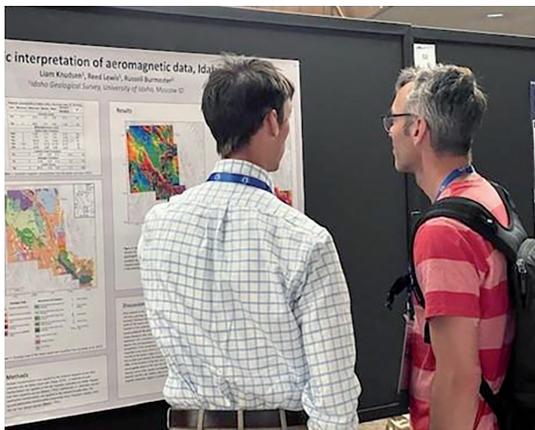
The scientific program was held over 4 days (four concurrent sessions) with the following themes:

- Symposium: Metallogenic provinces of North America
- Critical mineral resources: opportunities and challenges
- New frontiers in analytical techniques for the explorationist
- Structural Geology in Ore Deposit Genesis: Mechanisms, Models, and Mineralization

- Ore Deposits associated with magmatic systems:
- Porphyry/ Epithermal deposits
- Magmatic Ni-Cu-PGE and Fe-Ti-P deposits
- Alkaline Magmatism and carbonatites
- Volcanogenic Massive Sulfides: in Remembrance of Jim Franklin
- Tin-Tungsten and rare metal deposits
- Evolution of sedimentary basins and ore formation: Special session to honor the career of David Leach
- Targeting Mineral Deposits in Metamorphic Terranes
- Plate Tectonics, Earth Evolution and the secular distribution of mineral systems
- SGA-SEG session: Geochemical processes in ore deposition
- Discovery through geophysics, remote sensing, and hyperspectral techniques



View looking northwest from the Colorado School of Mines campus (North Table Mountain in background on right side of photo).



Delegates engaging in stimulating hands-on short courses, poster sessions and oral talks is what SGA Biennial meetings are all about.



The student-industry night was held at the Buffalo Rose in downtown Golden. This was free to all thanks to our diamond level sponsor Freeport McMoran. Others enjoyed light refreshments while perusing the Colorado School of Mines museum mineral specimens (sponsored by DREGS, Denver Region Exploration Geologists Society).



Gala dinner venue overlooking Golden. Pre-dinner cocktails and appetizers provided an opportunity to catch up with acquaintances while enjoying jazz piano (by Mitchell Kelley).



Friends and colleagues enjoying the Gala dinner.



Several past Presidents of SGA were able to gather at the Gala dinner for a special photo opp. From left to right: Georges Beaudoin, David Huston, David Leach, Karen Kelley, Stanislaw Mikulski, Hartwig Frimmel, and Jorge Relvas.

The sessions included 4 plenary speakers (one each day), 22 keynote speakers, and 16 invited talks, plus numerous regular oral and poster presentations. Completing our program were short courses and field trips that were rewarding ways to begin and end our program. Sharing research results, learning about mineral research results from international colleagues via oral/poster presentations and short courses, and networking in a casual setting is a hallmark of SGA Biennial meetings

Social Events

Social events were highly varied, including the welcome icebreaker, student-industry night, gala dinner, night at the museum, night on the commons, gold

panning, geology trail hike, and a day trip to Red Rocks and Dinosaur Ridge. These were excellent opportunities to network in a casual setting, while enjoying refreshments. The Gala dinner was held on Tuesday, August 5th in the Mount Vernon Canyon Club, a stunning venue in the foothills only a short drive from Golden. Delegates were treated to an evening of good food, fine wine, entertainment and an overall great opportunity to network and catch up with acquaintances.

Rio Tinto was our sponsor for the Gala dinner.

Closing Events

Our last evening social gathering was Wednesday, August 6. We offered food trucks with music and games on the Commons

outside the Green Center, the main conference venue. An annual event held in the winter in Golden is called “Goldens in Golden” (where hundreds of golden retrievers and their owners gather); we were fortunate to have a few golden retrievers visit, which delegates enjoyed.

As with all previous Biennial Conferences, our closing ceremony included student awards for best poster and oral presentations (see write up about awards by Jan Pasava in this newsletter). We congratulate you all for a job well done!



Night on the Commons where delegates could order dinner from food trucks and gather for some fun games and music.

Field Trips Associated with the 18th Biennial SGA Conference

We offered seven pre- and post-conference field trips. Two were one day trips and the others spanned multiple days. Many of these trips were to places that have never been offered as part of any conference, and we are proud to have been able to provide the opportunity. These included one day visits to world-class deposits in Colorado (Cripple Creek and Climax), as well as multiday trips to see Alaska Gold, the Butte porphyry system in Montana, the Yellowstone hydrothermal system (Wyoming), the Carlin/Bingham system in Utah/Nevada, and world class deposits in the San Juan Mountains in Colorado. Write-ups for select trips are included below.

Gold in Alaska

Leaders: Doug Kreiner and Erin Marsh

Written by: Hartwig E. Frimmel¹ and Lisa Wasitschek¹

¹ Department of Geodynamics and Geomaterials Research, Institute of Geography and Geology, University of Würzburg

Field trips are always highlights of SGA Biennial Meetings and this year's 18th SGA Biennial Meeting in Golden, Colorado, was no exception. Amongst the various field trips offered to a number of exciting destinations, the pre-conference Alaska Gold trip was possibly the pinnacle, because it combined one of the most exotic destinations with stunning landscapes, untouched nature and splendid geology, studded with great ore deposits.

The field trip, led most competently by Erin Marsh and Doug Kreiner from the USGS started in Fairbanks, where our illustrious mix of participants from industry, government and universities met on 27th July and received an excellent evening lecture introducing everybody to the general geology and metallogeny of Alaska. The following day was spent largely at the Golden Summit Project, a gold exploration project by Freegold, which has reached an advanced stage, set to go into pre-feasibility study soon.



Doug Kreiner showing a set of potentially auriferous quartz veins in one of the few outcrops at Golden Summit.



Auriferous quartz veins in drill core, Golden Summit.



Open pit at Fort Knox: in spite of poor weather, the oxidized top of the deposit can be clearly discerned from the distance.



An auriferous quartz vein in the Pogo deposit.

So far, >800 Mt indicated and a inferred resources @ 1.1 g/t Au Auriferous quartz veins in drill core, Golden Summit Pro and a cut-off grade of 0.5 g/t Au have been delineated, most of which is hosted by quartz veins. The project is not only geographically close to the famous Fort Knox deposits but bears also many geological and metallogenic similarities, supported by similar ages of around 90 Ma. The hospitality at the exploration camp was exceptional: in my entire career I have never been greeted by a warm buffet set up in the field with bouquets of fresh flowers on the table; just a pity that the weather didn't play along!

On 29th July we visited Fort Knox, one of the most legendary gold deposits of Alaska, where placer mining started as early as 1903. Today Kinross is operating an open pit there, from which gold has been extracted from granite- to granodiorite-hosted anastomosing quartz veins since 1996. Low-grade ore is heap-leached on a grand scale – a quite remarkable operation bearing in mind the overall cold climate there.

The principal destination on the next day was Pogo, a remotely located underground mine operation by Northern Star Resources. We had the opportunity not only to ex-

amine lots of drill core but also to visit the famous Liese vein, the principal ore body underground. The observations made by the group led to intense debate on the ore genesis, that is, whether the deposit is intrusion-related, of orogenic type or an altogether different type of gold deposit.

On the fourth day we visited Manh Choh, a very young open pit operation (the first gold bar was poured in 2024) by Kinross, from which the ore is hauled to Fort Knox for further processing. Although the area is by far not fully explored yet, a spatial relationship to a ca. 70 Ma quartz monzodiorite is conspicuous, and metal zonation patterns might even suggest a larger underlying porphyry system. With a high grade of, on average, 8 g/t Au, Manh Choh is set to be a major producer for years to come.

The final day took us, after a fantastic drive along the Denali Highway through spectacular mountain landscapes to Valdez Creek, which produced >18 t of placer gold, mainly between 1984 and 1995. Currently, further placers are being worked along a tributary to Valdez Creek as well as exploration for the lode source of the placer gold, conducted by Valdez Creek Mining.

We thank our field trip leaders, Erin Marsh, Doug Kreiner, our third driver, Rob McDermott, the Freegold team at Golden Summit, the Northern Star team at Pogo, Chris van Treeck and the entire Kinross team, as well as John Cioffoletti from Valdez Creek Mining for their great hospitality and willingness to share their geological knowledge with us.



Gold nugget from Valdez Creek.



The Alaska gold group.

Butte Porphyry Systems

Leaders: Eric Anderson, Joe Clevenger, John Dilles, Kyle Eastman, Chris Gammons, Karen Lund, Mark Reed, and Kaleb Scarberry

Written by Eric D. Anderson¹, John H. Dilles², and Kyle Eastman³

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The 18th SGA Biennial Meeting in Golden, Colorado, featured a range of pre- and post-meeting field trips that explored the geology and mineral deposits of some of the most spectacular locations in the western United States. One such trip, the Butte Porphyry Systems, gave participants the opportunity to examine the renowned ore deposits of the Butte district in Montana, along with nearby historical mining districts associated primarily with Cretaceous magmatism of the Boulder Batholith. Field trip leaders brought diverse expertise, offering a well-rounded educational experience. Specialists in economic geology (John Dilles, Kyle Eastman, Mark Reed, Chris Gammons), regional geology (Karen Lund, Kaleb Scarberry), and geophysics (Eric Anderson) provided valuable insights from multiple disciplinary perspectives.

The field trip began at the Bozeman Airport, where participants received a brief introduction to the geology of southwest Montana before setting off on a scenic drive to Butte, observing regional geology along the way. Highlights included exposures of folded and faulted rocks within the Sevier fold-and-thrust belt a view of the Golden Sunlight Mine—Montana’s largest historical gold producer with 3.6 million ounces—and the contact of the Butte granite, which hosts the ore deposits of the Butte district. The first day concluded at the Mineral Museum at Montana Tech, where participants enjoyed a catered dinner and a lecture on the ore deposits of Butte.



Chris Gammons providing an overview of the geology of southwest Montana.



Karen Lund pointing out the folded Paleozoic to Mesozoic rocks in Jefferson Canyon.



Participants in the Continental Pit.

Day 2 focused on the porphyry deposits of the Butte district, particularly the Pitts-mont Dome, which is currently being mined in the Continental Pit. Montana Resources provided an exceptional tour of the Continental Pit, allowing participants to examine oxidized, supergene, and hypogene ores in situ. In addition, historical drill core from Anaconda’s 1978–1983 deep drilling project was reviewed, offering valuable insights into the subsurface geology. The day concluded with lively discussion over pizza and beers at the Butte Brewing Company, located near the southwestern edge of the Berkeley Pit.

The third day of the field trip centered on the Main Stage veins of the Butte district. This zoned polymetallic vein system (Cu-Zn-Pb-Mn-Ag-As) produced approximately 10 million tonnes of copper metal and was one of the earliest and largest mining operations in the United States, active from 1883 to 1914. The day began underground, examining manganese-rich ores in the Orphan Girl and Orphan Boy mines. This was followed by a panoramic overview from Big Butte, where participants gained a better appreciation for the spatial extent of the Main Stage veins and associated porphyry systems. Next, participants visited Silver Bow Mining’s active exploration site along the Rainbow vein, where they examined drill core and outcrop vein exposures. The final stop of the day overlooked the Berkeley Pit, providing a dramatic backdrop for discussions on the environmental impacts of mining in the district. The day concluded at the Mineral Museum with a catered dinner and a series of lectures covering critical mineral zoning in Butte sphalerite, Mesozoic magmatism in Montana, and Earth MRI geophysical surveys of the Boulder Batholith.

The fourth day of the field trip ventured beyond the Butte district to examine other mineral deposits associated with the Boulder Batholith. The day began at the Montana Tunnels open-pit mine, where ore production started in 1987. By 1992, the mine had produced 4.15 million tonnes of ore with a head grade of 0.62 g/t Au, 15 g/t Ag, 0.61% Zn, and 0.22% Pb.



Mark Reed describes mineralogy in the historic drill core.



Joe Clevenger explaining the geochemistry of the altered rocks.



Rainbow vein exposures.

Next, participants examined a roadcut exposing porphyry stockwork veins, followed by a discussion on how geophysical data are being used to image hydrothermal alteration in the region. The afternoon was spent in the historic Elkhorn mining district, which hosts a variety of deposit types including carbonate replacement, skarn, magmatic-hydrothermal breccia, and low-grade porphyry Mo-Cu systems. The day concluded with barbecue and beers on the patio of Sparky's Garage in downtown Butte, providing a relaxed setting for continued discussion and reflection.

The final day of the field trip explored porphyry copper systems in the Elkhorn Mountains, located along the eastern extent of the Boulder Batholith. In the Radersburg district, PhD candidate Joe Clevenger presented an update on using geochemistry and airborne radiometric data to map highly altered rocks in the area. Discussions also focused on the petrogenesis of intrusive rocks with limited surface exposure, which are inferred from airborne magnetic data to underlie the gravel-covered valley. These rocks were drilled by Exxon Minerals in the late 1970s and exhibit biotite and K-feldspar alteration along with stockwork veining. In the afternoon, the group visited the Diamond Hill porphyry stock, which hosts low-grade porphyry copper veins, as well as a nearby Au-Ag skarn deposit at the Diamond Hill Mine. The field trip concluded with a leisurely drive back to Bozeman.

We'd like to extend our sincere thanks to the many individuals who helped make this a successful field trip. Steve Quane generously provided access to the beautifully curated Mineral Museum at Montana Tech. Amanda Griffith and the team at Montana Resources offered an outstanding tour of the Continental Pit. Phil Nickerson and the exploration crew at Silver Bow Mining shared valuable insights and access to their active Rainbow vein project. Jim Lloyd and Chris Frank at Eastern Resources facilitated access to the Montana Tunnels and Elkhorn districts. We also thank the Boulder Batholith crew from the USGS and MBMG for their logistical support throughout the trip.

Lastly, we are grateful to all the field trip participants, whose lively discussions and enthusiasm made for an engaging and memorable experience.



Kyle Eastman lecturing on critical elements in sphalerite.



Participants looking into the Montana Tunnels open pit mine.



Group photo at the Diamond Hill mine

Yellowstone Field Trip Summary

Leaders: Jeff Hedenquist (University of Ottawa) and Stuart Simmons (University of Utah)

Written by: Yang Li¹, John F. Slack², and David L. Kelley³

¹ Peking University, ² U.S. Geological Survey (Emeritus)³ Chakana Copper Corp

We recently had the privilege of participating in the SGA–SEG Yellowstone field trip, an exceptional learning experience led by two world experts in active geothermal systems and ancient epithermal environments, Jeffrey Hedenquist and Stuart Simmons. This trip brought together 25 participants representing 10 countries, with backgrounds from students to professionals in academia, industry, and government, creating a truly international and interdisciplinary atmosphere.

For many visitors, Yellowstone is mainly a holiday destination—a place to see a variety of wildlife, admire dynamic geysers, vivid colors, and dramatic landscapes, but often without an understanding of the geological processes generating them. This time, guided by two leading experts, the familiar sites of Yellowstone were transformed into a natural laboratory, where each feature becomes a window to understanding fluid flow, permeability evolution, mineral deposition, and the dynamics of magmatic-hydrothermal interactions, as expressed in the acid sulfate, alkaline chloride, and carbonate systems of the park.

The trip was kicked off at Jackson, Wyoming, on 8 August where Jeff and Stuart gave introductory lectures about the trip. These were followed by three and a half days of site visits within the park, based out of West Yellowstone, Montana.

9 August 2025, Upper Geyser Basin

We began by learning from Stuart Simmons how water compositions control the minerals that form in hot springs. Water compositions in turn vary due to differences in temperature, pH, and fluid pathways.



Stuart Simmons, using a simple field sketch, describes why variations exist among Yellowstone’s hydrothermal features.



Clepsydra Geyser forms a striking, bowl-shaped pool where hot water constantly churns and overflows. The vivid colors around the vent reflect silica sinter, sulfur, and iron-rich deposits created by continuous mineral precipitation. Steam drifts across the surface, hinting at the vigorous hydrothermal activity occurring just below. This feature is a classic example of how water chemistry, heat flow, and permeability shape Yellowstone’s dynamic geyser landscape.



This active mud volcano showcases one of Yellowstone’s most fascinating hydrothermal expressions. Thick, clay-rich mud continuously bubbles as CO₂-rich gases rise through the shallow subsurface, creating small, rhythmic bursts across the pool. The pale, mineral-rich slurry reflects intense acid-sulfate alteration of surrounding rocks, while the cracked margins record repeated wetting and drying cycles.



Grand Prismatic Spring, a large alkaline-chloride hot spring characterized by blue water, a slightly basic pH, thermophilic bacteria and archaea, and colorful bacterial mats.



While the group examines textures and contacts up close at Yellowstone Lake, Jeff is walking towards the camera, while dedicated “students” take notes on the driftwood log.



Mixed in with detailed descriptions of the geochemical processes throughout the park were some lighter moments and hands-on demonstrations. Trevor Burr (left) and Justin Milliard (right) showed how to professionally forecast the next burst of hot waters as human seismometers at the Black Sand Pool. They lie flat on the ground, sensing low-frequency seismic waves produced by the hydrothermal system underneath. We stand by, watching and feeling the subtle movement below our feet.

10 August 2025, Isa Lake and Grand Canyon of the Yellowstone

Near Isa Lake, we examined a roadside outcrop that beautifully exposes a sequence of volcanic eruption materials, hydrothermal breccias, and zones of intense alteration. On the shore of Yellowstone Lake, we paused at another outcrop that records both eruptive and alteration processes shaping the caldera’s history. Blocks of eruption-derived breccia, hydrothermally altered sediments, and lake-reworked debris scatter the shoreline, offering a compact summary of Yellowstone’s past.

One of the main attractions within the park is the steep, hydrothermally altered canyon walls of the Grand Canyon of the Yellowstone, cut deeply by the Yellowstone River. This gorge highlights centuries of acid-sulfate alteration as reflected in the yellow, orange, and pink walls.

11 August 2025, Mammoth Hot Springs

Mammoth Hot Springs was the focus of the stops on our third day in the park. These immense fields of travertine deposits are shaped by constantly shifting hot spring waters, providing stark landscapes.



The Yellowstone River cascades over the Lower Falls, the largest waterfall in Yellowstone National Park. Standing at the overlook, it's easy to appreciate the immense power of water and volcanic heat working over thousands of years.



A solitary tree stands frozen in a field of travertine, its trunk engulfed by calcium carbonate deposited from shifting hot spring waters. This silent marker captures the dynamics of Mammoth Hot Springs, where hydrothermal channels migrate rapidly, building terraces in some areas while others dry out.



During a brief pause along the trail, Dave Cooke and Trevor Burr take a close look at an altered outcrop, where mineralogical changes and color variations record reactions between hot fluids and rocks.



Group photo at Mammoth Hot Springs, with the travertine terraces as a backdrop. The cascading carbonate deposits provided one of the most memorable settings of the entire trip.

12 August 2025, Lower Geyser Basin and Grand Teton

On our last day, we were fortunate to meet a Yellowstone park ranger who kindly paused to explain how the park has changed

through the years. He described shifts in hydrothermal activity, long-term ecosystem recovery, and the challenges of balancing public access with preservation.

Before heading back to Jackson, we were able to observe the effect that microbial

material plays in the overall dynamics of Yellowstone. Microbial mats and floating patches of “foam” are composed of thermophilic bacteria that mark zones of active hydrothermal input.

Our SGA field trip offered an exceptional opportunity to observe Yellowstone's hydrothermal architecture and dynamics in real time, as a modern analogue for understanding magmatic-hydrothermal systems and their expression in epithermal and porphyry environments. Across the basin we encountered classic upflow and outflow zones, sinter terraces, hydrothermal breccias, steaming ground, and alteration halos—features that closely parallel those preserved in many epithermal and porphyry districts. The spatial arrangement of vents, mounds, and geyser basins reflected interplays among topography, permeability contrast, and structural control, illustrating how heat and fluids are channeled from deep magmatic sources to the surface.

For the industry participants, the trip provided an opportunity to observe features of modern hydrothermal systems and compare them to ancient systems targeted in their exploration programs. Of particular importance was understanding the contrasting alteration and geographic positioning between acid-sulfate upflow zones, boiling zones, and steam-heated zones.

Equally striking was the temporal dimension: episodic venting, overprinting alteration, and temperature-controlled sinter zonation revealed a distinctly pulsed and dynamic hydrothermal system, mirroring the transient behavior inferred from many ancient mineralizing environments. Yellowstone offered a rare modern analogue, showing directly how fluids mix, react, and redistribute heat and metals on short timescales. The trip also served as a valuable teaching refresher: witnessing active boiling, steam-heated alteration, and evolving fluid pathways gives new ways to communicate these processes to students.

Floating patches of “foam” are accumulations of microbial material produced by thermophilic organisms living in the hot, mineral-rich waters. As warm fluids rise and mix with cooler stream water, microbial communities trap bubbles, organic matter, and fine particles, forming delicate, drifting mats on the surface. Their presence marks zones of active hydrothermal input and subtle chemical gradients that support highly specialized life. Width of photo is ~0.6 m



A Yellowstone park ranger standing beside Stuart Simmons and Dave Cooke described how our geological observations are connected to broader environmental and management perspectives, reminding us that Yellowstone is not only a natural laboratory but also a living landscape shaped by time, people, and policy.



Microbial mats flourish in warm water near an influx of hot hydrothermal fluids. The colors and textures reflect subtle changes in temperature, chemistry, and flow conditions. In areas like Yellowstone, such biota play a key role in mediating mineral deposition and recording environmental gradients. A close-up look reveals just how active and vibrant life can be, even in extreme, mineral-rich waters. Width of photo is ~1.2 m.



SGA Mobility Grants Awarded

Copper mineralization within the Bou Azzer-El Graara Inlier, Morocco

*SGA Mobility Grant to Marieme Jabbour
University Ibn Zohr Agadir, Morocco*

As part of my SGA-funded mobility at ETH Zürich, I worked on a research project focused on the copper mineralization hosted within the Bou Azzer-El Graara inlier, a key metallogenic province in the Central Anti-Atlas of Morocco. This region is internationally recognized for its cobalt, nickel, and copper arsenide and sulfide deposits hosted in Neoproterozoic volcano-sedimentary sequences and influenced by Pan-African tectonics.

The objective of the project was to investigate the timing and formation processes of copper mineralization occurring in both the Precambrian basement and the overlying Cambrian cover sequences. The study focused on constraining the age of hydrothermal fluid circulation using carbonate U-Pb dating by LA-ICP-MS, complemented by detailed cathodoluminescence imaging of carbonates to characterize growth zones and diagenetic overprints. These data aim to evaluate the temporal evolution of mineralizing events and assess possible genetic or chronological links among the different deposits. Field and analytical work focused on 3 key sites, representing distinct geological and structural domains within the inlier.

The collaboration with ETH Zürich, supported by Prof. Cyril Chelle-Michou, provided access to state-of-the-art geochronology laboratories and training in carbonate U-Pb dating techniques. The expected outcome is a refined metallogenic model for copper mineralization in the Bou Azzer-El Graara Belt.



Marieme at work preparing samples

Tracking down the genesis of Li-pegmatites in southern Mali

*SGA Mobility Grant to Elhadji Mory Traore
Pan African University, Life and Earth Science
Institute (PAULESI), University of Ibadan,
Nigeria*

With the support of the Society for Geology Applied to Mineral Deposits through an SGA Mobility grant, Elhadji Mory Traore, a PhD student from the University of Ibadan, could visit the University of Würzburg to conduct analytical work from 5th to 18th May 2025.

The main purpose of this stay was to collect mineralogical and mineral-chemical data for the ongoing research on Palaeoproterozoic Li-bearing pegmatites and associated rocks in the Bougouni area in southern Mali within the framework of Elhadji M. Traore's PhD project. The work conducted in Würzburg comprised essentially XRD analyses of selected rock powders to gain new insights into the mineralogy of the pegmatites and their host rocks as well as electron microprobe analysis (EMPA) to identify and quantitatively characterize the minerals in these rocks. The preliminary

results made it possible to identify several minerals not detected under the optical microscope, to distinguish between different types of pegmatite and different zones within a given pegmatite body and thus help to distinguish between potentially economic and barren pegmatite bodies in the area.

Apart from the analytical work in the laboratories, Elhadji Mory's stay in Würzburg was also used to discuss his project and to give critical feedback that helped refine the interpretation of alteration vectors and mineral paragenesis in the study area.

In hindsight the two-week stay was very short, and it was a real challenge for Elhadji Mory to complete all the work he had planned to at his home institution because of the lack of quantitative analytical equipment there. He spent literally every single day in the laboratories which had been booked exclusively for him. Considering that this was his first trip to Germany, far too little time was left to explore the beautiful town of Würzburg and surroundings. The success of his visit would have been impossible without the onsite assistance by Stefan Höhn, the lab manager, as well as by Magda Stein, the local thin-section do. technician. The sections initially prepared in Ibadan proved to be of insufficient quality, and Magda tried her best to set a new record in preparing new high-quality polished thin sections in the shortest possible time.

The SGA Mobility Grant, comprising Elhadji M. Traore's travel costs from Ibadan to Würzburg and towards the costs for the analyses, enabled the student to conduct analytical work that would have been impossible. It formed a useful contribution towards capacity building and further training of an excellent, highly motivated young researcher from an economically disadvantaged background. Many thanks to SGA for having made possible this fruitful exchange between SGA members. We can only strongly recommend utilizing the SGA Mobility Grant for similar types of exchanges.



Elhadji Mory Traore controlling the electron microprobe in Würzburg

Lithofacies and geochemical characteristics of the banded iron-formations within the Ilesha Schist Belt, SW Nigeria.

Dr. Olawale Kayode Aromolaran, Department of Geology, University of Ibadan, Nigeria

The 2025 SGA Mobility Grant provided me with the opportunity to explore the Lithofacies and geochemical characteristics of the newly-discovered banded iron-formations within the Ilesha Schist Belt, SW Nigeria. The analyses were carried out in the Laboratory of Critical Elements, Department of Economic Geology, Faculty of Geology, Geophysics and Environmental Protection, AGH University of Krakow, Poland, where Drs. Gabriela Kozub-Budzyn and Krzysztof Foltyn were the host researchers. With this grant, my set objectives were to complete the aforementioned research project, broad-

den my knowledge in ore microscopy, learn new microchemical techniques, expand my research network, and publish in highly visible outlets.

During my two months research stay in Krakow, I had the opportunity to generate good-quality microchemical data of the BIFs using a JEOL SuperProbe JXA-8230 microprobe analyzer (EMPA) and a Thermo Scientific laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). It was a very valuable learning experience working with these two facilities and to be guided in interpretation of the generated data. Professor Adam Piestrzynski was very helpful in providing the much needed interaction in ore microscopy and chemistry of transition phases of iron ore and sulfide minerals and also presented his collection of BIF samples from the Krivyi Rih deposit (Ukraine). Other faculty members and technical staff in AGH Krakow

provided analytical supports and diversely shared their ore deposit knowledge with me. My research visit in Krakow is also a beautiful opportunity to experience other culture in Europe.

I would like to express my deep gratitude to SGA for the sponsorship opportunity, and for making my BIF research a possibility. The sustainability of the SGA Mobility Grant is hoped to provide the much needed analytical support and collaboration to other budding ore deposit researchers, thereby providing the needed impetus for the discovery more mineral deposits. The AGH University is also thanked for providing a very conducive research environment, while the faculty members are deeply appreciated for their warm hospitality.

SGA Student Chapter Bucaramanga Activities 2025

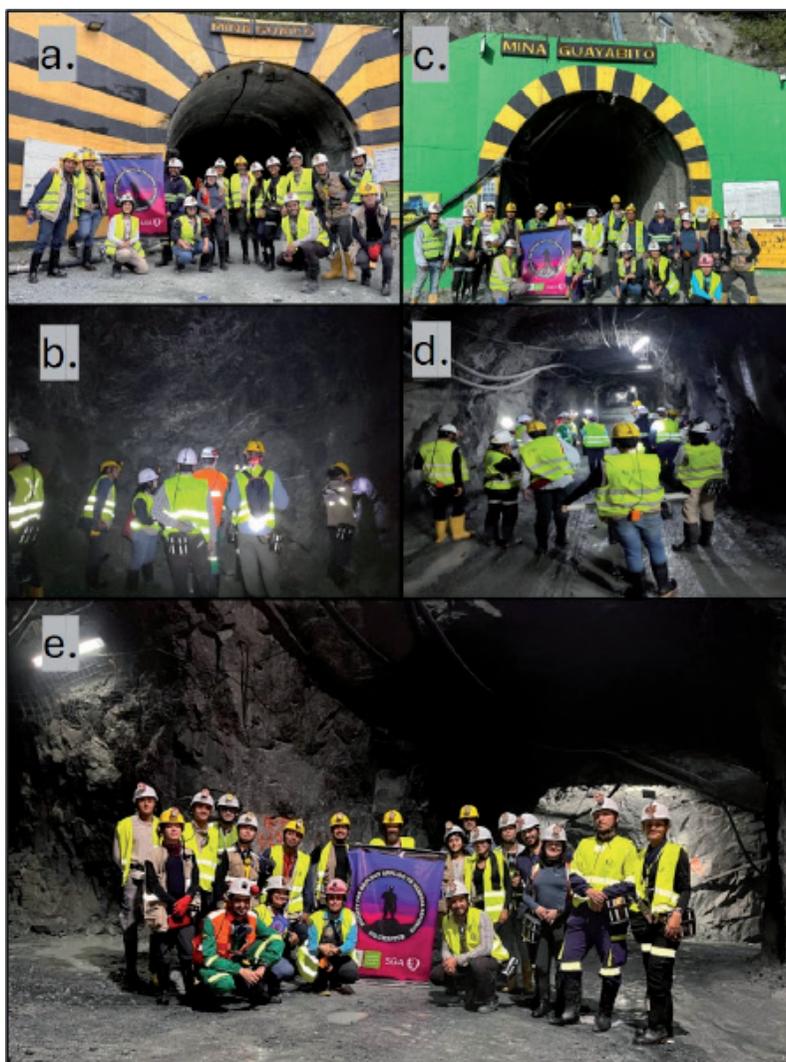
The Orogenic Gold Model: Geology, Genesis, and Exploration – with Richard J. Goldfarb

In August, the short course The Orogenic Gold Model: Geology, Genesis, and Exploration was delivered by the renowned economic geologist Richard J. Goldfarb. As part of this program, a complementary field trip was organized following the course held at the Universidad Industrial de Santander (UIS), within the framework of the XVI Technical Week of Geology, Geological Engineering, and Geosciences in Bucaramanga. During this intensive excursion, we visited several key operations in northeastern Antioquia, including projects operated by Antioquia Gold, Soma–Operadora Minera, and Aris Mining–Segovia.

Visit to Guaico and Guayabito Mines – Antioquia Gold

The first field day focused on the Cisneros Project, operated by Antioquia Gold. During the visit, participants accessed the two operating underground mines, Guaico and Guayabito, where we examined mineralization consisting of iron, copper, and molybdenum sulfides hosting gold. These assemblages occur within shear zones developed in altered granodiorites and tonalites of the Cretaceous Antioquia Batholith.

According to the NI 43-101 technical report, the structural framework of the project is dominated by several shear zones and faults oriented west–southwest in the Nus sector and southwest in Guayabito, which have undergone rotation and sinistral shearing events. Between these major structures, extensional and dilatational zones with north–northeast to northeast orientations provided favorable sites for the development of mineralized veins. In particular, the Guaico and Guayabito veins, striking north–northeast, correspond to extensional structures (tension gashes) formed between the principal shear zones and faults. Mineralization at the Cisneros Project is clearly structurally controlled, with gold hosted in shear zones, breccias, and quartz–sulfide veins (NI 43-101, Antioquia Gold).



Selected images from the visit to Antioquia Gold mines: a) Group photo at the entrance of the Guaico Mine; b) Echelon-type veining inside the mine; c) Group photo at the entrance of the Guayabito Mine; d) Reference image inside the Guayabito Mine tunnel; e) Group photo inside the Guaico Mine.

Visit to the Facilities and Fénix Mine – Soma Operadora Minera (El Bagre)

On the second day, the field trip continued at Soma Operadora Minera, located in the Zaragoza–El Bagre mining district, northeastern Antioquia. This region, part of the Bajo Cauca subregion, is characterized by a long-standing gold mining tradition and a complex geological evolution. The underground operation visited was the Fénix Mine, where participants had the opportunity to undertake core logging, observe active mining faces, and tour the processing plant facilities.

The geological context of the district is dominated by the Carmen Stock, a Carboniferous granodioritic intrusion considered one of the few intrusive bodies of this age in Colombia known to host gold mineralization. Veins within this intrusion are developed along brittle–ductile shear zones and display classic crack–seal textures, reflecting polymetallic mineralizing events under low- to medium-temperature conditions. One of the main ore-bearing structures, the Los Mangos vein, is emplaced within a sinistral–reverse shear zone striking N–S and dipping eastward, controlled by Riedel-type shear systems. This vein records at least two mineralizing pulses: (1) an early auriferous

stage associated with pyrite and quartz, and (2) a later stage enriched in gold tellurides and base metals (calaverite, hessite, sylvanite, altaite, coloradoite).

Field observations suggest that mineralization processes in this district developed under reduced physico-chemical conditions, with ore-forming fluids of predominantly magmatic or metamorphic origin, likely rich in CO₂ and sulfur species. These conditions favored gold transport as Au(HS)₂ complexes and subsequent precipitation. The mineralization style and structural framework support classification of these deposits as orogenic gold in granitoid-hosted systems, consistent with the model proposed by Groves et al. (1998).

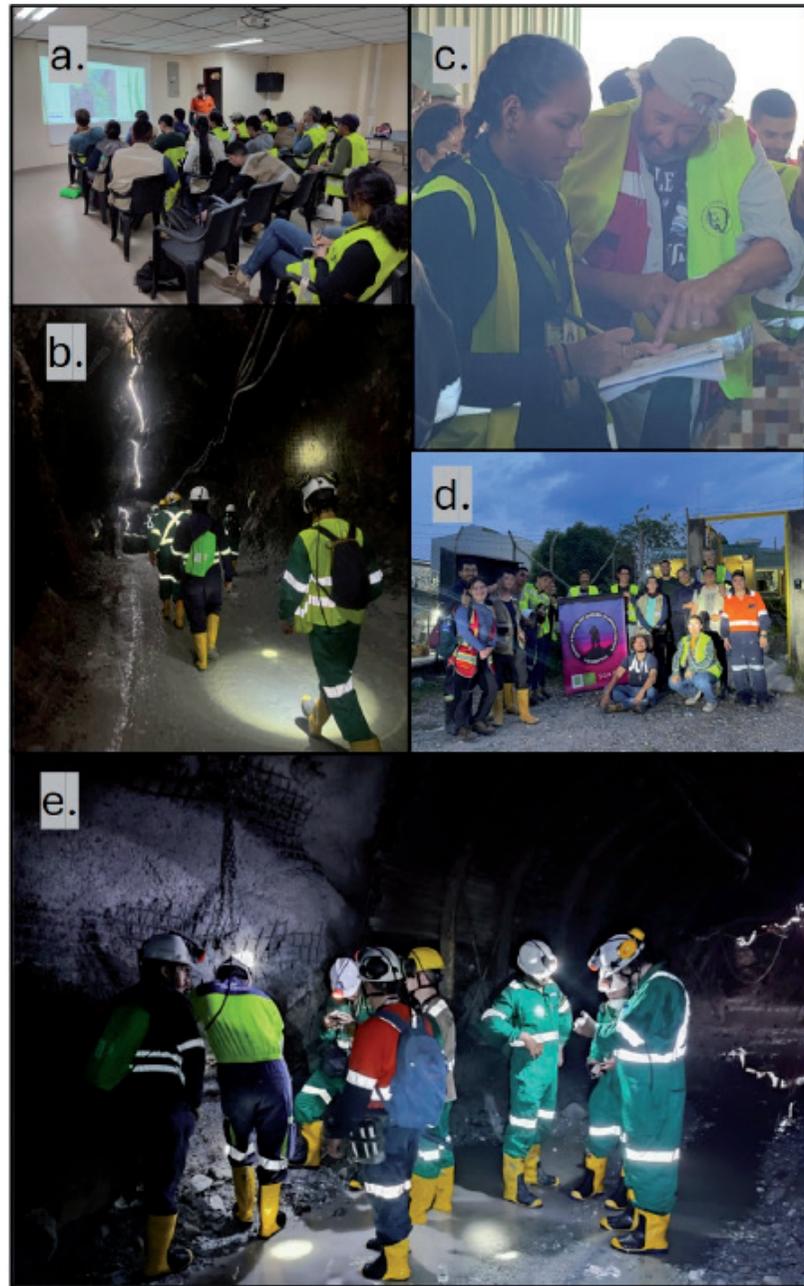
We extend our sincere appreciation to the geologists and technical staff at Soma Operadora Minera S.A.S. for their availability, guidance, and generous support. This field experience was instrumental in understanding both the geological setting and operational aspects of this important Colombian gold district.

Visit to Aris Mining – Segovia

As the concluding activity of the field component of the course The Orogenic Gold Model: Geology, Genesis, and Exploration, we carried out a technical visit to Aris Mining, one of Colombia's most important gold producers, located in the Segovia–Remedios mining district in northeastern Antioquia.

During the visit, we gained an overview of the company's geological and operational workflows and examined a range of drill cores. The cores revealed several lithologies associated with the Segovia Batholith, the main host of the district's auriferous vein mineralization, as well as mineralized structures themselves. These gold-bearing structures are controlled, mainly by reverse faults and shear zones related to the regional Otú Fault.

The Segovia Batholith is a Jurassic I-type, calc-alkaline intrusive body with a pronounced north–south elongation, approximately 270 km in length and 50 km in width, following the regional structural grain. It consists predominantly of medium grained phaneritic granodioritic, quartz



Visit to Soma Operadora Minera: a) Technical talk on the deposit delivered by project geologists; b) Underground tour of the Fénix Mine; c) Richard J. Goldfarb sharing his insights with a Chapter member during core logging; d) Group photo at the conclusion of the visit; e) Underground explanations by Richard. ioto at the conclusion of the visit; e) Underground explanations by Richard.

dioritic, and dioritic rocks, with local basic intrusions, especially hornblende gabbro dikes. The batholith intrudes Proterozoic quartz–feldspar gneisses; in sectors such as El Bagre and Palestina, the contact is tectonic. To the west, it is bounded by the Otú Fault, which juxtaposes it with Paleozoic metamorphic rocks. Geochemical and

isotopic studies (Rb–Sr, Sm–Nd, Pb–Pb) indicate a strong mantle contribution in its genesis (Leal-Mejía, 2011).

An engaging discussion emerged regarding the possible origin of the observed mineralization. Some undergraduate research projects propose that the veins could be associated with mineralizing pulses linked

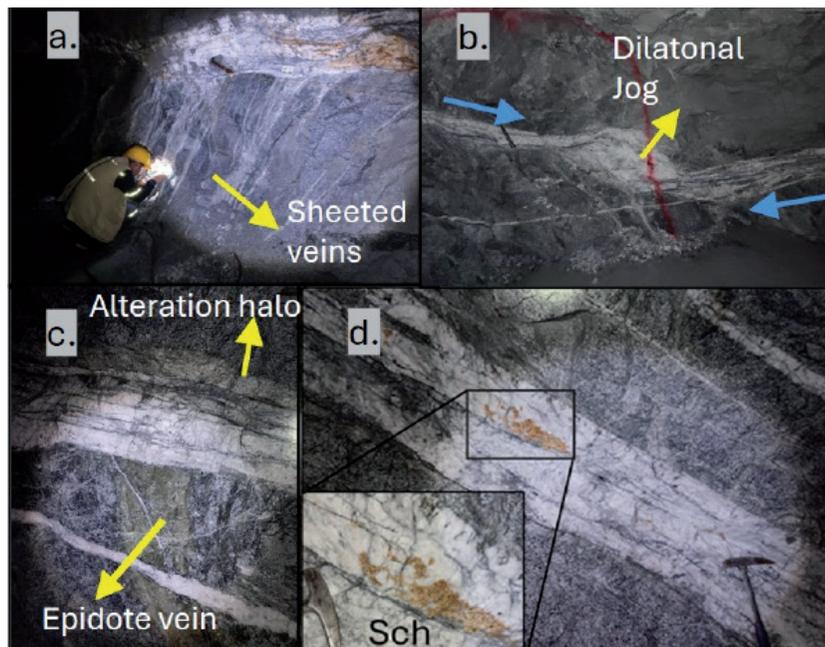
to the Antioquia Batholith, potentially emplaced within the Segovia Batholith. However, alternative hypotheses are also being explored, suggesting that the ore fluids might be related to metamorphic dehydration processes. This latter interpretation is supported by the relatively low abundance of sulfides in the veins and their sheared, brittle–ductile morphology. Additionally, it was noted that large igneous bodies at depth may not necessarily release significant volumes of ore-forming fluids. The entire system is framed within an accretionary tectonic context, which further complicates interpretations of the origin of these vein systems.

The visit to Aris Mining not only clarified the geological and structural framework of one of Colombia’s premier gold districts, but also provided direct exposure to mineral exploration workflows and responsible mining practices. This experience substantially enriched the academic training of participants, strengthening the link between geological knowledge and its application in the national mining industry.

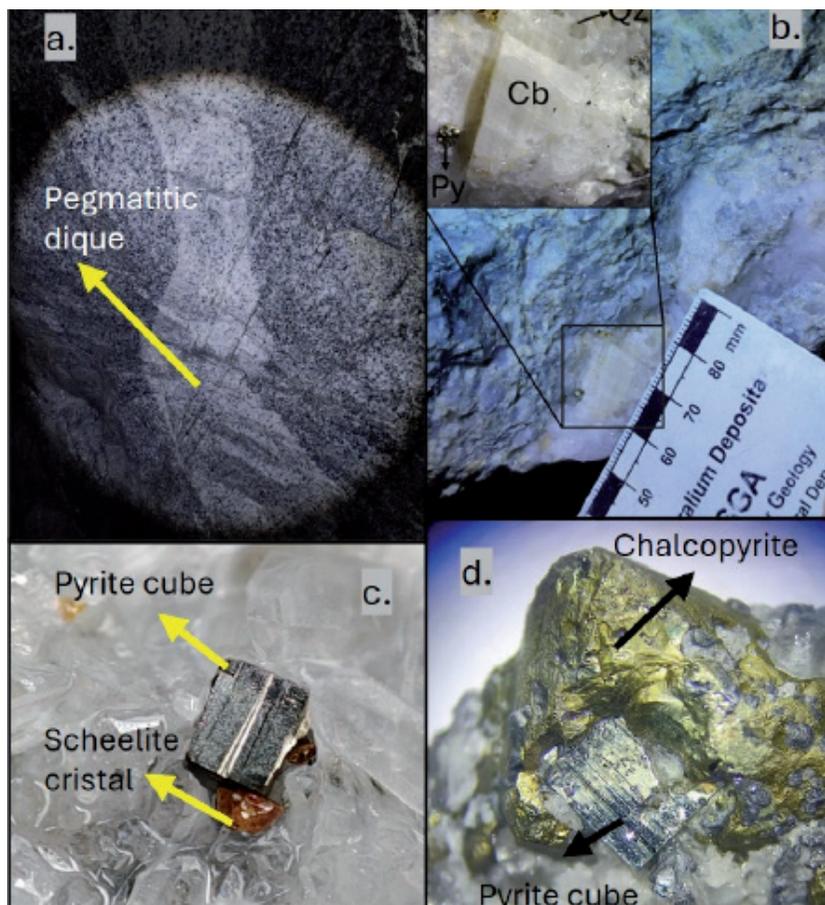
We gratefully acknowledge Aris Mining – Segovia and, in particular, its geological team for their hospitality, openness, and commitment to training the next generation of geoscientists. Their support was fundamental to the success of the visit.

Field Trip to Vein-Type Deposits in the Fondas–Limoncito Mining District (Cauca)

Members of our Chapter also visited several mineralized zones in the Fondas–Limoncito district, located east of the Western Cordillera of Colombia, in the department of Cauca. Polymetallic mineralization in this district is associated with vein-type structures hosted within the Jejínes tonalitic stock a low-potassium intrusive body dated at 84.4 Ma (Late Cretaceous) by Leal-Mejía using Re–Os geochronology in molybdenite. This stock crosscuts rocks of the Dagua Structural Complex, a former oceanic crustal fragment accreted to the continental margin during the Cretaceous, forming part of the present Western Cordillera. The Jejínes stock is interpreted as an allochthonous intrusive body related to pre-accretion arc magmatism. Other coeval mineralizing events in Colombia include those associated with the Antioquia Batholith.



a) Sheeted veins connected to the main structure; b) Dilatational jog formed by dextral shear stresses with drusy quartz, filling the central void; c) Cross-cutting relationships and alteration in the host rock (Chl–Ser halo in the hanging wall); note the discontinuous epidote vein at the top, evidencing shear-related displacement between hanging wall and footwall; d) Scheelite pocket within the vein.



Host rock and mineralization: a) Coarse-grained felsic dike intruding the Jejínes Tonalitic Stock; b) Carbonate fillings in the vein-type structure; c) Cubic pyrite and scheelite crystals on drusy quartz; d) Temporal relationships between mineralizing events, with chalcopyrite overgrowing cubic pyrite, indicating a late base-metal pulse

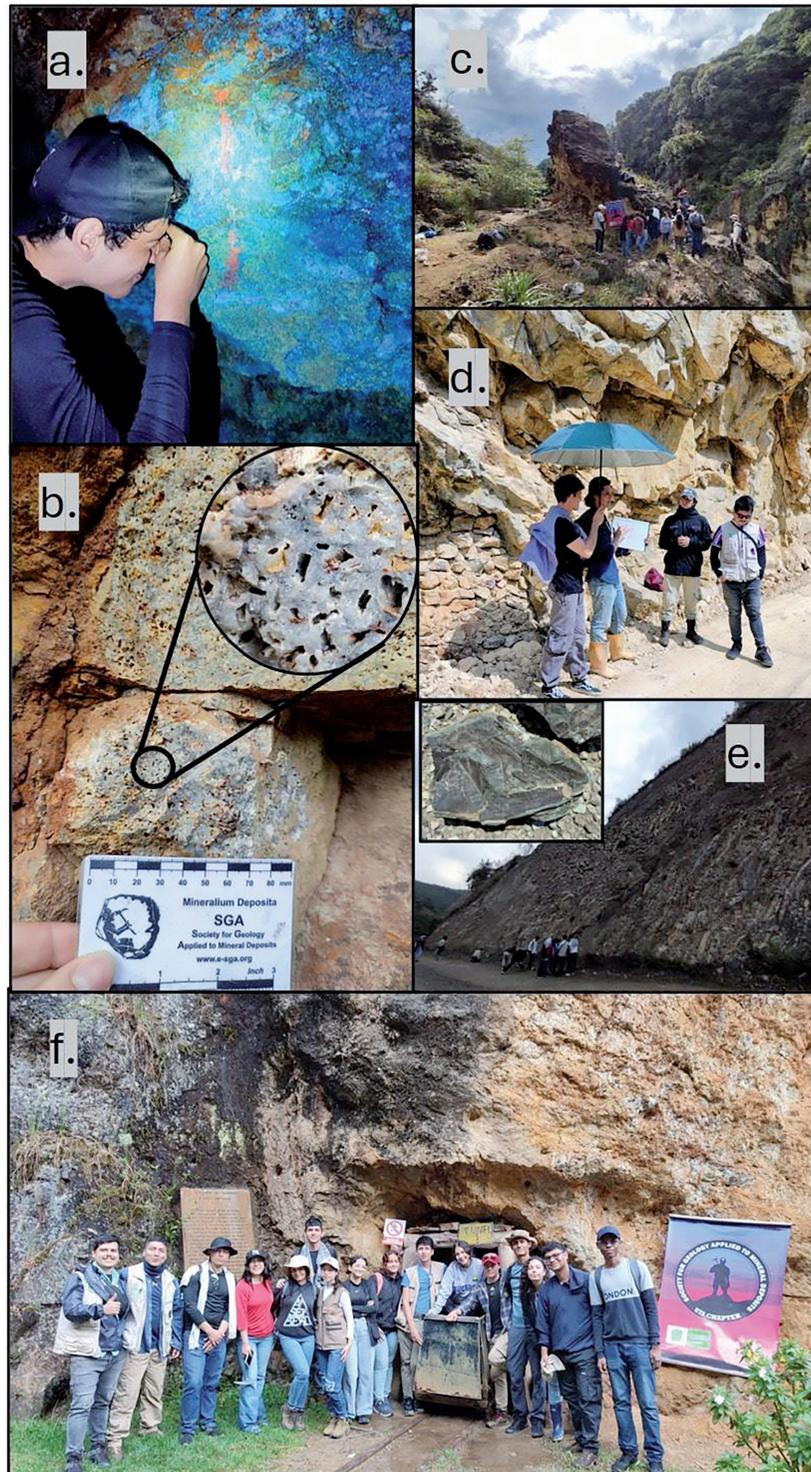
Two main families of veins were identified in the field, both with NE–SW orientations and gentle dips of 30–40°, and thicknesses ranging from 0.15 m to 1.50 m. The principal structure displays evidence of multiple filling events, expressed by banded, massive, and crystalline quartz textures that suggest a crack-seal-slip formation mechanism. Overall, sulfide contents are low, although significant associations of cubic and massive pyrite, sphalerite, galena, chalcopyrite, scheelite, and carbonates were observed.

Minor massive quartz veins with coarse pyrite, molybdenite rims, scheelite, chamosite, sericite, and carbonates were also recognized, with thicknesses of 0.1–0.3 m. These may represent a higher-temperature, earlier mineralizing phase. Additional features include epidote veins and veinlets, as well as sheeted quartz vein swarms with scheelite mineralization connected to the main structure. Mafic dikes—likely of diabase/doleritic composition—and coarse-grained textures in the tonalite were also identified. All these features are cut by the mineralized structures, indicating they belong to a magmatic stage predating the hydrothermal mineralizing event. Chlorite–sericite alteration is weak and restricted to narrow halos (centimeter-scale) along the vein margins, accompanied by localized mylonitization.

As a result of this fieldwork, two of our members will carry out their undergraduate research projects in the district, aiming to further constrain the genesis and 3D configuration of the deposits.

Introductory Field Trip for First- and Second-Year Members – Vetás–California Mining District

As part of our annual outreach and training activities, we organized an introductory field trip to the Vetás–California mining district, aiming to familiarize first-year students with the economic and regional geology of this emblematic area of northeastern Colombia.



Selected images from our field trip to the Soto Norte district: a) Member observing secondary copper sulfate mineralization in an abandoned adit; b) Close-up of vuggy silica in Jurassic granites (plagioclase leached by acidic fluids); c) Panoramic view of the outcrop shown in “b”; d) Board members explaining the geology of the area; e) Outcrop of the La Luna Formation showing the fish jaw fossil; f) Group photo of first-year participants at the entrance of an adit.

We first visited the La Baja area, where several outcrops related to Paleogene–Miocene hydrothermal events affecting granitic rocks of the Santander Plutonic Group are exposed. During the visit, we identified pyrite veinlets, vuggy silica zones, and alteration patterns characteristic of epithermal systems. We also entered abandoned adits, where copper sulfate efflorescences such as chalcantite coat the walls, associated with supergene oxidation processes. These features provided a natural classroom to discuss hydrothermal alteration and secondary mineralogy in epithermal environments. Subsequently, we visited an outcrop of the La Luna Formation. This Upper Cretaceous unit is renowned for its high organic matter content, its importance as a hydrocarbon source rock, and the exploitation of its upper levels for phosphates. It consists mainly of black shales interbedded with fossiliferous limestones and carbonate concretions. At the site, we observed concretions impregnated with bitumen and an exceptional abundance of fossils, including ammonites, bivalves, and fish remains. One highlight of the visit was the discovery of a complete fish jaw recovered from a calcareous concretion by one of the participants.

These short-distance field trips, located near our home institution (UIS), are particularly suitable for recurrent geological outings and academic integration. They strengthen students’ geoscientific knowledge while reinforcing their sense of belonging to both the university and the SGA Student Chapter.



a) Session 1 of the course; b) Session 2 of the course.



Group photo of the course participants.

The Orogenic Gold Model: Geology, Genesis, and Exploration

This course was held as part of the XVI Technical Week of Geology, Geosciences, and Geological Engineering at our alma mater. It brought together students and professionals from various universities and institutions across Colombia. The two-day course (8 hours per day) covered orogenic gold mineralization on a global scale, from large Precambrian deposits in cratons and greenstone belts to younger Phanerozoic systems. Importantly, the course opened a discussion on the potential for orogenic gold deposits in Colombia, thereby laying the conceptual foundation for the subsequent field trip to mining operations in north eastern Antioquia.



Promotional flyer for the conference series.

3D Modeling of Vein Systems

A short course on 3D modeling of vein systems was delivered by geologist B.Sc. Andrés Buitrago. Participants were introduced to geological modeling software and its application to the interpretation and three-dimensional representation of vein systems and associated geological data.



Course participants at the end of the 3D modeling session.

Conference: Introduction to Mineral Deposits and Practical Workshops

As part of our annual program, we organized introductory talks for new members to present the dynamics of the Chapter and reinforce their foundational knowledge. In parallel, we conducted hands-on workshops using samples collected during our field trips, as well as material donated by members. These sessions allowed participants to become familiar with ore and gangue minerals, textures, and alteration styles in a practical context.

The workshops were complemented by short talks on basic concepts in geology and mineral deposits, delivered by Chapter members themselves. This format not only supported academic dissemination but also helped develop scientific communication skills among students and opportunities for women in the industry, emphasizing the importance of gender equity and female leadership in the mining sector.

Talking about Mining and Mining Outreach

We organized a series of conferences with professionals from the mining sector. In one of these events, we hosted the participation of influencer Paula Sierra—known as Paula Minería—who shared her professional experience and reflected on the role of women in mining. Her talk highlighted both challenges and opportunities for women in the industry, emphasizing the importance of



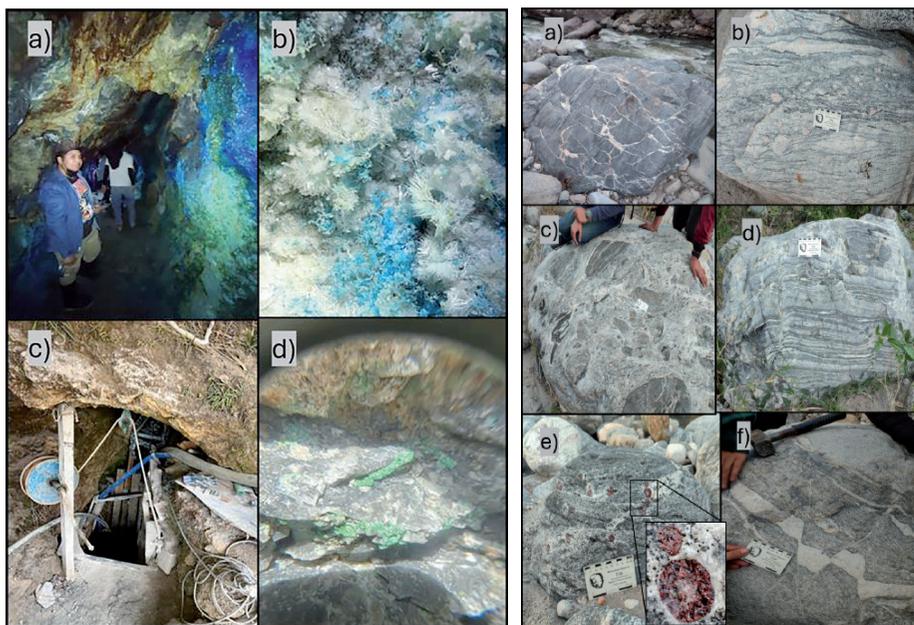
a) Informative meeting with Chapter members; b) Workshop with rock and mineral samples; c) “Introduction to Mineral Deposits” talk given by the board of directors.

gender equity and female leadership in the mining sector.

Introductory Field Trip – Soto Norte Region

As an integration and training activity for new members, we organized an introduc-

tory field trip to the Soto Norte region in the department of Santander. During this explored several sectors of the California mining district, which hosts a high-sulfidation epithermal deposit. In underground workings, we observed sulfate minerals produced by metal leaching and alteration within the host rock, as well as torbernite—



a) Abandoned tunnel with sulfate leaching; b) Close-up of copper sulfate (chalcantinite); c) View of an active adit; d) Torbernite coating on alaskite

a) Veinlets along fractures; b) Augen mylonite; c) Tectonic breccia; d) Boudins; e) Amphibolite with large almandine garnets; f) Graben-like structure in gneiss.

a secondary uranium mineral with greenish hues that is common in the area due to local geochemical conditions.

We then visited several nearby outcrops to gain an overview of the igneous units present in the region, their relationship to the tectonic evolution of the area, and their connection to mineralized hydrothermal systems. The field trip also included a walk along a creek, where we examined rounded boulders displaying particularly interesting structures, textures, and mineralogy, which served as a basis for discussing their origin and provenance within the regional geological framework.

This activity provided participants with an initial exposure to the geology, mineralogy, and mining activity characteristic of Soto Norte, strengthening both team integration and experiential learning in a natural setting.

Visit to La Paz Mine, Fura Gems (Otanche, Boyacá)

During another field activity, we visited the La Paz Mine operated by Fura Gems in Otanche, Boyacá, within Colombia’s Western Emerald Belt. This region is globally recognized for hosting emerald deposits formed in a sedimentary–hydrothermal environment—an exceptionally rare mineralization

style that is virtually unique to Colombia. The aim of the visit was to understand the geological conditions that allowed emerald formation and to learn about the modern operation of a world-class emerald mine. The group was accompanied by our industry advisor, Luis Paez, and our academic advisor, Daniel Garcia.

The visit began with a detailed presentation by Fura Gems’ geology team, who outlined the geological evolution of the Colombian emerald system. They emphasized that the story begins in the mid-Cretaceous (ca. 120–95 Ma), when intense weathering and erosion of ancient continental masses produced sediments rich in chromium, vanadium, and beryllium. These materials were transported to deep marine basins, mixed with organic-rich muds, and deposited under anoxic conditions, giving rise to the black shales of the Muzo Formation. Over time, these sediments were buried, compacted, and lithified during the Late Cretaceous, forming sedimentary rocks that later became essential to emerald mineralization.

Before entering the mine facilities, the team presented a comparative overview of emerald deposits worldwide. In countries such as Zambia and Brazil, emeralds form through interaction between Be-bearing pegmatites and ultramafic rocks enriched

in chromium, under high-temperature metamorphic conditions older than 500 Ma. In Russia, emeralds are associated with Permian igneous intrusions (~280 Ma), while in Afghanistan they occur in metamorphic schists formed during younger tectonic events (~30 Ma). In contrast, Colombian emeralds are formed in a moderate-temperature sedimentary–hydrothermal environment, where Be-rich fluids interact with black shales enriched in chromium and vanadium. This unique geological setting makes Colombia the only country with emerald deposits hosted in Cretaceous sedimentary rocks and generated by Tertiary tectonic processes.

The explanation continued with a reconstruction of the sequence of events leading to emerald formation in Colombia. During the Paleogene and Neogene (ca. 60–10 Ma), the Andean orogeny generated significant deformation, forming faults, fractures, and shear zones that acted as conduits for hydrothermal fluids. Between approximately 40 and 15 Ma, these fluids migrated through the fracture network and interacted with Cr- and V-rich black shales, crystallizing Be-bearing minerals that incorporated these elements and formed emerald. The uplift of the Eastern Cordillera during the Miocene reactivated structural zones and brought mineralized bodies closer to the surface, where millions of years of erosion eventually exposed the emerald-bearing veins now exploited at La Paz, Muzo, Coscuez, and other districts. Following this geological introduction, we toured the mine facilities.

The technical staff explained the design of the underground workings, the support and ventilation systems, drilling methods, and ore extraction procedures. At the surface, we observed the processes involved in selecting and classifying emerald-bearing rock, as well as the strict traceability and security protocols in place. This highly organized, technical operation contrasts sharply with the informal mining practices historically common in the region.

The visit to the La Paz Mine provided an integrated perspective on the geological, structural, and operational aspects of emerald mining in Colombia. It also illustrated how geological processes operating over more than one hundred million years are reflected today in a formal, modern mining operation within a geologically unique segment of the Colombian Andes.

Gold SGA Field Trip – Antioquia and Caldas

Visit to San Ramón Mine – EGM (Santa Rosa de Osos, Antioquia)

One field day was devoted to visiting the San Ramón Mine, an underground operation owned by EGM and located in the municipality of Santa Rosa de Osos, northeastern Antioquia. The visit began with a technical talk at surface, during which the geological framework of the deposit was presented, drawing on the regional knowledge developed by Red Eagle Mining for the broader Santa Rosa Project. The mine is hosted within the Antioquia Batholith, a Cretaceous intrusive body dominated by relatively homogeneous diorites and quartz diorites. Within this setting, San Ramón is interpreted as an intrusive-hosted, structurally controlled gold system characterized by quartz veins and stockworks associated with shear zones. Mineralization occurs along deformation corridors featuring brecciation and ductile to brittle–ductile shearing, where gold precipitates together with disseminated sulfides and veinlets (primarily pyrite, with local sphalerite and galena). This mineral assemblage accounts for the recovery of silver and base metals as by-products.

The broader Santa Rosa Project, which includes San Ramón, has been described as a quartz vein/veinlet system with kilometre-scale lateral continuity and remaining open at depth—a style typical of intrusive-related orogenic/mesothermal deposits. According to the NI 43-101 technical report, the San Ramón deposit strikes east–west, dips 70° to the north, and extends for more than 2 km, with widths of up to 50 m.

While examining stockpiles of extracted material and their classification, EGM staff explained the plant’s grade-control philosophy. Rather than pursuing very high head grades one month followed by marked declines, they prioritize grade stability by blending high- and low-grade material to maintain a consistent feed and avoid excessive metallurgical stress. Processing relies mainly on gravity concentration, producing saleable concentrates containing Au and Ag as primary values, and Cu, Zn, and Pb depending on the active mining front and ore geochemistry. We then entered the underground workings at San Ramón. At an active drilling area, we observed freshly



a) Discussion on resource estimation; b) Debate on the genesis of the emerald deposit.

recovered core and carried out a short logging exercise.

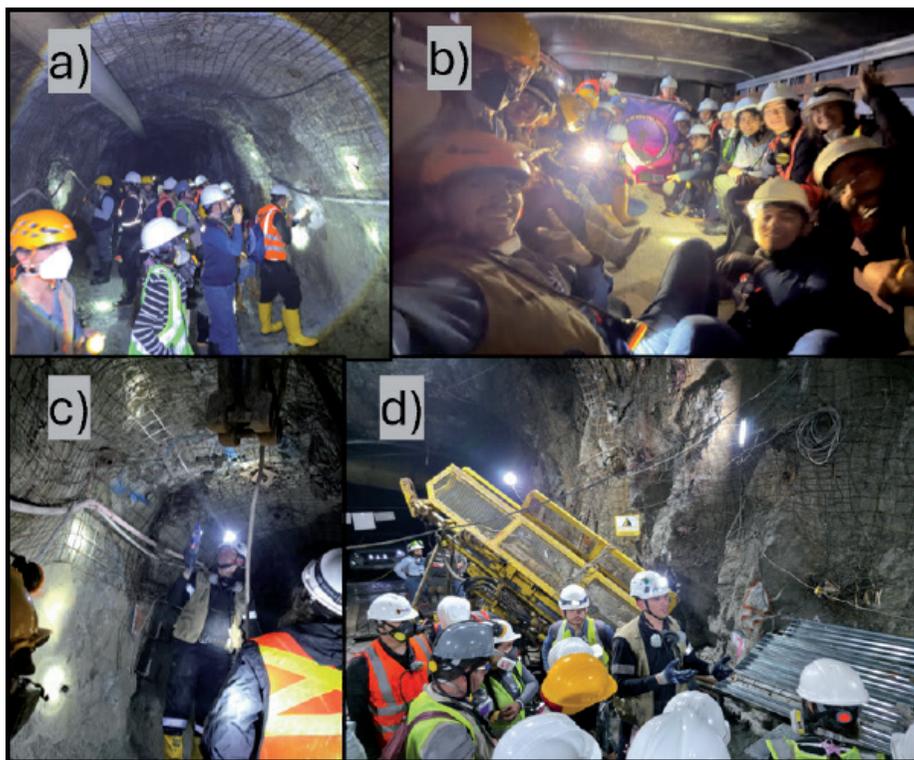
Mine geologists emphasized the importance of understanding lithologies, structures, veining, and alteration to correctly interpret the geology and design efficient drilling programs, maximizing both data quality and exploration success. In core, we could directly relate higher-grade intervals to increased shear-zone intensity, quartz-vein density, and sulfide content. The feasibility study reports metallurgical recoveries of 96% using a circuit comprising SAG milling, flotation, and carbon-in-leach (CIL).

Finally, we visited a recently developed production area, where sampling protocols for geochemical analysis were demonstrated. Using hands-on examples, the team illustrated proper channel sampling techniques: precise marking of sampling lines on the face, control of representative widths, and systematic collection to ensure robust, unbiased analytical results. This final component allowed participants to link geological observations with operational grade control and highlighted the central role of sampling in day-to-day mine decision-making.

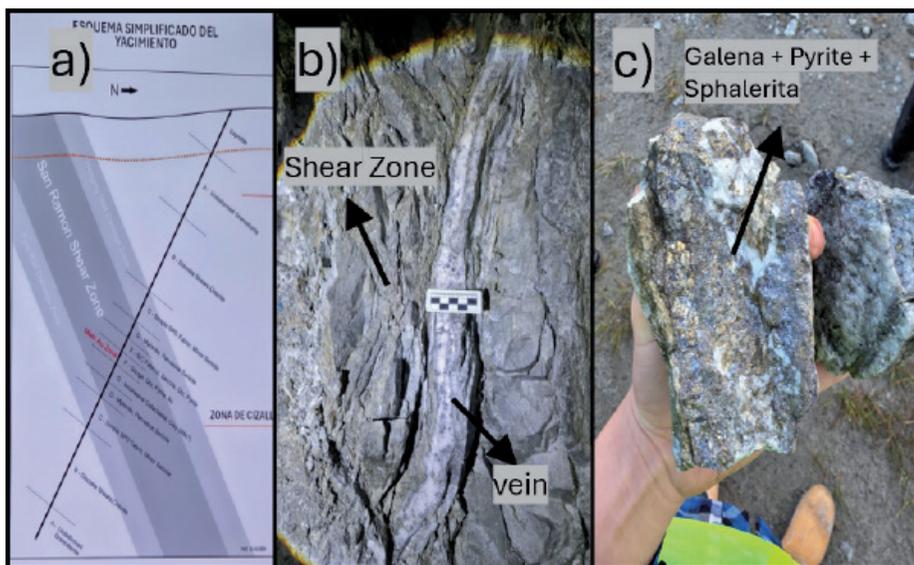
Visit to Marmato, Caldas

On the second day, we visited the municipality of Marmato, Caldas—often referred to as “the golden nativity scene of Colombia” due to its abundant gold resources and the terraced townscape that resembles a Christmas nativity display. Marmato is located on the eastern flank of the Western Cordillera of the Colombian Andes, overlooking the Cauca River valley. Geologically, it lies within the Middle Cauca metallogenic belt, associated with subduction of the Nazca Plate beneath the South American Plate and Miocene magmatism responsible for porphyry–epithermal systems rich in sulfides and metals such as gold. The main objective of the visit was to understand gold extraction from an artisanal perspective and to integrate sociocultural aspects into our analysis of mining.

A local guide led us through several gold-processing plants, where we observed key stages such as crushing, grinding, and gravity concentration. Walking through the town, we noted numerous artisanal adits excavated by local miners, who have practiced underground mining using manual methods for centuries. This provided an op-



a) Underground tour at San Ramón; b) Group selfie in the mine's internal transport; c) Explanation of sampling methodology by project geologists; d) Drilling chamber inside the mine.



a) General cross-section illustrating the mineralization and geology; b) General appearance of the mineralized zones; c) Ore samples donated by the company to enrich the Chapter's collection.

portunity to contrast artisanal practices with the more industrial and technologically advanced operations visited the previous day.

Beyond the geological and technical components, the visit emphasized the region's mining heritage. We visited a museum created and curated by a local resident

deeply committed to preserving Marmato's history. The museum exhibits photographs, letters, old mining tools, and 19th-century miner identification tags, documenting the strong mining identity of the town, which has evolved since colonial times.

On the return journey along the Marmato–Medellín road, we stopped at a creek near the Cauca River to observe lithologies representative of the regional tectonic setting. There, we identified andesites associated with Andean arc magmatism and metamorphic rocks of mafic protolith, interpreted as fragments of oceanic crust belonging to the Arquía Complex. This complex forms a high-pressure metamorphic belt composed of metamorphosed oceanic basalts, gabbros, and marine sediments, representing accreted oceanic crust on the western margin of Colombia during the Mesozoic.

Visit to Longueo–Pinguero Exploration, Buriticá

As part of Zijin–Continental Gold's support for academic development, the company donated drill core originating from the currently operating Buriticá project. These cores were transported to our university and will be used as teaching material in workshops, core logging exercises, and training activities in economic geology and mineral exploration. This contribution provides an invaluable resource, enabling students to directly examine the lithological, structural, and mineralogical characteristics of the deposit and complementing the technical visit to the project.

During the field trip, we visited the Pinguero exploration facilities of Zijin in Buriticá, where logging, classification, and sampling of diamond-drill core are carried out. Unlike an underground mine visit, this experience focused on the pre-mining phase: the scientific study of rock, structural interpretation, and identification of mineralized zones based on detailed core logging. Upon arrival, we were welcomed by the geology team, who explained the central objective of the project: to define the distribution of gold at depth and characterize the vein systems that will sustain future production, emphasizing the role of lithological, mineralogical, and structural analysis in planning.

The geologists introduced the Buriticá ore system as a narrow-vein epithermal gold deposit hosted primarily in volcanic and intrusive rocks of the Middle Cauca Belt. This environment is associated with magmatic pulses and active faulting that



Lunch sponsored by the company.

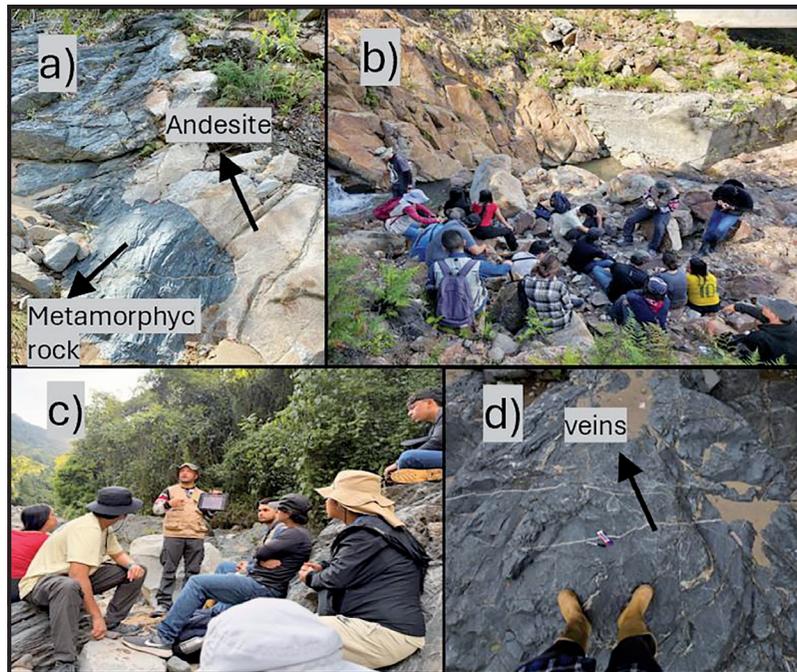
enabled the circulation of hydrothermal fluids carrying gold and silver. As these fluids ascended along fractures and shear zones, they precipitated quartz- and carbonate-bearing veins with sulfides—the mineralization targeted by drilling. The team highlighted how variations in texture, color, alteration style (silicification, sericitization, carbonatization), and indicator minerals can delineate higher-potential zones even before assay results are available.

We then moved to the core storage area, where drilled cores are arranged in numbered boxes, each labeled with depth intervals. There, we learned that logging consists of meticulously describing the core: lithology, veinlets, breccias, alteration intensity, fracturing, sulfide content, structural orientation, and more. Using wax pencils, geologists mark areas of interest, define sampling intervals, and annotate relevant changes in facies or textures.

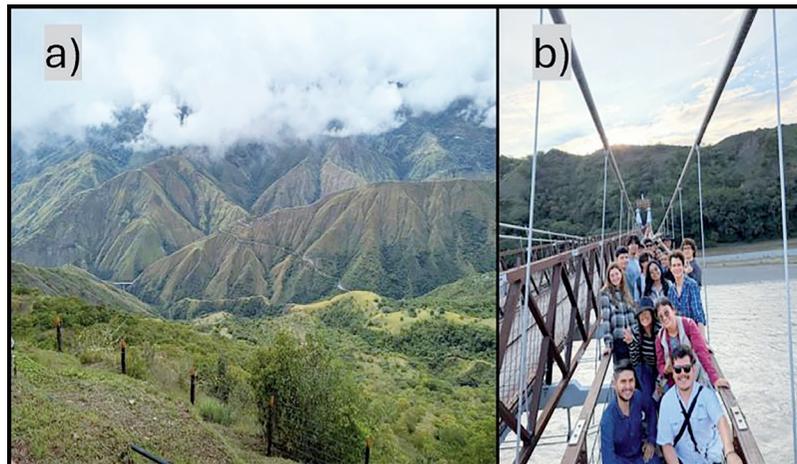
This experience underscored that logging and exploration are not isolated activities but form the scientific backbone of any mining project. Observing rock in its intact state, recognizing millimetre-scale veins that may host grams of gold per tonne, and interpreting color changes or fractures as evidence of ancient mineralizing fluids provided a direct connection between geological observation and mining decisions. Although we did not visit underground workings or production facilities, the tour at Pinguro offered a deep insight into the early-stage work that underpins modern mining: observing, recording, interpreting, validating, and predicting.



a) View of El Burro hill, host to the epithermal gold vein system; b) Close-up of a mine adit on the hill.



a) Intrusive contact between andesitic porphyry and mafic schist; b) Group photo at the creek; c) Explanation of mineralization by our advisor Daniel Garcia; d) Mafic schist cut by quartz + molybdenite + actinolite veinlets.



a) View of the Cauca Canyon near Buriticá; b) Selfie from the Puente de Occidente overlooking the Cauca River Canyon.

SGA Prague chapter fieldtrip to Slovakia, Slanské a Zemplinské Vrchy

On the days 24.-28.4. in 2025, the SGA Student Chapter Prague went to the Slanské and Zemplinské Vrchy mountains in eastern Slovakia. Locals and chapter members Jakub Repaský and Ondrej Ondič took charge of the field trip. During these days, we tried to familiarize ourselves with the geology of the area, with an emphasis on the main mineral deposits. Stanislav Levendovský, the chief mineralogist from the East Slovak Museum in Košice, and Radoslav Grega, a local expert, primarily provided expert interpretation. Organizers Ondrej Ondič and Jakub Repaský took care of additional explanation.

The Slanské Vrchy Mountains are a tertiary volcanic mountain range. It is a chain of stratovolcanoes stretching in the north-south direction from the city of Prešov in Slovakia to the town of Tokaj in Hungary. The mountain range's highest peak reaches a height of 1092 m.a.s.l. The local forests are deciduous, consisting mainly of beech. Stratovolcanoes began to form in the lower Miocene at the important tectonic boundary between the units of the Western Carpathians and the hard-to-classify units in the East. Volcanic activity does not exceed the Tertiary. Deep faults served as a pathway to the surface for the originally basaltic magma, which changed its composition to andesitic along the way up by melting crustal rocks. The volcanism occurred in a sea of varying depths, leaving behind various sediments, including salt, that used to be mined in the town of Prešov



Antimony, Zlatá Baňa



Members of the SGA Prague student chapter near the Dubník mine

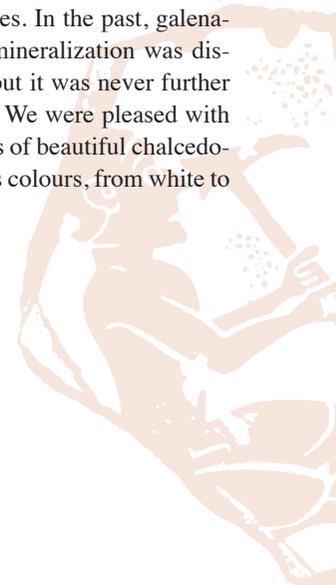
Immediately after our arrival, we visited the deposit of polymetallic ores near the village of Zlatá Baňa. It is Slovakia's third most abundant mineralogical locality (Ďuďa & Ozdín, 2012). The deposit is located in the Zlatobanský stratovolcano's caldera, the largest in the Slanské vrchy. The area is characterized by various types of andesites with intrusions of diorite porphyry. Polymetallic (Mo-Cu-Pb-Zn-Ag) and antimony mineralization arose thanks to hydrothermal activity in the final phase of volcanism. Since the 18th century, the main target of mining has been 0.1-2 m thick antimonite dikes. We found decent samples of antimonite, amethyst and arsenopyrite during our visit.

The most attractive stop among the trip attendees was the world's oldest precious opal mine in Dubník. In fact, it is a large area consisting of several separate mining sites with tunnel systems and heaps, of which we visited three of the most important. Due to the post-magmatic hydrothermal activity, precious Opals are found in andesite lava flows and pyroclastics. In addition, cinnabarite was mined at the site as an ore of mercury. We managed to find several varieties of opal. The most likely to be seen from the varieties was the milky opal, but glassy opal, precious opal and hyalite were relatively easy to find too. Dubník opals adorn the British crown jewels and are part of the French royal treasure.



Precious Opal, Dubník

In the southern part of the Slovak half of the mountain range, we visited a chalcedony outcrop near the village of Byšta. The occurrence of chalcedony is linked to brecciated and silicified bodies of tertiary rhyolites and andesites. In the past, galena-chalcopyrite-pyrite mineralization was discovered by drilling but it was never further explored and mined. We were pleased with the abundant samples of beautiful chalcedony cavities of various colours, from white to purple and blue.





Antracite, Veľká Trňa

A few kilometres east of Slanské vrchy mountains, the hills of a mysterious geological unit, Zemplinikum, of unknown tectonic origin, rise from the lowland. The unit comprises of the Proterozoic basement formed by gneisses, amphibolites, and sedimentary cover of the Carboniferous, Permian and Triassic ages. Sedimentary rocks of the younger Paleozoic age show that the unit is a remnant of an intermountain lowland area with rivers, lakes and swamps. Coal seams in the Upper Carboniferous rocks were experimentally mined in the past. Near the village of Veľká Trňa, there is a large heap left, where we managed to find samples of anthracite, as well as fossils of the Carboniferous flora, specifically the stems of the horsetail *Calamites* and twigs with the leaves of the horsetail *Sphenophyllum*.



Calamites, Veľká Trňa

During the field trip, we also visited the geological exhibition in the East Slovak Museum in Košice and the geological collections of the Mining Faculty of the Technical University in Košice. These visits helped us to understand the geology of eastern Slovakia and the Western Carpathians in a broader picture. We were also able to look at very aesthetic historical samples from the

places we visited in the previous days. We would like to thank Stanislav Levendovský for his great company and lectures in the museum and field. We would also like to thank Radoslav Grega, who kindly showed us his collections and shared his rich knowledge in the field with us.



SGA Prague chapter members listening intently to a lecture in the field



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