

9th SGA-SGNS-IUGS-SEG-UNESCO SHORT COURSE ON AFRICAN METALLOGENY

« How can West Africa best use its mineral wealth for economic development ? »

25th - 29th November 2024

University Amadou Mactar Mbow, Dakar, Senegal

Rue 21x20, 2^{ème} Arrondissement, Pôle Urbain de Diamniadio, Dakar, SENEGAL, 45927 Dakar · 15 km

AGENDA

Sunday, November 24th

16 :00 – 17 : 30	Registration Opens at University of Amadou Mactar Mbow
17 :30 – 20 : 00	Icebreaker and welcome reception

Day 1 - Monday, November 25th

8 : 45 – 9 : 00	Welcome and opening Ibrahima CISSE, Rector of the University Amadou Mactar Mbow (UAM), Senegal Rokhaya SAMBA DIENE Director general of Geological Survey of Senegal (SGNS) Beate ORBERGER, SGA, Université Paris Saclay, France
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Session 1 The role of technology metals in the energy transition Moderator: Beate ORBERGER	
09 : 00 – 09 : 30	Mineral wealth of West Africa Raymond SAGNA & Papa Malick NGOM, SGNS, Senegal
09 : 30 – 10 : 00	Importance of critical minerals in the energy transition Robert MORITZ, University of Geneva, Switzerland
10 : 00 – 10 : 30	Opportunities and challenges for West Africa in the current geopolitical situation Gavin MUDD, British Geological Survey, UK
10 : 30 – 10 : 45	Discussion
10 : 45 – 11 : 15	Coffee break & Networking

Session 2
Titanium-zircon oxide deposits: opportunities and risks for West Africa
Moderator: Rokhaya SAMBA DIENE

11 : 15 – 11 : 45	Titanium-Zirconium resources and reserves in West Africa and Senegal Moumar DIEYE, ENSMG, Senegal
11 : 45 – 12 : 15	Sediments hosted Titanium Zirconium deposit from exploration to mining Ousmane NIANE, Afrique SA, Senegal
12 : 15 – 12 : 30	Discussion
12 : 30 – 14 : 00	Lunch break
14 : 00 – 14 : 30	Heavy mineral sands exploitation Grande Côte: mining and processing Khadim Bamba NDIAYE, ERAMET, Senegal
14 : 30 – 15 : 00	Current destination and material flows of titanium and zirconium material from West Africa and Senegal - Lamine DIOUF, MEPM, Senegal
15 : 00 – 15 : 15	Discussion
15 : 15 – 15 : 30	Coffee break & Networking
15 : 30 – 17 : 00	Workshops – Coordinator : Malick FAYE, SGA/ASR Senegal 1. Tailings management (Senegal). Cheikh TIDIANE DIOP, UCAD, Senegal 2. Mendeley Referencing software, easy scientific write-up. Mary Immaculate NEH FRU, Center of Geological and Mining Research, Garoua, Cameroon 3. How to write a project proposal (Research and go-to-market). Beate ORBERGER, Geosciences Conseil, Université Paris Saclay, France

17 : 30 – 19 : 00	Visit to the Diamniadio Football Museum
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Day 2 - Tuesday, November 26th

Session 3 Phosphates: Risks and opportunities for West Africa Moderator: Mababa DIAGNE	
08 : 45 – 09 : 00	Registration
09 : 00 – 09 : 30	Phosphates deposits: Resources and reserves in West Africa Saliou SAMB, DGEOL, Senegal
09 : 30 – 10 : 00	Phosphate deposits: from exploration to mining Tourki NOURI, BMCC, Senegal
10 : 00 – 10 : 30	Phosphates and opportunities for West Africa Ndeye Penda DIENE,UCAD, Senegal
10 : 30 – 10 : 45	Discussion
10 : 45 – 11 : 15	Coffee break & Networking
11 : 15 – 11 : 45	Phosphate mining and treatment processes: the case of Burkina Faso, Valorization of natural phosphates and blending Saga SAWADOGO, SEPB, Burkina Faso
11 : 45 – 12 : 15	The production of alumina and phosphate concentrate from Thiès alumina and phosphate deposits: valuation of the deposit, ore, and process Abdoul Aziz NDIAYE, ENSG & ESP, Senegal
12 : 15 – 14 : 00	Lunch break

Session 4
Bauxite a critical raw material: opportunities and risks for West Africa»
Moderator: Doro Niang

14 : 00 – 14 : 30	Bauxite resources and reserves and trade in West Africa Joseph DOPOVOGUI, Guinea
14 : 30 – 15 : 00	Bauxite deposits: from exploration to Al compound production, example/case study? Baye Oumar DIOP, UCAD, Senegal
15 : 00 – 15 : 30	Discussion
15 : 30 – 16 : 00	Coffee break & networking
16 : 00 – 18 : 00	Workshops – Coordinator : Alla DIAW, SGNS Senegal 1-Geosites of Senegal - Ibrahim YOUM, UCAD, Senegal 2-African's Mineral Resources: Increase your knowledge in an interactive session Ismahen CHAUCHE, University of Sciences and Technology, Algeria
19 : 30 – 21 : 00	Short course Diner : Club de pêche, Gorée

Day 3 - Wednesday, November 27th

Session 5: Sustainability Moderator: David BARATOUX	
8 : 45 – 9 : 00	Registration
9 : 00 – 9 : 45	Metallurgical wastes: sustainable critical metal resources Beate ORBERGER, Geosciences Conseils, Université Paris Saclay, France
09 : 45 – 10 : 30	The importance of environmental mangement in the mining sector Birane NIANE, UIDT, Senegal
10 : 30 – 10 : 45	Discussion
10 : 45 – 11 : 15	Coffee break & Networking
11 : 15 – 12 : 00	HYPHEN Africa: Pioneering the African Green Hydrogen revolution Tony BEUKES, Hyphen, Namibia
12 : 00 – 13 : 00	Panel discussion 1h: presentation (3-4 min./pers): 40 min discussion and questions from the participants. What actions can be taken to ensure West Africa uses its mineral wealth for economic development? Moderators: Beate ORBERGER, Mary Immaculate NEH FRU 1. Education: what is the present situation; what changes are needed? (technical, academic, practical training). Ministry of education, Senegal or another West African country, or at another level: organizations? Olugbenga OKUNLOLA, Univ. Ibadan, Nigeria, Mahamadane DIENE, ENSMG, Senegal , David BARATOUX, IRD, France.

	<p>2. Mining (sustainability, environmental efforts, increase resource efficiencies, capital, investments etc). Felix EKRA (AFRICAN STAR Resources & Thor exploration, Senegal.</p> <p>3. Processing (sustainability, environmental efforts, increase resource efficiencies, capital, investments etc): Khadim Bamba NDIAYE, Eramet, Senegal.</p> <p>4. What essential new infrastructure is needed? (development: roads, electricity, water, chemicals...) Ousmane MBAYE, Chamber of mine, Senegal</p> <p>5. What promising projects for industrialization are implemented. Toni BEUKES, HYPHEN AFRICA, Namibia</p>
13 : 00 – 13 : 15	Closing remarks of the lecture part of the short course
13 : 15 – 14 : 00	Lunch break
15 : 00 – 19 : 00	Visits to Goree Island
20 : 00 – 21 : 00	Dinner organized by the short course: Goree Island

Day 4 - Thursday, November 28th

Excursion 1(Group 1) - Ti-Zr deposit: Grande Côte	
07 : 00	Departure at University of Amadou Mactar Mbow, Diamniadio
13 : 00	Lunch break
18 : 00	Expected return to Dakar

Excursion 2 (Group 2) - Baobab Mining and chemicals corporation	
07 : 00	Departure at University of Amadou Mactar Mbow, Diamniadio
13 : 00	Lunch break
18 : 00	Expected return to Dakar

Day 5 - Friday, November 29th

GEOTOURISM : Popenguine, Toubab Dialaw, Yene

Detailed Workshop description

- **Workshop 1 : Tailings Management, Tidiane DIOP, Senegal. Sponsored by Endeavour mining Sabodala-Massawa Mine**
Mining environment: Water quality & Treatment of mining effluents, characterization and integrated management of mining discharges. Inorganic chemistry & Soil characterization and treatment, Environmental assessment and impact studies. Case study of the performance of Massawa-Sabodala laterite in mining works for groundwater protection against arsenic, cyanides and salinity.
- **Workshop 2: How to write project proposal, Beate ORBERGER, France. Sponsored by African star Resources**
Based on practical examples (research proposals, go-to-market project proposals), participants will work on the proposal structure and major contents, as well as financial planning.
- **Workshop 3: Mendeley Referencing software, easy scientific write-up, Mary Immaculate NEH FRU, Cameroon Sponsored by ANSTS.** *Many students during research have a lot of difficulties when it concerns referencing. Citations and bibliographic assimilation can take a whole lot of time for many researchers. These challenges are often faced during thesis and publication write-up. It is important to note that available can greatly reduce this daunting task, including EndNote, Mendeley or Zotero. Mendeley software will be taught to the different attendees of the short course. This would facilitate their work in building up their bibliographies and doing intext citations.*
- **Workshop 4: African's Mineral Resources: Increase your knowledge in an interactive session, Ismahen CHAOUICHE, Algeria Sponsored by Barrick Gold.** *Brainstorming session: Do you have any ideas about African resources? Africa is a big country with important mineral resources, but African students still don't know them. This session is a good opportunity for the students to guess what the principal resources of each African country are. The students can contribute to the session by preparing the questions or the enigma and trying to elaborate on the common point with the African country. Why not propose some ideas on how to collaborate with them?*
- **Workshop 5: Geosites of Senegal, Ibrahima YOUM, Senegal, Sponsored by Geological survey of Senegal**
The development of geosites and the establishment of Geoparks requires a wide variety of scientific methodologies. It contributes to sustainable scientific and tourism development through research, education and awareness on Geoheritage. The objectives of this workshop are: i) To promote methods for the evaluation and valuation of geodiversity; ii) Inform and Raise Awareness on new concepts related to Sustainable Development: Geovalorization, Geoconservation, Geoparks and Geotourism. Targets: Ministries concerned, Teachers, Researchers, Students, Populations, tourism actors, Experts and development actors.

Lecturers



David Baratoux is a senior scientist at the French National Institute for Sustainable Development. He has about 10 years' experience in Mining Environments in West Africa. He was involved in the West African Exploration Initiative (WAXI project) focusing on the dispersion of chemical elements in regolith. He funded and led the International Laboratory for Responsible Mining in West Africa (LMI MINERWA, <https://miner-wa.org>, 2019, 2024, renewed for another 5-years period). He has mentored several master and PhD students in West Africa on various topics, including geophysics (radiometrics in the context of exploration), environmental issues associated with artisanal mining and remote sensing. He is also chairing an International Research Network focusing in Planetary and Space Sciences in Africa (AFIPS, <https://africapss.org>), with a focus on research topics having strong synergies with earth and environmental sciences. David holds a PhD in geophysics.



Toni BEUKES is a seasoned Namibian executive with 20 years of experience in the legal, renewable energy, oil, and gas sectors. She currently leads the Environment, Social & Governance (ESG) portfolio at Hyphen Hydrogen Energy, a major green hydrogen project in Namibia. Toni has held various roles under South Africa's REIPPP Programme, working with international wind energy companies including Nordex, Vestas, GE, and ENERTRAG. A qualified conveyancer and admitted attorney in Namibia, she holds a B.Juris and LL.B degree, and an MBA, and LL.M degrees (with Distinction) from the University of Dundee in Scotland. Toni is a Certified Director of the Institute of Directors of South Africa (IoDSA) and serves as a Director of the South African Renewable Energy Technology Centre (SARETEC).



Ismahen CHAOUICHE is an assistant professor and PhD researcher at the Sciences and Technology University of Bab Ezzouar, Algiers (Algeria), Since December 2011. She is also a member of the Laboratory Magmatism and Metallogeny of Algeria and a lecturer at USTHB University. Her research focuses on gold deposit exploration using tools/methods like metallogeny, mineralogy, and remote sensing. Driven by a passion for fostering global connections, Ismahen has been instrumental in building bridges between students worldwide. Her efforts include co-organizing training sessions and workshops. This commitment to international collaboration is further demonstrated by her role as a co-organizer of the SGA-IUGS-SEG-UNESCO Short Course on African Metallogeny. Before joining the university, she worked as an engineer at the ORGM (office de Recherche en géologie minière) from 2006 to 2008 and as an engineer and project manager at the Algerian Geological Survey between 2008 and 2011. With a commitment to continuous learning, Ismahen has actively participated in numerous international seminars, congresses, and workshops. These experiences have enriched her knowledge in mining exploration and identified new methods of analysis in minerals and rocks like petrology, mineralogy, and geochemistry.



Alla DIAW is a geologist engineer of design graduated at since 2009 at the Institute of Earth Sciences (ENSMG ex IST) of Dakar. After graduating as geologist engineer, he worked for more than 05 years in the exploration and exploitation of phosphate deposit , gold and iron exploration with companies such as : Arcelor Mittal, BMCC, Randgold resources and AFRIG. He joined the Ministry of Mines and Geology in 2017 and will hold the position of Head of Division for the control of research activities until 2022 and has acquired a lot of experience in mining administration. Also, he has done training on the management of mining in China, on structural mapping in Ivory Coast , on environmental management of mines in Cameroon, Mineral Resource Assessment in Morocco and Geoscience Data Management in Dakar. Since August 2023, he has been the Director of Laboratories at SGNS.



Ndeye Penda DIENE Holds a PhD in Sedimentary Environments - Phosphate Geology since 2011 from University of Cheikh Anta Diop of Dakar(UCAD). Lecturer and researcher in the Geology Department of the Faculty of Science and Technology at UCAD since 2021, PhD student since 2023 (doctoral course focused on the dynamics, environment and resources of sedimentary basins). Before joining the University, she worked for the Ministry of Mines and Geology, where she held various positions: Head of Division of the Analytical Laboratories Group in the Mining Prospecting and Promotion Directorate, Head of the Dakar Regional Mining and Geology Department, Technical Adviser.



Mahamadane DIENE is a lecturer and researcher in petrology and structural geology. His areas of research cover : Structural geology and geodynamics of the Palaeoproterozoic formations of Senegal and the West African Craton; Tectonic control of gold mineralisation in the Birimian; Tectonic control of Tertiary and Quaternary volcanism in the Senegalo-Mauritanian basin; the use of tectonic indicators in the research and development of geomaterials in the Horst de Ndiass area and in the Senegalo-Mauritanian basin. Structural study of slope stability in the Senegalo-Mauritanian basin and study of the environmental impact of mining and oil pollution. He was Director of Studies of the Institute of Earth Sciences from 2017 to 2023, when he was appointed Director of ENSMG (ex IST). He is member of several research groups: SAXI (South American Exploration Initiative), WAXI (West African Exploration Initiative), Member of the Scientific and Pedagogical Council of the Doctoral School of Physics, Chemistry, Earth, Universe and Engineering Sciences of Cheikh Anta of Cheikh Anta Diop University. He is also the author or co-author of several scientific articles on the geology of the ancient terrains of Senegal, the control of gold mineralization, basement hydrogeology and construction materials. He is also a member of the jury for several engineering and master's theses defended at UCAD and abroad.



Rokhaya Samba DIENE is a Doctor-engineer in applied geology from the University Cheikh Anta Diop of Dakar (UCAD) after attending the Institute of Earth Sciences of Dakar, where she went out in 1993 as an Engineer geologist. She specialised in Public Administration of Mines (CESAM) at the National Superior School of Mines in Paris and the Executive MBA in Advanced Finances and Management at the West African Polytechnic University (UPOA) in Dakar. She successfully completed the course on Regulation and Management of Mineral Resources at Curtin University, Western Australia, as part of the Australian Awards for Africa in 2011, and the course on Mining Policy and Commercial Contract Negotiations at the African Institute of Economic Development and Planning (IDEP) in 2012. She served in various positions at the Ministry of Mines and Geology, namely Director of Geology, Director of Prospection and Mining Promotion, head of the Documentation and Mining Cadaster Center of the Department of Mines and Geology, Chief of the Division of Mines and Careers, Head of the Regional Mines and Geology Service of Dakar. Currently, she is the President of the Organization of African Geological Surveys (OAGS), President of the Senegal-Australia Alumni Association (SEN3A), and Member of the Board of Women in Mining Senegal (WIM Senegal). She coordinated the six bi-annual editions of the Senegalese International Mining Exhibition (SIM Senegal).



Moumar DIEYE is a lecturer at Ecole Nationale Supérieure des Mines et de la Géologie - Cheikh Anta Diop University in Dakar. After graduating as a geological engineer from ENSMG in 2008, he worked in mining exploration in eastern Senegal and the Central African Republic, looking for and developing uranium deposits. After a spell in France to do a master's degree in Geosciences specialising in mineral raw materials and mineral processing, he joined a consultancy firm in Senegal before joining the University of Dakar as a lecturer since 2014. His doctoral thesis focused on the characterisation and recovery of rare earth minerals in heavy mineral sands in collaboration with Eramet Ideas and the GET laboratory in Toulouse. His research activities focus on the identification and recovery of rare and strategic minerals from heavy mineral sands and granitic provinces. Since October 2023, he has been Director of Studies at the Ecole Nationale Supérieure des Mines et de la Géologie (ex IST).



Baye Oumar DIOP is a Teacher and Researcher in applied Geology and Geotechnics since 2017. He holds a PhD in Geotechnics from ESP at UCAD in 2022 after obtaining his Master degree in Petrology, Metallogeny and Tectonics from the Geology Department at UCAD in 2015. In his MSc dissertation, he studied the properties of lateritic residual formations for their optimal use in Road Geotechnics, in line with their physical properties. He developed the topic of his Master's dissertation as part of his PhD project and applying materials science techniques, including the study of geochemistry, mineralogy and pedology of gravel lateritic soils, in order to develop a study and foresight strategy to avoid any evolution that could lead to the untimely deterioration of pavement built with these geomaterials. To bring this project to fruition, he had to work with several institutions and multidisciplinary teams. He has also been a construction assistant and site controller in Building and Public Works since 2015. He is the author and co-author of several scientific productions in terms of articles and reports, which he frequently shares their content at scientific events in Senegal, West Africa and around the world. As an entrepreneur and manager, formed in 2016, he is a leader and participant in several economic, technical and academic projects in West Africa. Baye Oumar is the Scientific Coordinator of AJGES.



Tidiane DIOP holds a DESS in Mineral Engineering from the University of Quebec in Abitibi-Témiscamingue (Canada). In 2012, he was awarded a unique doctorate from the Cheikh Anta DIOP university (Senegal). In 2013, Mr. Tidiane DIOP was awarded the prize for the best doctoral theses in the Senegalese university system, 2013 edition. His research focuses on the characterization, treatment of water and mine tailings and the environmental behavior of mine tailings. Responsible for several mining projects in the field of water and the environment. He has also given numerous lectures and seminars on these subjects and published over 30 articles in international journals.



Koffi Felix EKRA is a geologist with qualifications in mining exploration geology who has more than 15 years' worldwide experience in the mining industry. He has worked on mineral projects mainly in West Africa and Canada. Erka's skills are in all aspect mining exploration: Energy Resource Leadership Mining and Mineral/Environment/Strategic Management/Stakeholder Management/Business Risk Analysis. Ekra Koffi Felix is currently the Regional Manager of Thor exploration in Senegal and Cote d'Ivoire.



Malick FAYE is an Exploration geologist with 8 years of experience in many aspects of mineral exploration occurring in the west African craton and the Senegalese sedimentary basin. He is PhD candidate in Geosciences at the university of Cheikh Anta Diop of Dakar. He worked as co-author of the International Geological Correlation Programme (Program IGCP 638): Geodynamics and mineralisation of Paleoproterozoic formations for sustainable development funded by UNESCO. He is SGA representative in Senegal and co-organizer of the SGA-IUGS-SEG-UNESCO Short Course on African Metallogeny (South Africa, Namibia, Senegal). Also, he is secretary-General of AJGES. Currently he is project geologist at African Star Resources in Douta Gold project, Senegal.



Mary Immaculate NEH FRU holds a PhD in Applied Geology from the University of Buea, Cameroon. She works at the Center of Geological and Mining Research as a Research officer. She is passionate about remote sensing applications to mineral exploration. Her PhD work was based on using remote sensing techniques in predictive mapping for sapphire exploration in the Adamaoua Region of Cameroon. Also, she studied the different heavy and indicator minerals associated to gem. Furthermore, she loved carrying out activities that will get more students into geosciences and coordinates the workshop activities involving students for SGA short courses.



Ousmane MBAYE is currently the Managing Director of Dangote Cement Senegal, a subsidiary of the multinational Dangote Cement Group present in several African countries. He holds a Master 2 in Finance and Accounting and has extensive knowledge and a wide range of financial practices. Ousmane MBAYE has more than 20 years of experience in the private sector, including 15 years in the extractive sector where he worked during the different phases of a mining company (investment research and exploitation). With this, Ousmane has a very good knowledge of issues related to the operation of mining companies in Senegal. Ousmane Mbaye is the President of the Chamber of Mines of Senegal (CDMS), a private non-profit association whose mission is to promote and protect mining investments in the country, and to foster the development of a dynamic and structured mining sector. Ousmane MBAYE is also President of SPIS (Professional Union of Senegalese Industries). This Union aims to bring together representative industrial players so that they can speak with one voice in defending the economic and social interests of the industrial sector. Ousmane Mbaye is also Vice-President of the National Council of Employers of Senegal



Robert MORITZ is professor emeritus at the University of Geneva in Switzerland. He has 40 years of experience with various ore deposit systems and, together with his students and research associates, he has investigated the metallogenic and geodynamic evolution of different orogenic belts. He has been associate editor of *Mineralium Deposita* for 17 years. From 2015 until 2023, Robert Moritz was a member and president of the Swiss IUGS national committee, and between 2012 and 2016, he has chaired the Earth's Resources group of the International Geoscience Program (IGCP). He has been councilor of the Society of Economic Geologists (SEG) between 2015 and 2017, and Regional Vice-President for Europe from 2021 to 2023.



Gavin MUDD has over 25 years of experience researching the environmental and sustainability issues of modern mining. Starting from groundwater, his career has expanded to look at environmental impacts of mining, key sustainability trends, life cycle assessment, governance, regulation, global mineral resource assessments and critical minerals – Dr Mudd's experience includes how we mine and use almost the entire periodic table and is a world-renowned scholar in sustainable mining and critical minerals. Moving from academia in Australia, Dr Mudd joined the British Geological Survey in December 2023 as Director of the Critical Minerals Intelligence Centre



Abdoul Aziz NDIAYE is Senior Lecturer in Mining Geology / Geostatistics ENSMG (Ex-IST) of the University C. A. D. of Dakar (Senegal) since 2007. After graduating as geologist engineer and after a master's in mining Geostatistics at the Ecole des Mines de Paris, he worked for more than 10 years in the mining industry in phosphates, industrial clays and in the exploration of gold. After a short stay to the Mines and Geology Administration, he joined in 2007, IST where he's teaching Mining Geostatistics and Economic Evaluation of Mining Projects. His academic works focuses on applications of real options to mining, particularly in considering geological and financial uncertainties in the economic evaluation of mining projects with applications to mining taxation and income sharing between "stakeholders" (State, Mining Companies and Communities).



Papa Malick NGOM is a professor in the Department of Geology, Faculty of Science and Technology, Cheikh Anta Diop University (UCAD). He has multidisciplinary experience in geology: mapping, endogenous petrology, geochemistry and geology in Birrimian formations, geology and mining prospecting, metallogeny and endogenous deposits. He has been a consultant to several mining companies and projects: RANDGOLD for Exploration and mapping of gold showings in the Kanoumering, Boto and Massawa permits in eastern Senegal. Mapping and geology of the Sabodala gold perimeter Eastern Senegal, consultant associated with the Gold Project in the Faleme sector with IAMGOLD, consultant associated with the PASMI 9 ACP SE 009 Project - Terminology and Stratigraphic Nomenclature of the basement and sedimentary basin of Senegal. He also worked as project coordinator for the drafting of the Mineral Plan of the Republic of Senegal - 2016 Edition - Re-actualisation of the geological and mineral potential of the Republic of Senegal. He is the author of several scientific articles and has participated in the training and supervision of several engineers and PhD students. He is currently a member of the Board of Directors of Geological survey of Senegal (SGNS) and member of the Editorial Committee of the University of Eastern of Senegal.



Tourki NOURI is a senior Mining & Geological Engineer with over than eighteen (18) years' experience in exploration, operations and mining industries (phosphates, coal, oil and gas, etc), project set up, Team building and management as well. He is PhD candidate at the Physics, Chemistry, Earth, Universe and Engineering Sciences Doctoral School (ED-PCSTUI) of Cheikh Anta Diop University of Dakar, Senegal.

M. Nouri has a good experience and knowledge in type of mineralization and exploitation of phosphate deposit and phosphate ore beneficiation (dry and wet process as well) and skills in NI 43-101 and JORC (2012 Edition) codes and public reporting including definitions, guidelines, rules and policies. He is member of the Australasian Institute of Mining and Metallurgy (MAusIMM) under the member's number 336834.

Over the past ten years, Mr Nouri has held various positions, respectively: 2012-2015: Chief Geologist at Atlas Resources (branch of Agrifos USA Holding), from 2015-2017: Superintendent Geology at Gadde Bissik Operations (branch of Avenir limited), from 2017 to date: Head of Geology and Quality Control Department and lab (chemical and metallurgical) managing as well at Baobab Mining and Chemicals corporation (JV of Coromandel International).



Birane NIANE is a teacher-researcher at the Engineering Sciences Training Unit at the Iba Der THIAM University of Thiès (Senegal). He holds a PhD in Earth Sciences from the University of Geneva. He has more than 10 years of professional experience in the field of general geology and environmental geochemistry, more specifically in the evaluation of hydro systems in a mining context. Before joining the University, he worked at the Directorate of Mines and Geology (DGM) and held the position of Technical Advisor Department at the Ministry of Mines and Geology. He has benefited from the UNESCO program as principal investigator of the project "Mercury methylation and trophic transfer in ASGM area: case of Kedougou, Senegal" (IGCP UNESCO PROJECT NAI/DIR/ES/pm/2/15). He is also an Expert Trainer for the PanAfGeo project for Module 4 "Environmental Management of Mines" and Module 3 "Artisanal Mining in Francophone West Africa".



Doro NIANG is an environmental geologist and geotechnician . He has carried out a number of geological studies and mapping assignments in Senegal and abroad. He has worked extensively on the development of local materials (clay, laterite, etc.) through eco-construction with laboratories such as CEREEQ (now the National Reference Laboratory) and LABOSOL. As a result, he was one of the winners of Senegal's youth entrepreneurship programme. As part of his PhD research, Doro NIANG developed expertise in greenhouse gas emissions and carbon footprinting. He has taken part in several international training programmes with a multidisciplinary team on the environmental monitoring of greenhouse gas emissions (methane CH₄, CO₂, etc.) in the atmosphere, atmospheric monitoring of air pollution from anthropogenic sources, hydrogeochemical monitoring and CO₂ flux in the soil, study of diffuse geochemical degassing, study of the volcanic systems of Tenerife and La Palma in collaboration with GéoTénérife, the Volcanological Institute of the Canary Islands (INVOLCAN) and the Technological Institute of Renewable Energies (ITER) of Tenerife in the Canary Islands, Spain. He is currently President of the Association des Jeunes Géologues et Environnementalistes du Sénégal (AJGES), Vice-President of SGA Senegal and Director of Africa Global Geoengineering.



Olugbenga OKUNLOLA holds a PhD degree in Economic Geology of the University of Ibadan, Nigeria, where he is currently a full Professor and Head, Department of Geology. He obtained in addition, professional proficiency Certifications from the University of Oxford, England (2016) and The British Geological Surveys England.(2010). He has 42 years' experience as a geoscientists that straddles the public service, industry and academia. He has served as a Special Adviser (Mineral Assessment) to the Director General of the Nigerian Geological Surveys Agency (NGSA) from 2006 to 2013. He is currently the President of the Geological Society of Africa, Past President of The Nigerian Mining and Geosciences Society, President of the Geoscience Information and Research in Africa Network (GIRAF) and Vice President for Africa, Association of Geoscientists for International Development (AGID).



Beate ORBERGER is an Economic Geologist, Professor at the University of Paris Saclay, Orsay, France. In 2016, she founded Catura Geoprojects (Geoscience Conseil; www.catura.eu). She has 30+ years of experience in metallogeny and geometallurgy. She is co-manager of the EIT Raw Material project ScaVanger, DysCovery, Scaleup, Valore, and the EU Horizon project EURO Titan, upscaling processing for metal extraction from metallurgical residues and EoL magnets. She is SEG fellow and at SGA responsible for the Metallogeny short courses in Africa. She graduated from RWTH Aachen University, Germany, holds a PhD from Institut National Polytechnique de Lorraine, Nancy France, a habilitation to direct research from Université Denis Diderot-IPGP, Paris, and a diploma in Corporate Governance (Corporate Governance Institute-Glasgow Caledonian University).



Raymond SAGNA holds a master's degree in Natural Sciences from the Faculty of Science and Technology and a DESS in Business Administration at Cheikh Anta Diop University in Dakar. He specialised in Public Administration of Mines at the National Superior School of Mines in Paris and has successfully completed the course on Regulation and Management of Mineral Resources at Curtin University, Western Australia. Since January 2024, Mr Raymond SAGNA has been Director of Exploration and Applied Geology at the National Geological Survey of Senegal (SGNS), after successively serving as Technical Adviser to the Minister of Mines and Geology (2021-2023), Head of Mining Titles (2015-2019) and Head of the Geological and Mining Research Division (2007-2015) at the Directorate of Mines and Geology.

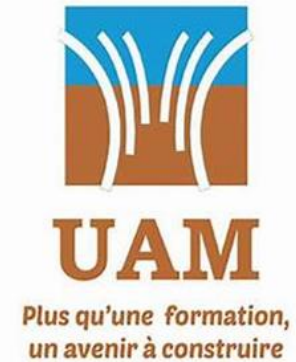


Saga SAWADOGO holds a unique state doctorate in Mineral Resources, Structural Geology and Petrophysics. He has over 10 years' experience in the mining sector. These include his contribution to the discovery of the second world-class mine at Kiaka (2012-2014), project manager for the Birim Gold Field exploration project in Pô (2015-2016), Geology and Mining Engineer for the Ministry in charge of Mines (2016-2018), Production Manager for Phosphate Exploitation Company of Burkina, where he led the exploitation of phosphates from the Kotchari deposit, two feasibility studies, including the Koupéla fertiliser blending plant, which is currently in production, and the Kotchari phosphate processing unit, as well as the development of phosphates for agriculture (2019-2023). Finally, he is a lecturer and researcher at Joseph KI-ZERBO University. In addition, he is principal consultant in charge of the exploration, development and exploitation of the semi-mechanised mine of Gnimi, Commune of Dano, South-West Region (2022-2024). He is also Secretary General of the Geologist Association in Burkina.



Cheikh Ibrahima YOUM, Lecturer and Researcher/Cheikh Anta Diop University/Dakar-Senegal, With more than 10 years of experience in Higher Education and the development of Geological Sites in Africa. Head of Mission and Expert of the Projet Geosite Valorization Project: "Identifying and mapping geosites and outcrops of scientific interest", from the Ministry of Mines and Geology of Senegal, since 2020 Mr. YOUM's research activities revolve around the Sedimentology of ancient and current basins, cartography, image processing and the Enhancement and Popularization of Senegalese Geoheritage.

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