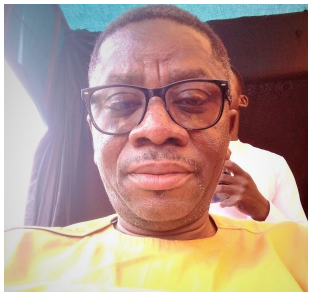

PERSONAL DETAILS

Name: Emmanuel **Arhin**
Professor of Applied Geology
Date of Birth: 1ST September, 1964
Nationality: Ghanaian
Hometown: Bohyen-Ashanti Region
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Present Address: Department of Geographic Sciences
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EDUCATION/DEGREES

PhD (Geology), Department of Geology, University of Leicester, UK (2013)
Dissertation: "*Use of Regolith Geochemistry to Delineate Gold Mineralization under cover, Lawra Belt, NW Ghana*
Major Advisors:
Dr Gawen R.T. Jenkin, Department of Geology, University of Leicester, UK
Dr Dickson W. Cunningham, Department of Earth and Environmental Science, Eastern Connecticut State University, U.S.A
MPhil (Mineral Exploration), Kwame Nkrumah University of Science and Technology, KNUST-Ghana (2005)
BSc (Geological Engineering), University of Science and Technology, U.S.T-Ghana (1991)

KEY QUALIFICATIONS

- Applications of regolith geology and geochemistry in mineral exploration
- Field mapping techniques(geological and regolith)
- Mineral exploration techniques in detecting mineralization especially mineraliation under cover
- Application of geochemistry to medical geology in relation to Public Health

GENERAL INTEREST

Earth and Health linkages (i.e. Medical Geology research), Agrogeology (boosting agricultural production from in situ chemicals from nature), Applied and Exploration Geochemistry (Identifying the worth and hazardous areas in the earth), Physical resource base enhancements for national development and Physical Environmental Earth Science applications towards the achievement of the internationally agreed goals (SDGs) via Applied Geology.

RESEARCH INTERESTS

Four dimensional models of regolith-landscape evolution; processes (inorganic and organic) of regolith development; distribution, dynamics and diagenesis of sediments; genesis of geochemical anomalies; integration of remote sensing, geophysics, regolith geology, geochemistry and geology for developing methods for exploration in regolith covered terrains;

regolith-landform processes and urban planning and application of biogeochemistry in mineral exploration especially in regolith-dominated terrains.

Geological processes and climate change impact on the natural environment and public health consequence; dynamics and origins of trace elements geochemistry and the related health impacts; other research area includes the effectiveness of using local background values in the establishment of environmental policies towards practical environmental engineering and all medical geology research which tend to address numerous environmental health problems in developing countries. Example trace elements assessments on health and investigations into roles of geology in a range of environmental health issues that impact the health of humans and wellbeing of people particularly in the savannah ecological zones of Ghana. The primary aim of these researches are to promote awareness concerning the environmental health issues among geoscientists, medical specialists and the public health workers at large t prevent the health menace from Medical Geology perspective.

MAJOR PROJECTS UNDERTAKEN

- **Geochemical Exploration in Regolith Dominated Areas: understanding metal transports in different Regolith Domains in Northern Ghana** (2010-2013; with Gawen R.T. Jenkin and Dickson W. Cunningham). The AMIRA International Project P934A and West African Exploration Initiative Stage 2 (WAXI 2)

The project used multifaceted approach which included field regolith and geological mapping, remote sensing data interpretation, regolith geoscience and geochemistry to understand the geochemical mix in the surface environment of metal ions during surface geochemical surveys. The project developed regolith map for the area and established the complexities of regolith and landforms that has evolved and still evolving, adding up to the geochemical data interpretation challenges for anomaly detection. The common near surface characteristic of the area is deep weathering, modified to varying degrees of leaching and by lateritization, erosion and subsequent depositional processes. However, the resultant landforms are broadly similar and were classified into ferruginous, relict, erosional and depositional regolith regimes. The regolith landform changes due to the surface processes and changing climatic conditions produce conspicuous changes along the pre-existing lateritic profiles and give rise to new geochemical parameters, which affect general procedures for geochemical exploration if regolith factors are not included in the exploration protocol. The nature, thickness and post-depositional modification of transported cover may also vary according to the climatic regime and landscape history. In some cases, it the unconsolidated regolith units are partly cemented by iron oxides whereas in others by silica or clay minerals. These processes have led to thick and complex regolith which presents particular challenges in exploration. True mineral anomaly follow-ups were identified as prerequisite for all successful geochemical exploration surveys and that requires discriminating transported regolith from residual types. The conclusions drawn suggest geochemical signatures be place in regolith context if true geochemical anomalies are to be defined. As the discovery rate of world-class mineral deposits continues to decline, hidden anomalies in complex regolith terrains can be detected if geochemistry is put in regolith context and that is developing well informed regolith map. A new regolith classification scheme acronym “FRED” has been developed for regolith mapping and semi quantitative characterizing index to unravel the regolith materials has also been established to help in mapping the regolith.

- **Regolith-Landform Evolution of the Lawra Birimian Gold Belt, North-western Ghana for Gold Exploration** (2007-present; with Nude, P. M) Under the project "AMIRA International Project P934 and West African Exploration Initiative Stage 1 (WAXI 1)

The challenges in discovering workable gold deposits in northern Ghana have been tricky as the humid dry savannah climate that influences the surface processes and also control the transportation of loose and unconsolidated weathered materials is not understood. These modifications of regolith and landforms from different climatic conditions can produce conspicuous changes along the pre-existing landscape profiles and give rise to new geochemical parameters, which will affect general procedures for geochemical exploration. The implications of the ignored regolith landform evolution into the exploration protocols probably contribute to exploration failures in the Lawra Birimian Gold Belt. The complex weathering histories and geomorphic histories in this complex regolith terrain has led to a thick and complex regolith which presents particular challenges in exploration. The importance of understanding the regolith, the landscape, and the sampling medium has not been seriously considered in Au exploration programmes in Ghana. This project was on a case study of Au exploration at Tinga and Kunche in the savanna of northern Ghana, where landform, climatic conditions, weathering histories and the regolith are considered in the exploration programme. Important findings from the project show that the classification of the regolith regimes into ferruginous, relict, erosional and depositional (FRED) regimes in the two study areas aided in determining the differences in the regolith profiles (or the unconsolidated weathered and secondarily cemented units above the coherent bedrock), the source of the regolith materials and nature of weathering. For relict and erosional regimes, optimum depth of sampling was established to be between 0.2 and 0.4 m. However, for depositional regimes, because of the variable overburden thickness, the base of the transported materials was sampled. The pits and trenches dug also contributed in identifying the in-situ and transported regolith. The study shows that, in savanna areas of northern Ghana, relict regimes generally have preserved laterite profiles whereas the ferruginous, erosional and depositional regimes are associated with landscape modifications. The results allow us to conclude that regolith mapping must be considered for any success in Au exploration in deeply weathered environments.

- **Application of Biogeochemistry in Gold Exploration (**2007-2015; with Michael Affam, Prosper M. Nude, Samson Boadi and Millicent Captain Esoah).

Termites provide benefits by providing aeration of soil during termites burrowing, improve soil fertility because of the rich mineral contents released when termiteria collapses etc. Under this research we realized termites had an important role in contributing to the identification and locating concealed gold anomalies masked by complex regolith. There are several cases that confirm the anomaly definition challenges confronting the Mineral Exploration Companies to detect gold mineralization under cover from complex regolith terrains particularly in widespread ferruginous duricrust, extensive redistributed depositional and patchy residual materials of relict and erosional unit areas. This complex regolith has resulted in the Mineral Industry to have increased attention focused on geochemical exploration methods designed for regolith dominated terrains that sees through the cover materials. Mounds form by termites is considered to be built from materials from deeper environment compared to soils. Termiteria samples were collected, prepared to < 125 µm particle size fraction and were analysed using Fire assay (FA–AAS) for gold (Au) and XRF for chalcophile and other selected elements. Gold

analyses in <125 µm particle size fractions were able to detect hidden anomalies in complex regolith terrains and can therefore serve as a supplementary sample medium in support for soils for geochemical exploration surveys. The study again found hidden gold anomalies in thick regolith overburden using the identified pathfinder elements As and Zn from termiteria samples.

- **Strategies for regional geochemical surveys for gold exploration in the savannah regions of northern Ghana** (2007-2010 with Nude, P.M.) Under the project "AMIRA International, WAXI-2007 West African Exploration Initiative".

Under this project we have compared the results of sediment samples from overbanks of streams from gold bearing areas in the savannah north of Ghana with samples from the active channels. The major findings from this project are that active stream channels may contain contaminated materials of recent origin, but overbank sediments, except for the uppermost horizons, represent paleo- regolith of earlier depositional cycles over time. Based on gold value repeatability, composite samples taken from the overbank sediment layers were relatively less erratic and considered to be appropriate geochemical medium that is capable of defining potential regional gold targets for follow up. The results show that overbank sediment sampling can be used as a cost- effective method to define broad anomalous zones; and the technique must be considered useful during reconnaissance geochemical surveys in the savannah regions

- **Trace Elements Assessments on Health-Medical Geology Perspective** (2014 to present; with Zango, M.S)

Environmental geochemistry classifies trace elements into essential and toxic elements. Human bodies require certain amount of trace elements beyond which the concentrations is considered detrimental. Under this project we sampled soils and sediments in streams draining the artisan mine sites, and cultivated lands for major and trace elements concentrations. The trace elements concentrations were compared with global accepted values (e.g. with WHO values) whilst the major elements were compared with average crustal abundances. In this project, we used different evaluation methods to assess the concentrations of essential trace elements and potentially toxic elements in the trace element samples at the artisan mine and cultivated land areas. The major findings are high concentrations of Hg, Pb and Cd around the artisanal workings and this require environmental cleaning.

ONGOING PROJECTS

- Gold exploration at Supercare Group Ltd Abansuaso PL at Ahafo Region, Ghana
- Investigations into roles of geology in a range of environmental health issues that impact the health of humans and wellbeing of people in the savannah ecological zones. Primary aim of the research is to promote awareness concerning the environmental health issues among geoscientists, medical specialists and the public at large.
- Medical geology and Public Health research
- Geology and sustainable development goals for national development;which goals require geology for its attainment
- Exploration and Evaluation of Rock Resources of Bongo District for Dimension Stone and Construction Aggregate Enterprise. University for Development Studies (UDS)-Savannah Accelerated Development Agency (SADA)-Bongo District collaboration Project USBP001

- Exploration and Evaluation of Brown Clay for Bricks and Tiles in the SADA ecological zone of Ghana. UDS-SADA-Bongo District collaboration Project USBP002.
- Industrial Mineral Exploration in SADA ecological zone. UDS-SADA-Bongo District collaboration Project USBP003
- Biogeochemical Survey Method to Detect Hidden Gold Anomaly for Exploration Geochemical Targeting. Collaborative research with Pelangio Mining at Ahafo Area.
- Identifying environments under which lateritic residuum, ferricrete and other types of laterite form and their suitability as geochemical sample media.
- Geochemical Exploration in Regolith-Dominated Terrains: A Global Perspective. The AMIRA International Project P1123.
- Regolith-Landform Evolution and Metallogeny of the Lawra Birimian Belt, Northwest Ghana.
- Gold in plants-use of Biogeochemistry to identify hidden gold anomalies in regolith dominated terrains

PROFESSIONAL BACKGROUND

- **Technical Advisor** for Supercare Group Ltd on issues related to Mineral Industry (2019-present)
- **Principal Investigator**: UDS-SADA-Bongo District Project on LVMM (2015-2018).
- **Associate Professor and Head:** Department Earth Science, Faculty of Earth and Environmental Sciences University for Development Studies (2017-present)
- **Senior Lecturer Head:** Department of Earth and Environmental Science, University for Development Studies (July 2013--2018)
- **Lecturer, Ag. Head:** Earth and Environmental Science, University for Development Studies (2007-2009)
- **Rig Geologist,** RedBack Mining, Chirano, Ghana (April 2006-30th September, 2006)
- **Project Geologist,** Newmont Ghana Gold- Regional Exploration (February 2003-March 2006)
- **Senior Geologist,** SEMAFO GH, Northern Ghana(February 2000 - July 2001)
- **Technical Director-Exploration,** REP Natural Resources Ltd, Accra Ghana (November 1998-Feb 2000)
- **Field Geologist,** Ashanti Exploration (Subsidiary of Ashanti Goldfields) and IamGold AGEM-Ltd, NW Ghana Projects (October 1995-November 1998)
- **Geologist** –Kenbert - Gencor Ntronang Project (August 1991-June 1995)

OTHER ORGANIZATIONAL EXPERIENCE

- Developed undergraduate curricula for Applied Geology and Geo-environmental Science for UENR School of Geoscience
- Developed postgraduate curricula for GeoHealth and Mineral Exploration for professional and academic tracks for UENR School of Geoscience
- Developed earth science curriculum for Department of Earth Science,University for Developent Studies (2007 and has been running till now)
- Developed curricula for the upgrade of Department of Earth and Environmental Sciences to Faculty of Earth and Environmental Sciences (2016). That was successfully done, given birth to Faculty of Earth and Environmental Sciences FEES) at the University for Development Studies Navrongo Campus (started 2017-2018 – present).

- Developed Postgraduate and PhD curricula for the Department of Earth Science

KEY INTERNATIONAL COLLABORATORS

- Dr. Gawen R.T Jenkin, University of Leicester, UK (2009-present)
- Dr. Dickson W. Cunningham, Eastern Connecticut State University, U.S.A (2010-present)
- Dr. Ravi Anand, AMIRA International and of CSIRO of Australia (2007-present)
- Prof. Butt C. R. M of CSIRO of Australia (2009-2013)
- Prof. Robert B. Finkelman, University of Texas at Dallas, U.S.A (2007-present)

MEMBERSHIP OF PROFESSIONAL BODIES

- Member (MGHiG-282), Ghana Institute of Geoscientists (GhiG-1991-present)
- Member, International Medical Geologists Association (IMGA-Ghana Chapter leader-2007-present)
- Board Member, Society of Environmental Geochemistry and Health [(SEGH-ISEH & ISEG)-2010-present]
- Member, Society of Economic Geologists (SEG)-(2010-2014)
- Fellow, Society of Economic Geologists (SEG-2018 – present)
- Member: International Mining for Development Centre (IM4DC), 2012-present

INTERNATIONAL SERVICE

- Board Member ((African Region) of International Society of Environmental Geochemistry and Health (ISEH-ISEG) – 2017-2020
- Editorial Panel Member, EC Nutrition Journal (ECNU)- 2017 – Present
- Visiting Scholar, Pan African University, Earth and Life Science Institute, University of Ibadan, Nigeria

SELECTED CONSULTANCY SERVICES

Current consultancy services include:
Technical advising to:

- Technical Advisor and Consultant for Tradex Global Ltd and SuperCare Group of Companies on Mining and Geoscience matters (2018 – present)
- X2P43 Ltd, UK in the search of prospective gold concessions in West Africa particularly in Guinea and Ghana.
- Small scale and artisan miners of gold, industrial minerals and low value mining materials (LVMM) in Ghana, Burkina Faso and Mauritania.
- Mineral and Geosciences Industry including periodic consultancy works for:
    i. Pelangio Mining Ltd, Ghana (2015- present)
    ii. Tafoli Minerals, Mauritania (2012-2014)
    iii. Theras Resources Sarl, Burkina Faso (2013-present)
    iv. Sand Metals, Mauritania (2012-2013)
    v. Burkina Manganese (a subsidiary of Africa China Mining Corporation -ACMC)-2010-present,

vi. Hebron Exploration and Mining, Ghana (2000-2004)
vii. Ghana Consolidated Diamonds, Akwatia, Ghana (1998-1999)
viii. Inependent review of alluvial gravels for gold at Atwima Mponuah District for Community Mining (July-August, 2019)

EXTENSION ACTIVITIES: Outside University for Development Studies

- Coordinator: Water, Sanitation, Health and Agricultural Development Project, Navrongo Mission Circuit, Kasenna Nankana Municpal (2016-present)
- Education and Youth Development, Navrongo Mission Circuit, Kasenna Nankana Municpal (2016-present)
- Welfare Committee Chairman, Navrongo Circuit Mission-Bethel Methodist Church (2016-present)
- Member of the Scientific Committee of Colluquim of African Geologists CAGS27 (2018)
- Organiizng Committee Member of the first virtual student-oriented medical geology/environmental health conference for Latin America (2020-2021)

OTHER COLLABORATION ACTIVITIES

- Established collaboration with Sapienza University of Rome and University for Development Studies as CO -coordinator/partner" (31st July, 2019 –present). Project agreement to start Isotope Tracer investigations in Groundwater Reharge in Ghana starts 10th February, 2020.
- Principal Investigator on Selenium Geoavailability code name 'Adopt Africa' with Kintampo Health Reseadch Centre (2020-present)
- Established Staff and Students Exchange Programme with MELVANA Exchange Programme with Mugla Sitki Kocman University in Turkey (2016-present)
- Established UDS-SADA-Bongo collaboration on exploration and evaluation of Dimension stones and Industrial Minerals in Bongo District (2015-present)
- Established UDS-SADA collaboration on Strategic Planning on Physical Resource base of SADA ecological zone for value addition (2015-present)

AWARDS

- Outstanding contributions in reviewing-Journal of Gechemical Exploration (2017)
- Outstanding Medical Geology Researcher by International Medical Geology Association (2016)

GRANTS/FUNDING

- Received small grant of GhS 100,000 for geological equipment from SADA through UDS-SADA-Bongo collaboration (May, 2017)
- Obtained equipment support for
- Research Microscope worth $25,000.00 from Petroleum Commission Ghana (13th December 2019) for the Department of Earth Science, Navrongo

Current Research

- Regolith geology and geochemistry to identify gold anomalies particularly in Ghana

- Biogeochemistry and gold exploration in areas under cover.
- Isotope geochemistry and Mineral Exploration.
- Medical geology research on earth and health particularly impacts of natural environment on Population or Public Health.
- Exploration and Evaluation of Rock Resources

- Exploration and Evaluation of Brown Clay for Bricks and Tiles in the SADA ecological zone of Ghana. UDS-SADA-Bongo District collaboration Project USBP002.
- Industrial Mineral Exploration in SADA ecological zone. UDS-SADA-Bongo District collaboration Project USBP003
- Biogeochemical Survey Method to Detect Hidden Gold Anomaly for Exploration Geochemical Targeting. Collaborative research with Pelangio Mining at Ahafo Area.
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- Regolith-Landform Evolution and Metallogeny of the Lawra Birimian Belt, Northwest Ghana.
- Gold in plants-use of Biogeochemistry to identify hidden gold anomalies in regolith dominated terrains

Researcher ID: ResearcherID H-4529-2019, ORCID 0000-0002-1724-8307

Publications

1. Latifatu Alhassan Abubakar, Samuel Kofi Tchum, Kenneth Wiru, Charlotte Tawiah, Kwaku Poku-Asante, and Emmanuel Arhin: Selenium Geo -Availability in Stream Sediments in Selected Communities in the Kintampo Area of the Bono East Region of Ghana, European Journal of Environment and Earth Sciences, Vol 3 , Issue 2 , March 2022

2. **Emmanuel Arhin** and Raymond Webrah Kazapoe (2021): Influence of Trace Elements in the Natural Environment and Public Health: A Medical Geology Perspective DOI: 10.9734/bpi/etdhr/v1/2156C , Print ISBN: 978-93-5547-029-4, eBook ISBN: 978-93-5547-036-2

3. **Emmanuel ARHIN,** Atta A. Y. ARHIN (2021) The application of threshold gold values based on geochemical exploration in complex regolith terrains: A case study at Lawra Greenstone Belt of Northwest Ghana, Ghana Journal of Science, Technology and Development Vol. 7, Issue 2. *www.gjstd.org, e-ISSN: 2343-6727*

4. Alfred Awotwi, Geophrey, K. Anornu. Jonathan Arthur, Quaye-Ballard, Thompson Annor, Isaac Kwadwo Nti, Samuel, N. Odai, **Emmanuel Arhin,** Charles Gyamfi: Impact of post- reclamation of soil by large-scale, small-scale and illegal mining on water balance components and sediment yield: Pra River Basin case study, Soil & Tillage Research, Elsevier

5. Rasheed Mohammed Abdul, **Emmanuel Arhin** & Atta Adjei Arhin Jnr (2021): Mineralogy and geochemistry of geophagic materials at Mfensi-Adankwame in the Ashanti region of Ghana and possible health implications, Geology, Ecology, and Landscapes, DOI: 10.1080/24749508.2021.1952775, Taylor and Francis group

6. Tchum SK, Arthur FK, Adu B, Sakyi SA, Abubakar LA, Atibilla D, **Arhin E.** et al. (2021) Impact of iron fortification on anaemia and iron deficiency among pre-school children living in Rural Ghana. PLoS ONE 16(2): e0246362. https://doi.org/10.1371/ journal.pone.0246362

7. **Arhin E** and Arhin A. A. Y (2021). The Application of Threshold Gold Values Based on Regolith Environments to Geocheical Exploration for Gold Deposits in Complex Regolith Terrains: An Example for the Lawra Greenstone Belt of Northwest Ghana. *Ghana Journal of Science, Technology and Development, Vol. ..., Issue .... p. 00-00, e- -ISSN: (in press)*

8. C Ntori, **E Arhin,** AS Ibrahim (2020) Detecting Real Gold Anomalies From Soil Geochemical Survey Using Regolith Knowledge In Areas Undercover: Example In The Sunyani Sedimentary Basin, Ghana. J Earth Sci Clim Change 11:9.

9. **Arhin, E.**, Kazapoe, R.W. and Salami, F. (2020), "Linking geology to the prevalence of non-communicable diseases: a case study of the Voltaian sedimentary basin, Ghana", *Ecofeminism and Climate Change, Emerald Publishing Limited, e-ISSN: 2633-4070,*

10. **E. Arhin,** Abu Mahamuda, Zango M. S. (2020). Environmental and Affordable Housing Material - The Use of Bricks and Tiles in Reducing Housing Deficits in Developing Countries: A Case Study at Bongo District, Ghana. *Ghana Journal of Science, Technology and Development, Vol. 7, Issue 1, p. 13-25, e- -ISSN: 2343-6727*

11. **E. Arhin**, A. W. Bukari, R. Kazapoe,(2020). Trace Elements in Tailings: Understanding Their Implications When Used as a Construction Material and as a Re-Usable Agricultural Land. *SSRG International Journal of Geoinformatics and Geological Science* 7(2), 37-42.

12. Abdul, R. M., & **Arhin, E**. (2020). Mineralogy and Geochemistry of Geophagic Soils in Ghana: A Review. *European Journal of Environment and Earth Sciences*, *1*(3). https://doi.org/10.24018/ejgeo.2020.1.3.9

13. **Emmanuel Arhin,** Pearl A. Ndo, and Musah S. Zango (2020). Hotspots Analysis of Trace Elements in Areas Affected by Illegal Mining Activities: A Case Study

at Mpatoam in Amansie West District of Ghana. *International Journal of Geoinformatics and Geological Science (SSRG-IJGGS*), Volume 7, Issue 1, Doi: 0.14445/23939206/IJGGS-V7I1P101

14. **Emmanuel Arhin**, Fulera Salami and Atta Adjei Jnr Arhin (2020). Contamination and Ecological Risk Assessment of Trace Elements in Soils and Sediments at Balungu River Basin of Bongo District: An Index Analysis Approach to Avert Public Health Epidemics. *International Journal of Geoinformatics and Geological Science (SSRG-IJGGS*), DOI: 10.14445/23939206/IJGGS-V7I1P102

15. Ntori C., **Arhin, E.** Sulemana, I. A and Antwi Boateng D.Y (2019) .Characterization of regolith types and its impact on gold anomaly in highly weathered trains using multiple dataset. *International Journal of Geography and Geology*, Vol. 8, No. 4, pp. 137-152, ISSN (e): 2305-7041 ISSN(p): 2306-9872 DOI: 10.18488/journal.10.2019.84.137.152

16. Michael J. Watts, Taicheng An, Ariadne Argyraki, **Emmanuel Arhin,** Anthea Brown, Mark Button, Jane A. Entwistle, Robert Finkelman, et al. (2019) The Society for Environmental Geochemistry and Health (SEGH): building for the future. *Environ Geochem Health, ISSN 0269-4042, DOI 10.1007/s10653-019-00381-9,* Springer *(Editorial)*

17. **Emmanuel Arhin,** Chaosheng Zhang & Raymond Kazapoe (2019). Medical geological study of disease-causing elements in Wassa area of Southwest Ghana, *Environ Geochem Health*, **41**, p.2859–2874(2019), https://doi.org/10.1007/s10653-019-00341-3
18. Raymond Kazapoe & **Emmanuel Arhin** (2019): Determination of local background and baseline values of elements within the soils of the Birimian Terrain of the Wassa Area of Southwest Ghana, Geology, Ecology, and Landscapes, DOI: 10.1080/24749508.2019.1705644

19. Samson Boadi, **Emmanuel Arhin**, Robert Hewson, Caroline Lievens , Samuel Torkornoo (2019). Using Spatial Distribution of Termite Mounds To Support Subsurface Geological Imaging In A Complex Regolith Terrain of Sefwi-Bibiani Gold Belt, SW Ghana. *SSRG International Journal of Geoinformatics and Geological Science (SSRG-IJGGS*), Volume 6 Issue 3, p40-47.

20. **Arhin E.** (2019). "Nutrition and Medical Geology: The Hidden Truth on Healthy Dietary Food Consumption that Never was - An Example from Ghana". EC Nutrition 14.11 (2019): 43-47.

21. **Arhin, E**., Torkonoo, S., Zango, M. S. and Kazapoe, R. (2018), "Gold in Plant: a biogeochemical approach in detecting gold anomalies undercover- a case study at Pelangio Gold Project at Mamfo Area of Brong Ahafo, Ghana",Ghana Mining Journal,Vol. 18, No. 1,pp.39-48.

22. **Arhin E,** Zango, M.S., and Kazapoe, R. (2017). Characterizing and Indexing Regolith Materials Using Geochemistry towards Hidden Mineral Anomaly Delineation: A Case Study of Savannah Region of NW Ghana. Universal Journal of Geoscience 5(6): 169-182, 2017 http://www.hrpub.org DOI: 10.13189/ujg.2017.050602.

23. **Arhin,** E. (2017). "Plant-Soil Interactions an Important Consideration Guide in Advising on Healthy Food for Human Wellbeing". EC Nutrition 8.4 (2017) 106-108

24. **Arhin,** E. and Kazapoe, R. (2017. Selenium in Locally Produced Food Crops and Implications on Healthy Eating: A Case Study at the Talensi District of Ghana. EC Nutrition 8.3 (2017) 85-92

25. **Arhin., E,** Kazapoe, R., and Zango, M. S (2017**).** "The Hidden Dangers of Unknowingly Ingesting Harmful Trace Elements from Food Crops and their Health Implications: A Case Study at Talensi District in the Upper East Region, Ghana. EC Nutrition 7.1 (2017) 34-45

26. **Arhin, E.** Mouri, H., and Kazapoe, R (2017) Inherent Errors in Using Continental Crustal Averages and Legislated Accepted Values in the Determination of Enrichment Factors (EFs): A Case Study in Northern Ghana in Developing Environmental Policies. J Geogr Nat Disast, an open access journal, Volume 7 • Issue 3 • 1000204J, ISSN: 2167-0587

27. **Arhin,** E and Zango, M. S (2016). Impact of Trace Elements in the Natural Environment and Public Health: A Medical Geology. Perspective. Annals of Public Health and Research. *Ann. Public Health Res.,* 3(4): 1051

28. **Arhin, E.,** Zango, M.S. and Berdie, B. S. 2016. Geochemical background of some potentially toxic and essential trace elements in soils at the Nadowli District of the Upper West Region of Ghana. *Journal of Earth, Environment and Health Sciences.* 2(2) p.56-65. Wolters-Kluwer-Medknow publishers, Doi: 10.4103/2423-7752422.

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30. Amedjoe, C. G., Gawu, S.K.Y., **Arhin, E.,** and Adjei P. K. 2016. Integrating geoscience data for delineating potential gold targets: a case study from Sian Goldfields Limited, Ghana. *Research Journal of Applied Sciences, Engineering and Technology. Maxwell Scientific Publication.*

31. **Arhin E.,** Zango, M. S, and Berdie, B. S 2016. Climate change and its health implications at Bongo District of Upper East Region of Ghana, *Journal of Environment and Earth Science,* vol. 6, issue 2, p. 167-178. ISSN 2224-3216 (paper), ISSN 2225-0948 (online)
32. **Arhin E.,** Zango, M. S, and Berdie, B. S 2016. Trace Elements Assessments using Pollution Load Index and Spatial Maps towards the Development of Environmental Policies against the Impacts of the Natural Environment on Primary Health, Nadowli District-NW Ghana, *Journal of Environment and Earth Science,* vol. 6, issue 2, p. 43-51. . ISSN 2224-3216 (paper), ISSN 2225-0948 (online)

33. Nude, P. M, **Arhin, E,** Yidana, S. M, Foli, G. and Dowuona, G. N. N. 2014. Geochemical Dispersion of Elements and Their Correlation with Gold in the Regolith at the Tetteh Prospect of the Chirano Gold Mines in the Sefwi Belt of the Birimian, Southwestern Ghana. *Journal of Environment and Earth Science*, ISSN 2224-3216 (paper) ISSN 2225-0948 (Online), vol. 4, No. 9
34. **Arhin**, E., Zango, S.M. 2015. Unravelling regolith material types using Mg/Al and K/Al plot to support field regolith identification in the savannah regions of NW Ghana, West Africa, *Journal of African Earth Sciences,* vol. 112,p. 597-607/ Elsevier Publication.

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Teaching

- APGE 150 Evolving Earth
- APGE 156 Regolith Science
- APGE 252 Medical Geochemistry
- APGE 352 Exploration Geochemistry
- APGE 366 Trace elements and environmental health
- APGE 450 Economic Geology
- APGE 451 Environmental Geochemistry
- APGE 453 Mineral Exploration Techniques

Editted Abstracts & Conferences

1. **Emmanuel Arhin (2019).** The Nexus between Earth, Environment and Implications for Public Health, *the 11th International Symposium on Environmental Geochemistry (ISEG), Peking University, Beijing, China on August 7-10, 2019.*
2. **Emmanuel Arhin (2019).** Medical Geology: the essential and most neglected aspect of Public Health System in Developing Countries-Examples from Ghana, *8th IMGA International Conference, Guiyang, China, August 12-15, 2019*
3. **Emmanuel Arhin** & Zango Saeed Musah (UDS). Averting impacts of disease-causing elements through medical geological studies: a key step towards SDG 4 attainment in Ghana. *1st Annual National Conference of GhIG (GhIGCon 2018) 21st-25th November, 2018, Kumasi-IDL Conference Centre, KNUST.*
4. Raymond Kazapoe & **Emmanuel Arhin** (UDS). Known and anticipated medical geology issues: An aspects of public health concerns to avert the spate non-communicable disease outbreak. . *1st Annual National Conference of*

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5. **Arhin, E.,** Zango, M. S., and Ndo, P.A (2018). Hotspots Analysis of Trace Elements in Areas Affected by Illegal Mining Activities: A case study at Mpatoam at Amansie West District of Ghana. . *1st Annual National Conference of GhIG (GhIGCon 2018) 21st-25th November, 2018, Kumasi-IDL Conference Centre, KNUST*
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9. **Emmanuel Arhin (2018).** Discovering the next big elephant-current trends in mineral exploration': Geological Perspective. WAIMM Annual Industry Conference (WAIC 2018) on harnessing West Africa Natural Resources to drive economic growth and Investment at the auditorium of Ghana Shippers Council, Accra, 13th-15th November, 2018
10. **Emmanuel Arhin (2016).** Semi-quantitative characterization and indexing of regolith materials using geochemistry towards hidden anomaly delineation. 2. Biogeochemistry and mineral exploration n areas undercover: a case study at Pelangio Gold, Tepa, Ashanti Region, Ghana. WAXI-AMIRA International *23rd October 2016 Abidjan Meeting*
11. **Emmanuel Arhin (2016).** Problem of geophagia in Ghana (Webinar version was presented also on 27th September, 2016). 2. Geochemical background of some potentially toxic and essential trace elements in soils. **Webinar, Sept*ember, 2016 after*** ISEH-ISEG & Geoinformatics 2016 joint International Conference on Environment, Health, GIS and Agriculture, *Galway, Ireland, August 14-20, 2016.*
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16. **Arhin, E** and Nude, P. M., (2014). Regolith Mapping: Key to successful mineral exploration in areas under cover. Simesxmin 2014*. A benchmark symposium in Mineral Exploration, May 11th-14th, Keynote Speaker, Minas Gerais*, Brazil.
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19. Affam, M., **Arhin, E.,** and Asamoah, D. N., (2012). Source of endemic fluorosis attributed to igneous granitoids in northern Ghana: A case study "*2nd Umat International Biennial Mining and Mineral Conference",* p. 242-248.
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23. **Arhin, E.** and Nude, P. M. (2007). Significance of regolith mapping and its implication for gold exploration. *AMIRA International-WAXI 2007 West African Exploration Initiative, WAXI/IXOA Workshop, Abstract Volume,* p. 47.

Workshop

1 10th-11th September, 2015 workshop at Valley View University as a facilitator on **'Research Design, Execution and Presentation**'- Accra VVU Campus.

2 15th-17th August, 2015 NEWMONT-SEG Gold Forum on 'Orogenic gold deposits' at Eusbett Hotel, Sunyani-Ghana- **a Participant**

3 'Structural and Metamorphic Petrology of Lawra –Wa Greenstone belt. Participitant-10th- 16th February, 2014, Wa, Northern Ghana-**Participant.**

Public Lectures

- **Arhin E (2017):**Medical Geology: The Missing Gap in Ghana's National Development. *GhiG Public Lecture,* 2nd November 2017, WRI Conference Room, Accra -Ghana
- **Arhin E (2018):** Medical Geology: Essential aspects of the Public Health System in National Development at a *GPHA Scientifc Workshop on Sanitation and Environmental Management*, 13th April, 2018, College of Physicians and Surgeons, Accra, Room Zero, Ghana
- **Arhin E 2021:** SEYCHEM-CFX100 gold extraction agent for ASM operators: the safe breakthrough for Artisanal and Small Scale Miners. Invited presentation in Burkina Faso, 7TH -10th October, 2021
- **Arhin E (2022)**"Prescription for better environment and prevention of spread of non-communicable disease: The perspective of the Geoscientist" at UENR University Auditorium, March 29, 2022, Sunyani-Ghana

Selected Company Reports

1. **Arhin E, 2020.** Stream sediments and other geological media survey for gold at Abansuaso PL for Supercare Group of Companies
2. **Arhin E, 2019.** Due diligence report on alluvial gold deposits at Adumasa and Ampekrom concessions for KOLAK Mining in Ashanti Region
3. **Arhin E, 2016.** Final report on exploration and evaluation of low value materials in Bongo and the surroundings: UDS-SADA-Bongo District Collaborative Research.
4. **Arhin E.,** 2004: Multimedia sampling-the new approach to successful gold exploration using different regolith materials, prepared for Newmont Ghana Gold Ltd. (unpublished), 26 p.
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6. Nude, P., **Arhin E.,** and Ruerrger R., 1999: Adonkrono alluvial diamond project, work programme and a report on exploration and geology. REP Natural Resources Ltd. Internal report, 35 p.

Selected Technical Reports

1. **Arhin, E. (2016).** Report on exploration and evaluation of Clay Deposits and Dimension Stones in Bongo District. Prepared for UDS-SADA and Bongo District Assembly.
2. **Arhin, E.** 2015. Proposal and work programme for dimension stones and brown clay exploration in SADA ecological zone**.** *Prepared for UDS-SADA and Bongo District.75 p*
3. **Arhin E.,** 2013: Technical report on Cu-Au mineralisation at Amsaga area of Mauritania (unpublished-Company's report for Tafoli)
4. **Arhin E.,** 2006: Technical report on geology and mineralization for Newmont Gold Ltd. Report submitted to the Minerals Commission, Ghana, 53 p.
5. **Arhin E.,** and Nude, P.M., 2002**:** Technical report on lode gold written for Hebron exploration and mining. Report submitted to the Minerals Commission, Ghana.
6. Bailie, N., **and Arhin E.,** 2000: Terminal report on geology and mineralization for SEMAFO GH., Ltd. On Tinga and Wa gold projects. Report submitted to the Minerals Commission, Ghana, 156 p.

7. **Arhin E.,** and Bawa C., 1998: Ashanti-AGEM Alliance, Babile concession, Terminal report on geology and exploration. Report submitted to the Minerals Commission, Ghana, 78 p.

Media enquiries
Get in touch for media enquiries, expert opinion, interviews, images or video.

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