Dr. Kennedy Kiprotich Kilel, PhD

Nuclear Science Researcher | Academic| Radiotracer Expert| Nuclear Forensics Expert

Contact Information

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Google Scholar: https://scholar.google.com/citations?user=-038EUQAAAAJ&hl=en

Career Profile

Dr. Kennedy Kilel is a dedicated nuclear science researcher and academic with extensive expertise in nuclear application techniques, sediment transport, radiotracer applications, and environmental monitoring. He has specialized in the development of low-cost gamma detection systems, led IAEA-funded research projects, published in high-impact journals, and mentored the next generation of scientists. He has focused on interdisciplinary research that integrates nuclear science, data analysis (Python, R), machine learning and geostatistics to address critical environmental challenges.

Education

PhD in Nuclear Science (Dec 2024)

University of Nairobi, Kenya

Thesis: *Development and Application of a Low-Cost Delta Underwater Gamma System (DUGS) for Investigating Sediment Transport in Aquatic Ecosystems*

- Awarded an IAEA PhD Scholarship, where I was sponsored to carry out my PhD research at Stellenbosch University, South Africa, under supervision of Prof. Jacques Bezuidenhout.

Master of Science in Nuclear Science (2016)

University of Nairobi, Kenya

- Funded by the Kenya Nuclear Electricity Project currently NuPEA

Research Interests

1) Nuclear Detection and Measurements
2) Radiotracer Applications
3) Sediment Transport

4) Nuclear Forensics
5) Machine Learning and Data science
6) Geostatistics and Geospatial Modelling
7) Application of Nuclear techniques in Geothermal, Environment and Agriculture

Technical Skills

1) Programming: Python, R, C++, VB.Net, and Pascal
2) Geospatial mapping: QGIS, ARCGIS, and R
3) Operating system: Windows and Linux
4) Analytical Instrumentation: AAS, ICP-OES, ICP-MS, LA-MS,
5) Nuclear Analytical Techniques: Gamma Spec (NaI, Ge(Li),), TXRF, EDXRF, XRD
6) Modelling: RTD
7) Statistical Software: Genstat, XLStat, STATA, Excel

Work Experience

- **Lecturer & Researcher (April 2025-Present)**

  Department of Physics, Kenyatta University, Kenya

  - Teaching and training
  - Carrying out research in Nuclear Science and Technology
  - Student mentorship
  - Postgraduate student supervision

- **Chief Scientific Investigator** (Jan 2021–Present)

  IAEA Coordinated Research Project (CRP), Kenya

  - Leading the project titled *"Development of Radiometric Methods and Modelling for Measurement of Sediment Transport in Coastal Systems/Rivers."*
  - Coordinating research activities and submitting annual reports to the IAEA.
  - Publication of the results and presenting to the conferences and coordination research meetings.

Research Experience

- **Research Fellow** (2026-2029)

  Faculty of Military Science, Stellenbosch University, South Africa
- **ISTRA Working Group Member- Natural Radioactivity** (April 2025)

  I was appointed as the member of working group in application of Natural Radioactivity in Sediment transport and tracer studies. The members of the working group are drawn from France, South Africa, Spain, and Greece.
- **Invited Reviewer** (March 2025)

  Journal of Environmental Monitoring and Assessment, Springer Nature

  I was invited to review a manuscript based on my research experience and expertise.
- **Development of Radiometric Methods for Sediment Transport** (2021–Present)
  - Funded by IAEA (Grant: €16,000).
  - The focus of the project: ***Using natural radionuclides as radiotracers for sediment transport studies in Kenya.***
- **Delta Underwater Gamma System (DUGS)** (2020–2024)
  - Developed a low-cost gamma detection system for in-situ measurement of radionuclides in aquatic sediments. This work was done in collaboration with Stellenbosch University, South Africa.
  - Published findings in *Journal of Radioanalytical and Nuclear Chemistry* (2023).

Teaching Experience

- **Lecturer/Tutorial, Physics** (2020–2022)
  Stellenbosch University, South Africa
  Developed and delivered lectures, practical sessions, and exams for undergraduate students.
- **Lecture/Tutorials, Nuclear Science (**2020–2023)
  University of Nairobi, Kenya
  - Taught tutorials, administered practical classes, and set examinations.
  - Units taught include Radiochemistry and Nuclear Waste Management
- **Lecturer, Radiation & Nuclear Physics** (2018–2020)
  JKUAT, Kenya
  - Developed and delivered lectures, practical sessions, and exams for undergraduate students.

- Units taught include Radiation physics I &II, Non-Destructive testing, Interventional Nuclear Medicine, MRI, and Radiobiology

Grants and Funding

Successful Grants and Research funds

- **IAEA PhD Scholarship** (2020–2024)
  - Funded research on sediment transport using radiotracers.
- **IAEA Research Grant** (2021–Present)
  - €16,000 for the development of radiometric methods for sediment transport.

Research Grants applied and currently undergoing review.

- **KENET** (2025)
  - KES 1.5m
  - I submitted a grant proposal as PI in collaboration with University of Nairobi and University of Embu titled: ***Geostatistical Modelling and Machine Learning of Natural Radionuclides for Sediment Transport: A case Study of River Tiva, Kitui County, Kenya.***

Awards, Fellowships, and Honours

1) Secured grant to participate at the ICARST-2025 conference awarded by International Atomic Energy Agency
2) International Training Course on Nuclear Forensics Fellowship, awarded by IAEA to participate on the expert training course for 2 weeks at JRC, Karlsruhe, Germany
3) Secured grant to participate at the ICARST-2022 conference from the IAEA Energy Agency
4) Secured grant to participate at the MedGU-2021 conference from the International Science Program, Uppsala University, Sweden
5) PhD Sandwich Research Scholarship at Stellenbosch University, awarded by IAEA
6) Secured grant to participate at the Tracer-8 conference from the International Science Program (ISP), Uppsala University, Sweden
7) International Training Course on Radioatracer Application and Radiation Methodologies Fellowship, awarded by IAEA to participate in 3 weeks expert training at CEA/ISTN, Saclay, Paris in France
8) Master of Nuclear Science Scholarship by the Government of Kenya through Kenya Nuclear Electricity Project (Currently known as NUPEA) at the Institute of Nuclear Science and Technology, University of Nairobi.

Local and International Collaborators

1) Prof. Jacques Bezuidenhout, Faculty of Military Science, Stellenbosch University, South Africa
2) Dr Ian Kaniu, Department of Physics, University of Nairobi, Kenya

3) Dr. Rikus le Roux, Faculty of Military Science, Stellenbosch University, South Africa
4) Dr. Isaac Kipkemoi, University of Embu
5) Dr. Christos Tsabaris, Hellenic Institute of Marine Research, Greece
6) Prof. Alicia Tejera, Department of Physics, Las Palmas de Gran Canaria, Spain
7) Dr. Delali Tulasi, Ghana Atomic Energy Commission (GAEC)
8) Dr. Eng Isaack Kanda, Geothermal Scientist, Geothermal Development Company
9) Dr. Ester Kitur & Dr. Ezekiel Ndunda, Department of Environmental Studies, Kenyatta University

Professional Affiliation

- **Member**, East Africa Association of Radiation Protection (EARP)
- **Member**, International Society of Tracers and Radiation Applications (ISTRA)
- **Registered Radiation Worker**, Radiation Protection Board (Reg No. ORW/157)
- **Member**, Internation Youth Nuclear Congress (IYNC), served in the bylaws committee
- Member, Kenya Young Generation in Nuclear, Served in the Program and strategy Committer. I also recently served as a Chairman of Elections board (2025)
- **Expert,** National Committee Member-Technical Committee (Dosimetry, radiometry and non-destructive metrology), Kenya Bureau of Standards KEBS) under the ISO representing ISTRA
- **Fellow,** International Atomic Energy Agency

Certifications and Training

- I**nternational Training Course on Nuclear Forensic Methodologies**
  National Nuclear Security Administration/ IAEA/European Nuclear Security Training Centre at Joint Research Centre, Karlsruhe, Germany (2024)
- **Tracer and Radiation Application Operator** (Level 2)
  International Society of Tracers and Radiation Applications (ISTRA), 2018 sponsored by International Atomic Energy Agency
- **QGIS Specialist Training**
  Stellenbosch University, South Africa, 2020.

Publications in Peer Reviewed Journals

Year	Article	Scopus/Web of Science indexed
2026	G.W. Mlay, M.I. Kaniu, L.W. Njenga, K.D. Njoroge, M.J. Gatari, **K.K. Kilel**, I.J. Lugendo, Livestock meat as a bioindicator of natural radionuclide exposure and cancer risk near the Manyoni uranium deposit, Tanzania, Physics Open, Volume 26, 2026, 100373, ISSN 2666-0326, https://doi.org/10.1016/j.physo.2026.100373.	Yes
2025	**Kilel, K.K.**, Kaniu, M.I., Bezuidenhout, J. Gatari, M.J. Assessing sediment transport using principal component analysis of natural radionuclides in aquatic environments. J Radioanal Nucl Chem (2025). https://doi.org/10.1007/s10967-025-10612-2	Yes
2025	Tsabaris, C., Tejera, A., Koomans, R. L., Pham van Bang, D., Hammouti, A., Malliouri, D., Kapsimalis, V., Martel, P., Arriola-Velásquez, A. C., Alexakis, S., Androulakaki, E. G., Eleftheriou, G., **Kilel, K.**, Maramathas, C., Patiris, D. L., & Affum, H. (2025). Evaluation of Coastal Sediment Dynamics Utilizing Natural Radionuclides and Validated In-Situ Radioanalytical Methods at Legrena Beach, Attica Region, Greece. *Journal of Marine Science and Engineering*, *13*(7), 1229. https://doi.org/10.3390/jmse13071229	Yes
2025	Mlay, G.W., Kaniu, M.I., Njenga, L.W., Njoroge, K.D., Gatari, M.J**., Kilel, K.K**. and Lugendo, I.J. (2025), Assessment of natural radioactivity and radiation risks in soil near the Manyoni uranium deposit, Tanzania, *Radiat. Prot. Dosimetry*, **Vol. 201 No. 5**, pp. 351–360. https://doi.org/10.1093/rpd/ncaf021	Yes
2023	**Kilel, K.K.,** Bezuidenhout, J., Gatari, M.J., Kaniu, M.I. A low-cost delta underwater gamma system (DUGS) for in-situ measurement of natural radionuclides in aquatic sediments. J Radioanal Nucl Chem 332, 659–667 (2023). https://doi.org/10.1007/s10967-022-08701-7.	Yes
2023	Bezuidenhout J, le Roux RR, **Kilel KK.** The Characterization and Optimization of an Underwater Gamma-Ray Detection System (DUGS). Journal of Marine Science and Engineering. 2023; 11(1):171. https://doi.org/10.3390/jmse11010171.	Yes
2023	Babalwa Mtshawu, Jacques Bezuidenhout, **Kennedy K. Kilel,** Spatial autocorrelation and hotspot analysis of natural radionuclides to study sediment transport, Journal of	Yes

	Environmental Radioactivity, Volume 264,2023,107207. https://doi.org/10.1016/j.jenvrad.2023.107207.	

Other Publications

Mathu EM, Waswa AK, Kariuki PC, Kianji GK, Odhiambo MB, **Kiprotich KK.** "THE MIDDLE EASTERN COUNTIES IN KENYA: AN AWAKENING GIANT IN MINING AND IDEAL FOR MINING INVESTMENT." In: GEOEACE. NAIROBI; 2015.

Kiprotich, K.K (2016). Characterization of Sands for Heavy Minerals, Distribution and Profiling of River Tiva Sands, Kitui County, South-eastern Kenya. *MSc Thesis.*

Articles in Preparation

Loise Mbae, Ian Kaniu, Jacques Bezuidenhout, **Kennedy Kilel,** Elijah Mwangi. Using Natural Radionuclides to Study Sediment Movement in Harbours: A case study of Kilindini Harbour, Mombasa, Kenya.

Participation in International Conferences

Year	Paper Presented	Venue
2025	**Kilel, K.K.,** Kaniu, M.I., Bezuidenhout, J., Rikus, R., (2025). The development of a Delta Underwater Gamma System (DUGS) for radionuclide measurements in aquatic sediment, IAEA headquarters, Austria, Vienna, 6-11 April 2025. *ICARST-2025*	Vienna, Austria
2025	Loise Mbae, Ian Kaniu, Jacques Bezuidenhout, Elijah Mwangi, Kennedy Kilel (2024). Sediment Fingerprinting in Kilindini Harbour, Mombasa: Advanced Analytical Techniques for Environmental Monitoring and Process Efficiency, 2024 IEEE 9th International Conference on Engineering Technologies and Applied Sciences (ICETAS)	Bahrain
2024	**Kilel, K.K.,** Bezuidenhout, J., Gatari, M.J., le Roux, R., Kaniu, M.I., (2024). DUGS as a Tool for Measuring Natural Radionuclides as Tracers for Sediment Transport Studies, Benicassim, Spain, 14-16th May 2024. https://tracer9.sciencesconf.org/user/submissions *Tracer-9*	Benicassim, Spain
2022	Rikus, R., **Kilel, K.K.,** Bezuidenhout, J., (2022). The development of a Delta Underwater Gamma System (DUGS) for radionuclide measurements in aquatic sediment, IAEA headquarters, Austria, Vienna, 22-26 August 2022.	Vienna, Austria

	https://conferences.iaea.org/event/222/abstracts/17966/. *ICARST-2022*	
2022	**Kilel, K.K.,** Bezuidenhout, J., Gatari, M.J., le Roux, R., Kaniu, M.I., (2022). Measurement of Primordial Radionuclides using *In-situ* Gamma Ray Spectrometer as Sediment Tracers, IAEA headquarters, Austria, Vienna, 22-26 August 2022. https://conferences.iaea.org/event/222/abstracts/17982/. *ICARST-2022* `	Vienna, Austria
2021	**Kilel, K.K.,** Bezuidenhout, J., Gatari, M.J., le Roux, R., Kaniu, M.I., (2021). In Situ measurements of natural radionuclides to determine sediment transport on the seafloor of Saldanha Harbor, South Africa, Istanbul, Turkey, 25-28th November 2021. *MedGU-2021*	Istanbul, Turkey
2019	**Kilel, Kk**, Mangala MJ, Gatari MJ, Mathu E, Koech NK (2019). Characterizing Sediments for Black Sands as Possible Radiotracer for Sediment Transport Studies, Conference proceedings on Tracers and Tracing methods, Da Nang, Vietnam. *Tracer-8 conference*	Da Nang, Vietnam

Postgraduate Student (s) Supervision

No	Student Name	Thesis Title	Level	Status
1	Henry Kioko	Development and Evaluation of An Intelligent Gamma-ray Spectrometry System for Rapid Onsite Soil Fertility Assessment	PhD	On going

Community Service

1. I serve as a youth promoter at AIC, Tabain, Molo. My role is to mentor the youth of the church on good morals, social skills and career development.
2. I Chair the Board of Management for Muchorwe Secondary School, Kuresoi North, Nakuru

References

1. **Prof. Jacques Bezuidenhout**
   Associate Professor of Physics, Stellenbosch University, South Africa.
   Email: jb@sun.ac.za | Phone: +27 84 581 4948
2. **Dr. Ian Kaniu**
   Senior Lecturer, University of Nairobi, Kenya.
   Email: ikaniu@uonbi.ac.ke | Phone: +254 723 713 247
3. **Dr. Raphael Nyenge**
   Chairperson, Department of Physics, Kenyatta University, Kenya.
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