

IRANKUNDA Elisephane



Research and Teaching Interests

- Investigating urban network-environment interactions using novel observations, data analysis, and modeling. Emphasis on climate change adaptation, mitigation strategies amidst changing conditions, air quality, air pollution, and transportation networks.
- Conducting regional and local assessments of environmental and human health impacts and risks. Utilizing time-series data and modeling analyses to study indoor and outdoor air pollution dynamics for exposure-response relationships.
- Modeling air quality at various scales including rural, urban, and mining areas. Addressing sub-grid scale parametrizations, spatial emission heterogeneity, urban meteorology, and the dispersion of air pollutants in complex topographies.
- Engaging in environmental science and engineering, atmospheric and climate science, and conducting noise pollution and climate impact assessments.



Education

Present
↑
07/2021

06/2021
↑
06/2020

11/2018
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06/2016
07/2015
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06/2011
11/2014
↑
02/2011
10/2010
↑
01/2005

Ph.D., Environmental Science, Babeş-Bolyai University of Cluj-Napoca, Faculty of Environmental Science and Engineering, Romania

Romanian Language and Culture: Preparatory Year as Ph.D. Candidate Babeş-Bolyai University of Cluj-Napoca, Romania

M.S., Atmospheric and Climate Science, University of Rwanda, Department of Physics, Rwanda

B.S., Computational Physics, University of Rwanda, Department of Physics, Rwanda

Diploma in Theology, Joy of God Bible Institute Come and See Africa, Huye, Rwanda

Advanced General Secondary School in Physics, Mathematics, and Chemistry, Geography, and Biology, at EAV Ntendezi, Nyamasheke, Rwanda



Key Course Taken

- **Ph.D.:** Advanced research methodology and specificity of environmental research, Risk assessment on health in relation to environmental factors, Assessment of risk, vulnerability and environmental crises. **Thesis:** *Quantification of Air Pollutant Emissions Through In-Situ Measurements and Dispersion Modelling in Romania and Rwanda. Risk Assessment.*



Contact

✉ Phone



🏠 Website

🌐 www.ubbcluj.ro
www.teau.ac.ke



Skills

- Proficient in R, Python, LaTeX, QGIS, Origin, and ArcGIS
- Skilled in fixed and portable air quality monitors
- Skilled in climate, air pollutant dispersion, and chemical models
- Skilled in Windows and Linux environments
- Problem solving and teamwork
- Effective communication
- Build powerful partnerships and stay adaptable
- Drive projects to success



Languages

Kinyarwanda	Mother Tongue
English	Fluent
French	Fluent
Romanian	Proficient
Kirundi	Independent
Kiswahili	Basic

- **M.S.:** Atmospheric physics and chemistry, Weather and Climate system, Numerical method in environmental science, Climatology and hydrology field work, Numerical modelling of weather and climate, Planetary Boundary layer, Meteorology and pollutant transport.



Work experience

07/2022



01/2019

LECTURER and STAFF, The East African University (TEAU), Nairobi Main Campus, Kenya

Main Activities and Responsibilities

- Teach as a teaching team member within an established program of study.
- Supervise students' work, provide advice on study skills, and assist with learning problems.
- Set and assess assignments, design examination questions, evaluate students' work and progress using defined criteria, and offer constructive feedback.
- Reflect on teaching design and delivery, seek methods to enhance performance, and gather and analyze feedback.
- Supervise student projects under guidance and support.
- Manage teaching, scholarly, and administrative activities, oversee students' fieldwork and placements.
- Utilize teaching resources and facilities appropriately, and plan and organize teaching and tutorials.

12/2018



04/2018

08/2017



01/2015

LECTURER, The East African University Nyagatare Campus, Rwanda

Teacher and IT Support Officer, Nyakabwende Secondary School, Rusizi, Rwanda



Honors and Awards

- Research Fellowship, Air Quality Monitoring and Dispersion Modelling in Urban and Mining Backgrounds - Babeş-Bolyai University through Romanian Ministry of Education and Foreign Affairs (2020-2024), Reference Number: DGRIAE-0713/III/139/CMJ/26.08.2021.
- Romanian Chemical Engineering Society "Emilian Brat" Doctoral Student Awards: Second Prize 2022 on 17-18 November 2022, Bucharest, Romania.
- Research Fellowship Grant, The Foundation National Centre APELL for Disaster Management (CN APELL-RO) (May 2022-Feb 2024), Reference Number: ROC/Busa/RFB/58/2022.
- Research Fellowship, Indoor Air Quality Monitoring - University of Rwanda through Rwanda Education Board and Rwanda Ministry of Education (2016-2018), Reference Number: 1343/REB/2017



Publications

1. Török, Z., **Irakunda, E.**, & Ozunu, A. (2023). The Modelling the Dispersion of PM10 Via Wind Erosion from Opencast Mining-Moldova Nouă Tailings Ponds-Romania. *Environmental Monitoring and Assessment journal*. doi.org/10.1007/s10661-023-12199-1
2. **Irakunda, E.**, Török, Z., Alexandru, M., Gasore, J., Kalisa, E., Akimpaye, B., et al. (2022). The comparison between in-situ monitored data and modeled



Volunteer Work

- Member of the Air Quality in Africa, Scientists, and Researchers (ASAQ) group
- Reviewer Team Member at the Elsevier Scientific African Peer Review Journal, recognized with an annual 2020 certificate of review
- Reviewer Team Member at the Springer Environment, Development, and Sustainability Peer Review Journal
- Committee Member, International Research Conference Organizer at the East African University
- Reviewer Team Member at the African Journal for Science, Technology, and Social Sciences Peer Review Journal
- Acting Coordinator of the EUTOPIA Ambassador Program at Babeş-Bolyai University, Romania, collaborating with ten other European Universities



Research Projects

- Kigali, Rwanda: From December 2021 to January 2024 (Air quality and Household wood burning effects)
- Cluj-Napoca, Romania: From December 2021 to January 2024 (Mining and emission factor determination)
- Nairobi, Kenya: From March to November 2021 (Wood burning and deforestation scenario linked to household energy use)
- Daloa, Ivory Coast: From December 2021 to January 2022 (Determination of soil contaminant and water pollution in Mining environment)
- Kigali, Rwanda: From December 2019 to January 2020 (Wood household burning and Indoor air quality)
- Tokyo, Japan: From December 2020 to January 2021 (Air quality in Kigali, and vehicle emission assessment)
- Kigali, Rwanda: From December 2018 to January 2019 (Air quality assessment and ambient air quality assessment)
- Kigali, Rwanda: From March to November 2018 (Noise pollution and school child exposure to air pollution)



International Conferences

Research Presentations

1. **Irakunda, E.**,..., Ozunu, A. (2022). *IDRiM 2022 - The 12th International Conference of the International Society for the Integrated Disaster Risk Management - Hosted by Babeş-Bolyai University of Cluj-Napoca*. Topic: AERMOD Dispersion Model for En-

- nitrogen dioxide (NO₂) results case-study, Kigali city, Rwanda road networks. *Heliyon*, e12390. doi.org/10.1016/j.heliyon.2022.e12390
3. Kalisa Egide, **Elisephane Irankunda**, Eulade Rugengamanzi, and Mabano Amani. "Noise levels associated with urban land use types in Kigali, Rwanda." *Heliyon* 8, no. 9 (2022): e10653. doi.org/10.1016/j.heliyon.2022.e10653
 4. **Irakunda, E.**, Gasore, J., Dewitt, L., Safari, B. (Dec 2018). First National Scale Measurements of Ambient and Indoor Air Pollution in Rwanda. *American Geophysical Union (AGU) Advancing Earth and Space Science*, volume = 2018, pages = A44B-03. harvard.edu/abs/2018AGUFM.A44B..03G
 5. Ali Sanou, Namory Méité, Amadou Kouyaté, **Elisephane Irakunda**, Alfred Niamien Kouamé, Aka Eric Koffi, Koffi Jean-Paul Bohoussou, Lébé Prisca M.-S. Kouakou. "Assessing Levels and Health Risks of Fluoride and Heavy Metal Contamination in Drinking Water." *Journal of Geoscience and Environment Protection* Vol.10 No.11, November 9, 2022. DOI:10.4236/gep.2022.1011002
 6. **Irakunda, E.**, Török, Z., Alexandru, M., Gasore, J., Kalisa, E., Akimpaye, B., ... & Ozunu, A. (2022). Potential Source Identification of SO₂ and Comparison Between Modelling Results with In-situ Monitoring Data: Study Case, Road Networks of Kigali-Rwanda. *Bulletin of Romanian Chemical Engineering Society; Bucharest Vol. 9, Iss. 1, (2022): 131-142.* (ISSN 2360-4697). ID:2777075576
 7. **Irakunda, E.**, Török, Z., Alexandru, M., Gasore, J., & Ozunu, A. (2023). AERMOD Performance Evaluation for Modelling the Dispersion of Particulate Matter (PM₁₀) in Complex Topography of Kigali-Rwanda. *Environmental Engineering and Management Journal*, 23 (2), 979 - 992, Accepted
 8. **Irakunda, E.**, Török, Z., Alexandru, M., Gasore, J., Ozunu, A. (2023). Evaluation between In-Situ Monitoring and Dispersion Modelling of Carbon Monoxide (CO) In Complex Topography of Kigali-Rwanda. *Journal of Engineering Sciences and Innovation Technical Sciences Academy of Romania, ASTR-BRASOV (Under review)*
 9. **Irakunda, E.**, Török, Z., Alexandru, M., Gasore, J., Kalisa, E., & Ozunu, A. (2023). The First and Extensive Air Quality Mapping of Particulate Matter (PM_{2.5}) in Kigali City, Rwanda. **Ready to be submitted to the Web of Science journal.**
 10. **Irakunda, E.**, Török, Z., & Ozunu, A. (2023). The Impact of Environmental Components on Ambient Air Pollution in Kigali-Rwanda. *Risk Assessment. Journal of Environmental Sciences* (Impact factor: 6.9) (**Submitted**)
 11. **Irakunda, E.**, Gasore, J, March 2021. Assessing the Effects of Household Wood Burning on Particulate Matter in Rwanda. *International Journal of Sustainable Energy and Environmental Research*. 2021 Vol. 10, No. 1, pp. 29-37. DOI:10.18488/journal.13.2021.101.29.37.
2. **Irakunda, E.,...**, Ozunu, A. (2022). *The SICHEM2022 Romanian Chemical Engineering Society Romanian Chemical Society Academy of Technical Sciences Chemical Engineering Section and University POLITEHNICA of Bucharest Faculty of Chemical Engineering and Biotechnologies 17, November 18, 2022, Bucharest, ROMANIA.* Topic: Potential Source Identification of SO₂ and Comparison Between Modelling Results with In-situ Monitoring Data: Study Case, Road Networks of Kigali-Rwanda.
 3. **Irakunda, E.,...**, Ozunu, A. (2022). *International Conference on Air Quality in Africa (ICAQ'AFRICA2022) hosted online by the CERN, the European Centre for Nuclear Research, on 11th-14th October 2022.* Topic: Source Identification of CO and Comparison Between Modelling Results and In-Situ Monitoring Data: Case Study Street Road Networks of Kigali City, Rwanda.
 4. **Irakunda, E.,...**, Ozunu, A. (2022). *Ph.D. Students' Days Faculty of Food Engineering, Tourism, and Environmental Protection "Aurel Vlaicu" University of Arad the Second Edition, November 25, 2022.* Topic: The Comparison Between In-Situ Monitoring Data and Modelled Results of Particulate Matter (PM₁₀) For Environmental Risk Assessment: Study Case, The Closed Moldova Nouă Tailings Ponds – Romania.
 5. **Irakunda, E.,...**, Ozunu, A. (2023). *Gheorghe Asachi Technical University of Iasi, Romania 6th International Conference of the Doctoral School May 17 - 19, 2023, Iași, România. Excellence in Doctoral Studies through Innovation, Convergence and Interdisciplinarity.* Topic: Potential Source Identification of NO₂ and Comparison Between Modelling Results with In-situ Monitoring Data: Study Case, Road Networks of Kigali-Rwanda.
 6. **Irakunda, E.,...**, Ozunu, A. (2023)" *Days of the Romanian Academy of Technical Sciences (ZASTR)" on 5-6 October 2023 at the Transylvania University of Brasov.* Topic: Evaluation between In-Situ Monitoring and Dispersion Modelling of Carbon Monox-

12. **Irankunda, E.** 2019. Ambient Particulate Matter (PM) Evaluation in Gasabo District, Rwanda. *International Journal of Sustainable Development & World Policy*. 2019 Vol. 8, No. 2, pp. 62-67. doi.org/10.18488/journal.26.2019.82.62.67
13. **Irankunda, E.**, Tuyisabyimbabazi, D. 2019. Seasonal Variability of Nitrous Oxide (N₂O) in Rwanda. *International Journal of Science and Research (IJSR)*. Volume 8 Issue 12, December 2019. DOI: 10.21275/ART20203771. DOI: ART20203771
14. **Irankunda, E.**, Yo I, 2020. The Effect Assessment of Industrial Activities on Air Pollution at Cimerwa and its Surrounding Areas, Rusizi-District-Rwanda. *International Journal of Sustainable Energy and Environmental Research* December 2020, Volume 9, 2, pp 87-97: doi.org/10.18488/journal.13.2020.92.87.97
15. Gonzague Isirabahenda, **Irankunda Elisephane**, Biraasa Raymond. The Green Growth Agenda: A Critical Analysis In Rwanda Situation. Conference paper. October 2020. International Conference On Conflict Studies "Conflict And Climate Change" at Cluj-Napoca, Romania. Conflict-and-climate-change-Chereji-et-al.pdf
16. **Irankunda, E.**, Tuyisabyimbabazi, D. 2019. Seasonal Assessment of Relative Humidity, Ambient Air Temperature and CO₂ Concentration Level in School Buildings of Kigali-Rwanda. *International Journal of Sustainable Development & World Policy*. 2019 Vol. 8, No. 2, pp. 83-90: doi.org/10.18488/journal.26.2019.82.83.90
17. **Irankunda Elisephane**, Takashi Yoda, Yo Ishigaki, et al 2019. Seven Months Observations of Indoor Air Pollution in Kigali Rwanda, *Proc. Of 15th International Conference on Atmospheric Sciences and Applications to Air Quality*, Kuala Lumpur, Malaysia, 28-30 Oct. 2019: indoorair.com
18. **Irankunda, E.** 2019. Assessment of Indoor air quality particulate matter (PM 2.5 and PM 10) in Kigali city. Master's thesis Project submitted at University of Rwanda: ur.ac.rw/handle/123456789/529
19. Dinah Aulo; **Elisephane Irankunda** (2020-12-31). Investigating Attitudes of Learners and Graduates to Blue Collar Jobs in Institutions of Higher Education in Kenya. *Lukenya University Multidisciplinary Journal (LUMJ)*, 1 (1), pp. 47-54, 2020, ISSN: 2663-3163: aulo-and-irankunda-2020/
20. **Irankunda, E.**; Yoda, T.; Yamaguchi, K.; Matsukawa, M.; Matsumoto, Y.; Ishigaki, Y.; Eto, K.; Shibata, Y.; Ggombe, K. (Dec. 05, 2019). Indoor Air Quality in Kigali city-Rwanda. *J-Global*. Volume: 2019 Page: 306-307 (WEB ONLY). ID=202002287622141198
21. **Elisephane Irankunda**, Takashi Yoda, Takaaki Yamaguchi, Muneo Matsukawa, Yoshinori Matsumoto, Yo Ishigaki, Kazuko Eto, Yoko Shibata, Ggombe Kasim Munyege (2019). Indoor Air Pollution in Rwanda, Africa. The situation of indoor air regulation in Rwanda, Africa. PROJECT-19H03957/

ide (CO) In Complex Topography of Kigali-Rwanda.

7. **Irankunda, E.** (2023). *Afri-SET Webinar - Intro to Atmospheric and Air Quality Modelling*. Centre of Atmospheric Particle Studies (CAPS): Carnegie Mellon University. On December 4, 2023 @ 1400 UTC, Online Zoom meeting. Topic: Air quality assessment in Modelling perspective and its implication in human health.

Workshops and Seminars

1. Fiftieth Greater Horn of Africa Climate Outlook Forum (GHACOF-50) Kigali Rwanda 2018
2. Workshop, Forum Training on Aerosol Chemical Speciation Monitor (ACSM) (Rwanda Environment Management Authority), from 1 to February 9, 2018
3. Participated in data entry, cleaning, and analysis using Python, SPSS in a Research project of Post Doc Commonwealth Rutherford Fellow (Visiting Research Lancaster University)
4. African School of Fundamental Physics and Applications (ASP-2016) (the University of Rwanda, college of science and technology), from 1 - 20 Aug 2016
5. Cambridge English Language Proficiency, from November 2012 to September 2013



References

1. **Prof. Dr. Eng. Alexandru Ozunu** My Ph.D. Supervisor, approved Scientific Supervisor at the Council of the Doctoral School of Environmental Science, RO-400294, Babeş-Bolyai University, Cluj-Napoca. Email: alexandru.ozunu@gmail.com (Profile)
2. **Prof. Kitambala Marcellin** Vice Chancellor, The East African University, P.O. Box 18583-00100, East Africa (Main Campus), Nairobi, Kenya. Email: markitamb@gmail.com (Profile)
3. **Prof. Yo Ishigaki** Professor (Specially Appointed) at The University of Electro-communications 1-5-1 Chofugaoka,

22. **Elisephane Irankunda**, Takashi Yoda, Takaaki Yamaguchi, Muneo Matsukawa, Yoshinori Matsumoto, Yo Ishigaki, Kazuko Eto, Yoko Shibata, Ggombe Kasim Munyeye (2019). Monitoring Household Air Pollution Caused by Open Fire Stoves in Rwanda
PROJECT-19H03957/

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4. **Dr. Kalisa Egide**
Assistant Professor at Western University of Ontario, Canada, N6G2M1.
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Declaration

I, IRANKUNDA Elisephane, declare and certify that the information in this CV is accurate and complete, and authorize the verification of any or all information listed above.

IRANKUNDA Elisephane