

Call for Proposals

Research and Innovation Grants in Computational Modelling and Materials Science Grants - 2024/2025

KENET Research and Innovation Grants Overview

KENET has, as one of its mandates, the role of catalyzing collaboration in research and education among member universities and research institutions. KENET promotes collaboration through facilitation of Special Interest Groups (SIGs) in priority academic areas, discovery of active researchers/faculty, provision of research and education grants to researchers and member institutions, as well as travel grants for faculty and/or graduate students in SIG areas.

The Computational Modeling and Materials Science (CMMS) is a special interest group supported by KENET to enhance research capacity development in the use of computational modeling in science and technology. Research work is expected to involve university faculty and graduate students in Biology, Chemistry, Mathematics, Physics and the Environmental Sciences but strongly welcomes those from other basic and applied sciences. To increase research output directly or by complementing the existing limited work from groups with standard experimental infrastructure, CMMS has embraced computational modeling which is now considered as an important decision support tool in science and technology as well as product development. In this regard, CMMS targets training of graduate students as well as young and upcoming faculty in universities, research institutions and industry.

KENET has provided CMMS with grants of KES 1.5 Million each, to be awarded competitively in the following themes:

1. Earth observation science and technology.
2. Enhancing teaching of fundamental science using educational technologies to achieve improved learning outcomes and support innovation and technological advancement.

Innovation Grants: Structure, Technical Brief and Schedule

Grants Structure

1. Each grant will be for a maximum of KES 1.5 Million for the 2024/2025 round of funding.
2. The grant period is 12 months.

Areas of Focus: Technical Brief

1. Earth Observation Science and Technology

Human development and sustainable utilization of natural resources requires a balance in order to ensure that the next generation inherits a habitable world. In recent years, Earth Observation Science and Technology (EOST) has taken a firm root in providing information on the state of planet earth thereby generating large volumes of data that require careful collection and storage. Information accessible is provided by satellite, lately also involving drones, among others, with image capturing devices and includes the physical, chemical and biological state of the earth. Such data provides a space map on activity on the ground from agriculture, mining, water management, forestry, tourism, as well as rural and urban growth, among others. EOST can be used to support policy development by national and local authorities, sustainable commercial exploitation and innovation by industry as well as ecological and biodiversity protection for

posterity.

The need for increased precision and handling large volumes of data may be addressed by technology and artificial intelligence, allowing enhanced support to decision-making and monitoring activities in support of the mandates of an organization. The world is undergoing tough challenges such as maritime safety and security, food insecurity, changing land uses, urban sprawl, degrading vegetation and biodiversity, adaptation to change climate, geographic economy, just to mention a few. These can be addressed by availability of complete and up-to-date information to inform, plan, implement and adjust appropriate responses and policies. EOST offers valuable input to resolving these and advising on the interventions.

This call seeks proposal applications employing EOST, geospatial analysis and machine learning in the following sectoral areas:

- a) Agriculture and Food Security.
- b) Water Security (water abstraction, treatment, quality, demand versus supply).
- c) Weather and Climate (air quality and health, drought, flooding cycles).
- d) Ecosystem Function and Management (biodiversity, habitat modelling, invasive species, forest cover change/restoration).
- e) Land Use Land Cover Change Analysis (urban development and planning, flooding in urban areas).

Faculty and researchers are encouraged to leverage the frontier technologies of Artificial Intelligence, Internet of Things and Big Data, as applicable, in their proposals. The **application of IoT** and other LoRAWAN based solutions in data collection and environmental monitoring is encouraged.

2. Enhancing Teaching of Fundamental Science using appropriate educational technologies to Support Innovation and Technological Advancement

Fundamental sciences play a major role in supporting the applied sciences and technology. Students of applied sciences grounded in fundamental science are likely to be more innovative in search of solutions to problems in their fields. Many at times, challenges being observed at the levels of application have origins at the fundamental level. Best practices in the developed world provide us with sufficient evidence of the strong support in their basic science institutions as manifested by outcomes of their innovations, products and services for which Africa remains a major consumer. It is observed with concern that over the last decade, the knowledge of the fundamental science of students enrolling for and pursuing applied sciences at the university level has been eroded. There is a need to develop license free, local and innovative teaching tools as well as materials that can be deployed for the benefit of our community.

This call seeks to enhance pedagogy and content for the teaching of fundamental Mathematics and Physics, with the following outcomes:

- a) High quality and pedagogically sound learning materials.
- b) Development of innovative methods of content delivery.
- c) More effective engagement to attract and retain students in the STEM subjects.

Using High Performance Computing (HPC) cluster for computational modeling to solve problems in science and technology.

Simulations to study real systems for possible applications require computing resources beyond laptops and desktop computers. This calls for computing capacity that is dedicated to perform tasks that require large resources with calculations which run continuously with minimal interruption. Kenya does not have a national HPC facility for basic and applied sciences to support research that could benefit from computational modeling. In many cases, researchers undertaking work that requires intense calculations for a long period of time rely on supercomputers provided by collaborating institutions in other parts of the world.

KENET provides a select set of computing services to the grantee’s that includes access to computing facilities at partner institutions, such as the CHPC, as well as 24 hours local cloud services, that may be used as a platform to power computational needs of the research problems. All these are tailored towards development of HPC capacity, and efficient utilization of the same in the local research fraternity. These computing skills should enable the application of novel computational methods such as machine learning, both CPU and GPU based, to aid in innovation and design.

Applicants in these areas should consider the calls by KENET for support as preparation for funding to other organizations, at the national and international levels, providing much larger support.

Table 1: Grant Call Timeline

Activity	Dates
Call for proposals open for submissions	December 2024 – February 28, 2025
Review and evaluation of received proposals	March 3, 2025, to March 14,2025
Face-to-face presentations of shortlisted applicants	End of March 2025
Finalists announced and grants awarded	Early April 2025
Grantees on-boarding	Early April 2025
Implementation period	May 2025 to April 2026
Evaluation, reporting and close-out	April – May 2026

Eligibility, Terms and Conditions

Theme 1 targets full-time PhD faculty and/or researchers in Environmental Sciences, GIS, Meteorology, Atmospheric Science research at any of the KENET member institutions. The lead applicant must be a PhD holder, attained within the last 5 years, and is expected to demonstrate active research interest.

Theme 2 is open to lead applicants with PhDs obtained more than five years from the date of this call but who have remained active in research and teaching with technology in the past five years. Evidence of publications and/or innovative and engaging teaching materials at undergraduate and graduate levels.

Team Composition and Student Involvement

One of the objectives of this grant is to develop expertise and build capacity in the areas of focus as well as to grow a community of practitioners. To this end, it is important for faculty to work closely with students with a view to furthering their knowledge and capacities in the various technologies and issues of interest, in the areas of focus. Incorporating full time MSc/PhD students as team members as well as designing student-level projects from the research activities to be undertaken is encouraged. It is recommended that the students identified to be part of the team should have completed their course work and available for research. Although circumstances may vary, an ideal number of students should be two (2) based on the size of this 1-year grant. Evidence of student postgraduate registration and completion of course work are useful as commitment to proper training and grant administration.

The lead researcher is strongly encouraged to incorporate other researchers into their team, especially dedicated research staff. If other members are incorporated into the team, then the roles and extent of involvement of these team members must be clearly spelt out. A letter of commitment from each team member with support from respective Heads of Department or Deans, must be included as part of the team's submission documents. Teams with multidisciplinary backgrounds are encouraged. The lead researcher will serve as the team leader and the primary point of contact on all matters related to implementation of the grant.

Collaboration and partnerships

To enhance research uptake and utilization, it is important for researchers to identify and seek out collaborations and partnerships with strategic persons and institutions. This not only opens up pathways for moving research from the lab to the society, but also enhances visibility of researchers and their institutions, attracting even more funding and opportunities to further their research agenda. Given the identified areas of focus, it will be imperative for teams to identify strategic partnerships and collaborations with a view to modeling and planning for prototyping, testing and scaling at later stages in the research cycle.

Intellectual Property

Intellectual property derived from the funded R&D activities will be appropriated and protected based on the lead researcher's institution's IP policy and procedures.

Post-Award Requirements

The successful grantees will be expected to:

1. Provide quarterly progress reports to the CMMS Research Associate at KENET.
2. Participate and present project work at selected meet-ups organized by KENET.
3. Grow a community of researchers in the area, by reaching out to other local researchers working in the area and other related multidisciplinary domains.
4. Actively seek post grant funding to further their research work by writing (joint) funding proposals.
5. Prepare a final project report at the end of the grant period and submit it to KENET. Prepare an abridged version of the project report for profiling on KENET's and institutional websites.
6. Publish paper (s) on their work in reputable journals.

Proposal Submission

Proposal Format

1. The proposal should not exceed 6 pages (12pt, single spacing, excluding appendices).
2. The proposal should be submitted in PDF format.
3. The research area should be clearly indicated in the title page.
4. To enable a blind review process, no personal identification (names) or institutional affiliation should be included in the proposal.

Proposal Structure

The proposal note should have the following structure:

1. Title
2. Problem definition and justification
3. Proposed solution and justification
4. Methodology
5. Resources (human, hardware, software, etc.)
6. Work plan (not exceeding 12 months in duration)
7. Detailed Budget (not exceeding Kes1.5 Million). Only up to 30% of the total budget should be set aside for purchase of PCs, laptops. The use of the KENET cloud services is strongly encouraged
8. Relevant appendices.

It is expected that the proposal will be an original vision and expression of the applicants and not generated by AI tools and other related modern text production techniques. Proposals submitted will be subjected to similarity index checks to limit undue advantage.

Supporting Documents

The following documents should be included as part of the proposal submission:

1. Team profile document, indicating the names, institutional affiliation and brief biographies of the lead researcher (s). Details of other team members and any collaborating institutions should also be included in the team profile.
2. CVs of the lead researcher (s), clearly profiling research activities undertaken to date as well as relevant publications.
3. Letters of Commitment from team members and any collaborating institutions.

Proposal Submission

Proposals with all supporting documentation should be sent via email to cmmsgroups@kenet.or.ke on or before **February 28, 2025 5.00 PM East African time.**

Enquiries and applicant support

All enquiries and requests for further information related to this call should be addressed to grantsadmin@kenet.or.ke.

Proposal Evaluation

1. KENET will constitute a review panel of leading CMMS experts. Members of the review panel will sign Non-Disclosure Agreements, as well as statements acknowledging that they will make no claim to the intellectual property developed by the grantees.
2. The reviewers will review all received applications as per the evaluation criteria provided

- in Table 2 below, and select the top 3 proposals for each area of focus.
3. The top three (3) finalists in each area will be invited for a final face-to-face presentation. During the oral presentations, the applicants will respond to and clarify any questions from the panel that will have arisen out of their written submissions. They will also be required to respond to any ad-hoc questions arising from the oral presentation.
 4. After the oral presentations, the reviewers will make their final decisions on the proposals that will receive the grant, per area of focus. Four (4) teams will be selected.
 5. Selected grantees will be notified formally and profiled on KENET’s website.

Table 2: Evaluation criteria

Evaluation Criteria	Evaluation Aspects	Weighted Score
Relevance and justification of proposed research topic	Is the proposed topic and preferred solution aligned with Kenya’s Big 4 agenda, Vision 2030 or SDGs? Is it an important problem to solve in a developing world context? Is there sufficient research uptake and utilization potential for the proposed research outputs?	15%
Technical Approach and Methodology	Is the research concept innovative and effective compared to existing alternatives? Does the proposed approach have a potential experimental component partner to test the computational findings proposed? Is there a potential HPC development component? Is the proposed work doable given the time and budgetary constraints of the grant, considering the team’s composition?	35%
Budget justification	Are the items to be procured related to the project objectives and activities? Can these items be obtained with the project timelines?	10
Viability assessment and scaling potential	Is scale built into the solution? Can it be replicated in similar contexts? Is there scope for furthering the research idea/prototype? Is there scope for future external research funding in order to scale-up the research?	10%
Human capacity	Does the team have the required expertise, experience and necessary contacts to deliver? Do they have a local footprint?	10%
Student engagement	Are there concrete roles and responsibilities for student team members? Are there clearly defined student-level project ideas?	10%
Inter-university/industry involvement	Have critical partnerships in the main domain of application been identified? Is there likelihood for collaboration during and after the grant period? Does lack of partnerships severely impede the research work during the grant period?	5%
Potential for publication in refereed journals and/or conferences	Are the results likely to be published in international peer reviewed journals / conferences that are indexed in the Elsevier Scopus database?	5%