**Technical Concept Note**
**Justification for Hosting AIMS Interns at SEI Africa to Support Air Quality and Early Warning Systems**

**PI: NGONGANG W. Danube, Research Fellow, SEI Africa**

**Background**
SEI Africa has established a strong presence in 12 African countries, enabling real-time air quality monitoring across multiple cities. Through strategic partnerships with governments, research institutions, and civil society, SEI Africa is collecting live PM2.5, PM10, CO₂, and meteorological data from a growing network of low-cost sensors. This network has positioned SEI Africa as a key actor in linking environmental monitoring to early warning systems for climate resilience.

However, the full potential of this data remains underutilized. Continuous, high-quality analysis is needed to transform raw sensor readings into actionable insights for decision-makers, researchers, and communities. There is also a need for advanced modelling to address challenges such as missing data, short-term forecasting, and the automation of network management processes.

**Rationale**
To address these challenges, SEI Africa proposes to integrate three advanced-level students from the African Institute for Mathematical Sciences (AIMS) into its air quality and early warning programme. These students, selected from AIMS’ pool of top-tier Master’s candidates, bring strong analytical, statistical, and data science skills, including expertise in machine learning, artificial intelligence, and environmental modelling.

The AIMS interns will complement existing SEI Africa capacity and collaborate with two Master’s students from the KTH Royal Institute of Technology to be posted at SEI Africa. Together, they will form a high-capacity, multidisciplinary analytics team focused on and not limited to:

* Developing **imputation models** to accurately reconstruct missing data from sensors, ensuring completeness and reliability in time-series datasets.
* Creating **short-term and seasonal forecasting models** for air quality parameters, integrated with weather and climate service information.
* Designing and deploying **automated data management systems** for the sensor network, enabling efficient quality control, archiving, and dissemination of information.
* Producing **monthly data analytics reports** tailored for partner institutions hosting the sensors, thereby increasing local ownership, visibility, and value in the monitoring effort.
* Supporting the preparation of **knowledge products, awareness tools, and peer-reviewed publications** that elevate the profile of SEI Africa’s work regionally and globally.

**Partnership Framework**
AIMS has agreed to fully cover the academic fees, placement arrangements, and stipends for the **three selected students** for a period of 6 months , removing financial barriers for SEI Africa. The interns will be based at SEI Africa’s Nairobi office, with the option to work remotely from AIMS Kigali if infrastructure constraints arise. This arrangement ensures cost-effectiveness while delivering high technical value.

The collaboration will also open the door for **peer exchange** between AIMS, KTH, and SEI Africa, strengthening the technical ecosystem for environmental data science in Africa. By pairing students from different academic backgrounds and geographical origins, the initiative will promote knowledge co-creation, cross-learning, and diversity in approaches to environmental analytics.

**Expected Outcomes**

* High-quality, continuous analytical outputs for SEI Africa’s 12-country air quality network.
* Improved reliability and usability of sensor data through advanced modelling and automation.
* Increased visibility and impact of SEI Africa’s work among hosting partners and regional stakeholders.
* Strengthened pipeline of African data scientists with applied expertise in environmental analytics, aligned with SEI Africa’s mission and long-term strategic goals.

**Conclusion**
Hosting AIMS and KTH interns represents a strategic, high-impact opportunity for SEI Africa to enhance the quality, visibility, and policy relevance of its air quality and early warning work. This collaboration will ensure that SEI’s regional data assets are not only technically sound but also widely used for environmental awareness, research, and decision-making.