

UNESCO's Remote Lab Access Initiative, Petra Rudolf's point of view

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The UNESCO Remote Access to Laboratory Equipment initiative, known as UNESRALE, is a global programme designed to expand equitable access to advanced scientific infrastructure for researchers in under-resourced regions, particularly in Africa and the Global South. We interviewed Petra Rudolf, former EPS President, to learn more about this initiative, which she actively supports.

Antigone Marino: Could you outline what this initiative entails?

Petra Rudolf: The concept of remote access to scientific equipment emerged from discussions led by UNESCO with its partners in the aftermath of the COVID-19 pandemic. These discussions explored alternatives to traditional open laboratory models, where researchers were typically trained through on-site, hands-on access to equipment. The idea of researchers in the Global South sending their samples, a technician in the host laboratory can mount and prepare them, while the measurements themselves can be conducted remotely, was tempting. In this way, data acquisition can take place from anywhere in the world, often during periods when the instrument would otherwise be idle.

In February 2023, UNESCO formalized this vision by signing a Memorandum of Understanding (MoU) with the International Union of Crystallography (IUCr) and the Centre National de la Recherche Scientifique (CNRS). This partnership aimed to provide early-career African scientists with remote access to single-crystal X-ray diffractometers located at the University of Lorraine in France.

Building on the initial success of this collaboration, the Section for Basic Sciences, Research, Innovation and Engineering at UNESCO, led by Amal Kasry, the Chief of the Section, launched the UNESRALE Initiative (<https://www.unesco.org/en/basic-sciences-engineering/remote-access>). This initiative seeks to scale up the model by increasing the



range of accessible equipment and expanding its reach to a broader community of researchers across Africa and other regions in need of scientific resources.

AM: How is this concept implemented in practice?

PR: To operationalise the initiative, UNESCO has identified suitable partners who can offer access to their equipment and/or computational resources and launched calls for access that are based on selection and merit. In some collaborations, researchers in the Global South act as a liaison and will ultimately perform measurements on behalf of colleagues at their home institution. In all cases, researchers were encouraged to share the knowledge they have gained and utilize the remote access to equipment for research and educational purposes. Importantly, the application is not for a single experiment, but for sustained access to the facility over an extended period.

For example, in a recent call concerning access to a single-crystal X-ray diffractometer, researchers from fourteen African UNESCO Member States were trained, illustrating the targeted effort to broaden participation across the continent.

The selected liaison investigator spends approximately one month at the host laboratory, acquiring hands-on experience in measurement protocols, data analysis, and interpretation. Upon returning home, this individual becomes the local expert, coordinating and conducting measurements remotely for their institution. However, with other techniques, full remote modalities are currently done, including remote access to high-performance computing, quantum computing and microscopy.

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Portrait
by Reyer
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AM: What are the benefits for the instrument owners participating in this scheme?

PR: First and foremost, there is the intrinsic reward of enabling scientists—particularly in Africa and other under-resourced regions—to access advanced instrumentation without the need to travel. Access to state-of-the-art facilities remains a major bottleneck in many parts of the world, contributing to a persistent knowledge gap between North and South. This initiative directly addresses that imbalance.

By 2026, the UNESRALE Initiative had facilitated remote access and training for 39 participants across seven different scientific techniques, in collaboration with eight partners. The indirect beneficiaries number extend to 200.

AM: How have you personally contributed to the initiative?

PR: I have supported it in several ways. Upon my retirement, I invited colleagues to contribute to the initiative in lieu of personal gifts. While the amount raised was modest, I hope that if many others adopt a similar approach, these individual contributions will collectively have a meaningful impact. For those who would like to financially support the initiative, here is the link: https://www.paypal.com/donate/?hosted_button_id=GEMF5KRTNQ5XY

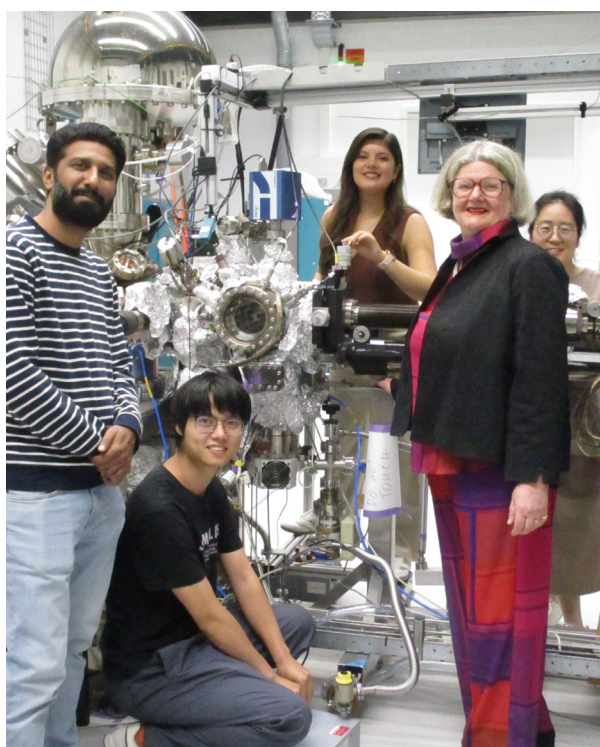
Secondly, my successor, Antonija Grubišić Čabo, together with her technician Dominic Gerlach, is currently preparing our X-ray photoelectron spectrometer for remote operation within the framework of the initiative. At present, a former PhD student of mine—now a professor in Latin America—is conducting test measurements on samples she sent to Groningen. This serves to refine the workflow and resolve any remaining technical issues. Once fully operational in remote access, the instrument will be made available through UNESCO's programme.

Finally, I actively promote the initiative at European conferences to encourage instrument owners to participate, and at conferences in Africa to raise awareness among potential users.

If these efforts ultimately contribute to mitigating brain drain—by enabling talented scientists to pursue high-level research without leaving their home countries—I would consider that a particularly meaningful outcome. ■

■ **Antigone Marino,**

National Research Council (CNR)



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