Part 1: Scanning a Probe Fast - High-Speed Atomic Force Microscopy

Much like the scanning tunnelling microscope (STM) and other scanning probe microscopes (SPMs), the atomic force microscope (AFM) has revolutionized our ability to image and manipulate surfaces at the atomic scale. From unveiling the intricacies of proteins to sculpting nanostructures, its applications span physics, chemistry, biology, and beyond. However, conventional AFMs often face a major bottleneck – slow image acquisition. This significantly limits their throughput and hinders real-time observation of dynamic nanoscale processes.

The high-speed AFM (HS-AFM) is the faster cousin of the classic instrument. HS-AFM enables rapid surface characterization and manipulation over larger areas. This opens a new era of possibilities, from characterizing complex biological samples to manipulating surfaces in real-time with unprecedented precision.

In this first part of the talk, we will highlight some applications of HS-AFM across various scientific disciplines, dive into the technical advancements that propel the HS-AFM to faster speeds and highlight ongoing challenges and future directions of development.

Part 2: Cultivating Innovation at Home – A Spotlight on Kenya's Research Landscape

Kenya, aiming to become an industrializing middle-income country by 2030, recognizes the crucial role of innovation in driving its development. Fostering a vibrant research ecosystem is at the heart of this ambition. However, navigating this landscape with limited resources presents unique challenges.

In the second part of this talk, we will shift our focus to Kenya's research scene. We will:

- identify the key actors and stakeholders shaping Kenya's research landscape,
- highlight national research priorities aligned with Kenya's development goals,
- explore the funding and infrastructural hurdles faced by Kenyan researchers,
- highlight the policy frameworks shaping the research ecosystem and their potential impact,
- conclude with some examples of ongoing research in Kenya and highlight potential avenues for international collaboration.

In an evolving research landscape such as Kenya’s, technologies such as modern SPMs can be used to spur research in health, agriculture, energy, manufacturing, and other sectors. By linking cutting-edge technologies to Kenya’s nascent research environment, this talk aims to spark dialogue and foster collaboration to create social, economic, technological, and scientific progress.