

The Challenge

“The ability to scan a region in a defined mode, then change the probe and reliably return to the exact same position, enables more complex and reproducible experiments that would be very difficult to achieve with a fully manual system.”

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— Rebeca Ribeiro-Palau, CNRS Researcher
Université Paris-Saclay, France

Your Challenge, **Our Solution**
Park FX40



This case study is based on an interview with Rebeca Ribeiro-Palau at Université Paris-Saclay.
The FX40 helps simplify advanced AFM workflows and enables reliable, reproducible measurements in a busy multi-user research environment.

The Solution



Automated Probe Exchange & Alignment
Simplifies workflows by enabling automatic probe loading, exchange, and alignment



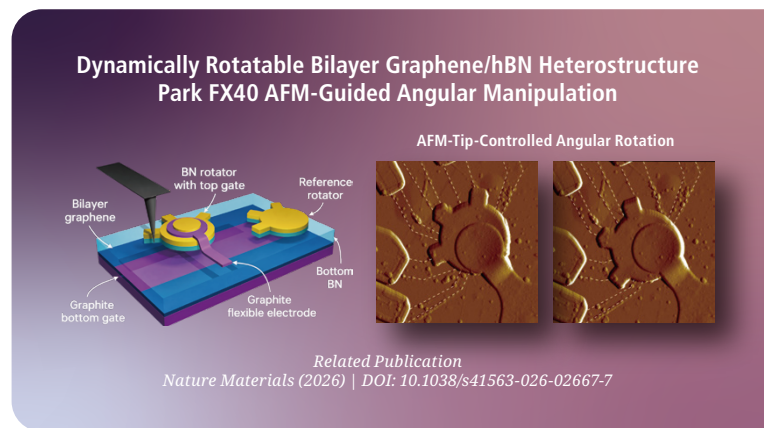
Reliable Mode Switching
Enables users to change probes and measurement modes while reliably returning to the same region of interest



User-Friendly Multi-User Operation
Makes AFM accessible to users ranging from new students to experienced researchers



Flexible 2D Materials Characterization
Supports dynamically rotatable bilayer graphene/hBN heterostructures with AFM imaging and contact mode angular manipulation, enabling controlled studies of twist-angle-dependent electronic behavior



Schematic of the device (left) and FX40 AFM error-signal images of a dynamically rotatable bilayer graphene/hBN heterostructure at two angular configurations (right). The hBN rotator was mechanically manipulated with the AFM tip in contact mode to control layer alignment. Images courtesy of Université Paris-Saclay and CNRS.

The Results



More Complex & Reproducible Experiments
Enables repeatable multi-step measurements on complex 2D devices, including reliable return to the same region after probe or mode changes



Efficient Multi-User Workflows
Saves time and supports high productivity across users with different levels of AFM experience



Reduced User-Related Errors
Helps prevent errors that can lead to tip damage or instrument issues



Reliable Shared-Lab Operation
Provides the ease of use, reproducibility, and robustness needed for a busy shared research environment

“Overall, the FX40 stands out for its reliability and user-friendly design. These aspects are important for both of our FX40s, especially the one in the clean room, where ease of use, reproducibility, and robustness are essential for maintaining high productivity across our team.”

— Rebeca Ribeiro-Palau



The Interview

— *Rebeca Ribeiro-Palau, CNRS Researcher
Université Paris-Saclay, France*

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Q *How often do you use the FX40 in your daily research, and how many people work on it? What is their level of experience?*

A *We use the FX40 on a daily basis; it is one of the busiest instruments in our group. Currently, seven users regularly operate the system, with experience levels ranging from beginners (such as new students) to more advanced users.*

Q *How does AFM automation on the FX40 make a difference compared to working with a fully manual tool?*

A *The automation makes a significant difference in several ways. First, in a multi-user environment, features such as automatic probe exchange and alignment greatly simplify our workflows, for example, when we conduct measurements on twisted bilayer graphene and dynamically rotatable devices. This is particularly beneficial for students and new users, but it is equally important for experienced researchers, as it saves time and helps prevent user-related errors that can lead to tip damage or instrument issues. Second, automation expands experimental possibilities for 2D materials in general. The ability to scan a region in a defined mode, then change the probe and reliably return to the exact same position, enables more complex and reproducible experiments that would be very difficult to achieve with a fully manual system.*

Q *What features particularly help you and your team in daily research work?*

A *Automatic probe loading and alignment are extremely valuable features. In addition, the ease of use of the software is a major advantage, as it lowers the barrier to entry for new users while maintaining efficiency for more experienced ones. For example, when using mode switching in twisted bilayer graphene, we want first to locate the area of interest and then to switch to a new tip to visualize the moire pattern in LFM mode. Mode switching makes this straightforward and contributes to the system's flexibility.*

Q *Is there anything else you find helpful and useful that the FX40 provides?*

A *Overall, the FX40 stands out for its reliability and user-friendly design. These aspects are important for both of our FX40s, especially the one in the clean room, where ease of use, reproducibility, and robustness are essential for maintaining high productivity across our team. Thank you, Park Systems, for this versatile and playful tool, and in particular thanks for the great customer service, which is super reactive and ready to help us either with problems with the machine or with developing new techniques.*

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Park FX40
Customer Success Story

