GAIA Colloquium Presentation Abstract

1. 연사(Speaker)	
성명(Name)	정구은
소속(Affiliation)	파크시스템스
직위/직급(Position)	부장 / 국내사업부문 RDS 부서장
2. 강연(Presentation)	
주제(Title)	Introduction to Atomic Force Microscopy (AFM)
시간(Time)	2026년 11월 24일(화) 15:00 ~ 16:30

3. 강연 개요(Abstract)

Atomic Force Microscopy (AFM) is a high-resolution characterization technique that utilizes atomic-scale interactions between a probe tip and a sample surface to measure surface topography at the nanometer scale. Beyond surface imaging, AFM enables the characterization of various local material properties, including mechanical, electrical, magnetic, and thermal properties. Owing to its versatility, AFM has been widely applied in various fields, such as semiconductors, displays, polymers, nanomaterials, and biological sciences.

This presentation will introduce the history and development of AFM, its fundamental components, and operating principles. The measurement principles and characteristics of Contact Mode and Non-Contact Mode will be compared based on the interactions between the probe tip and the sample surface. In particular, the principles of signal detection and feedback control based on cantilever deflection and oscillation will be explained, with an emphasis on the technical features and advantages of True Non-Contact Mode, which enables stable and reliable measurements while minimizing damage to both the sample and the probe tip.

Furthermore, this presentation will explore various AFM measurement techniques beyond conventional surface topography imaging. These include mechanical property characterization, such as elastic modulus, stiffness, and adhesion, using Force-Distance Spectroscopy and PinPoint Nanomechanical Mode, as well as electrical property characterization using techniques such as Conductive AFM (C-AFM) and Kelvin Probe Force Microscopy (KPFM). Through practical measurement examples involving polymers, semiconductor devices, and nanostructures, the presentation will highlight the broad applications of AFM and its significance as a powerful tool for nanoscale material characterization.