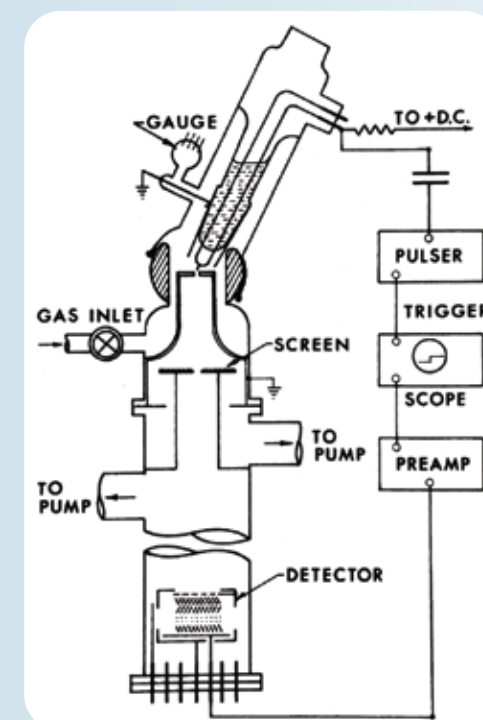
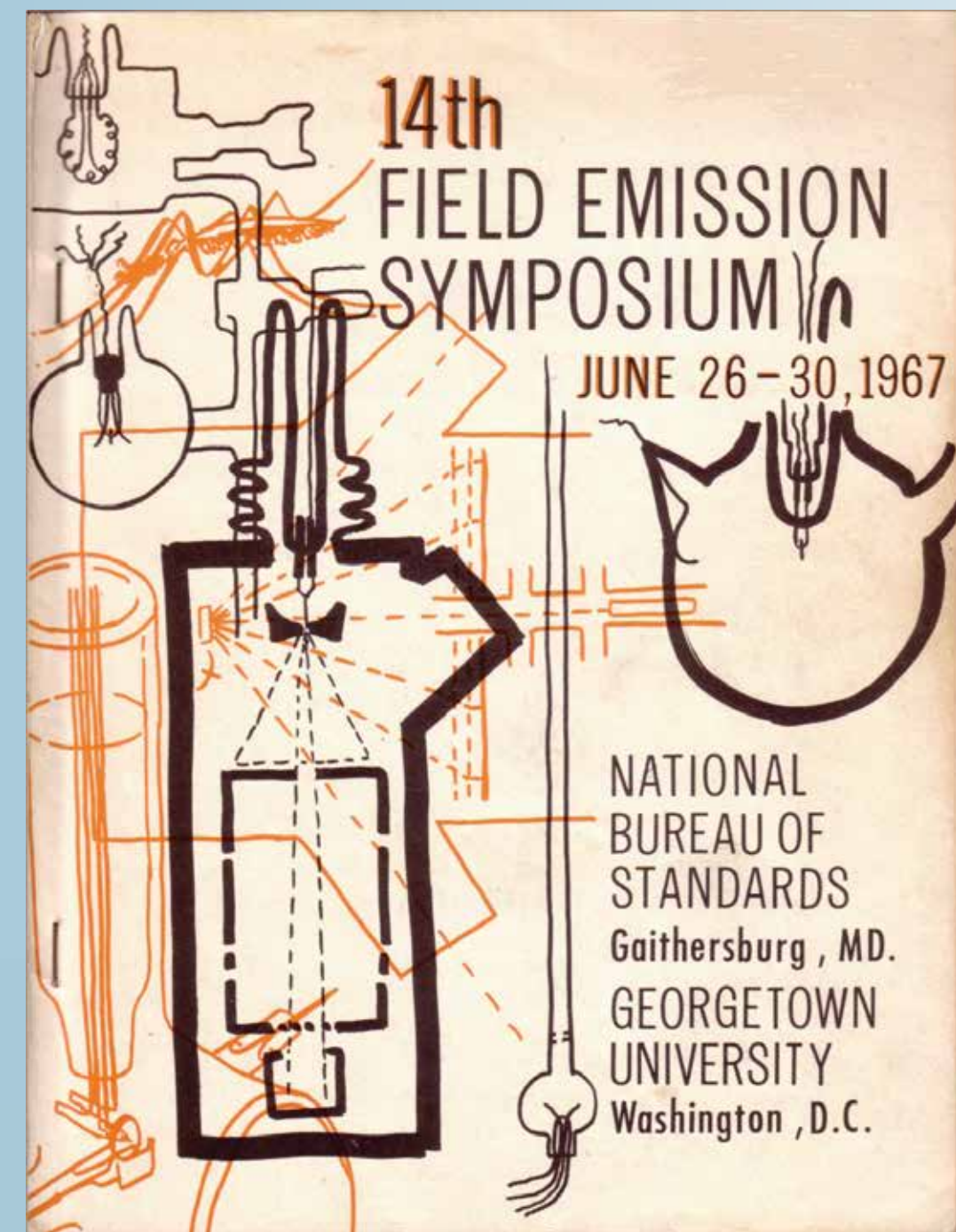


# HISTORY OF THE ATOM PROBE: An Odyssey

## Milestones in Atomic-Resolution Atom Probe Microscopy

Professor Erwin W. Müller of the Pennsylvania State University and his graduate student, John A. Panitz introduced the first atom probe in 1967. With the new instrument, they could “determine the nature of one single atom seen on a metal surface and selected from neighboring atoms at the discretion of the observer.” Today, we can record, mass analyze, and display a billion atoms of metals, insulators, and semiconductors in real time.

**The Atom-Probe Field Ion Microscope**  
Erwin W. Müller and John Panitz  
Physics Department, The Pennsylvania State University  
University Park, Pa.

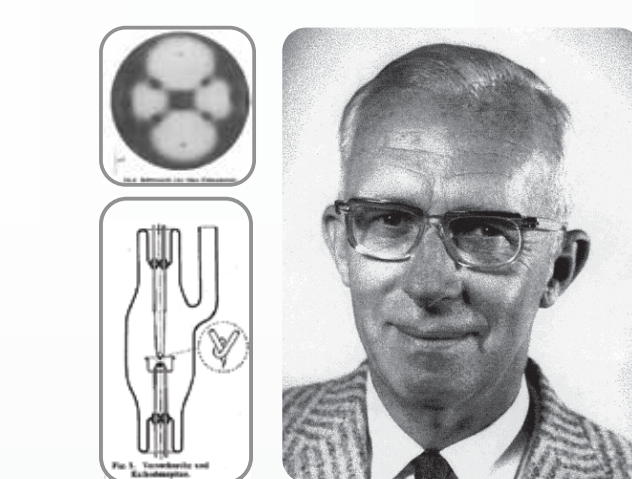


Erwin W. Müller  
John A. Panitz  
Introduce the Atom-Probe Field Ion Microscope (APFIM)  
**1967**

10 cm Atom Probe could image and identify all detected atoms as a function of depth from the surface making it the first 3D Atom Probe and the progenitor of Atom Probe Tomography.



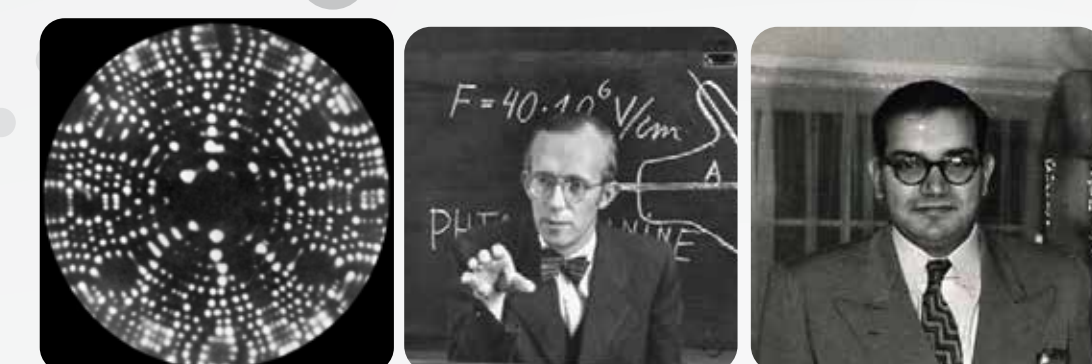
John A. Panitz  
10 cm Atom Probe (1973) and Imaging Atom Probe (1974)  
**1973-1974**



**1936**  
Erwin W. Müller  
Invents the Field Emission Electron Microscope (FEEM)



**1951**  
Erwin W. Müller  
Field ion microscopy developed as a path to atomic-scale microscopy



**1955**  
Erwin W. Müller  
Kanwar Bahadur  
Images of atoms achieved for first time in history using Field Ion Microscope (FIM)



Commercial Tomographic Atom Probe (CAMECA)  
**1992**



Tomographic Atom Probe  
Didier Blavette et al. Second 3D Atom Probe with an improved detector  
**1990**



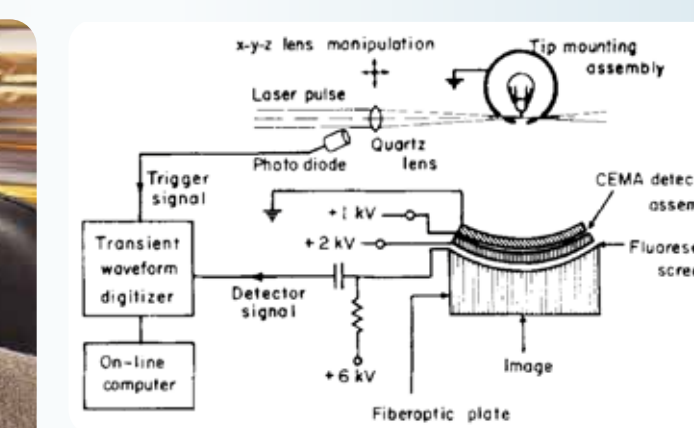
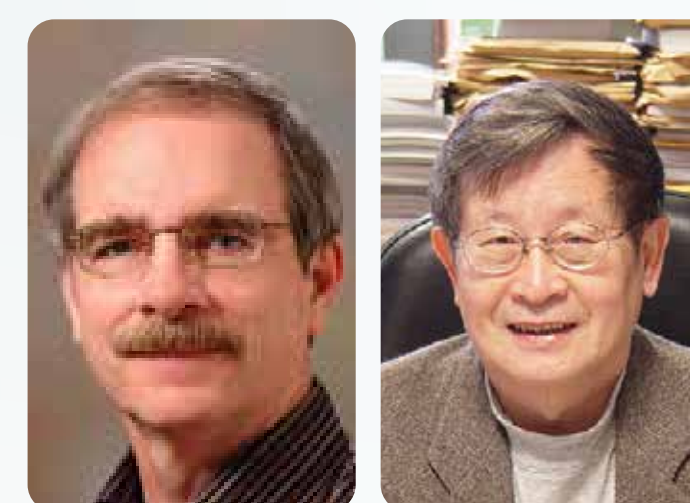
**1990**

**1984**  
Vacuum Generators, APFIM 100 with help from G.D.W. Smith Group  
First shipped commercial atom probe



**1980**

Gary L. Kellogg and Tien T. Tsong  
Pulsed Laser Atom Probe – First demonstration of thermal pulsing in atom probe



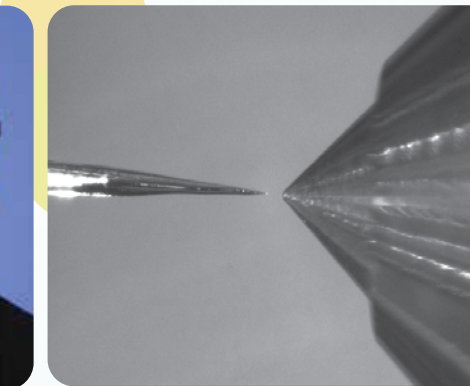
**1972**  
FIRST COMMERCIAL ATOM PROBE  
Erwin W. Müller

SCIENTIFIC SYSTEMS INCORPORATED  
1120 W. COLLEGE AVE.  
STATE COLLEGE, PA. 16801

Scientific Systems Incorporated, the exclusive manufacturer of the patented atom-probe field ion microscope now offers a modular instrument for field ion microscopy utilizing channel plate image intensification, and atom-probe analysis achieving ultimate single atom sample sensitivity.



Local Electrode Atom Probe  
Thomas F. Kelly et al.  
LEAP concept  
**1994**



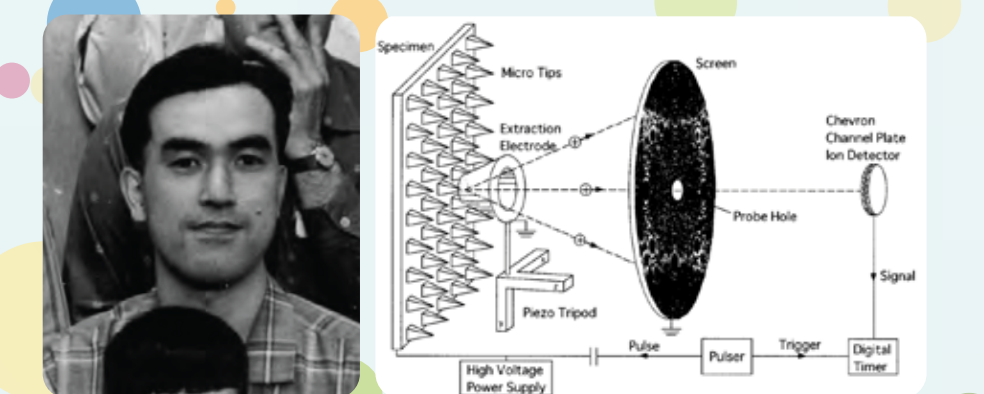
Commercial Local Electrode Atom Probe (LEAP)  
Imago Scientific Instruments  
First LEAP shipped went to Oak Ridge National Laboratory  
**2002**



LEAP 5000 from CAMECA  
**2017**

and it CONTINUES...

**1993**  
Scanning Atom Probe  
Osamu Nishikawa and Masahiro Kimoto



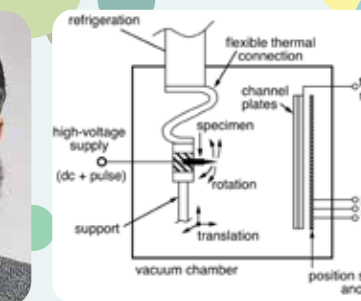
**1991**

Commercial Position-Sensitive Atom Probe Kindbrisk Ltd.  
A. Cerezo and G.D.W. Smith



**1988**

Position-Sensitive Atom Probe  
A. Cerezo, T. Godfrey, and G.D.W. Smith  
First 3D Atom Probe



*“It seems as if the evasive atoms still hide from the curious eye of the casual sightseer and reveal themselves rewardingly only to the serious researcher.”*  
Erwin W. Müller

The ODYSSEY Begins

