Remote Instrument Operation

Topics

- **Enhancing Demonstrations in the Classroom**

- **Tool for Collaboration**

- **Remote Instrument Operation**

- **Issues/Problems**

# Levels of Access

- **Passive**
  - Remote users watch live experiment
    - Little or no control of experiment
    - Useful for teaching large classes
    - Great tool for collaboration – especially for users with no training
- **Active**
  - Remote users control experiment
    - much better than "watching" for students or collaborators
    - Gives remote access to users who cannot travel

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A tool for teaching

- **Brings the University to the classroom**
  - Most school budgets do not include money for field trips
- **Watching a live experiment, or better yet, running an instrument is very exciting and memorable**

Credits:
David Luzzi
(Northeastern University-formerly U Penn)
Barry Stein
(Ben Franklin Technology Partners)
James Murray
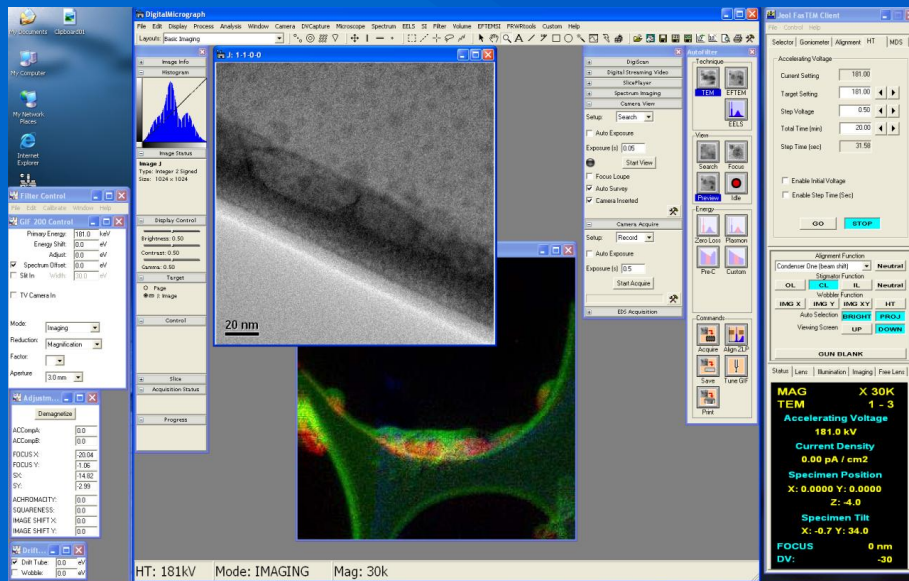**(Immaculata University)**
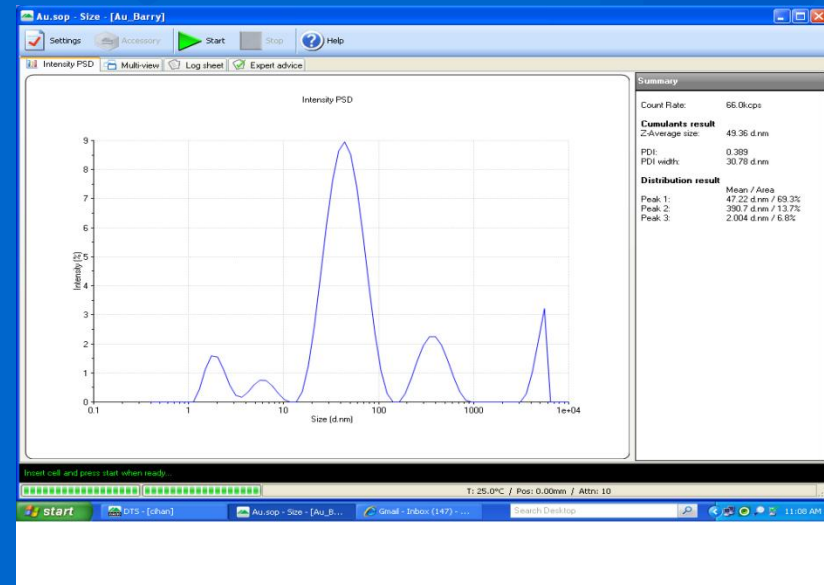
Remote Teaching

- **Use desktop sharing (UltraVNC)**
- **Connect via webcams**
- **Bring a few students to the lab**
  - Makes the demo seem more real and the students can later tell the class about their experience
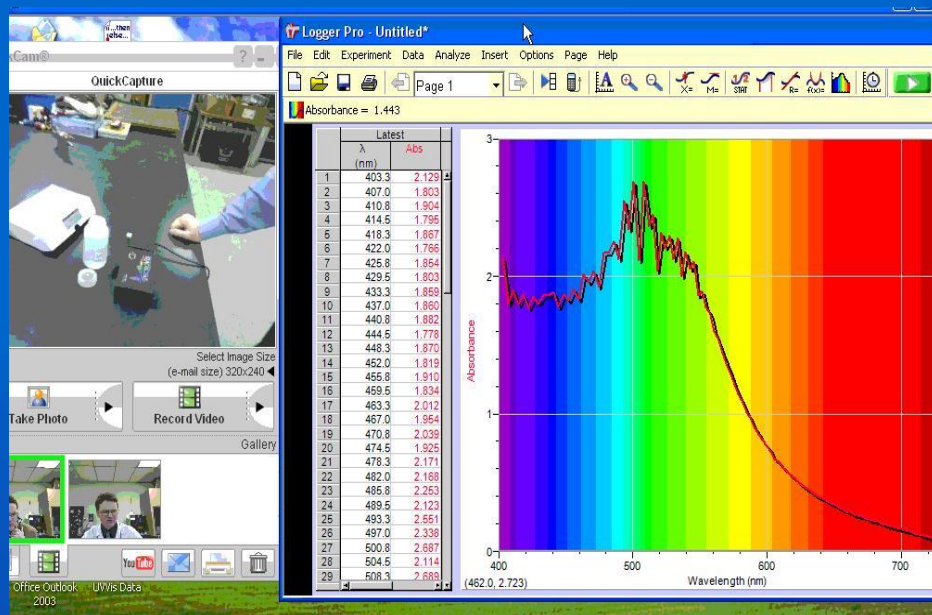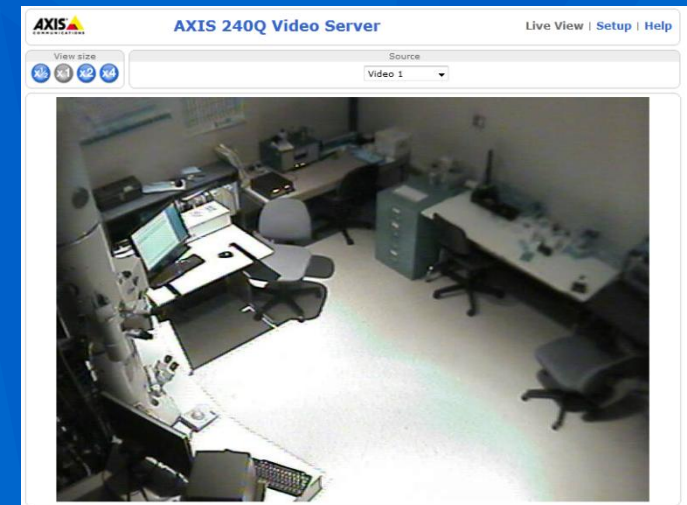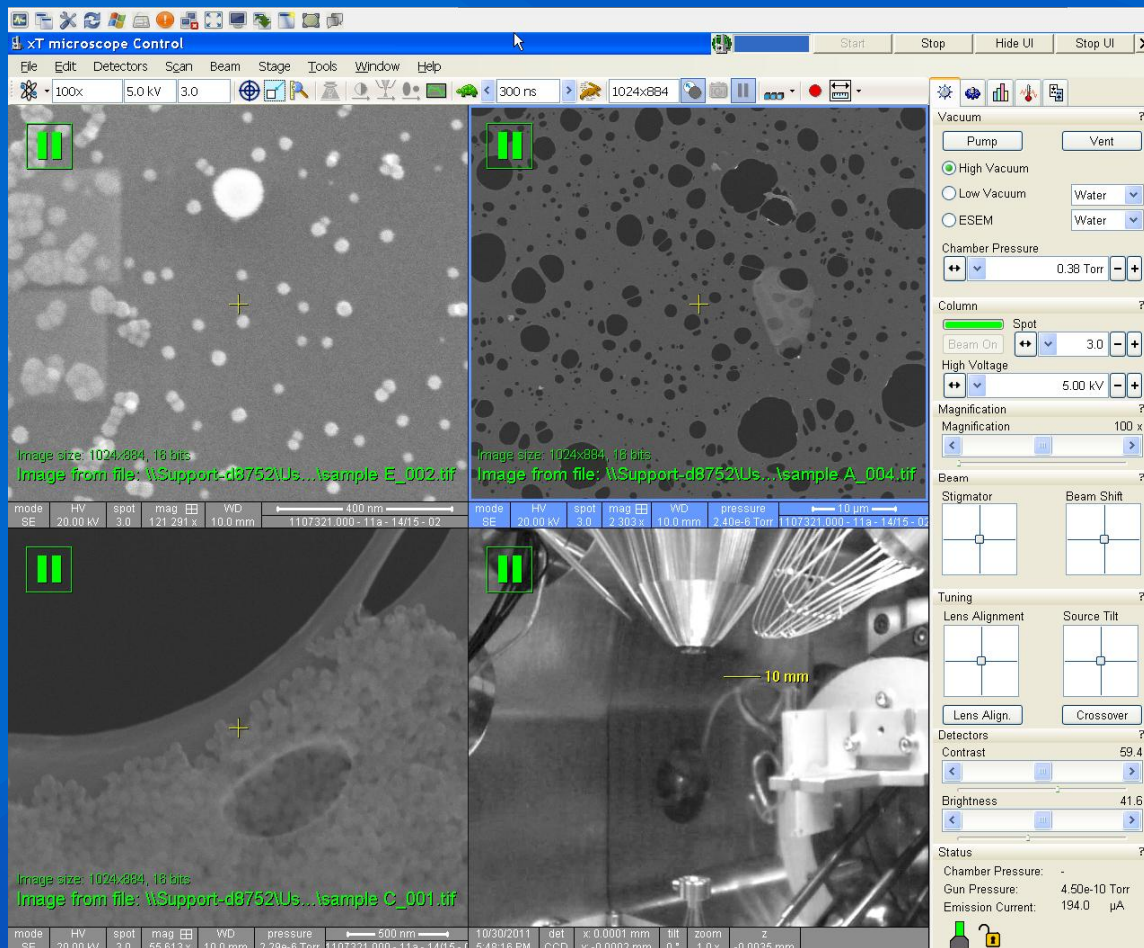
Facilitating Collaborations

- **Bring a collaborator into a microscopy session.**

- **Great tool for industry users**
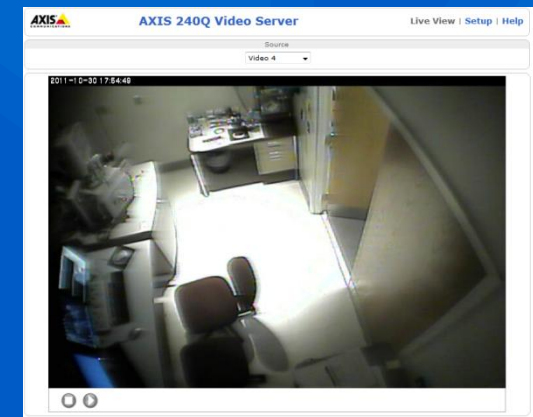 - **Allows visiting industry users to show results to group members at their facility.**

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Examples -

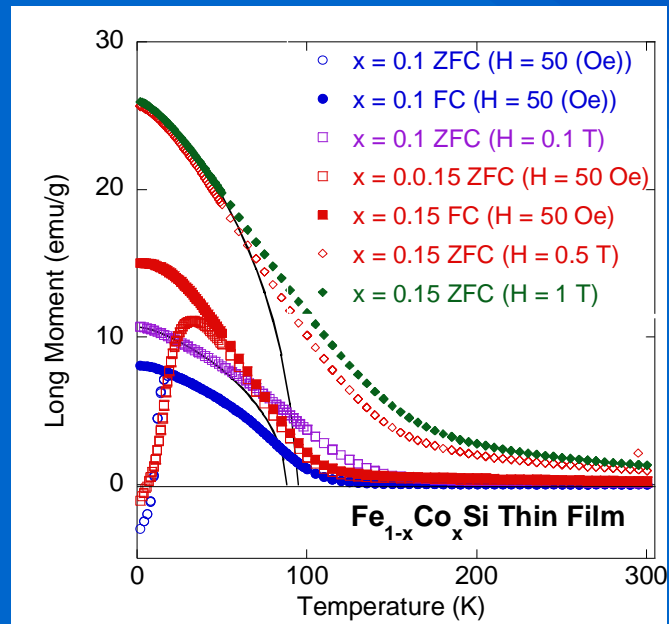## Scanning Electron Microscopy

- **Stage is software driven**

- **Nearly complete control of microscope**

Examples -

Properties Measurement Shared Equipment Facility

- **Prof. Jay Kakawa**

Fe$_{1-x}$Co$_x$Si Thin Film

- x = 0.1 ZFC (H = 50 (Oe))
- x = 0.1 FC (H = 50 (Oe))
- x = 0.1 ZFC (H = 0.1 T)
- x = 0.0.15 ZFC (H = 50 Oe)
- x = 0.15 FC (H = 50 Oe)
- x = 0.15 ZFC (H = 0.5 T)
- x = 0.15 ZFC (H = 1 T)

Remotely acquired SQUID data taken by remote users at NUL in Africa.

- **Once the experiment is setup, remote operation is ideal.**
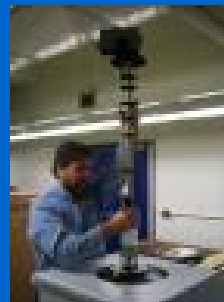
Successful off-site users:

- **National University of Lesotho**

- **University of Pretoria**

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Issues with Remote Access

- **Staff member is still involved**
  - Sample loading
  - Adjustment of non-software driven components

- **Damage to instruments**
  - Safe guards and interlocks vary by instrument

- **Training**
  - For Active remote instrument sessions, the user must receive sufficient training

- **Resistance from OEM's and staff members**