

# **Classroom Teaching with Collaborative Network Technologies**

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# Classes Taught & Instructional Needs

- Computer Programming in JAVA (Ugrads).
- Systems Modeling & Simulation (Ugrads & Grads).
- Applied Machine Vision (Ugrads & Grads).
- Characteristics of these classes:
  - Computer intensive.
  - Understanding by “Building” Knowledge.
  - Linked to “What if” Scenarios or “Physical” Experiments.



# BAE Engineering Education Needs

- More “hands-on” experiential learning for students.
- More “collaborative” activities between teacher-student & student-student.
- More immediate feedback on concepts being discussed or applied in class.
- More involvement of off-campus faculty in teaching students in Athens. Distance & Time are the main constraints.

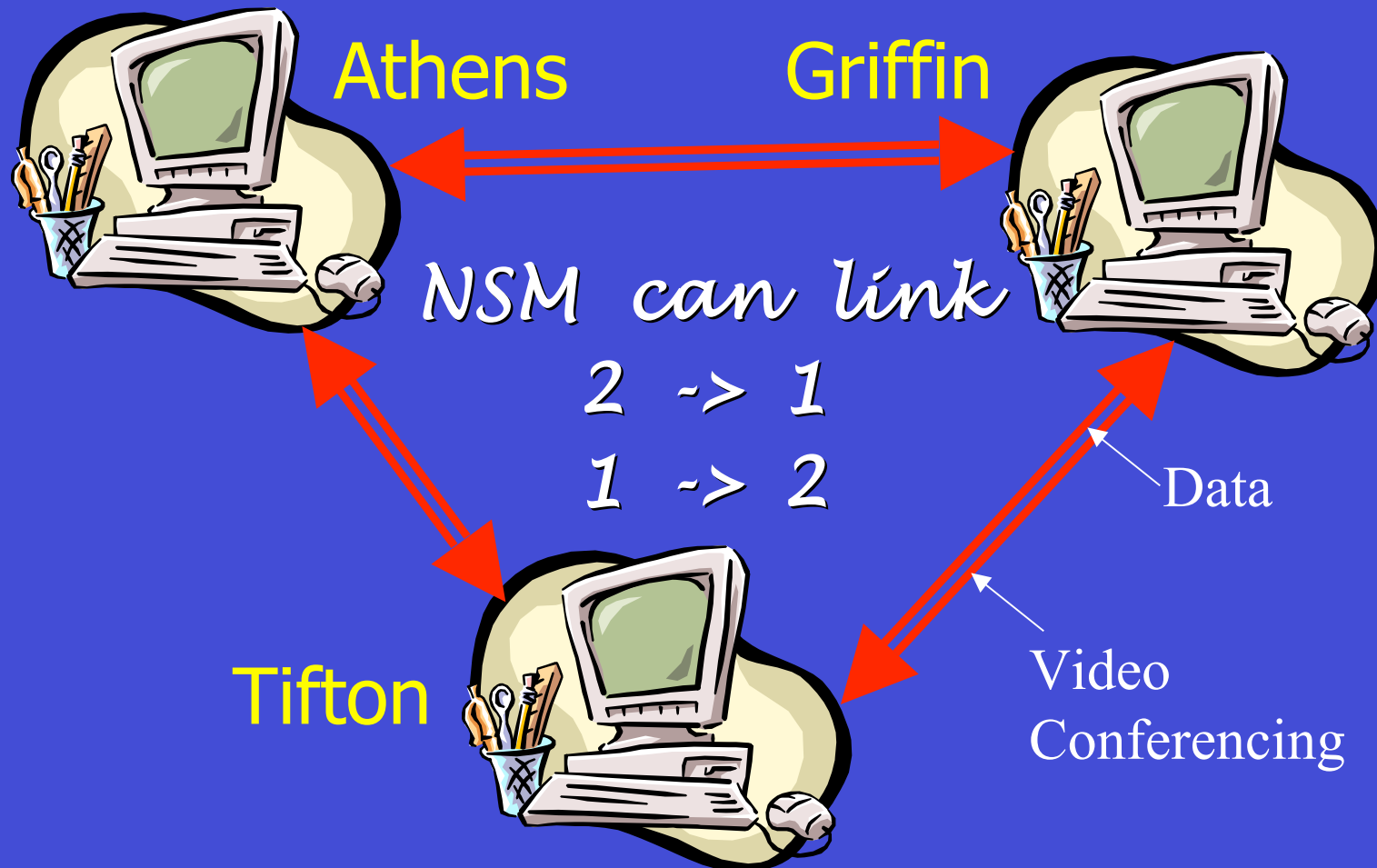


# BAE Approach

- Combination of **Video Conferencing & Network Control** technologies to provide as much as possible **Real-Time Control & Collaboration** between PCs from **local sites** as well as from **remote sites**:
  - **Room 310** – Electrical & Electronics Lab.
  - **Room 219** – Collaborative Distance Education Lab.
- **Funded with BAE & CAES funds, UGA Student Tech. Fees & Learning Technology Grants over 2+ years.**



# Teacher Stations Wide Area Network (using NetSupport Manager)

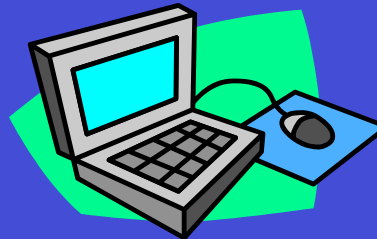
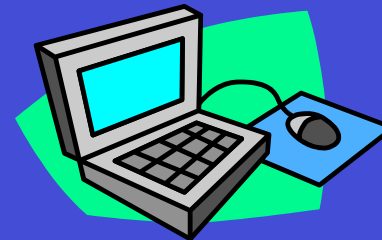
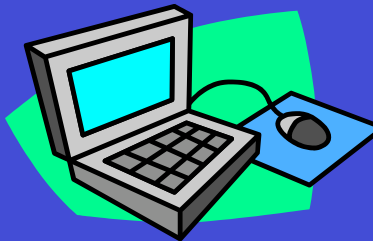


# Room 219 (Local Teaching Mode) (using NetSupport School)

Athens Teacher PC



*NSS links*  
1 -> 30

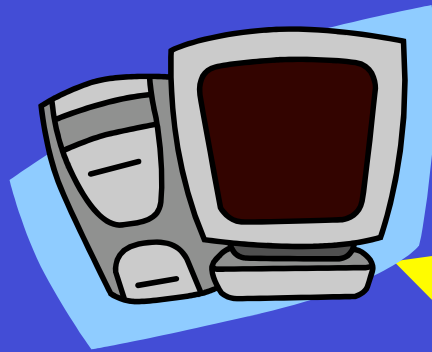


30  
Student PCs



# Room 219 (Remote Teaching Mode)

Remote Teacher  
PC



Minimize  
Long Distance  
Ethernet Traffic

Athens Teacher PC



Student

PCs



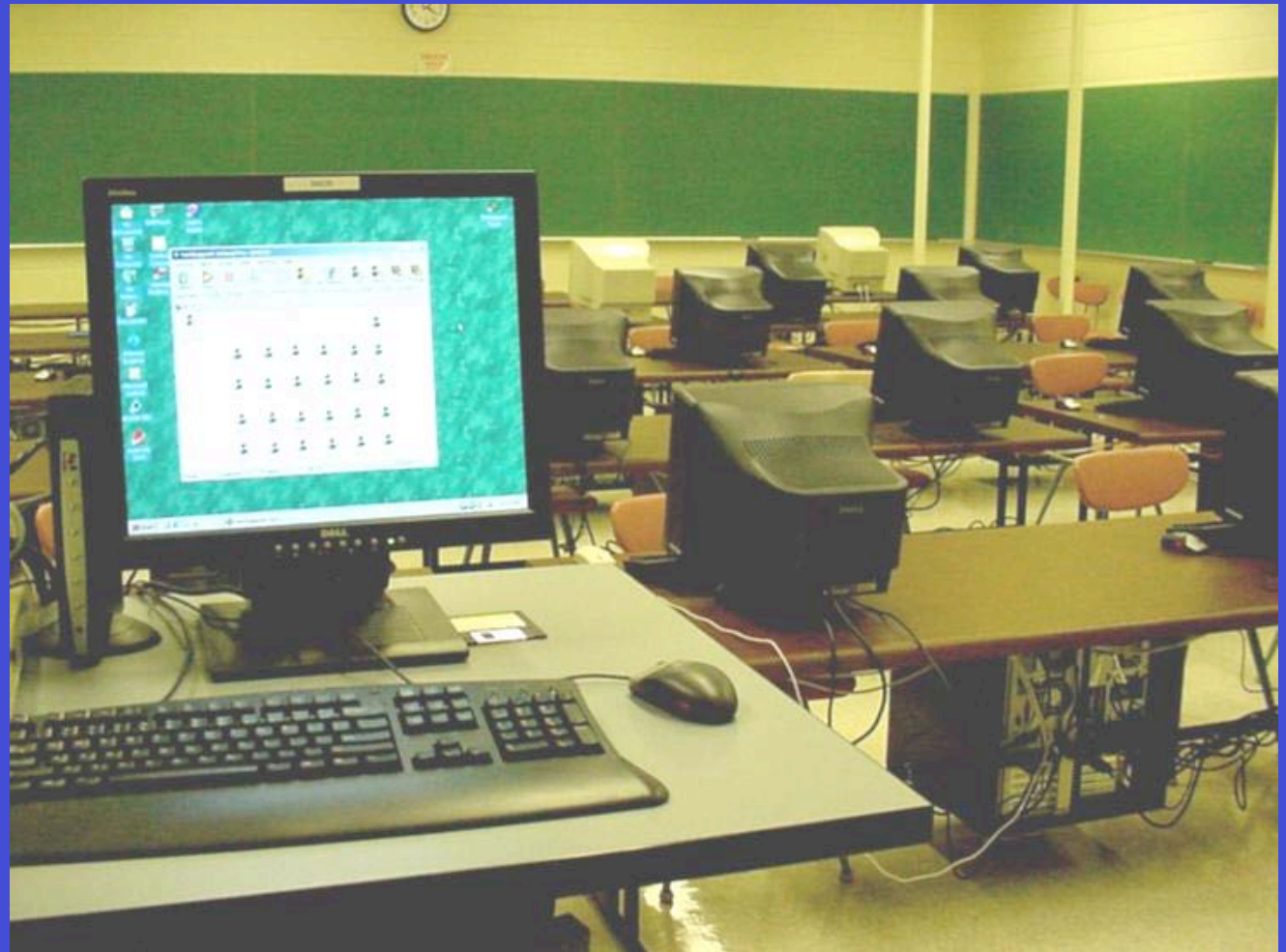
All PC applications run on  
Athens Teacher PC





# CDE Lab Classroom Design

- Standard layout.
- Separate projection screens for data and video conferencing







All : 24



Add Students

# PC Local Interactions using NetSupport School

BAE52

BAE56 BAE68 BAE66 BAE65 BAE35 BAE34

BAE45 BAE44 BAE43 BAE42 BAE41 BAE32

BAE37 BAE36 BAE38 BAE39 BAE40 BAE31

# One-on-One: Watch-Share-Control

The screenshot displays a remote control interface for a Windows XP desktop. The desktop background is blue and features several icons: My Documents, Stakeout, My Computer, Super Pro Designer, My Network Places, Surfer 7, Recycle Bin, Connect to the Internet, Internet Explorer, Acrobat Reader 5.0, and AutoCAD 2002. A taskbar at the bottom shows the Start button and several open applications.

The main window is titled "BAE47 - Viewing" and has a menu bar with "Client", "View", "Tools", "Window", and "Help". The toolbar includes icons for "Share", "Watch", "Control", "Scale to fit", "Full Screen", "File Transfer", "Chat", "Message", "Execute", "Clipboard", "Audio", "Settings", "Logout", "Blank", "Capture", and "Annotate".

In the foreground, a window titled "java1140" is open, displaying a file explorer view of the directory "D:\java1140". The window has a menu bar with "File", "Edit", "View", "Favorites", "Tools", and "Help". The address bar shows "D:\java1140". The left pane shows a tree view of the file system with "java1140" selected. The right pane shows a list of files and folders:

- A
- Accumulate...
- AddMatrices
- AddNumbers
- AddTwo
- ApproxExpo...
- Area
- AreaCalcula...
- ArrayArgum...
- Average
- AverageFiv...
- AverageNu...
- B
- backup
- BadConstant

The "java1140" window also displays a "See also:" section with links to "My Documents", "My Network Places", and "My Computer".

# Show Teacher to Student(s)

NetSupport School Pro - Show



Ready to start showing to:

- Client (none selected)
- These Clients

Name	Description
<input checked="" type="checkbox"/>  Brian	
<input checked="" type="checkbox"/>  Emma	
<input checked="" type="checkbox"/>  Jody	
<input checked="" type="checkbox"/>  Robert	

Removing the check mark next to a Client excludes it from the Show

Set Show Mode at Client

Full Screen



<< Basic

Show icon on taskbar

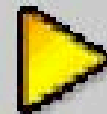
Enable Audio Support



Show

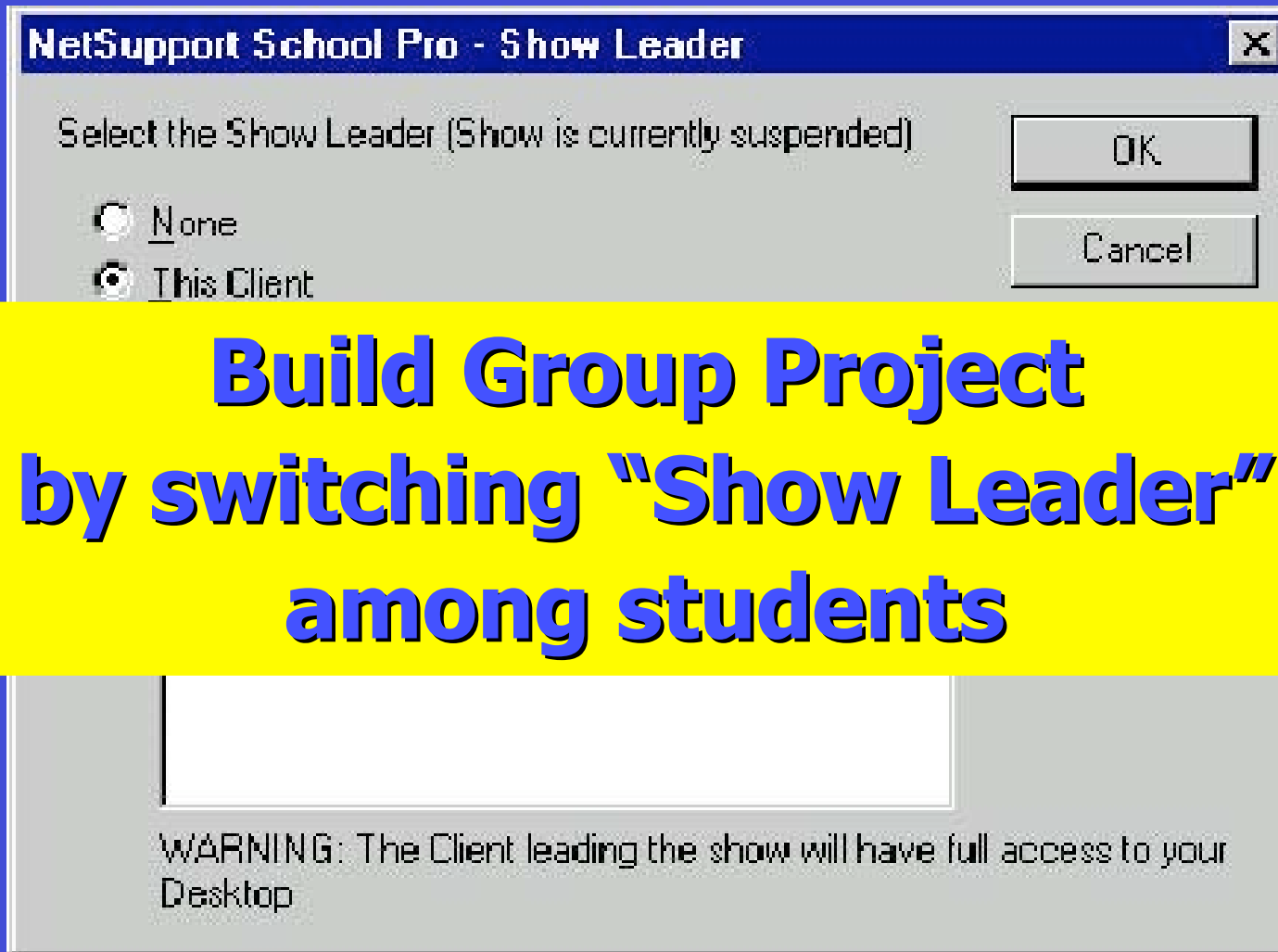
Cancel

Help





# Show Leader



# Exhibit Student Work

Exhibit Client



Ready to start exhibiting Client Brian to:

Name	Description	
<input checked="" type="checkbox"/>  Emma		
<input checked="" type="checkbox"/>  Robert		
<input checked="" type="checkbox"/>  Jody		

Exhibit

Cancel

Help

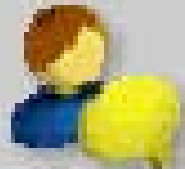
Removing the check mark next to a Client excludes it from the Exhibit

Set Show Mode at Client

Full Screen



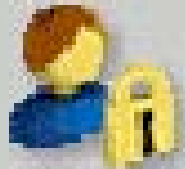
# Other Tools



Chat



File Distribution



Lock



Unlock



Scan



Execute





# Scanning Student PCs

NetSupport School Pro - Scan

Scan the following Clients:

Name	Description
<input checked="" type="checkbox"/>  Brian	
<input checked="" type="checkbox"/>  Chris	
<input checked="" type="checkbox"/>  Emma	
<input checked="" type="checkbox"/>  Jody	
<input checked="" type="checkbox"/>  Robert	

Scan

Cancel

Help

Removing the check mark next to a Client excludes it from the Scan

Scan Interval





- Display one Client at a time
- Display multiple Clients at a time

2x2




# Send / Collect Work Macros

 **Send/Collect Work** X

 Select an operation from the list and click Send Work or Collect Work. Add a new operation by clicking New, modify an existing operation by selecting it and clicking Properties.

Description	Last Sent	Last Collected	Students
Year 12 Maths 1	[never]		
Year 11 Maths 1	[never]		





# Student Survey

The screenshot displays the NetSupport School Pro interface. The title bar reads "NetSupport School Pro : CDE LAB". The menu bar includes "School", "Client", "Group", "View", "Survey", "Window", and "Help". The "Survey" menu is open, showing options: "Send", "Cancel Survey", and "Print Results".

The toolbar contains icons for "Refresh", "Show", "Show Video", and "End Show". Below the toolbar, a "Quick View" section lists client IDs: BAE37, BAE43, BAE38, BAE65, BAE38, BAE39, BAE45, and BAE41. On the right, "Web Metering" and "Application Metering" are both checked.

The main area shows a grid of student icons. A tooltip for "All: 24" is visible. The grid contains two rows of icons with labels: BAE31, BAE32, BAE33, BAE34, BAE35, BAE36, BAE37 in the first row; and BAE38, BAE39, BAE40, BAE41, BAE42, BAE43, BAE44 in the second row.

At the bottom, there are two panels: "Student Survey" and "Survey Results".

**Student Survey**

Question

Is the "reference" to an array a memory address?

**Survey Results**

Answer: Percentage

At the bottom left, there is a "Press F1 for help" message. At the bottom right, there is a speaker icon.

# Approved Applications List

Web Metering  Application Metering

All : 24

BAE31 BAE32 BAE33 BAE34 BAE35 BAE36 BAE37

BAE38 BAE39 BAE40 BAE41 BAE42 BAE43 BAE44

Approved Applications		Restricted Applications	
Name	Description	Name	Description
notepad			
IDE			
explorer			
runjava			

Current Application List  
NetSupport School Pro

Ready Connections : 24 24 Clients All : 24




# Approved Web Sites List

Web Metering  Application Metering

All : 24

BAE31 BAE32 BAE33 BAE34 BAE35 BAE36 BAE37

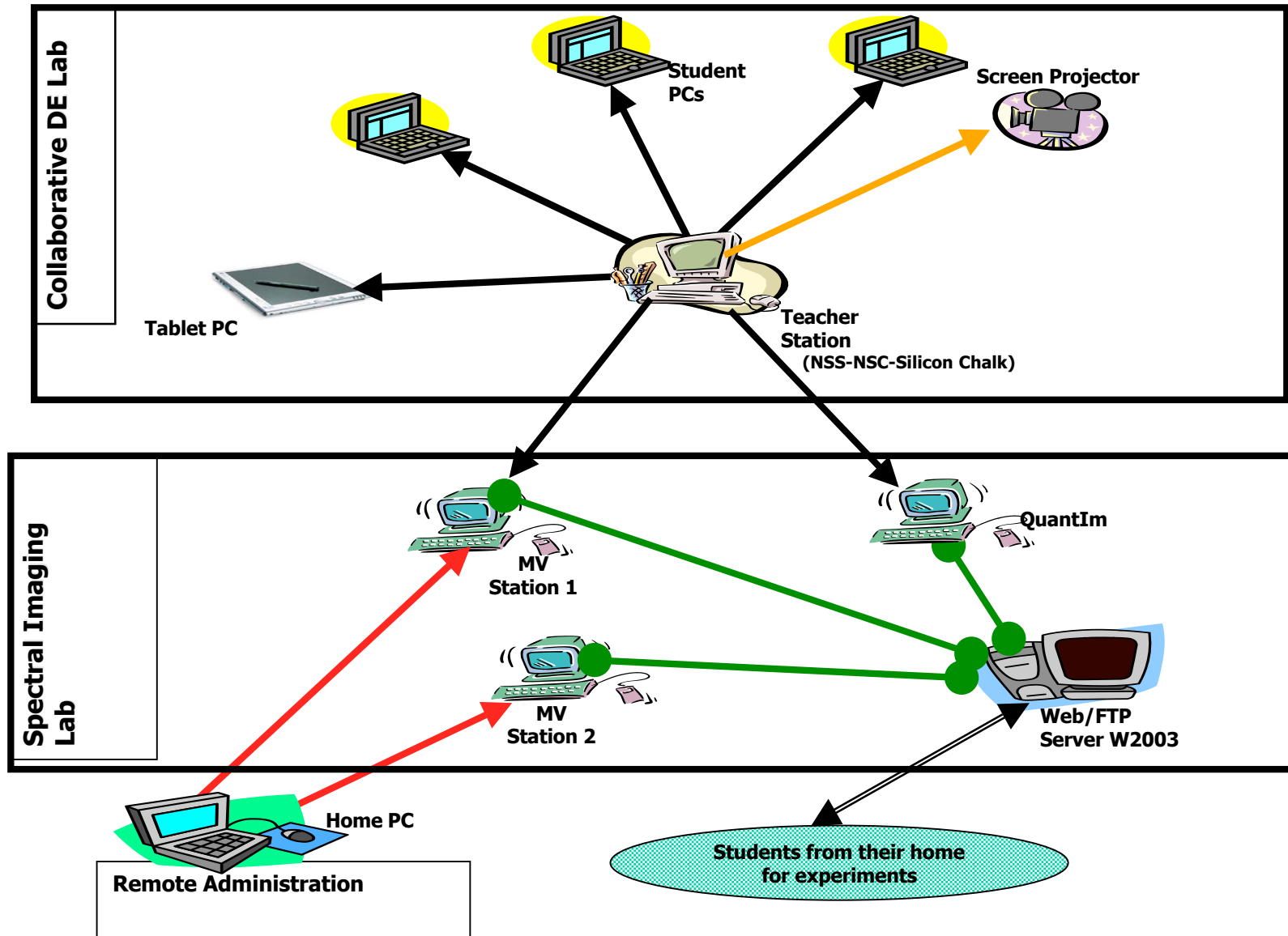
BAE38 BAE39 BAE40 BAE41 BAE42 BAE43 BAE44

Approved Sites		Restricted Sites	
URL	Description	URL	Description
 www.engr.uga.edu			

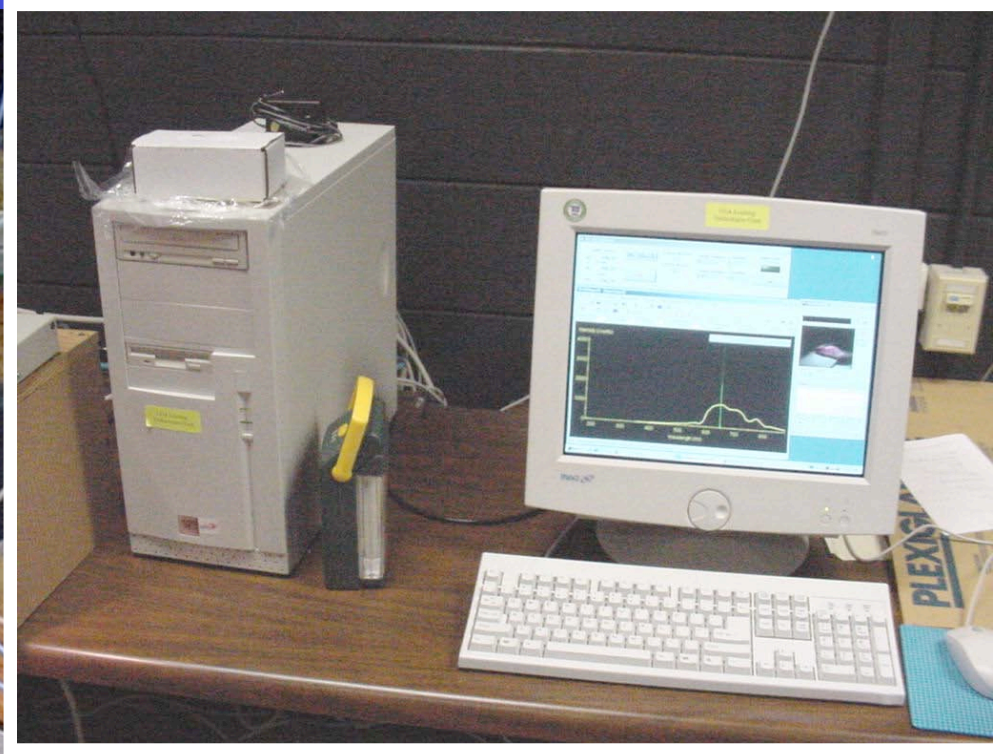
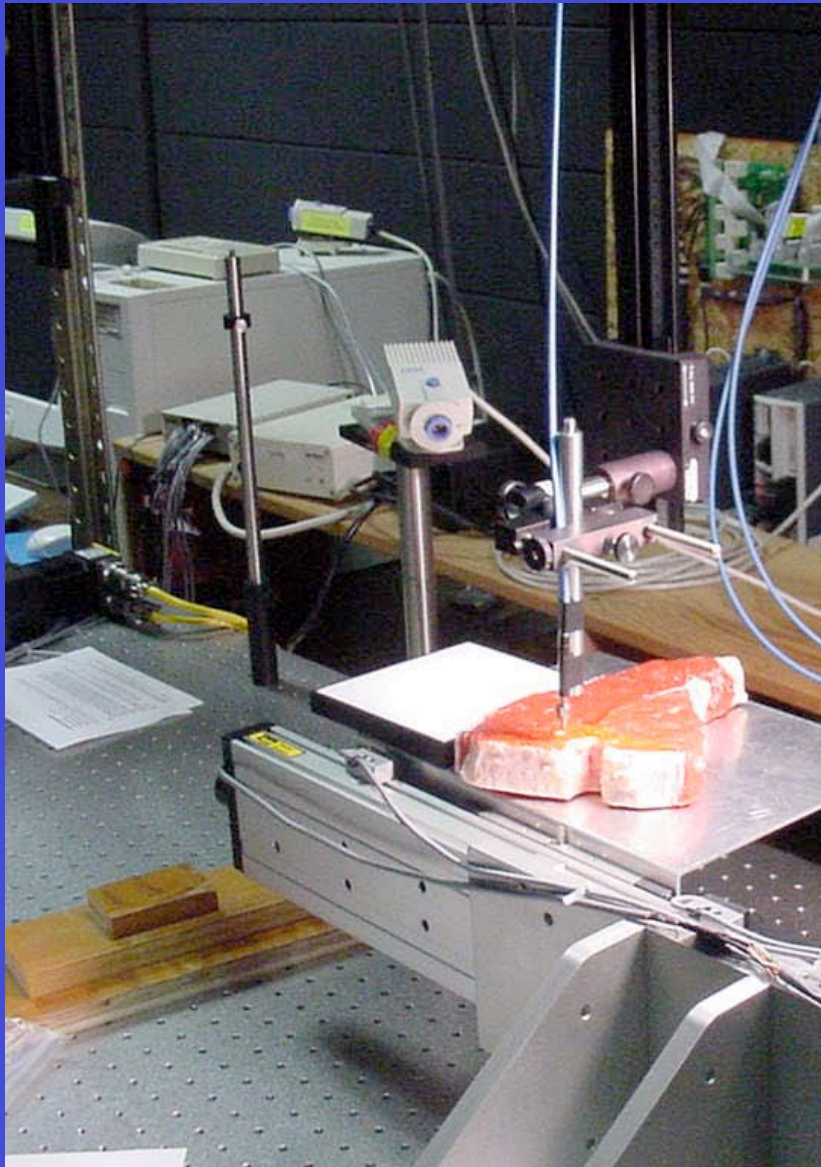
Current Web List  
NetSupport School Pro

Ready Connections : 24 24 Clients All : 24

# CDE Lab & Applied Machine Vision Course



# “Real” Spectral Imaging Lab





# Bringing in Live Lab Session to Students

The screenshot displays a multi-windowed software interface for a live lab session. The top window, titled "MV1 - Viewing", contains a control panel with the following elements:

- Light Source:** Three toggle switches labeled "ON" for "Light Source", "X-Axis", and "Y-Axis".
- Buttons:** "INITIALIZE" (grey), "END" (red text on grey), and "GO" (grey).
- Axis Status:** "X Axis Active" and "Y Axis Active" with green indicator lights.
- Position Controls:** Two sets of "Target Position" and "X Position" / "Y Position" input fields with numerical values (0 and 130).
- Input Data:** A green bar graph labeled "Input Data" with the text "Out of Range".

The middle window, titled "Spectrum1", displays a spectral plot with the following details:

- Y-axis:** Labeled "Intensity (counts)".
- X-axis:** Numerical scale from 200 to 800.
- Plot:** A yellow curve showing a broad peak with a sharp vertical line at approximately 337.35 nm.
- Text Overlay:** "Slave 2: 337.35 nm, 424, -1.247".
- Toolbar:** Includes icons for file operations, zoom, and acquisition parameters like "Average 10", "Boxcar 10", and "Flash Delay (msec) 100".

The right window, titled "NetMeeting - Not in a Call", shows a video feed of a pinkish biological specimen on a dark surface. Below the video are controls for "Name", "Not in a call", and communication icons.

At the bottom of the interface, there are status bars for "Sharing", "Unmapped Keyboard", and "Print Capture Off".



# Student Access to Lab ( 24/7 )

Address <http://weblabs.engr.uga.edu>

Go Links

## Web Enabled Engineering Laboratories

[Multi-Spectral Imaging Laboratory](#)

[Fermentation Laboratory](#)

### **Purpose:**

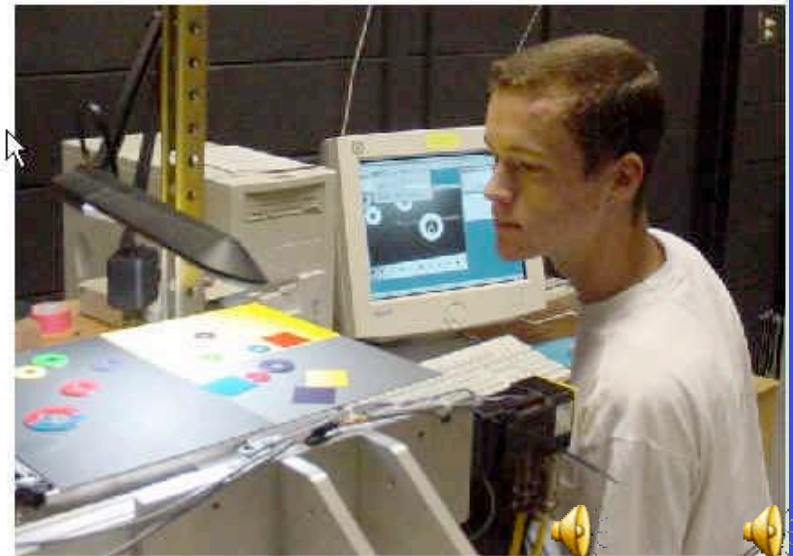
To facilitate student access to state-of-the-art equipment needed for their education.

These laboratories are designed for access by students 24/7 via the web.

The multi-spectral imaging laboratory has been in service since January 2002. Please click on the appropriate link below for a video presentation describing this laboratory (Quicktime version 6 or higher must be installed to view).

[Dial Up \(56k\)](#)

[Cable Modem](#)



# Spectral Imaging Lab (Web-enabled)

## Welcome to BAE Multi-Spectral Imaging Laboratory

[Experiment 1](#)

[Experiment 2](#)

[Experiment 3](#)

[Experiment 4](#)

[Experiment 5](#)

[Experiment 6](#)

[Experiment 7](#)

To run this program, you need to install Microsoft NetMeeting3.0 click [here](#) to download

Click the following link to connect to the specific vision station

PLEASE REMEMBER TO TURN OFF ALL POWER (i.e. the RELAYS) INSIDE QUANTIM WHEN YOU ARE DONE!

ALSO PLEASE DO NOT CLOSE OUT QUANTIM. THANKS!

[Machine Vision 1](#)

[Machine Vision 2](#)

[Research Station 1](#)

[Ocean Optics Spectrometer](#)

When finish, click this button

Finish

To see the NetMeeting, click the "Undock" button

Undock



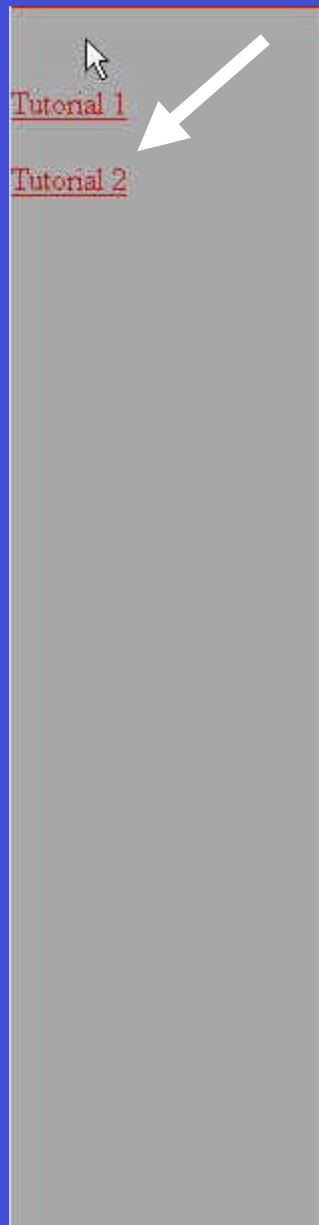
# Student Access to Lab Equipment

The screenshot displays a Windows desktop environment with several open applications:

- Control Panel (MachVision1's programs - controlled by File Server):** This window contains controls for a light source and an XY-MOVE system. It features buttons for "INITIALIZE" and "END", and status indicators for "X Axis Active" and "Y Axis Active". There are also input fields for "Target Position" and "X Position" (both set to 30), and "Target Position" and "Y Position" (both set to 100). A "GO" button is present. The "Input Data" section shows "Out of Range".
- 001 00IBase32 - [Spectrum1]:** This is a spectrometer control window. It includes a menu bar (File, Edit, View, Overlay, Spectrometer, Spectrum, Time Acquisition, Script, Window, Help) and a toolbar with various icons. Below the toolbar are several control fields: "Integ. Time (msec)" set to 60, "Average" set to 10, "Boxcar" set to 10, "Flash Delay (msec)" set to 100, "Strobe/Lamp Enable" (unchecked), "Correct for Electrical Dark" (checked), and "LED On" (unchecked). The main display area shows a spectrum plot with "Intensity (counts)" on the y-axis (0 to 500) and a yellow curve. A vertical green line is positioned at approximately 718.64 nm. A status bar at the top right of the plot area reads "Slave 2: 718.64 nm, 1528, 445.08".
- NetMeeting - 1 Connection:** This window shows a video feed of a pink object on a scale. It includes a "Name" list with "File Server" and "s1 MachVision1", and various communication icons.



# Experimental Instructions (Web page)



## SPECTROMETRY EXPERIMENT No. 1 FOR KAGOSHIMA UNIVERSITY STUDENTS (SPRING 04)

There are 3 parts to this spectrometry experiment:

1. Part A is to show how to set up basic data acquisition parameters (with no light). The goal is to show how system noises.
2. Part B to measure reflectance spectra of the MacBeth color chart under a light source called "Reveal" from (this is a common household light bulb in the U.S.A.).
3. Part C to measure reflectance spectra of various features of a replica of a T-bone steak, in preparation for imaging experiments.

In general, as you are remotely controlling equipment located in GA, USA from Kagoshima, Japan, the visual feed initiated by you will be much slower than usual, so be patient while waiting for the actions of your keyboard or mouse confirmed by changes in the window being displayed back to you.

### Part A Experimental Procedures

- 1) Go over the 2 Flash tutorials to learn how to log onto "Weblabs" and for gaining access to the Machine Vision getting familiar with how to use the "X-Y Axis Move" and "OOIBase32" software applications.
- 2) Then actually log on to the web site <http://weblabs.engr.uga.edu/> in order to gain access to Machine Vision Site name "XXXXXXXX" and the password "XXXXXXXX" that were given to you by the instructor.
- 3) Click with the mouse on the title bar of the "xy\_axis\_move.vi" window, and when it turns blue, you are now in this software application (the mouse cursor changes from an arrow to a hand icon). Make sure that the toggle switch source is turned OFF. The "X-Y Axis Move" window should look like Figure 1.



# Narrated "How to" Tutorial

The image displays a software interface for MachVision1, controlled by PC114 BAE. The main window shows a spectral data plot with the following parameters and settings:

- Integ. Time (msec): 60
- Average: 10
- Boxcar: 5
- Flash Delay (msec): 100
- Strobe/Lamp Enable:
- Correct for Electrical Dark:
- LED On:
- Modu LED:

The plot displays Intensity (counts) on the Y-axis (0 to 4000) versus Wavelength (nm) on the X-axis (200 to 800). A yellow line represents the spectral data, showing a broad peak around 650 nm and a smaller peak around 550 nm. A legend indicates the data is from "Slave 2".

A tutorial overlay box contains the following text:

There are many buttons here useful in collecting spectral data. Click inside each highlight box to learn about the button.

When you are finished, click here to continue.

The interface also shows a taskbar with "XY-MOVE" and "001: DOIBase32 - [Spe...]" and a system tray with a speaker icon.

# Student Data Collection & Download

ftp://kustudent@weblabs.engr.uga.edu/ - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Folders History



Address ftp://kustudent@weblabs.engr.uga.edu/

**weblabs.engr.uga.edu**

Server:  
weblabs.engr.uga.edu  
User Name: kustudent

[Click here](#) to learn about browsing FTP sites.

Name	Size	Type	Modified
RealFat3.Slave2.Sample	32.0 KB	SAMPLE File	5/7/2004 11:45 AM
RealMuscle3.Slave2.Sample	31.6 KB	SAMPLE File	5/7/2004 11:41 AM
RealFat2.Slave2.Sample	32.3 KB	SAMPLE File	5/7/2004 11:40 AM
RealFat1.Slave2.Sample	32.3 KB	SAMPLE File	5/7/2004 11:39 AM
RealMuscle2.Slave2.Sample	31.8 KB	SAMPLE File	5/7/2004 11:39 AM
RealMuscle1.Slave2.Sample	31.8 KB	SAMPLE File	5/7/2004 11:38 AM
RealMarrow3.Slave2.Sample	31.9 KB	SAMPLE File	5/7/2004 11:36 AM
RealMarrow2.Slave2.Sample	31.8 KB	SAMPLE File	5/7/2004 11:35 AM
RealMarrow1.Slave2.Sample	31.9 KB	SAMPLE File	5/7/2004 11:34 AM
RealBone3.Slave2.Sample	31.7 KB	SAMPLE File	5/7/2004 11:33 AM
RealBone2.Slave2.Sample	31.8 KB	SAMPLE File	5/7/2004 11:31 AM
RealBone1.Slave2.Sample	31.6 KB	SAMPLE File	5/7/2004 11:29 AM
White.Slave2.Sample	32.8 KB	SAMPLE File	5/7/2004 11:28 AM
Dark.Slave2.Sample	28.5 KB	SAMPLE File	5/7/2004 11:27 AM
TBoneDark.Slave2.Dark	28.5 KB	DARK File	5/7/2004 11:27 AM
LensDetermination.jnt	67.4 KB	JNT File	4/28/2004 10:33 AM
ThinLensTheory.pdf	686 KB	Adobe Acrobat Doc...	4/28/2004 10:31 AM
Imaging_Sensors.pdf	881 KB	Adobe Acrobat Doc...	4/27/2004 11:58 AM
RayDiagrams.jnt	100 KB	JNT File	4/26/2004 10:17 AM
LensResolutionAberrations.pdf	602 KB	Adobe Acrobat Doc...	4/24/2004 3:54 PM
LensTypes_Materials.pdf	593 KB	Adobe Acrobat Doc...	4/24/2004 3:52 PM
Group1		File Folder	4/24/2004 5:08 AM
Group2		File Folder	4/24/2004 4:51 AM





# Live Lecture Recording with Silicon Chalk

The screenshot displays the Silicon Chalk software interface, which is used for live lecture recording. The main window is titled "Silicon Chalk - University of Georgia - ENGR-4540 - Instructor". The interface includes a menu bar (File, Edit, Configuration, Diagnostics, Live, Help) and a toolbar with various icons for presentation control, audio, notes, questions, polling, sharebox, and pace. The main content area is divided into several panes:

- Top Pane:** "Presentation - MV1 - Viewing (Chi Thai)". It features a "Target Position" section with "X-Position" and "Y-Position" both set to 135, and a "GO" button. Below this are "X-Axis" and "Y-Axis" controls, each with a "FF" (Fast Forward) button and an "ON" indicator.
- Bottom Pane:** "IBase32 - [Spectrum]". This pane displays a spectrum plot with "Intensity (counts)" on the y-axis. A yellow curve represents the spectrum, and a vertical green line indicates a specific wavelength. The text "Slave 2: 648.98 nm, 1314, 1137.872" is displayed above the plot. The plot area includes a toolbar with various icons for editing and analysis, and a control panel with parameters: Time (msec) 60, Average 10, Boxcar 10, Flash Delay (msec) 100, Strobe/Lamp Enable (unchecked), Correct for Electrical Dark (checked), LED On (unchecked), and Modu LED (unchecked).
- Left Pane:** "Presentation - Power". It contains a "PowerPo" window showing a black screen and a "Share Watch" button. Below this is a text box that reads "This is a spectrometer from Ocean Optics".
- Right Pane:** "NetMeeting - Not in a Call". It shows a video feed of a person's hand holding a pink object, and a text box that reads "Not in a call".

The bottom of the screen shows a taskbar with several open windows: "Presentation - Power", "Presentation - MV1", and "Notes1". The system tray on the right includes a volume icon and a network icon.

# Conclusions

- We can integrate several hardware and software components together to obtain an instruction engineering system that students can use during class as well as after class.
- With increased and easier access to instructional materials, ones can then hope and perhaps expect that students will learn better.