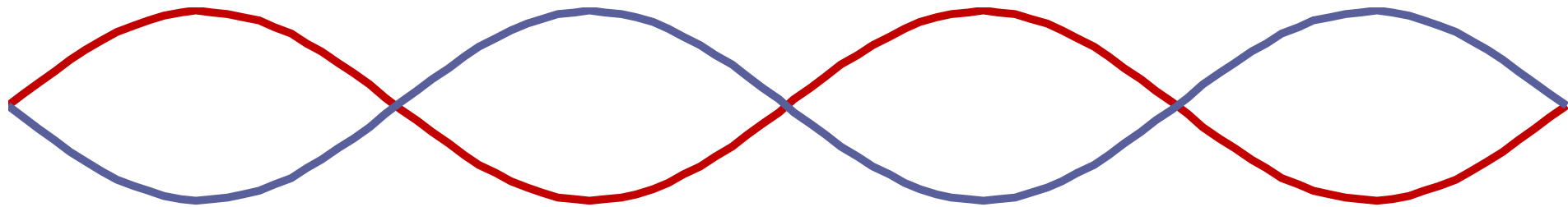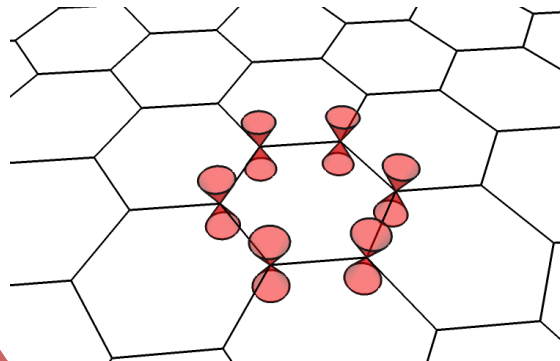# WiTec at Sandia:
Pushing a Great Tool Further
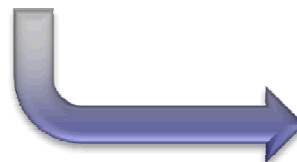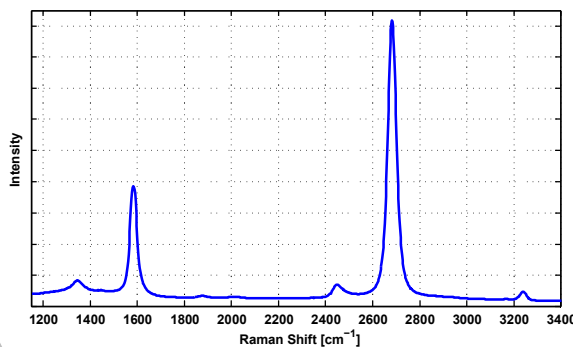
Thomas Beechem

Guiding Questions

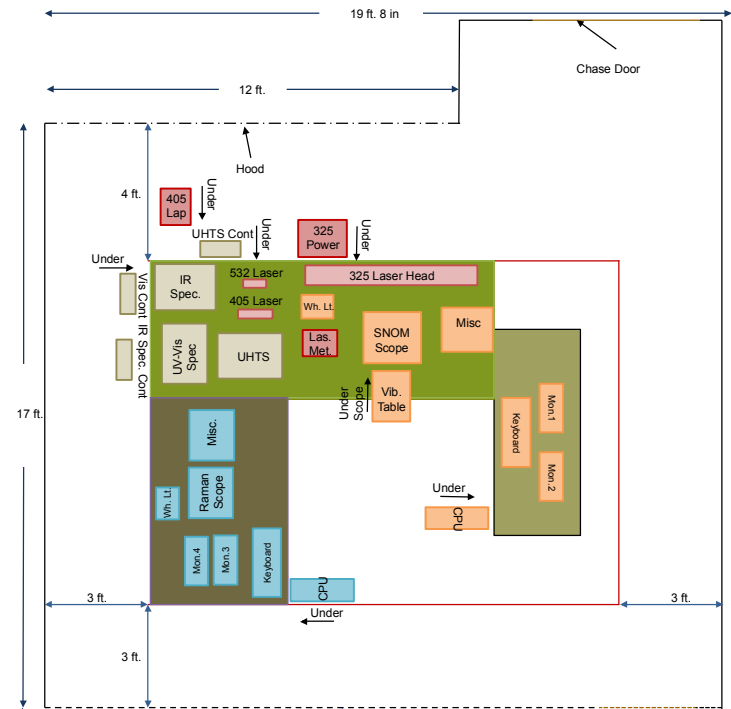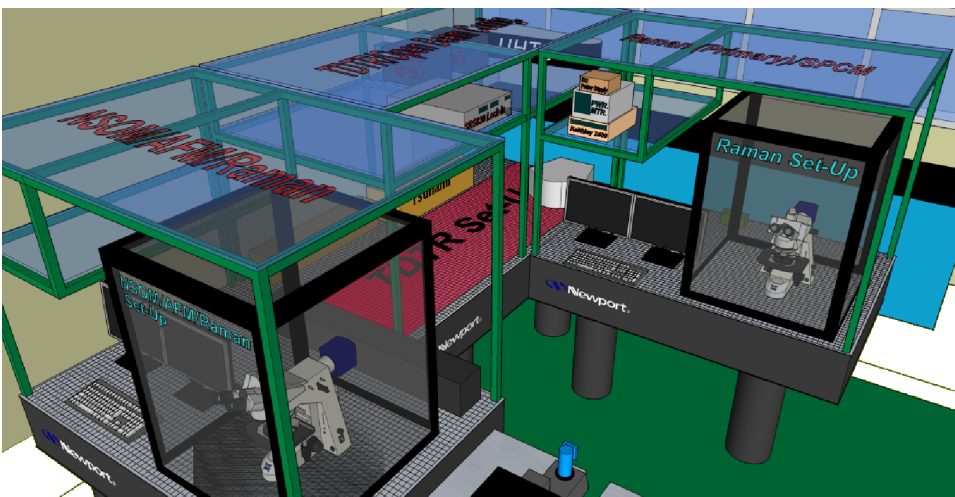**What do I get?**

How do I analyze it?

Could it be better?

?

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Our System: Twins
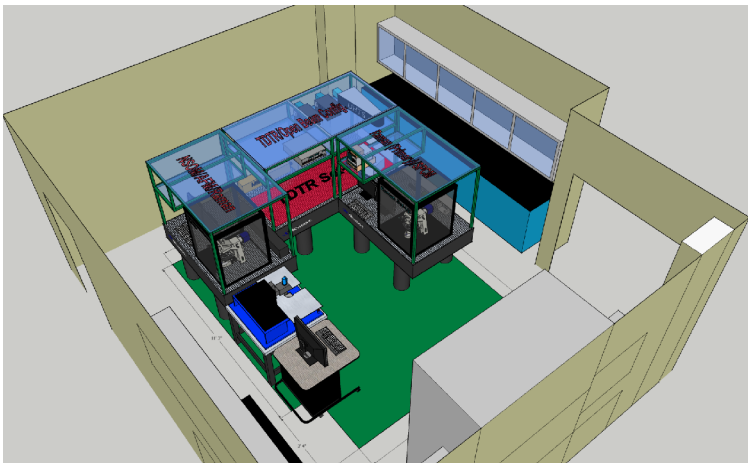
A Typical Week in our Lab

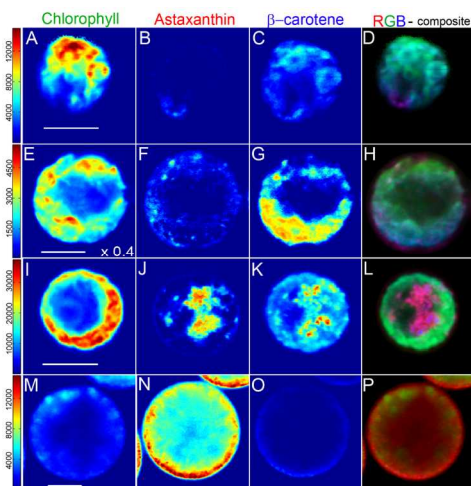| Week of: 11/28-12/2	Monday	Tuesday	Wednesday	Thursday	Friday
Sample	Solvent ZnO Nanowires on Glass	GaAs Transistors	GaAs Transistors	MFO C60 (AM) SiGE-12416F (PM)	Graphene 1ML/H/SiC 110114 #4 and #11
Scan Type	Map/Line	Temp Measurements	Temp Measurements	AM-Work with TEB PM-Linescans	Map 25X25 Micron 75X75 Points
Grating	600 l/mm 550 Center	2400 l/mm 50 Acquisitions Each Power 400 Center	2400 l/mm 50 Acquisitions Each Power 400 Center	AM-600 l/mm 2046 PM-2400 l/mm 550 Center	600 l/mm 2046 Center
Counts	Max 434 Pak	20,000 Counts for 289 Peak	20,000 Counts for 289 Peak	AM-Experiment PM-24,000 on 520 Peak	7,000-8500 Counts for 2D Peak
Objective	20X/0.45 Expt. With 100X/0.9	20X/0.45	20X/0.45	AM-20X/0.45 PM-100X/0.9	100X/0.9
Laser/Fiber	10 mW 100 Micron	10mW 100 micron	10mW 100 micron	AM-10 mW, 100 micron PM-10 mW,25 micron	20mW 25 Micron

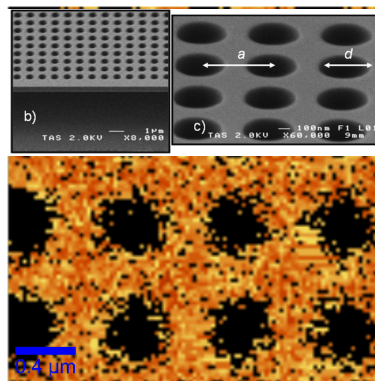# Core Effort: Raman Imaging

Graphene Transfer
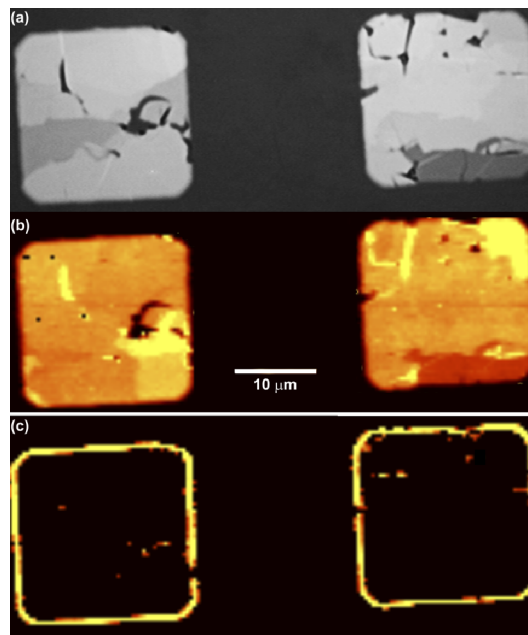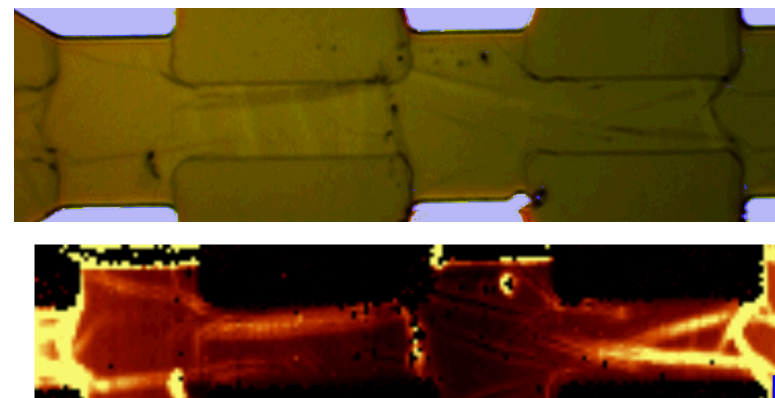
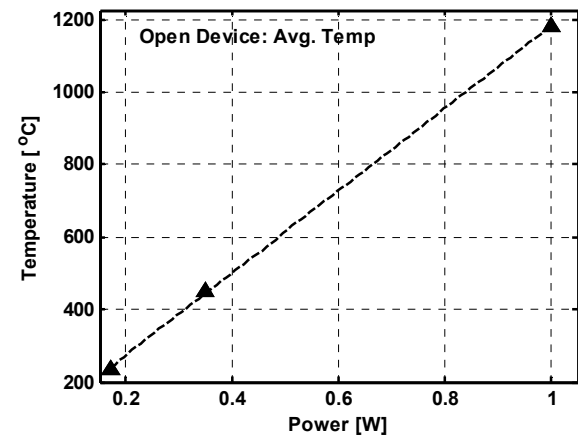## Graphene Science
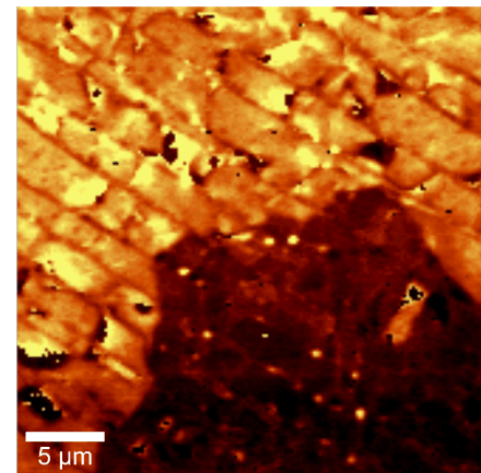
Nanowires and Tubes

3 µm

Cell Imaging

Phononics

Graphene Device Fabrication

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Raman for Thermal Sciences

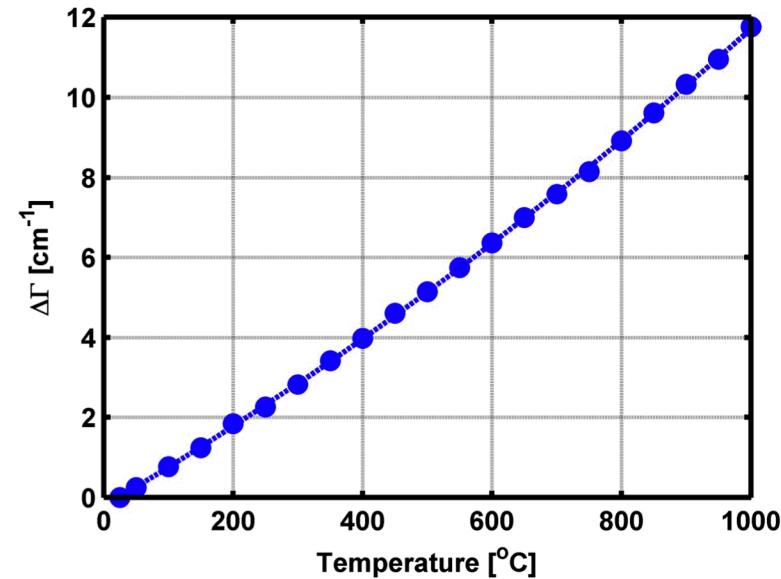
$\Delta\omega = -0.026 * T + 1.03$

Raman + Photomapping

Raman Intensity   **Photovoltage**
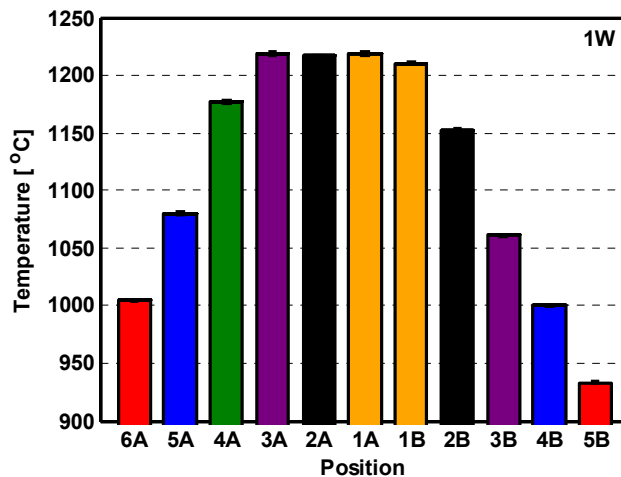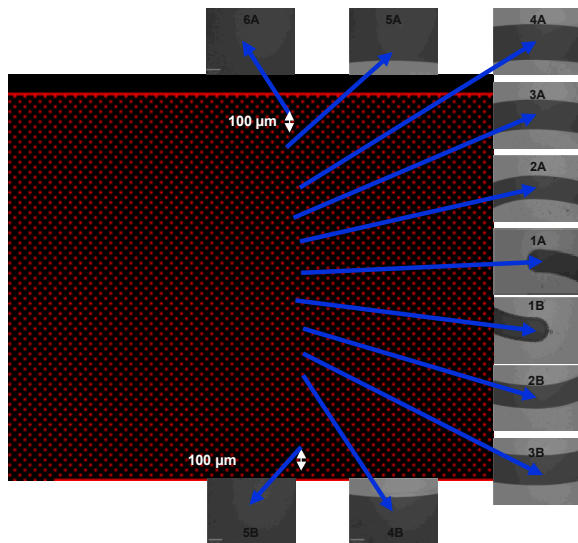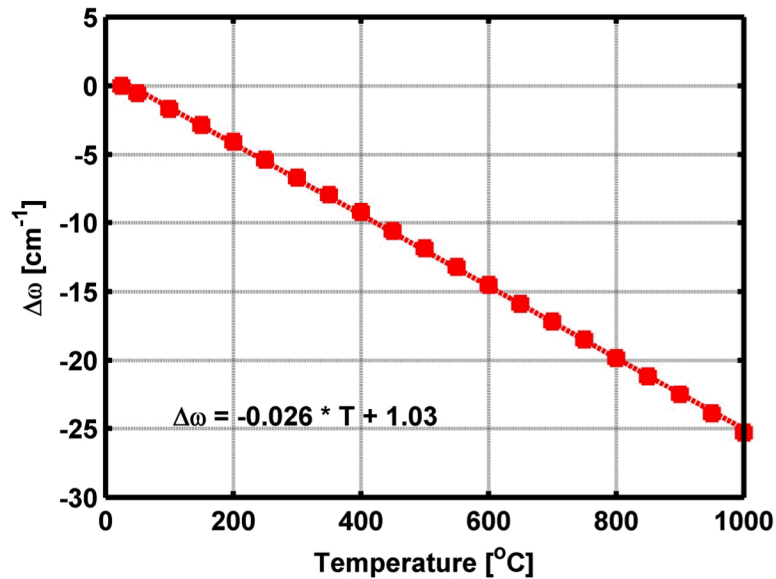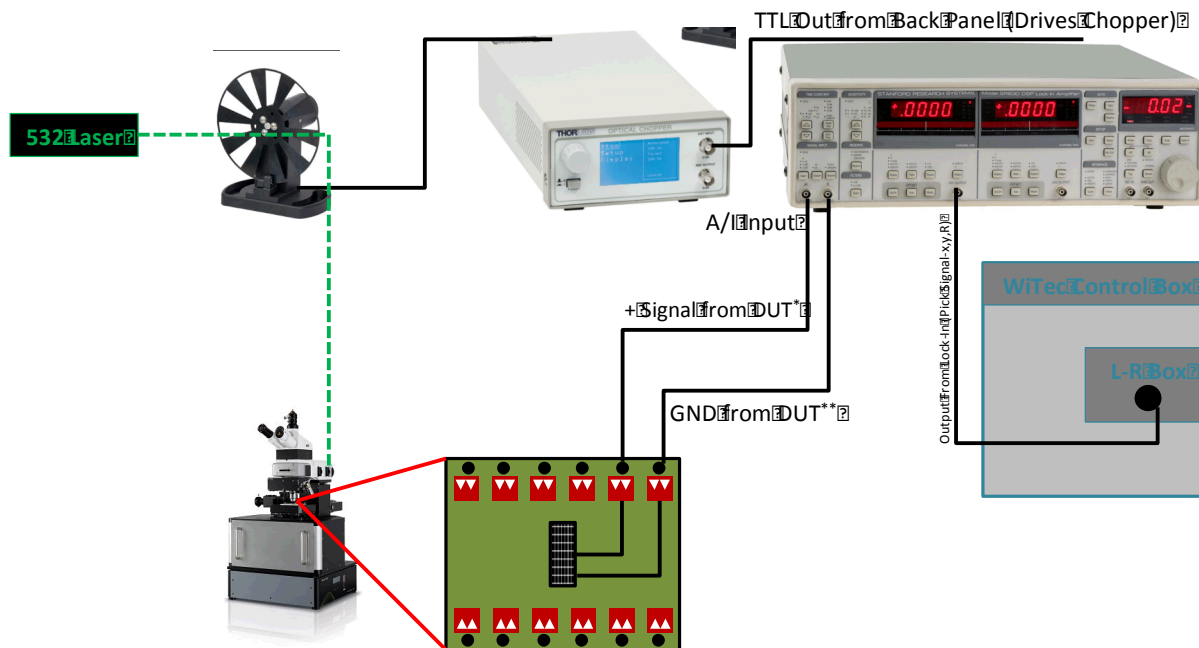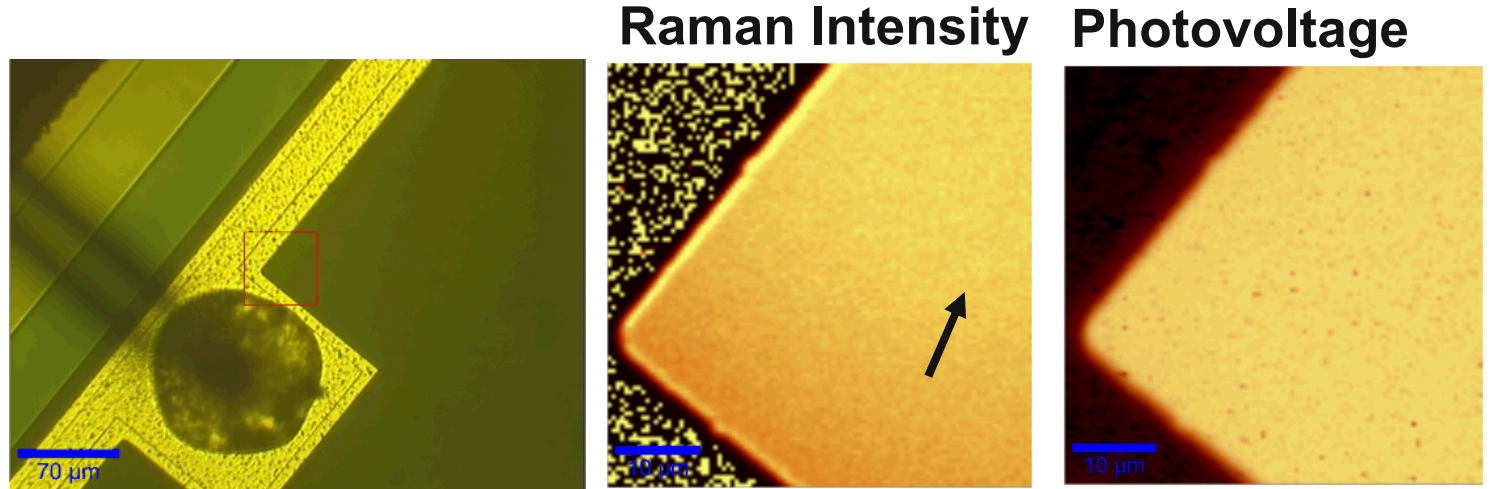
How do I analyze? Calibration

Moving Data: Matlab & .spe

Acquire Data in Control	→	Output to Matlab	→	Data Analysis in Matlab	→	Write binary .spe file

Divide Image by 10,000	←	Utilize the sum filter	←	Associate with coordinates	←	Import to WiTec Project

The image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been corrupted. Restart your computer, and then open the file again. If the red x still appears, you may have to delete the image and then insert it again.

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Next Steps: Hardware Flexibility

High Throughput Couplers

Tunable Spectroscopy

New SPM Modes

+

Beam Combiners?

Raman Laser

Damage Laser

Photodiode

Scanning Stage
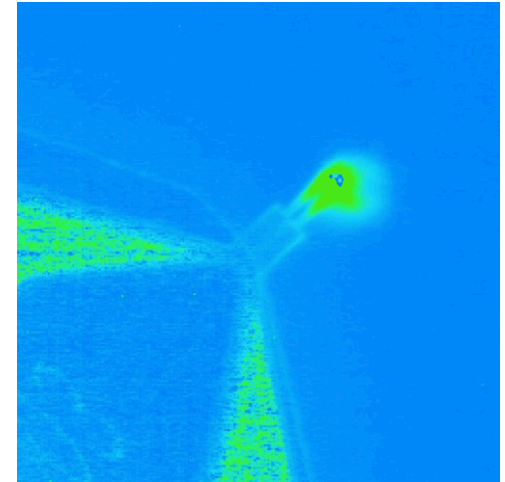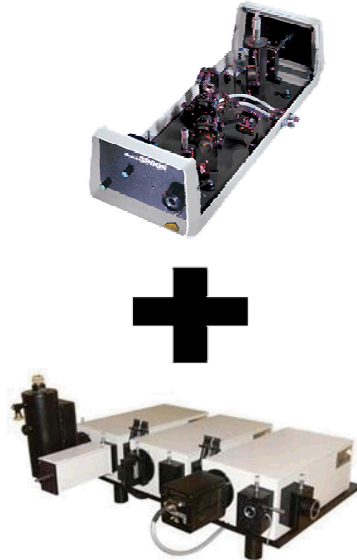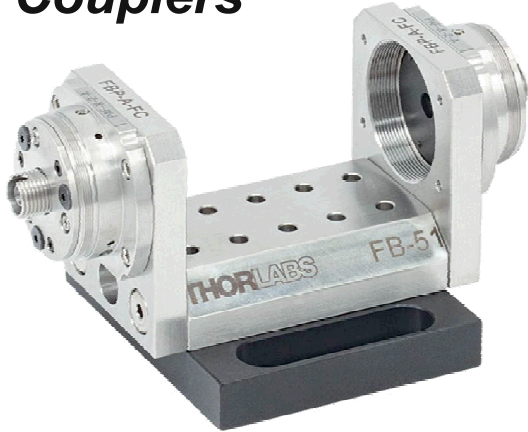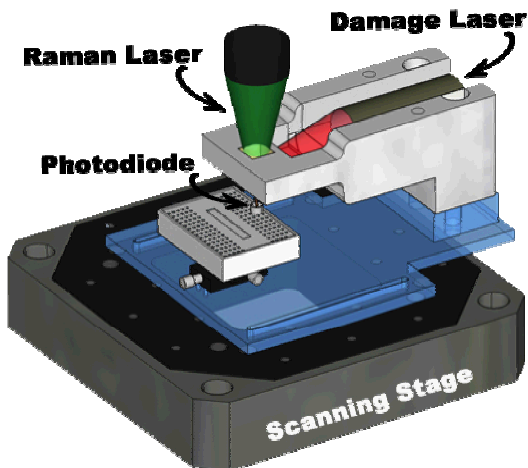
Monochromator Imaging

No Fiber Options
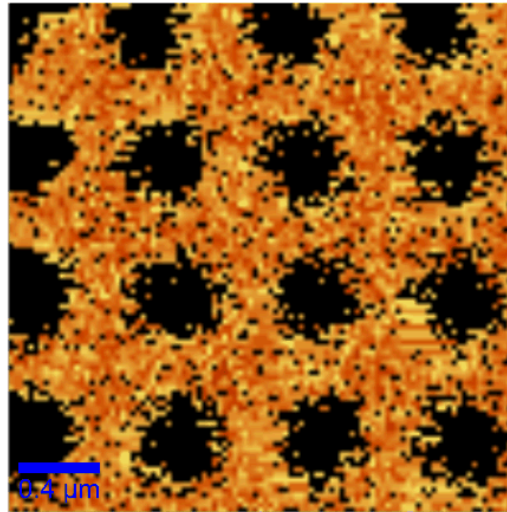
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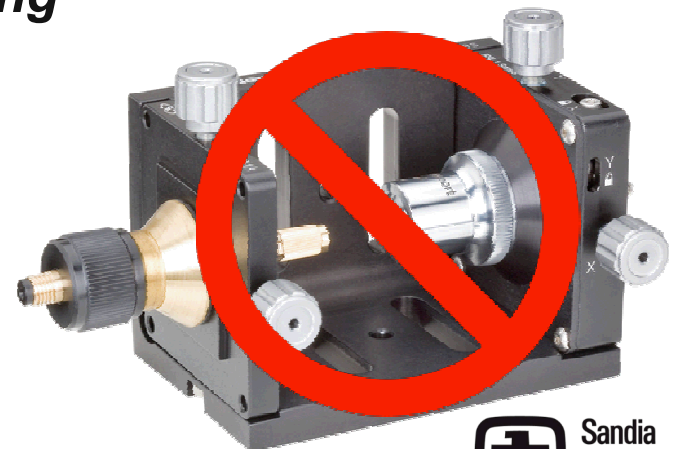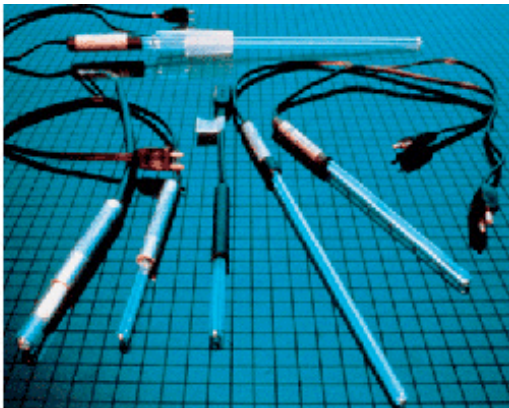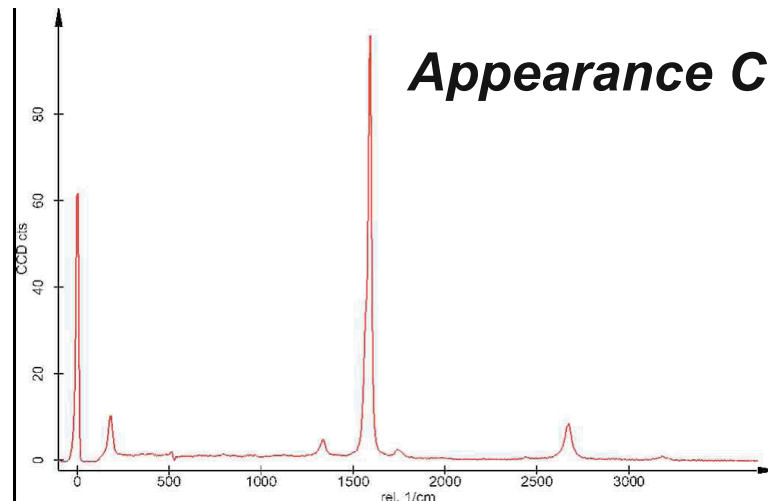
Next Steps: WiTec Control

Remote Control?

Multiple Acquisition: Map
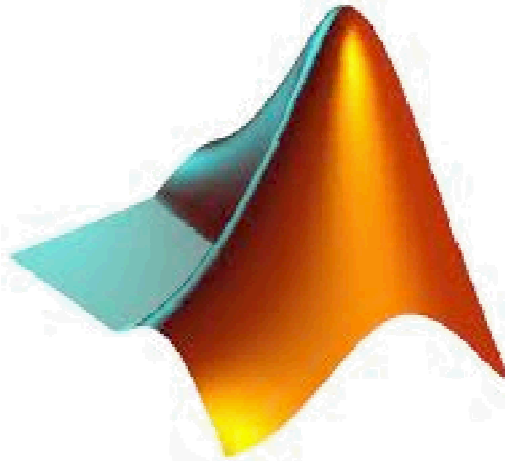
Built-In Raman Calibration

Appearance Control

Next Steps: WiTec Project

Are you only a PC?

Data Bridge

Scripting

Social Users Network

Project Manager

MATLAB CENTRAL

WITec
focus innovations

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