

**NS&M Characterization Service Center**  
**Catalog of Services**  
Amended 7/17/2014

All equipment charges will be billed in one hour increments.

**IMAGING FACILITY**

**Location:** Engineering Computer Science North Room ECSN 2.516

<b>Fee Schedule:</b>	Training for new users	6 hours at \$50/hour
	Hourly fee for trained users	\$20/hour
	Sample preparation	\$50/sample
	Samples run by technician	\$100/hour

Note: Users must supply their own SEM mounts and sample boxes. These are available from SPI Supplies (<http://www.2spi.com/catalog.html>) and TED Pella (<http://www.tedpella.com/SEMsuply.htm>).

***Zeiss-LEO Model 1530 Variable Pressure Field Effect Scanning Electron Microscope***

- EDAX
- E-beam lithography
- Equipped with Zyvex S100 Nanomanipulator

***Digital Instruments Multimode 8 Atomic Force Microscope/Scanning Tunneling Microscope***

NanoScope V controller

- ScanAsyst™ self optimizing AFM
- PeakForce Tapping™ Mode
- Aqueous electrochemistry
- Stand alone STM
- High temperature heater accessory (room temperature to 250 °C)

**THERMAL AND MECHANICAL ANALYSIS FACILITY**

**Location:** Berkner Hall Room BE 3.530

<b>Fee Schedule:</b>	Training for new users	3 hours at \$50/hour
	Hourly fee for trained users	\$10/hour
	Samples run by technician	\$75/hour

Note: Users must supply their own platinum pans and stirrups for use in the TGA. These will be available for sale at the facility.

***TA Instruments Q400EM Thermomechanical Analyzer***

- Temperature Range: -150 to 1000 °C
- Heating Rate Range: 0.1 °C/minute to 100 °C/minute
- Temperature Precision: ±1 °C

***TA Instruments Q500 Thermogravimetric Analyzer (TGA)***

- Measures sample mass as a function of temperature
- Temperature Range: Ambient to 1000 °C
- Scanning Rates: 0.1 °C/minute to 100 °C/minute in 0.01 °C/minute increments
- Temperature Accuracy:  $\pm 1$  °C
- Temperature Precision:  $\pm 0.1$  °C
- Sensitivity: 0.1  $\mu\text{g}$
- Weighing Precision:  $\pm 0.01\%$
- Up to 1.0 gram sample size
- Modulated TGA

***Perkin Elmer PYRIS Diamond Dynamic Mechanical Analyzer***

- Storage and loss modulus
- Glass transition
- Sub- $T_g$  transitions
- Creep and stress relaxation
- Degree of crystallinity
- Softening temperatures
- Shrinking behavior
- Heat dissipation properties
- Compatibility of anisotropy or orientation
- Acoustical and vibrational damping
- Impact resistance
- Aging effects
- Crosslink densities

***TA Instruments Q2000 Automated Digital Scanning Calorimeter (DSC)***

- Temperature Range: -180 °C to 725 °C
- Temperature Accuracy:  $\pm 0.1$  °C
- Temperature Precision:  $\pm 0.01$  °C
- Calorimetric Precision < 0.05%
- Sensitivity: 0.2  $\mu\text{W}$
- Dynamic Range:  $\pm 500$  mW
- Scanning Rates Heating/Cooling: 0.01 °C to 500 °C/min

***Instron 5848 Microtester***

- Designed for both static and dynamic testing and performs tensile, compression, flex, cyclic, and shear tests on a variety of materials, specimens and components
- Load cells available up to 2 kN
- Nano-level position accuracy

**SPECTROSCOPY FACILITY**

**Location:** Berkner Hall Rooms BE 3.530, BE 2.408 (Raman Spectrometer), and BE 2.306 (EPR)

<b>Fee Schedule:</b>	Training for new users	3 hours at \$50/hour
	Hourly fee for trained users	\$10/hour
	Samples run by technician	\$75/hour

Note: Users must supply their own cuvetts for use in the UV-Vis/NIR. These may be purchased at the facility.

***Perkin Elmer LS55 Fluorimeter***

- Microplate-based measurements
- Polarization
- Anisotropy assays
- Intact cell work
- Fluorescence, phosphorescence and bio- and chemi-luminescence measurement modes
- Excitation, emission, constant wavelength synchronous, and constant energy synchronous spectral scanning
- 3D excitation/emission scans, 3D synchronous and kinetic scans
- Microplate measurements with fixed wavelength, wavelength program or automated spectral data collection
- TLC plate, electrophoresis gel or other flat sample types can be analyzed with plate reader accessory
- Single and multiple wavelength kinetics
- Simultaneous kinetics for multiple samples
- Simple quantitation by curve fitting with a number of fit algorithms
- Intracellular ion analyses
- Analysis of protein suspensions

***Perkin Elmer Spectrum GX FTIR***

- Four equivalent output beams allow the greatest available sampling flexibility
- Ten different interchangeable, bar-coded beamsplitters, a choice of more than nine different detectors, and a built-in filter wheel with many different filters provide optimum performance from the Near-IR to the Far-IR
- Software controlled dual iris apertures at the J-stop and B-stop allow optimization of the beam attenuation and divergence to optimize performance for optical and sampling options
- Dynascan interferometer immune to tilt and shear
- Available spectral resolution of better than  $0.15 \text{ cm}^{-1}$
- Continuously variable scan speeds
- Interchangeable optics for specialized configurations
- Equipped with an integrating sphere
- Onboard AutoImage FTIR Microscope

***Perkin Elmer Lambda 900 UV-Vis/NIR Spectrophotometer***

- Quick-Change Optical Module for sampling flexibility
- High Sensitivity PMT for improved signal to noise in UV region
- Sample and reference beam attenuators built into the spectrometers
- 175 nm to 3300 nm wavelength range
- UV WinLab software

- Wide range of accessories for sampling flexibility
- Application specific software for Color, Filter, and glass measurements

**Perkin Elmer AutoImage FTIR Microscope** (part of Spectrum GX FTIR)

- Full automation of all microscope functions
- Integral software including interactive multimedia
- High-throughput, permanently aligned optical design
- Transmission, reflectance and ATR modes of operation
- Single-point, multi-point, line-scan, mapping, ATR mapping and auto focus mapping modes of operation
- Interactive 3-D display software

**Jobin Yvon LabRam HR Micro-Raman Spectrometer** (BE 2.408)

- Linkham heating/cooling stage from -196 to 300 °C
- Argon-Krypton, Helium-Neon, and 785 nm diode lasers give multiple excitation energies
- Complete kit for polarized Raman

**Bruker Electron Paramagnetic Resonance Spectroscopy** (BE 2.306)

- ER041XG microwave bridge x-band
- ER 4119HS resonator. TE<sub>102</sub> rectangular cavity with a nominal center frequency of 9.75 GHz and unloaded Q of 6000
- Port for optical irradiation of the sample with 1500:1 signal to noise ratio
- Magnetic field to 10kG
- Oxford Instruments He (N<sub>2</sub>) Cryostat with ITC503 temperature controller.
- Programmable one axis goniometer with 1/8° resolution

**PHYSICAL AND MAGNETIC PROPERTIES FACILITY**

**Location:** Berkner Hall Room BE 2.404A

<b>Fee Schedule:</b>	Training for new users	6 hours at \$50/hour
	Hourly fee for trained users	\$5/hour
	Sample preparation	\$50/sample
	Samples run by technician	\$100/hour

**Quantum Design Magnetic Properties Measurement System**

- Performs ultra-high sensitivity DC magnetization measurements between 2 K < T < 400 K and -7 T < H < 7 T
- Ultra low field operation to 50 mG
- Precision of 10<sup>-8</sup> emu (<1 ng iron)
- Connection to short-term and long-term power backup for near 24/7 uptime
- Evercool reliquification system eliminates need for expensive liquid helium purchases

**Quantum Design Physical Properties Measurement System**

- Performs a variety of measurements between 2 K < T < 400 K and -9 T < H < 9 T including:

- Conductivity (AC and DC)
  - AC/DC magnetic susceptibility
  - Thermal Transport
  - Heat Capacity
  - Torque magnetization
  - In situ sample rotation
- Connection to short-term and long-term power backup for near 24/7 uptime
  - Cryomech reliquification system eliminates need for expensive liquid helium purchases

### **NanoTech Institute Cost Center General Operating Procedures**

To inquire about training in the Cost Center, complete the Request for Certification and Training. Once the information on this form is verified, training sessions will be set up with a designated Center staff member. A completed Request for Certification and Training form must be on file with the Facilities Director for anyone working in the Center. Once trained personnel are granted permission to use a facility, the following guidelines must be strictly adhered to:

- a. Users must sign in using the equipment logbook. The experiment, sample type, time in and time out, and any problems should be recorded.
- b. The work area must be left clean. No samples or other materials are to be left behind.
- c. All safety policies of the University and the Department of Chemistry must be followed, including proper disposal of chemicals and broken glass, wearing of safety glasses, etc.
- d. Users will log onto the equipment computer using their unique UTD NetID. The time logged in under the NetID will be cross-referenced with our scheduling software to generate invoiced billing time. Do not allow anyone else to use the equipment while you are logged in. Sharing of logins is against University policy, is strictly not allowed, and will result in immediate termination of privileges.
- e. Data may be left as a backup on equipment computers; however the facility is not responsible for lost data. Save your data files and take them with you when your session is over.

Failure to follow any of the above procedures will result in either temporary or permanent termination of privileges.

#### **Reservations**

Equipment reservations will be made by using NanoWeb, a web based interface that we have developed for equipment scheduling, problem reports, and machine status updates. After a

Request for Certification and Training Form is on file for a user, he/she will be able to create an account on the website. NanoWeb is located at <https://nanoweb.utdallas.edu/>

### **Billing**

Invoices will generally be sent out during the first week of the month for the prior month and are due 14 days after they are received. All equipment charges are billed in one hour increments and are based on the equipment reservation system. It is the responsibility of the user to make any reservation cancellations at least 24 hours prior to the reservation start time. Any reservation not cancelled with 24 hours notice will be charged to the user at the standard rate.

### **Damage to Instrumentation**

The user is responsible for any damage to instrumentation due to neglect or misuse by that user.

Questions, comments, and requests should be directed to:

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Office: Berkner Hall Room 2.304  
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E-mail: [scollins@utdallas.edu](mailto:scollins@utdallas.edu)

or

Winston Layne, Ph.D.  
Lab Manager  
Office: Berkner Hall 2.408  
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