

# Dental Materials Research Laboratory

This guide provides a brief overview of the major equipment present in the Dental Materials Research Laboratory

*Major  
Equipment  
List*

# **Dental Materials Research Laboratory** **Equipment List - B9/B11 Squire**

What follows is a short list highlighting the equipment available for use in the Dental Materials Research Laboratory (B9/B11 Squire Hall).

Please visit our laboratory website for more information:  
<http://dental.buffalo.edu/research/centers-and-facilities/DentalMaterialsResearchLaboratory.html>

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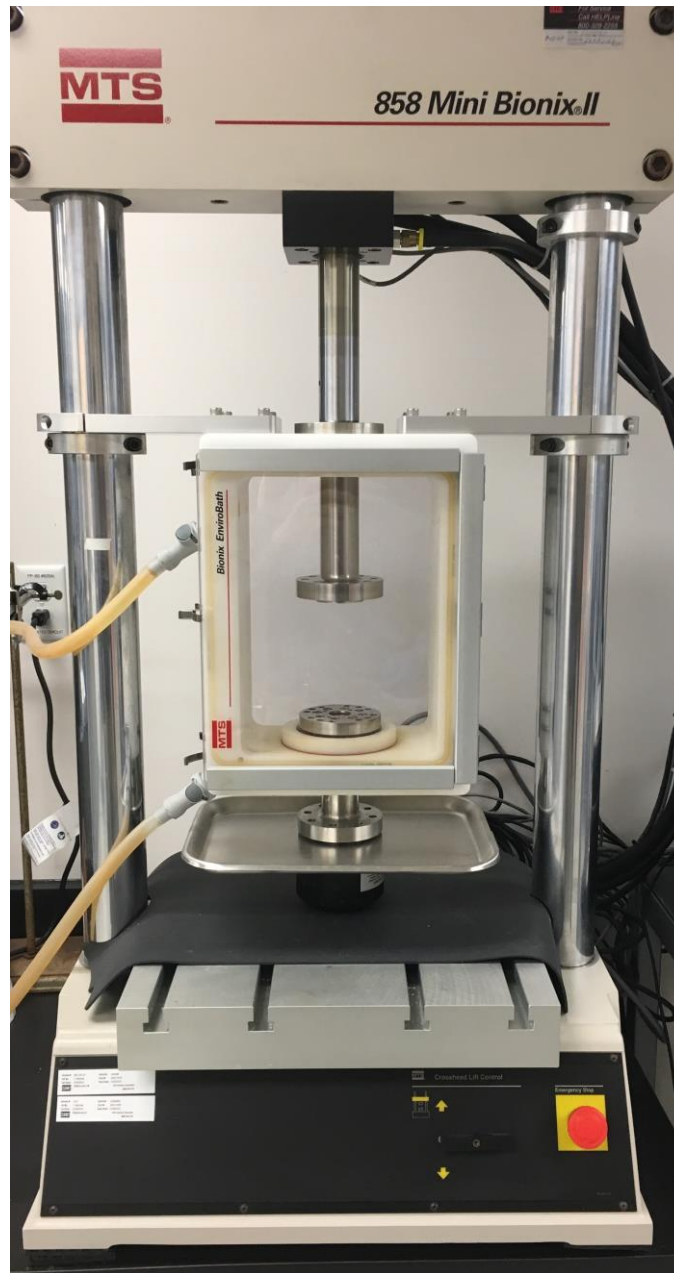
# Dillon TC2i Quantrol

*Universal testing machine (electromechanical)*



The Dillon TC2i Quantrol is an electro-mechanical universal testing machine with a 500N and a 1000N load cell. We are currently equipped for microtensile and small scale 3 point bending tests. The unit is placed on a vibration dampening table.

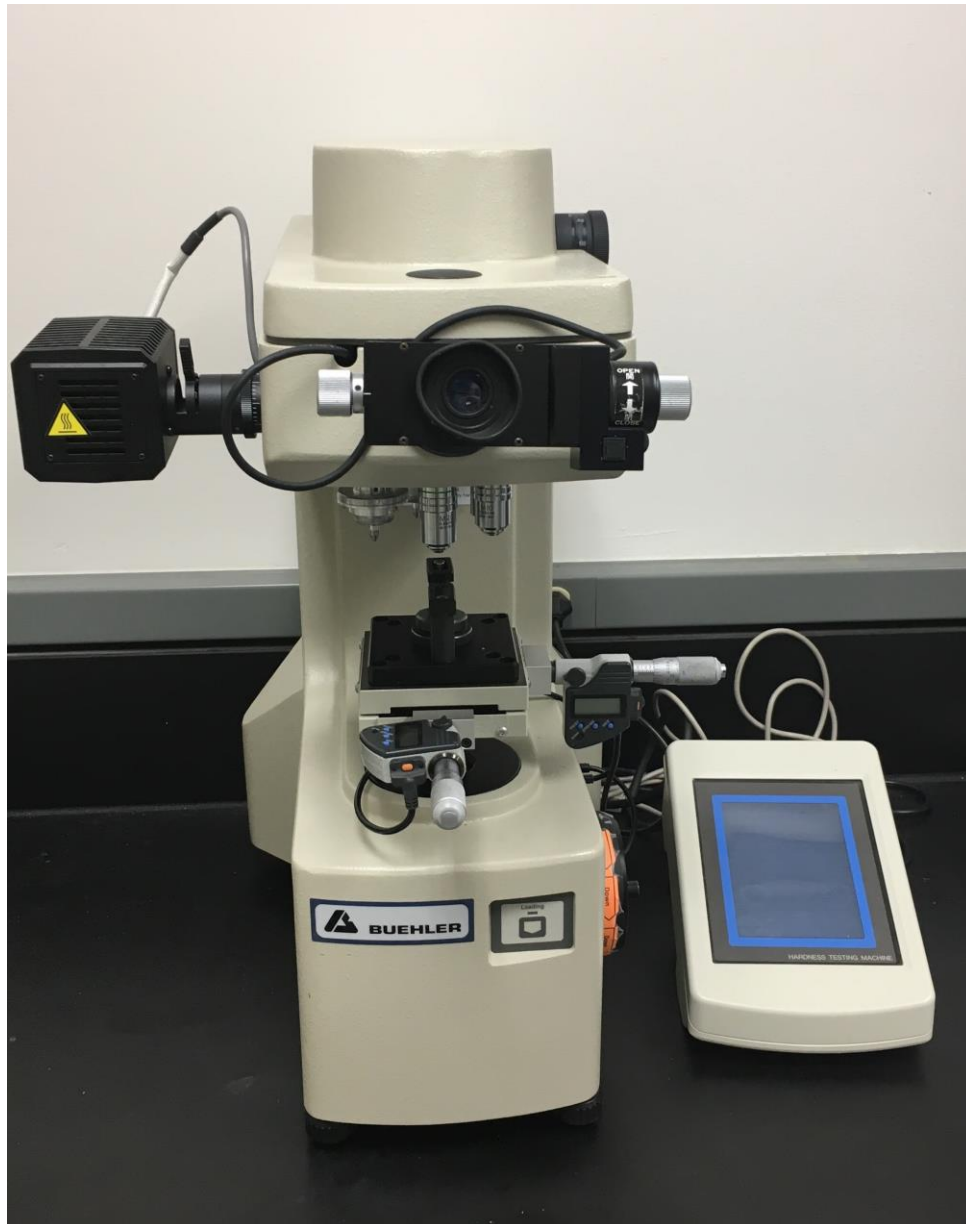
## **MTS 858 Mini Bionix 2 with integrated water bath** *Universal testing machine (hydraulic)*



The MTS 858 Mini Bionix 2 is a hydraulic universal testing machine with a 10kN load cell. Its integrated water bath allows for testing at body temperature in wet environments. It is primarily used for cyclic fatigue, tensile, and compressive tests. Currently we have grips for tensile testing and are building a new underwater fixture.

## Buehler Micromet Hardness Tester

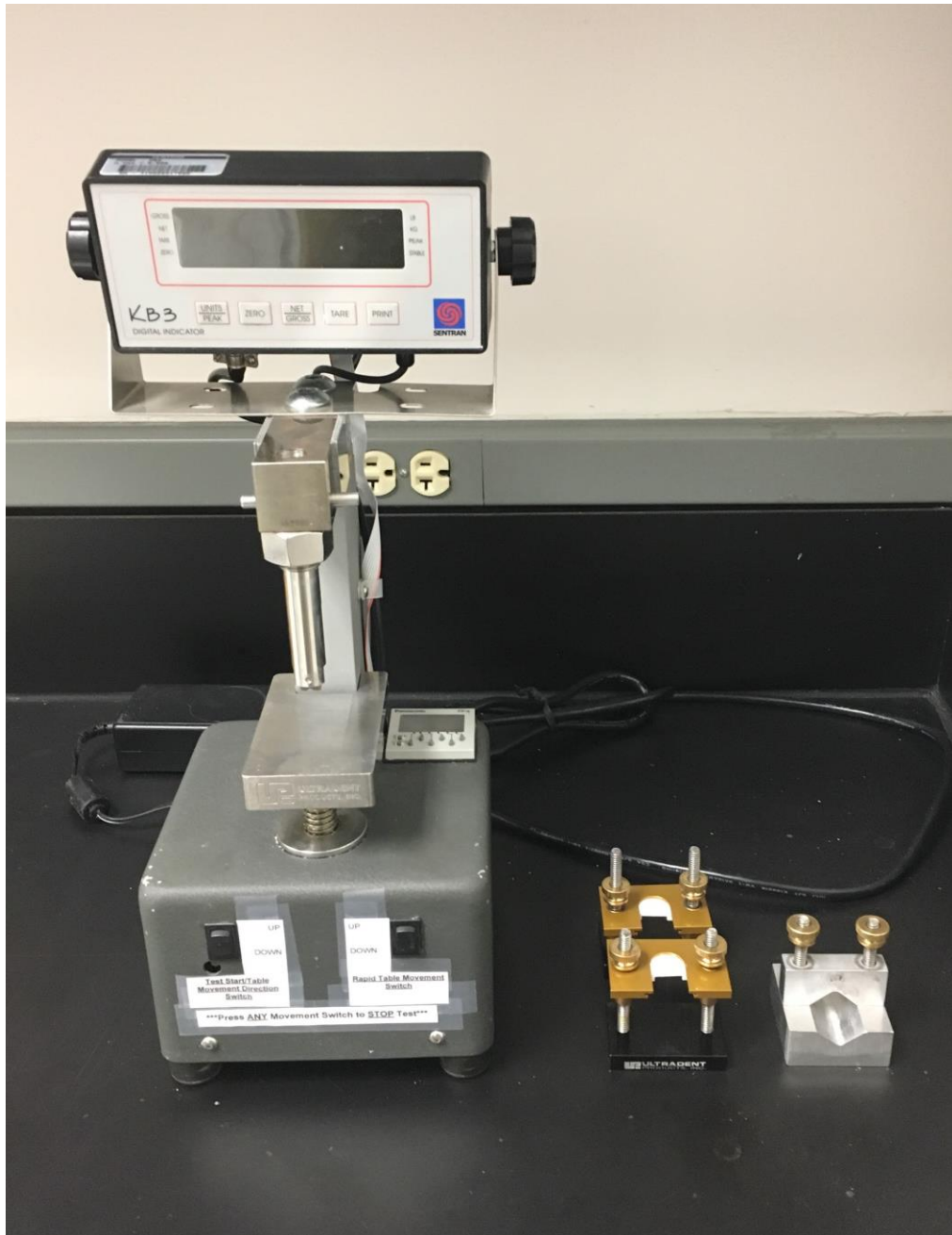
*“Micro” Hardness tester*



The Buehler Micromet Hardness Tester is a dead-weight micro indentation hardness tester. It has micro Vickers and Knoop indenters with available loads of 10, 25, 50, 100, 200, 300, 500, and 1000gf. It can be used for hardness analysis of thin films, determining depth of hardened layers, estimation of mechanical material values, and more. Curved surfaces can be tested with the micro vickers indenter, and some curvature correction is possible for regularly curved surfaces.

# Ultradent Ultratester

*“Micro” shear tester*

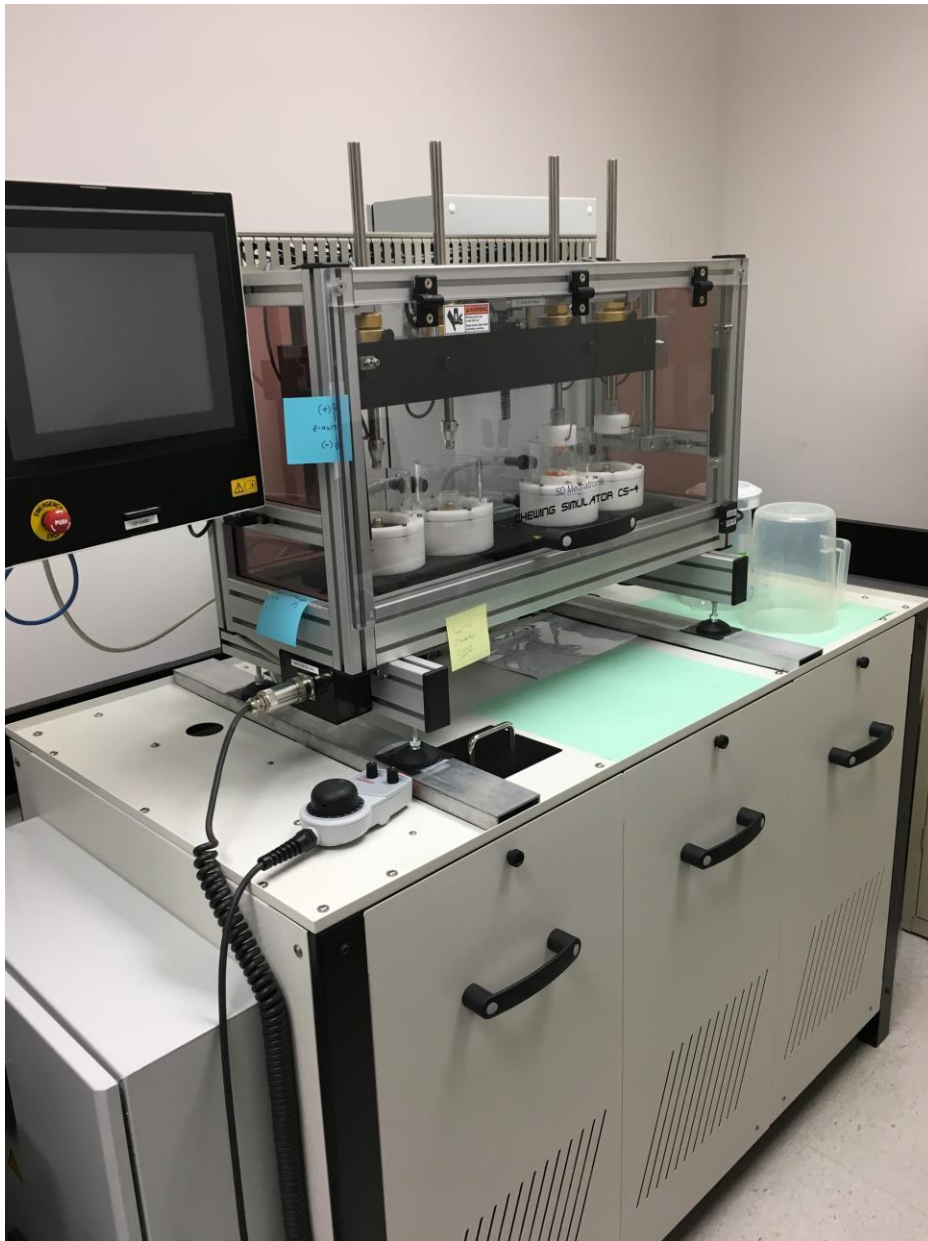


The Ultradent Ultratester is a “micro” shear tester intended for testing samples embedded in PMMA or other resin. To a limited extent, it can be fitted with other fixtures for operations such as flexural testing.



## SD Mechatronik CS-4 Chewing Simulator

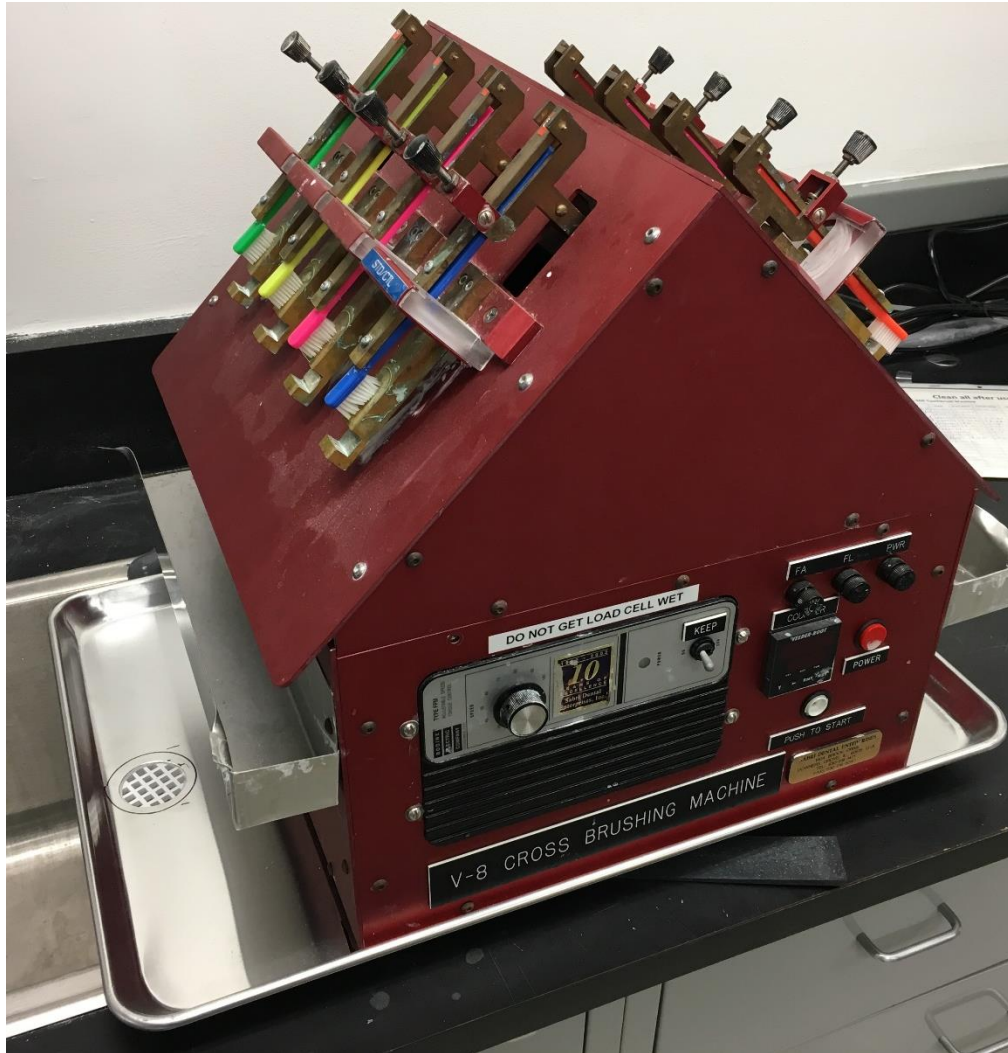
*Small scale accelerated material wear simulator*



The SD Mechatronik CS-4 Chewing Simulator is an electromechanical dead-weight device that simulates the wear and fatigue caused by chewing. It applies force through either a circular, impact and slide, or impact only pattern. Additionally, it can cycle the temperature of each chamber between 5 and 55 degrees celsius with its built-in water immersion thermocycler. Our machine features 4 chambers that work in sync with each other.

# Sabri V-8 Cross Brushing Machine

*Tooth brushing simulation device*



The Sabri V-8 Cross Brushing Machine is designed to simulate the wear from brushing on various surfaces (ex. Composite fillings). The unit has eight chambers and can work with the samples fully submerged.

## **SD Mechatronik Thermocycler**

*Small scale thermocycler for accelerated wear*



The SD Mechatronik Thermocycler is a device that cycles a basket of samples between two water baths; typically held at 5 and 55 degrees celsius. It simulates the thermal shock of materials (ex. bonded metals) in the mouth during eating and drinking.

## **Buehler Automet 250**

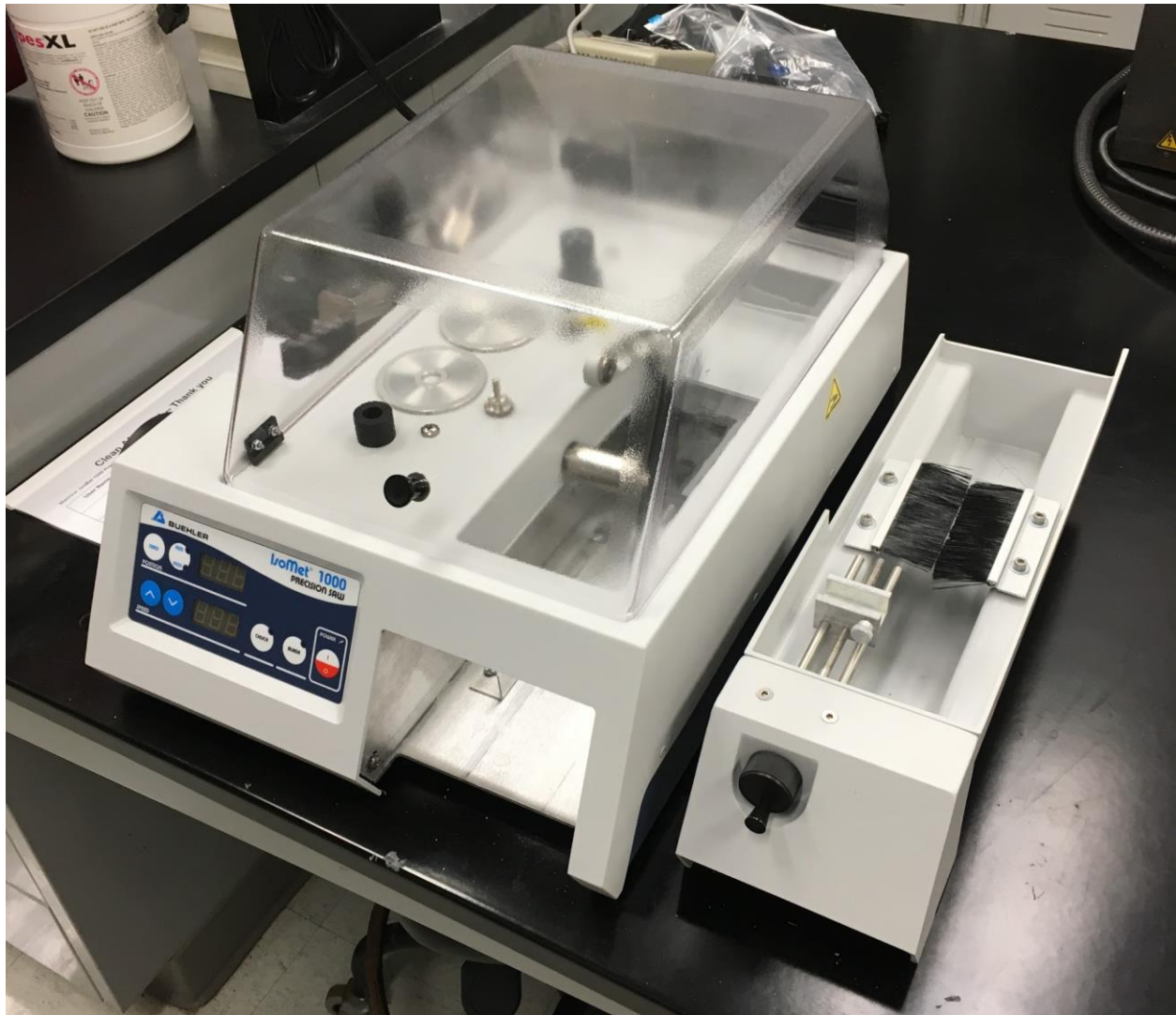
*Semi-automatic variable speed/load grinding/polishing system*



The Buehler Automet 250 is a semi-automatic grinder/polisher primarily used for preparing samples for adhesive bonding, smoothing samples from rough sample preparation, or preparing samples for microscopic analysis. The device can polish wet or dry. Samples can either be polished with the automatic polishing head and programmed routines, or they can be polished manually against the rotating platen and abrasive. The unit can use silicon carbide discs, diamond embedded discs, or diamond slurries. Currently we have fixtures for 1 inch and 1.25 inch diameter samples, and for thin samples.

## Isomet 1000 Precision Saw

*Variable speed water cooled precision wafering saw*



The Isomet 1000 Precision Saw is a gravity fed rotary saw that uses diamond embedded abrasive blades in coolant (usually DI water) to finely section materials. These materials can be almost anything short of diamond. The speed and section width is set digitally. The feed rate is set with a counterbalance and dead weight. A series of fixtures are available for holding materials for cutting.

## **Buehler Handimet 2 manual wet/dry polisher and a Whipmix abrasive diamond wet grinder**

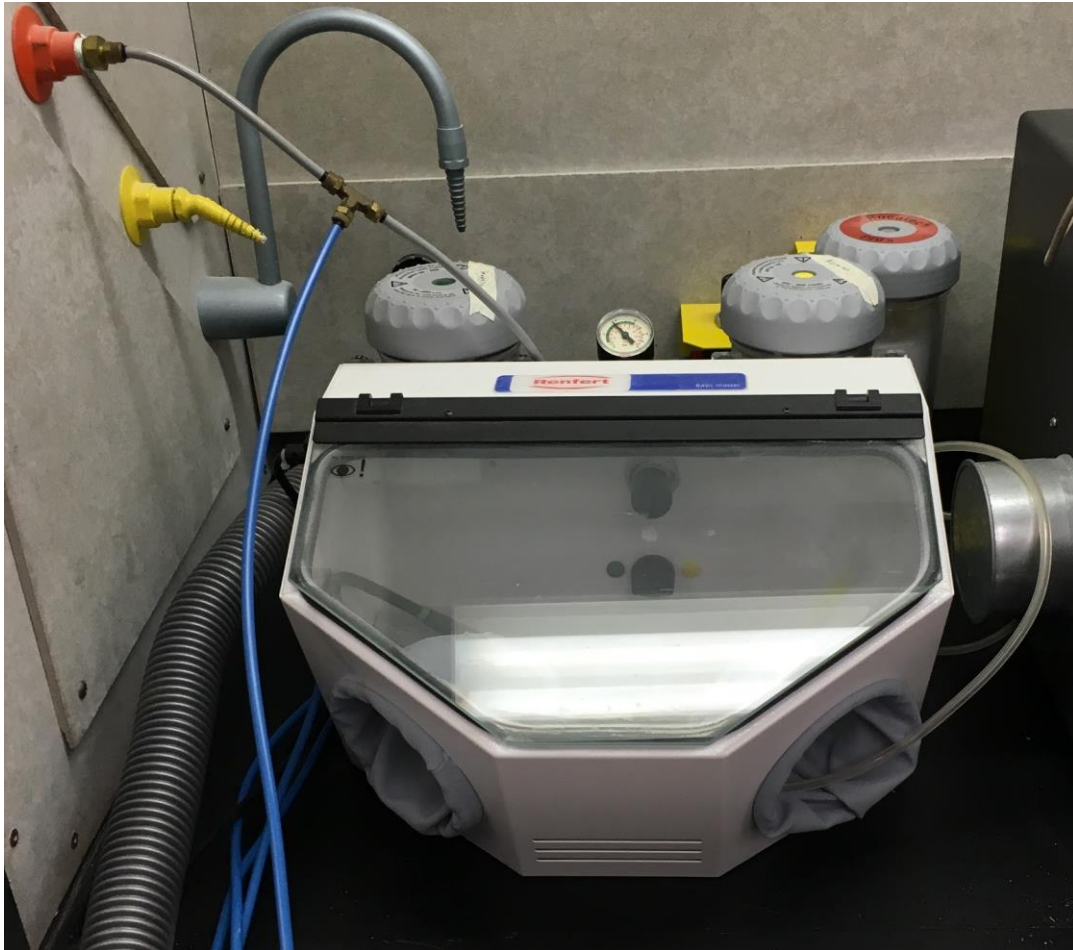
*Wet/dry manual sanding and polishing stations*



These devices are used for rough and final sample preparation for adhesive shear bond testing and microscopy.

## Renfert Basic Master

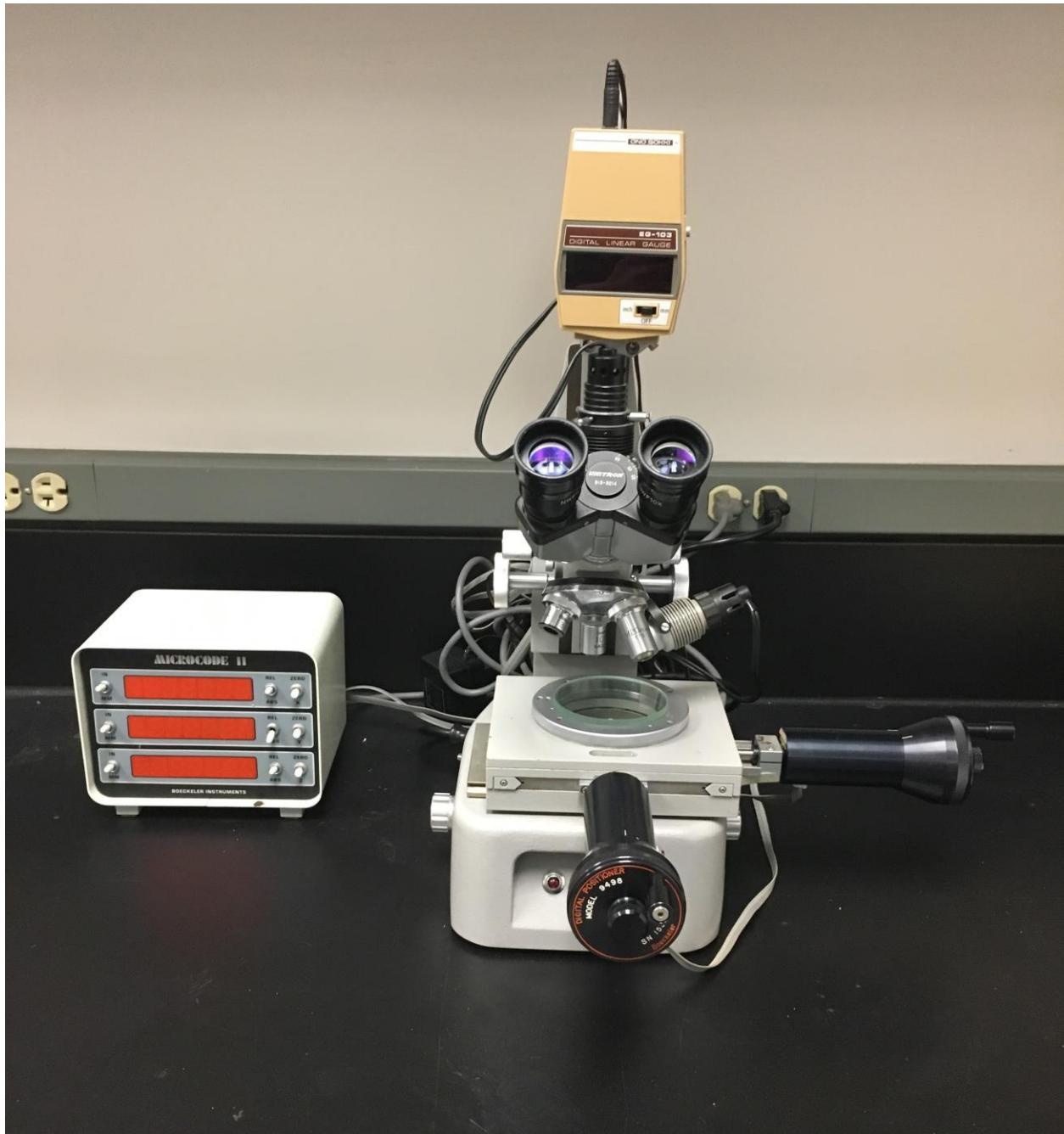
*Small scale media ("sand") blaster*



The Renfert Basic Master is a sandblaster for surface modification. It is equipped with alumina (25 - 70 micron), glass beads (70 - 250 micron), and Rocatec blasting media.

# Unitron Measuring Optical Microscope

*Stereo microscope with optical measurement capabilities*

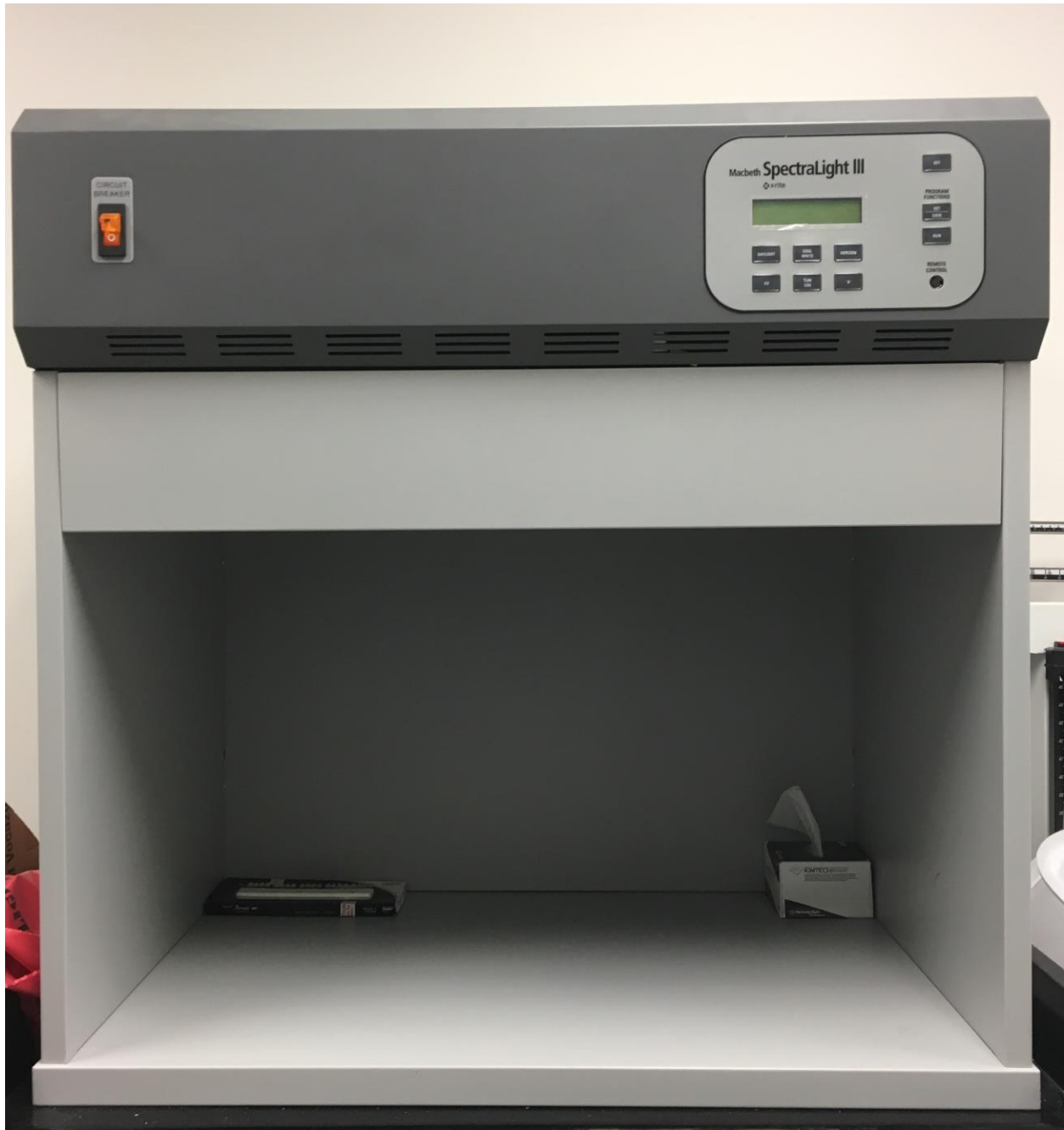


The Unitron Measuring Optical Microscope is used for measuring a variety of samples and features (ex. cracks) with its moving stage and digital readout (accurate to four decimal places). It is capable of measuring the X, Y, and Z axis.



## Spectra Light III

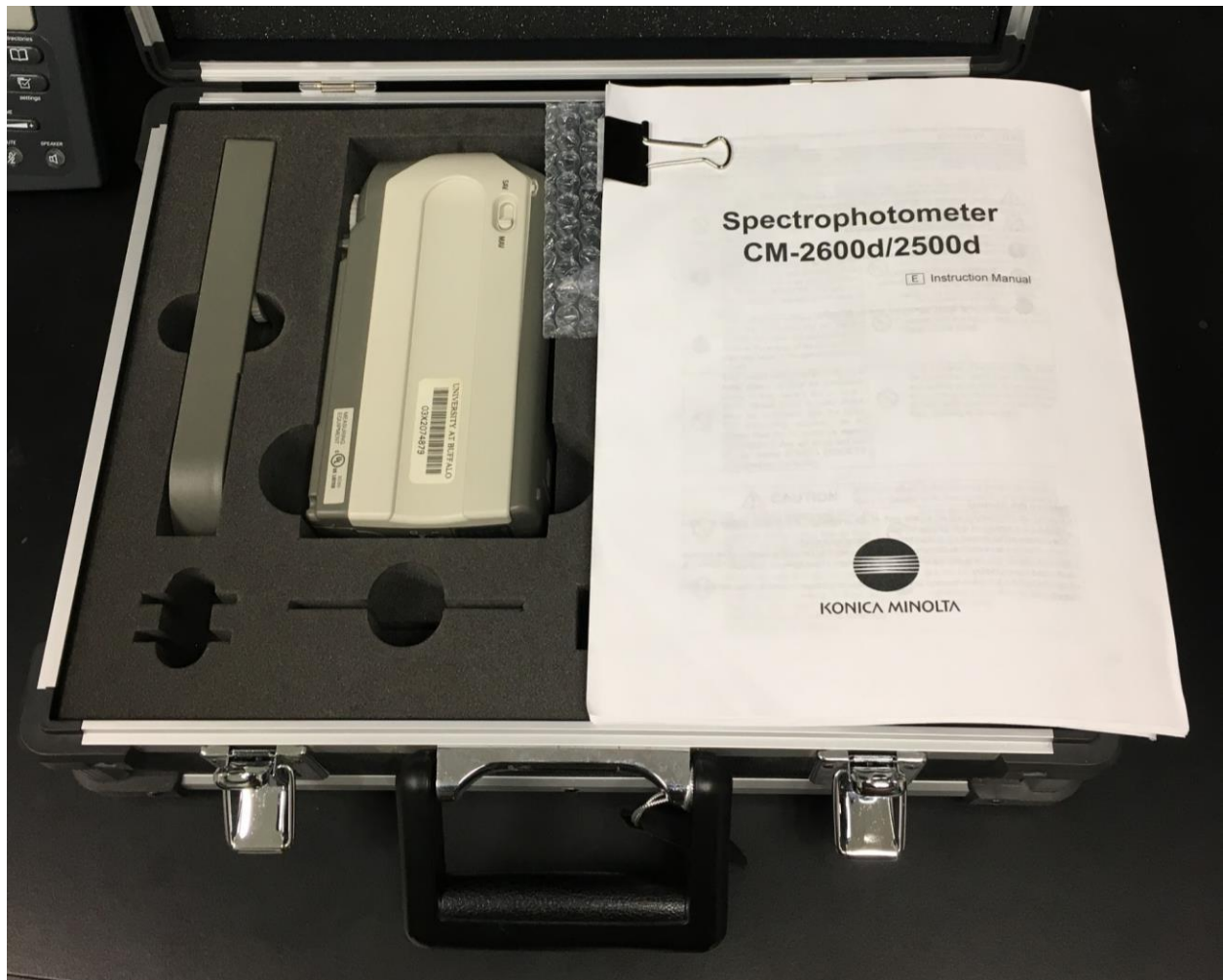
*Lighting booth with standardized light sources*



The Spectra Light 3 is a light booth with a series of standardized light sources for replicating various common lighting conditions. The available options include: daylight, cool light, horizon, TL84U30, “A”, and UV. Each setting may be used with or without UV. It can also cycle through the lighting conditions.

# Konica Minolta CM-2600d Spectrophotometer

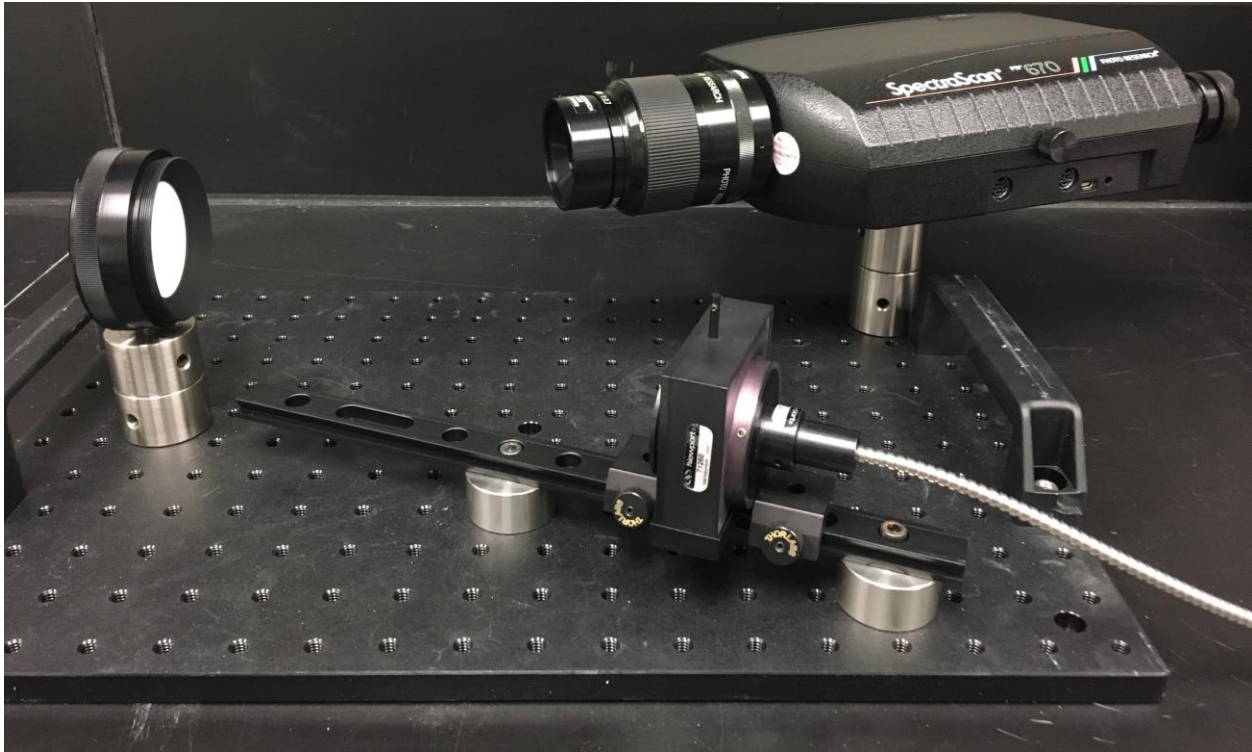
*Visible light spectrophotometer/colorimeter*



The Konica Minolta CM-2600d Spectrophotometer uses an integrating sphere to analyze the visible color spectra reflected off a surface under a xenon flash bulb (standardized internal light source). It is capable of outputting full color spectra that can be used to predict the appearance of the surface under different lighting conditions (ex. Daylight, cool fluorescent lighting). It requires dry surfaces that are flat or slightly curved. It can output values in various color spaces and spectra plots.

## **SpectraScan PR 670**

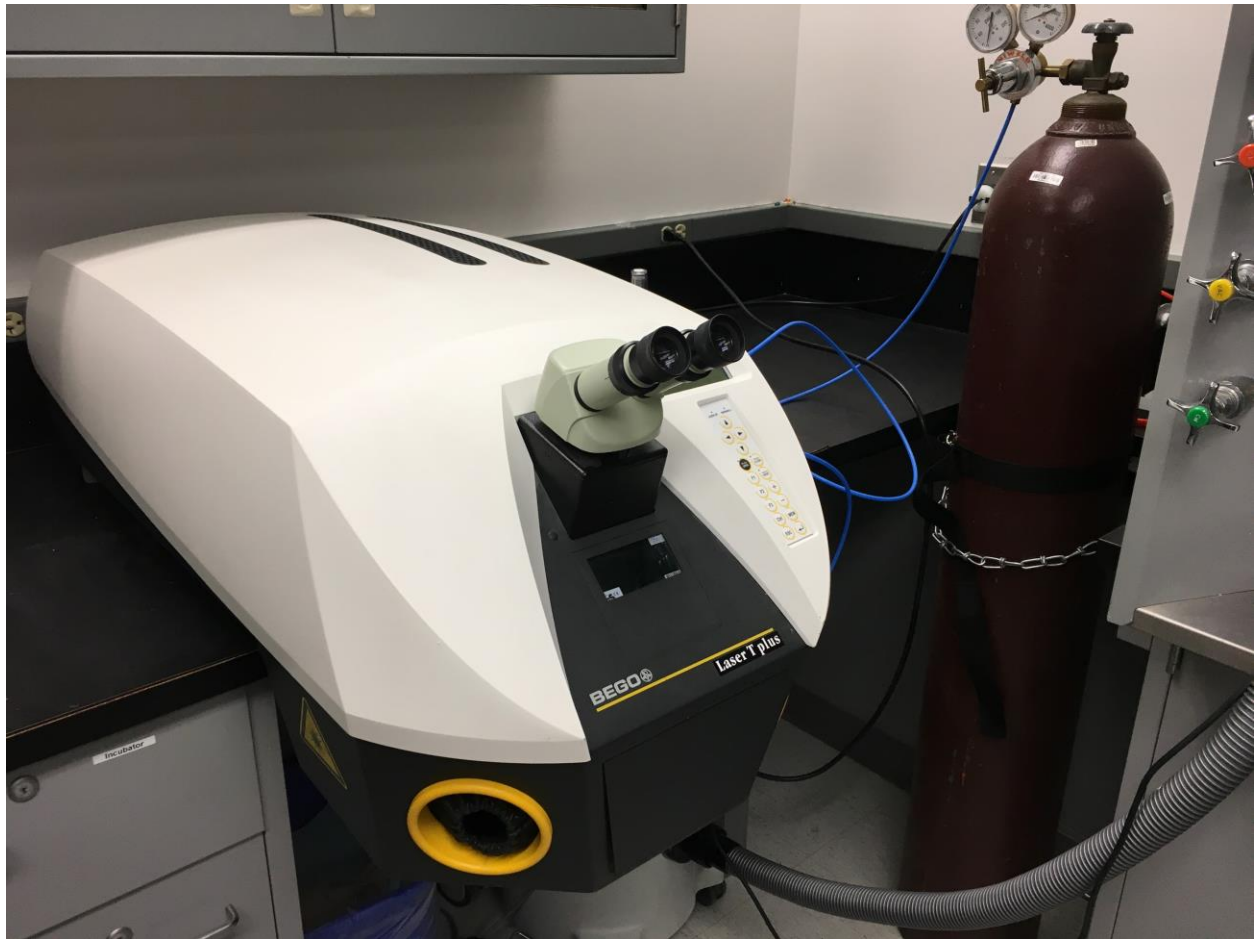
*Visible light spectroradiometer*



The SpectraScan PR 670 is a spectroradiometer for analyzing visible light spectra. It analyzes the visible color spectra of either an illuminated monitor or a surface under illumination. The device can perform measurements at a distance or close-up; outputting data as a color spectra.

## **BEGO Laser T Plus**

*Laser welding system*



The BEGO Laser T Plus is a laser welder for welding small objects (example: dental crowns, dental bridges, dental retainers). It uses a 1064 nm ND:YAG laser with an argon gas curtain to weld gold alloys, CrCo, Palladium, Titanium, Nickel Titanium, and other commonly available dental metal alloys. It can perform spot and continuous welds.

## **PicoTron**

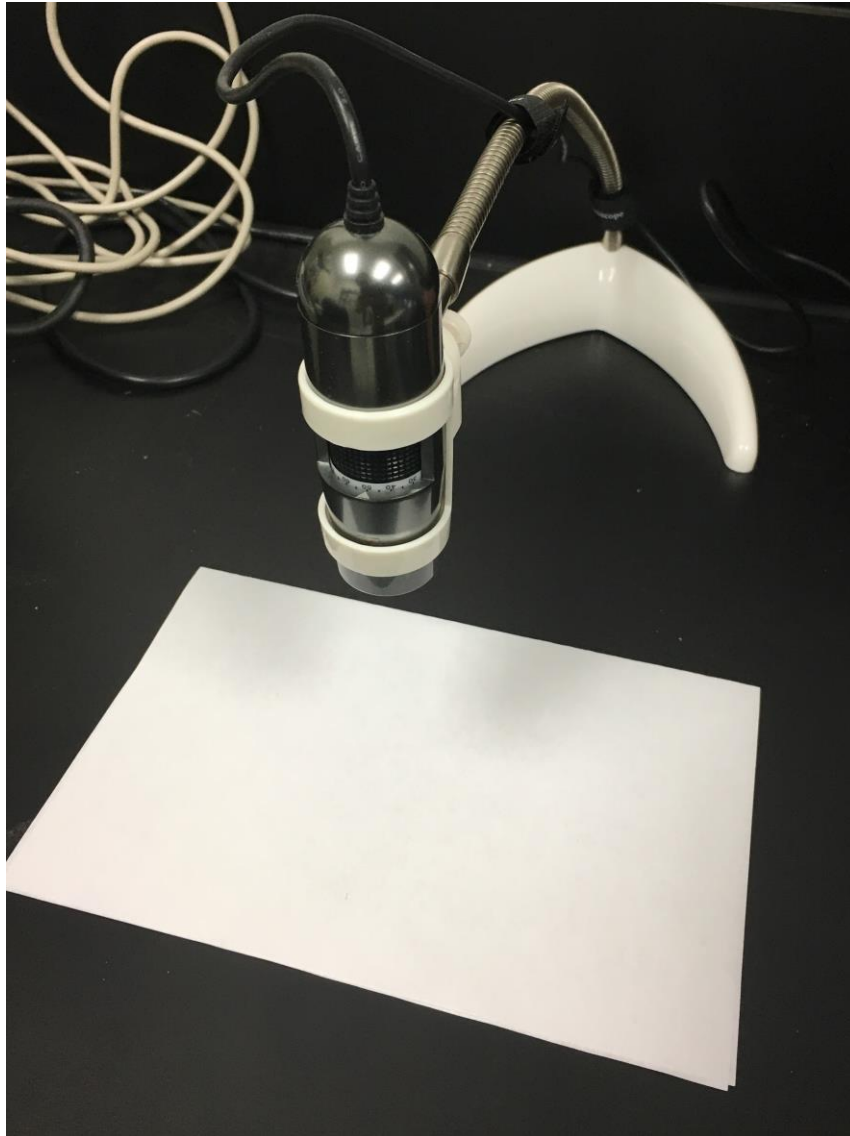
*Radio Frequency Glow Discharge (RFGD) Plasma Cleaner*



The PicoTron radio frequency glow discharge plasma surface cleaner allows for plasma sputter cleaning of small objects of virtually any dry material. Uses ambient air for plasma generation, other gases are possible with special request and sufficient advance notice.

## **DinoX Lite Digital Microscope**

*Digital stereo microscope*



The Dino X Lite digital stereo microscope and its associated measurement software provide a convenient system for easy imaging, measurement, and documentation of samples.

# Mettler Toledo and Hanna Digital pH Meters

## Digital pH Meters



The Mettler Toledo and Hanna digital pH meters allow for general purpose real time testing of the pH of chemical solutions.

## **Pelton & Crane Validator Plus**

*Benchtop Steam Autoclave*

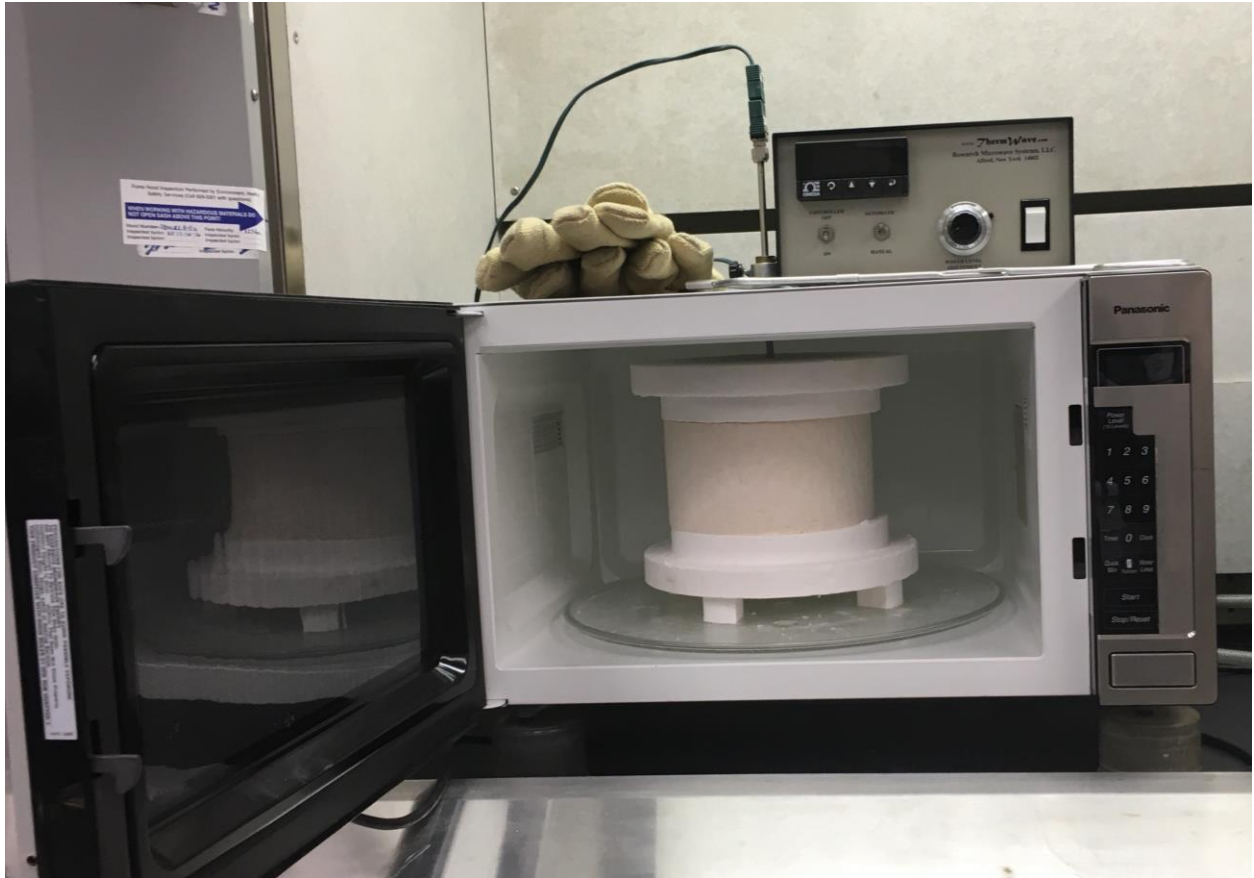


A small desktop steam autoclave for sterilization of small equipment for experiment use. It is capable of sterilizing: unwrapped equipment, wrapped equipment, packs, and liquids. It can also accept limited custom programs.



## ThermWave 1.3

*Microwave Sintering Oven*



A small desktop programmable microwave sintering oven for use with ceramics. It is capable of reaching temperatures of at least 1400° C and operating at ambient atmospheric pressure. The working volume is a cylinder approximately 5.5 inches in diameter and 2 inches high.

We also have a similar unit for use with metals.

## **Additional Equipment**

*List of equipment not pictured*

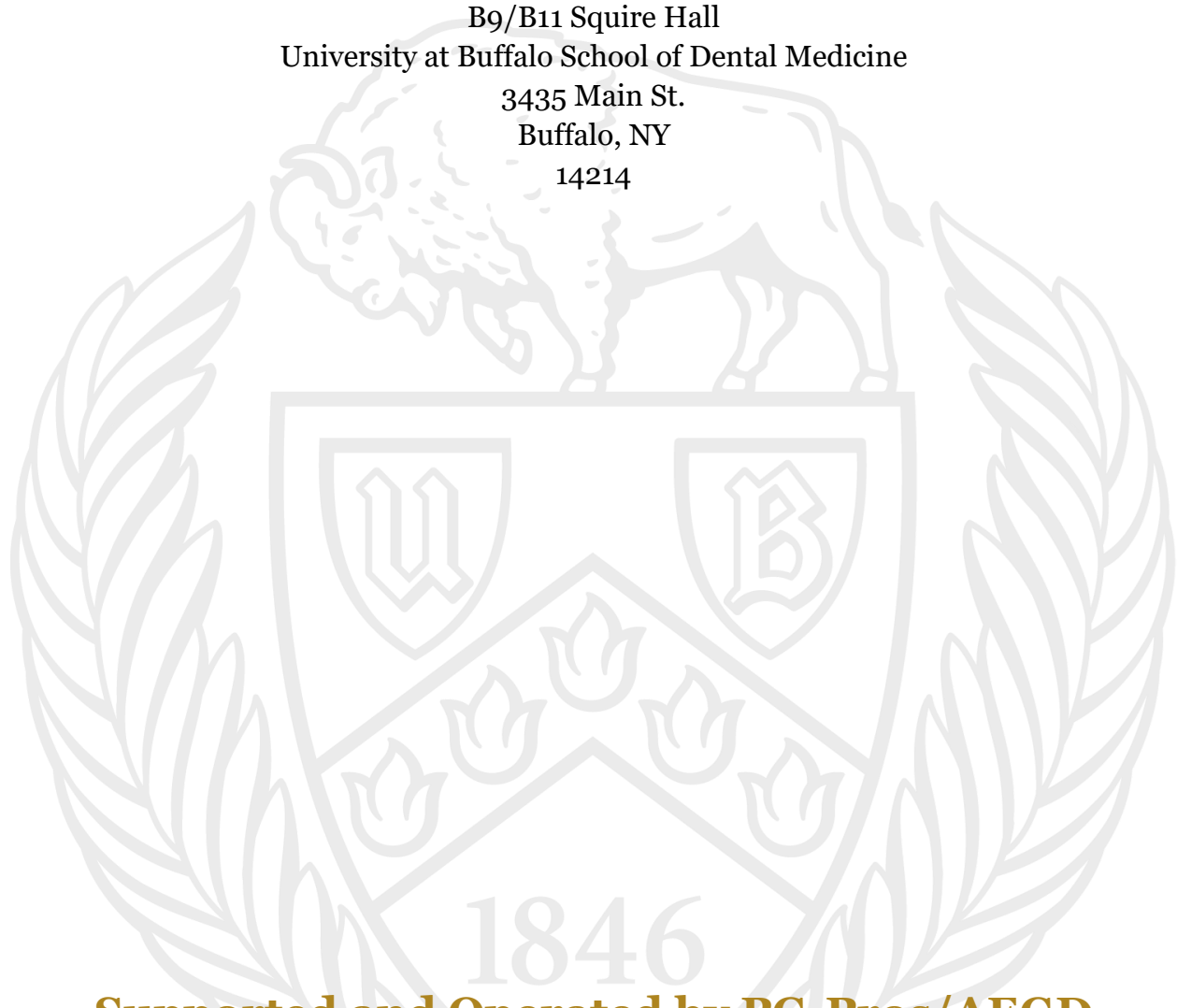
In addition to the equipment listed above, the Dental Materials Research Laboratory is also equipped with the following:

- General chemistry:
  - Several lab benches
  - Taps
    - Gas
    - Cold air
    - Vacuum taps
    - Di-Ionized water
  - Multiple chemical fume hoods
  - Stocked chemicals
  - Refrigerators for chemical and sample storage
    - Not rated for explosions
  - Water jacketed incubator for chemical and sample storage
  
- More specialized:
  - Light controlled room for photo-reactive polymers
  - Micro-centrifuges
  - Dental steam cleaner
  - Small diamond band-saw
  - Micropipettes
  - Ultrasonic Bath
  - BluePhase Curing Lamp (Ivoclar Vivadent) and Radiometer
  - Dental handpieces
    - High speed
    - Low speed
    - Implant torque wrench
  
- Optical Microscopy
  - Basic optical microscopes
  - Stereo microscopes
  - Inverted metallurgical microscope

Please visit our laboratory website for more information:  
<http://dental.buffalo.edu/research/centers-and-facilities/DentalMaterialsResearchLaboratory.html>

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