

ODU Research Resources

Examples of Biomedical Engineering-
Related Research Resources for
Science and Education in the
Commonwealth

- **Atomic Force Microscope**

MultiView 4000, Near Field Scanning Optical and Scanning Probe, Four independent probes placed nanometers apart, Multi point measurements in nano-scale.

- POC: **Ali Beskok** (757)683-6819

abeskok@odu.edu

- **Dave Gauthier** (757)683-3595 dgauthie@odu.edu

- **Surface Plasmon Resonance**

ICx Nomadics Explorer Dual-Channel and BI-3000X (Mfg. Biosensing Instrument), kinetics (associate and dissociate rate constants and affinity) of biological interactions.

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- **Nanoparticle analysis**

qNano (a nanoparticle research instrument from IZON, New Zealand): It can be used to measure nanoparticle size and zeta potential distribution.

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NMR Spectroscopy

ADVANCE II 400 MHz NMR Spectrometer

Structural characterization of complex organic compounds and polymers, Biochemical study of proteins and DNA

POC: **Susan Hatcher** (757) 683-5609

shatcher@odu.edu



Mass spectrometer

Bruker Apex Qe, Hybrid Qh-FTMS, 12 Tesla, sub fmol sensitivity, Molecular analysis of proteins and complex carbohydrates

POC: **Susan Hatcher** (757) 683-5609

shatcher@odu.edu



Electron Probe Microanalyzer

Microbeam instrument, in-situ non-destructive analysis of very small solid samples, Elemental analysis of thin slices including biological samples, cartilage, multi-wall carbon nanotubes

POC: Mike Stacey (757) 683-2245

mstacey@odu.edu

- **Thermojet Rapid Prototyping machine**

Main material: Thermopolymer (Wax);

Resolution 300 DPI; Max model size: 10 x 7.5 x 8 inches

POC: **Han Bao**, (757)683-4922,

hbao@odu.edu

Location: 116 Kaufman Hall

- **Nth Dimension Rapid Prototyping machine**
Main material : ABS (Thermoplastic); Resolution 250 DPI; Max model size: 8 x 8x 12 inches

POC: Moustafa Moustafa (757)683-3767,
mmoustaf@odu.edu

Location : 116 Kaufman Hall

- **Z-510 Rapid Prototyping machine**

Main material: High-Performance Composite and Elastomeric materials; Resolution: 600 x 540 dpi; Max model size: 10 x 14 x 8 inches; Location: Engineering and Computer Science Building

POC: Rick McKenzie (757) 683-5590

rdmckenz@odu.edu

- **Oxygen Bomb Calorimeter**

Instrument to determine heat of combustion of bio-diesel, biochar, microalgae and regular fuels

POC: **Han Bao**, (757)683-4922, hbao@odu.edu

- Location: Kaufman Hall 116

Powder X-ray Diffractometer

Philips Model 1710, materials analysis, crystallite size and strain calculations

Micro-Raman Spectroscopy

Corrosion Analysis

Mossbauer Spectroscopy

POC Desmond Cook (757) 683-4695

dcook@odu.edu

- **Lasers** (range infrared to ultraviolet)
Amplified 100 femtosecond Ti:sapphire laser
Q-switched Nd:YAG laser
cw Nd:YAG laser for machining and welding
excimer laser
CO2 laser

POC: **Hani E. Elsayed-Ali**, Applied Research
Center helsayed@odu.edu

Materials Fabrication

Pulsed Laser Deposition (PLD) System

E-Beam Evaporation

Sputtering

Mask Aligners

Radio Frequency (RF) Etching

Electron Cyclotron Resonance (ECR) Plasma
Deposition

POC: **Hani E. Elsayed-Ali**, Applied Research
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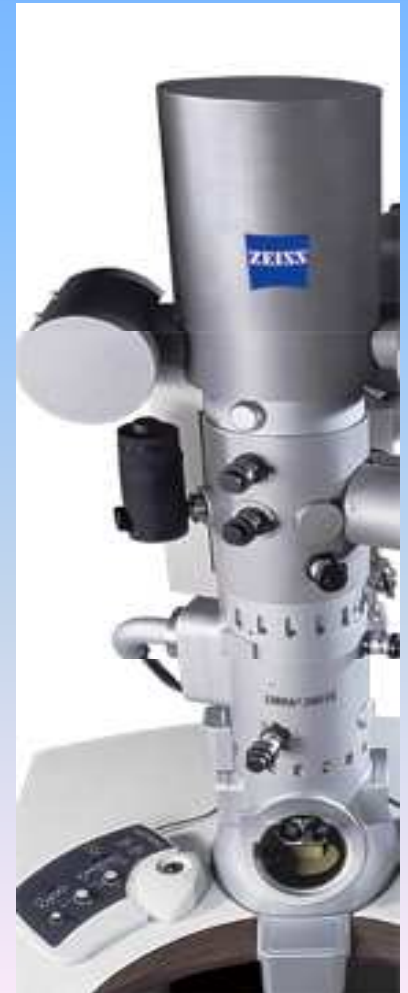
High Resolution Transmission Electron Microscope

JEOL JEM-2100F

200kV, resolution to 0.10 nm (lattice),
spot size 2-5 nm (TEM mode) and to
0.5 nm (analytical mode)

Magnification: to 1,500,000x

POC: **Hani E. Elsayed-Ali**, Applied
Research Center helsayed@odu.edu



Scanning Electron Microscope JEOL JSM-6060LV

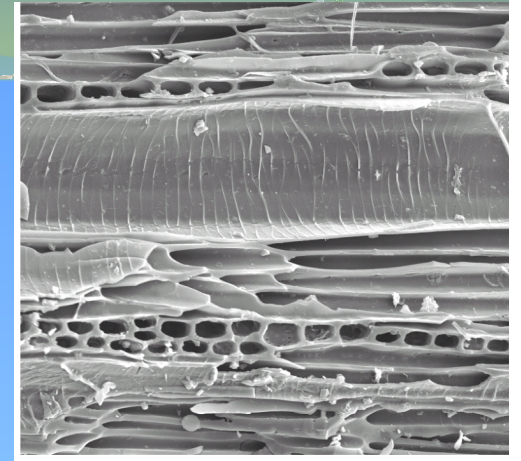
5-30 kV acceleration

High vacuum for regular samples

Low vacuum for biological samples

Resolution: 3.5 nm (HV mode), 4.0 nm (LV)

Magnification: 30x - 300,000x



100 μ m

POC: **Hani E. Elsayed-Ali**, Applied Research
Center helsayed@odu.edu

- **Electrical and Optical Testing Instruments**
Optical Microscopes
Spectrophotometry
Ellipsometry
Four Point Probe

POC: Hani E. Elsayed-Ali,
Applied Research Center
helsayed@odu.edu



- **Mechanical and Fatigue Testing of Materials**

Profilometer

Materials Testing System for fatigue analysis

Time-resolved electron diffraction

POC: **Hani E. Elsayed-Ali**, Applied Research
Center helsayed@odu.edu

Frank Reidy Research Center for Bioelectrics

**~40 researchers from more than 10
countries, Facility of 14,000 sq ft**

**Host of
7th International Bioelectrics
Symposium, June 24-26, 2010
Norfolk, VA, USA**

POC: Barbara Carroll (757) 683-2518
bcarroll@odu.edu

- **Wound Healing**

Platelet gels or analysis for analysis of platelet activation

Gene therapy

Delivery of plasmids encoding angiogenic factors to accelerate wound healing. Micro-millisecond pulse electric fields to deliver plasmid DNA to stimulate immune system. Phase I clinical trial successfully completed.

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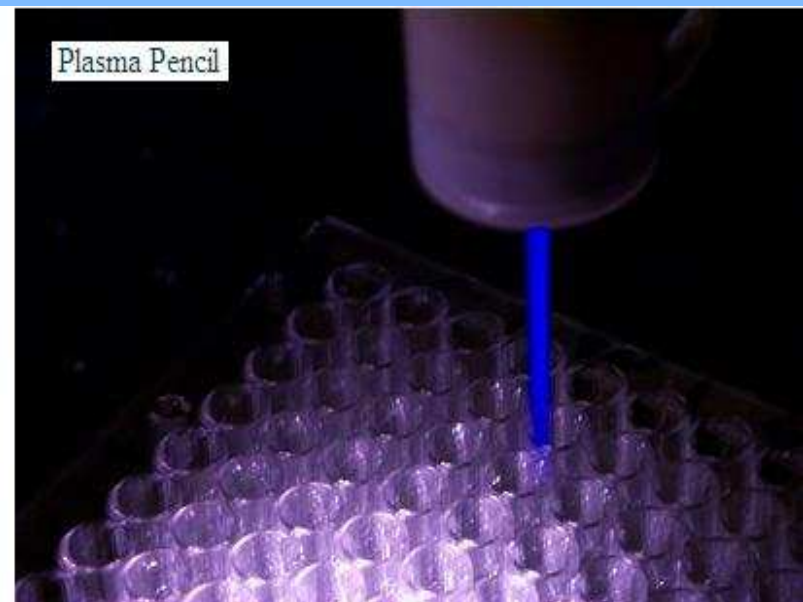
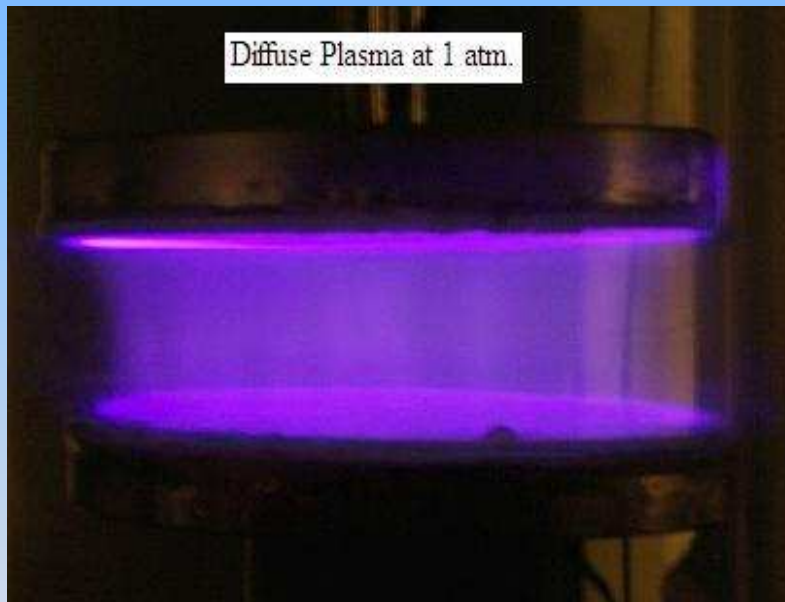
- **Cold Plasma Systems**

- Use of cold plasma to destroy bacteria, prevention of wound infections, decontamination of food

POC: Barbara Carroll (757) 683-2518

bcarroll@odu.edu

Applied Plasma Technology Laboratory



POC: Mounir Laroussi (757) 683-6369
mlarouss@odu.edu

- **Nanosecond pulse electric fields to destroy cancer cells**

Ablation therapy —melanoma, squamous cell carcinoma, liver cancer, pancreatic cancer and breast cancer

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bcarroll@odu.edu

High-power Ultrashort Pulse Power Systems

100 KV, 200 psec, applications for imaging malignancies, bioelectric effects

High-resolution Ultrasound Imaging System

1 mm resolution in-vivo imaging

POC: **Barbara Carroll** (757) 683-2518

bcarroll@odu.edu

- **Gene Therapy in Cardiovascular Research**

Coronary artery disease – gene therapy to assist revascularization

Peripheral vascular disease - gene therapy to assist revascularization

POC: **Barbara Carroll** (757) 683-2518

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Fluorescence-assisted Cell Sorter

FACS-ARIA, Core facility

POC: **Barbara Carroll** (757) 683-2518

bcarroll@odu.edu

Laser Scanning Confocal Fluorescence Microscope

FV-1000 Olympus

POC: **Andrei Pakhomov** (757) 683-8003

apakhomo@odu.edu

- **Cardiac Electrophysiology Instruments**

Fast optical mapping system for heart arrhythmias and stimulation research, heart perfusion system, cardiac stimulators, instruments for measuring biopotentials

POC: **Stephen Knisley** (757) 683-3549

sknisley@odu.edu

- **Imaging, Diagnosis, and Analysis Lab**

KH-1300M Hirox 3D Microscope System,
Mitsubishi RV-3S-S11 3Kg, 6-axis, 64.2 cm
reach robotic arm, Dental Drill end effector,
DVC-1500 Near Infrared Camera, ProScope
HR Skin Exam Camera system

POC: Frederick McKenzie,

rdmckenz@odu.edu

● **Brain Research and Rehabilitation**

- A ten-camera VICON motion capture, Cosmos treadmill, Zebris pressure measuring, GAITRite 20 ft pressure-sensitive walking surfaces, AMTI force and Bertec balance platforms, Telemetered accelerometry and EMG
- Falls risk in type 2 diabetes, Balance and gait in Parkinson's disease, Fatigue and postural control, Virtual Reality for rehabilitation in clinical populations of children and adults, Standardized walking obstacle course

POC: Martha Walker (757) 683-3309

mlwalker@odu.edu

- **Motion Analysis Laboratory**

3-dimensional Flock-of-Birds motion analysis and two Bertec forceplates

- **Applied Anatomy Laboratory**

Human cadavers, models, and computer software; kinesiology, anatomy

- **Motor Behavior Laboratory**

Video motion analysis for biomechanical and developmental human movement

POC: **Bob Spina** 757-683-4995

rspina@odu.edu

APPLIED RESEARCH CENTER

Thomas Jefferson National Laboratory and the Free Electron Laser

**•World's Most Powerful Free
Electron Laser**

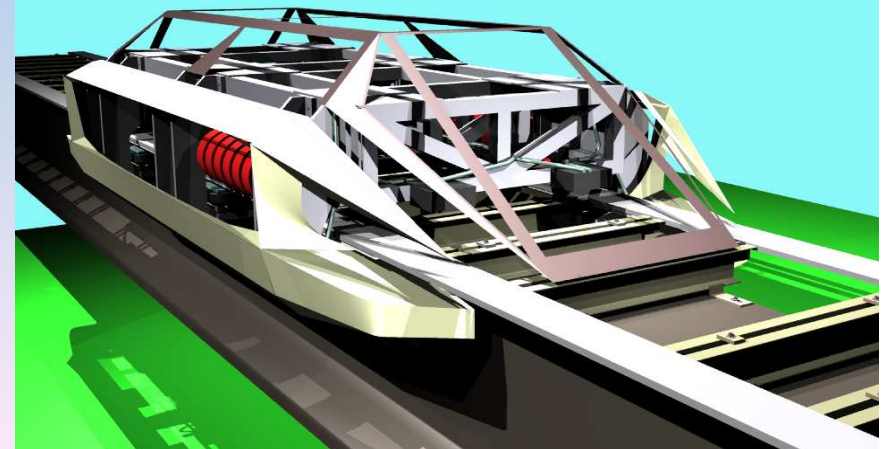
**•POC: Hani E. Elsayed-Ali,
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ODU Maglev

POC: **Bernie Bohm**
bbohm@odu.edu





Virginia Modeling Analysis & Simulation Center (VMASC)

Medical Modeling –
Virtual Surgery

POC: John Sokolowsky
jsokolow@odu.edu



Orchids Conservatory



