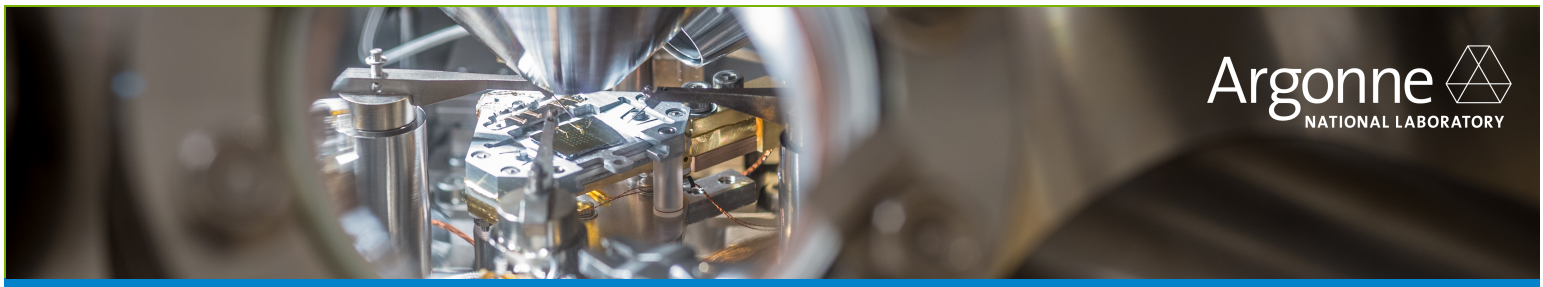

CENTER FOR NANOSCALE MATERIALS
SCIENTIFIC CONTACTS

Nanofabrication and Devices

Anirudha Sumant (Group Leader) ..... sumant@anl.gov
superlubricity, diamond-based NEMS, CNT, graphene wear/friction measurements

David Czaplewski ..... dczaplewski@anl.gov
MEMS/NEMS, electron beam lithography, CVD

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nanophotonics

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electron beam lithography, nanogels, MEMS/NEMS

Xu Han ..... xu.han@anl.gov
high-frequency piezo-optomechanical spectroscopy, CVD

Dafei Jin ..... djin@anl.gov
ultralow temperature/strong magnetic field measurement, FIB/SEM dual beam imaging and patterning

C. Suzanne Miller ..... csmiller@anl.gov
XeF2, evaporation, RTP, dicing saw

Fubo Rao .....
clean room manager

Liliana Stan ..... lstan@anl.gov
ALD, PVD, sputtering, evaporation

MAJOR TOOLS

- JEOL 8100FS, 100kV electron beam lithography
- Raith 150, 30kV electron beam lithography
- FEI Nova 600 NanoLab DualBeam FIB/SEM
- Karl Suss MA6 Optical mass aligner
- ASML PAS 5000 wafer stepper
- Direct write optical lithography
- Interferometric lithography
- Xactix XeF2 etcher
- BlueFors LD400 10mK Dilution Refrigerator System
- AMI 5-1-1Telsa Vector Magnet
- Wet chemistry & metrology
- Bruker FastScan AFM
- Deposition (Temescal ebeam evaporators, AJAs, atomic layer deposition (ALD), etc.)
- Lambda microwave plasma CVD nanocrystalline diamond
- Thermal/PECVD for CNT/graphene synthesis
- Tribometer for friction and wear measurements
- Sonotek Ultrasonic Spray Coating System
- Piezo-Optomechanical Spectrometer (POMS)

Quantum and Energy Materials

Nathan Guisinger (Group Leader) ..... nguisinger@anl.gov
UHV STM, AFM, 2-D materials, STS, cryo-STM

Brandon Fisher ..... bfisher@anl.gov
XRD, magnetometry, electrical measurements

Jeffrey Guest ..... jrguest@anl.gov
STM, laser spectroscopy, ambient AFM, EPR

Saw Wai Hla ..... shla@anl.gov
LT-STM, SP-STM, AFM, SX-STM

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synthesis of nanocrystals, TGA/DSC, rotating disk electrode, rheometry at Sector 8 of APS, glovebox

Volker Rose ..... vrose@anl.gov
synchrotron X-ray scanning tunneling microscopy

Dan Rosenmann ..... rosenmann@anl.gov
evaporation, deposition, sputtering

Nozomi Shirato ..... nshirato@anl.gov
synchrotron X-ray scanning tunneling microscopy

MAJOR TOOLS

- UHV SPM (AFM/STM) (Omicron)
- VT-AFM (Omicron XA) with optical access
- Createc LT-STM
- Cryo-STM w/magnetic field
- Scanning probe microscope, AFM (Veeco)
- Kurt Lesker electron beam evaporator and sputtering, deposition
- Agilent ICP-OES
- FT-IR w/ Hyperion Microscope
- Magnetometry (QD PPMS & MPMS)
- TGA/DSC
- Luminescence/ UV-vis-NIR
- X-ray diffractometer (Bruker D2 & D8)
- Integrated glovebox system
- Synchrotron X-ray STM (SX-STM) at Sector 4 of APS
- RheoXPCS/SAXS at Sector 8 of APS

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Theory and Modeling

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nanoscale oxide energy materials, machine learning

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multi-scale modeling, soft materials, AI/ML for imaging and inverse design, scientific software development

Maria Chan ..... mchan@anl.gov
photovoltaics, photocatalysts, thermoelectrics, batteries, informatics, atomistic modeling integration w/expt

Pierre Darancet ..... pdarancet@anl.gov
charge and energy transport, optoelectronics; exciton dynamics

Stephen Gray ..... gray@anl.gov
nanophotonics, electrodynamics

Michael Sternberg ..... sternberg@anl.gov
software development

MAJOR TOOLS

- Nanoscience Computational Facility 30 TFlop cluster for:
  - Density-functional-based tight-binding
  - Time-domain nanophotonics simulation
  - MPI-based parallel versions of nanophotonics and tight-binding codes
- GPAW; real space, grid-based DFT-PAW
- Access to Argonne computer facilities
- Support for experimental projects
- Support for theoretical projects
- (DFTB) electronic structure package
- BLAST
- FANTASTX

Nanophotonics and Biofunctional Structures

Richard Schaller (Group Leader) ..... schaller@anl.gov
transient absorption/emission spectroscopy, solar energy

Benjamin Diroll ..... bdiroll@anl.gov
synthesis, time-resolved spectroscopy

Chris Fry ..... hfry@anl.gov
synthesis, peptide synthesis, HPLC, CD, EPR

David Gosztola ..... gosztola@anl.gov
lasers, Raman microscopy

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single molecule/particle spectroscopy

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bio(in)organic, biological chemistry, synthetic biology, GC/MS

Elena Shevchenko ..... eshevchenko@anl.gov
2-D and 3-D nanoparticle assembly, SEM

Jie Xu ..... xuj@anl.gov
modular robotic workflow for synthesis and processing, polymer processing, wearable electronic devices

MAJOR TOOLS

- Ultrafast transient absorption spectroscopy
- Confocal Raman microscope, Renishaw
- VIS/NIR microscopy
- Time-resolved emission spectroscopy
- Time-correlated single photon counting
- UV-to-TH_3 ultrafast spectroscopy
- Single photon microscope for optics (SNSPD)
- Fluorescence spectroscopy
- Field-emission SEM (JEOL JSM7500F)
- Electron paramagnetic resonance (Bruker)
- Peptide synthesizer
- Adiabatic demagnetization refrigerator (ADR)
- Functionalization, electro/photo-chemical
- HPLC, GCMS
- Laser Scanning Confocal Microscope (Zeiss)
- Post-self-assembly processing
- ZetaSizer Nano, Malvern
- Solar simulator, QEMS (Oriel)
- FTIR (Thermo-Nicolet)
- Synthesis & surface modification of nanoparticles
- Magneto-Electrical-Optical Spectrometer (MEOS)
- Microfluidic Droplet Generation and Imaging

Electron and X-ray Microscopy

Martin Holt (Group Leader) ..... mvholt@anl.gov
X-ray diffraction, pytchography and fluorescence

Electron Microscopy

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Ultrafast electron microscopy (UEM)

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SEM/TEM trainer

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UEM, TEM, STEM, EELS, SAED

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analytical TEM, in situ TEM

Jianguo Wen ..... jwen@anl.gov
ACAT, TEM, batteries, PV

Synchrotron X-ray Microscopy

Tao Zhou ..... tzhou@anl.gov
X-ray diffraction

MAJOR TOOLS

Electron Microscopy

- ACAT: Argonne Chromatic Aberration -corrected TEM
- UEM: Ultrafast Electron Microscopy
- FEI Talos F200X TEM/STEM
- FEI Tecnai F20ST TEM/STEM
- Field-emission TEM (JEOL 2100F)
- Zeiss 1540XB FIB-SEM
- Zeiss NVision FIB-SEM
- Hitachi S-4700-II high-vacuum SEM
- FEI Quanta 400F environmental and variable-pressure SEM

X-ray Microscopy

- Hard X-ray nanoprobe beamline, Sector 26 of APS
- Scanning nanodiffraction and ptychography
- Chemical and structural nanoimaging
- Heating/cooling specimen stage
- 20-30 nm resolution, 6-12 keV
- In situ/in operando experiments