NAME	GROUP	RESEARCH AREA	PRIMARY INSTRUMENTS
Karren More	Division Director	Karren More's research has been focused on using high-resolution analytical electron microscopy to understand the behavior of materials, including structural ceramics, ceramic matrix composites, nanoparticle catalysts, and polymer electrolyte fuel cells.	
Stephen Jesse	Section Head	Developing and using novel microscopy methods to induce and study nano- and atomic scale transformations to better understandi material behavior at fundamental length scales	
Scott Retterer	Section Head	The development of materials and fluidic interfaces to biological systems with an emphasis on understanding the effects of nanoscale structure, molecular transport, and spatial organization on biological processes.	
Bobby Sumpter	Section Head	Multiscale modeling, electronic structure and AI/ML methods for understanding and prediction of chemical and physical processes ranging from the molecular to the mesoscale in soft matter, catalysis and separations	
Andy Lupini	STEM Group Leader	STEM, High-resolution scanning transmission electron microscopy (STEM) imaging and electron energy loss spectroscopy	Nion UltraSTEM; NION Hermes
Jeffery Baxter	STEM	Operating and maintaining mechanical polishing equipment as well as ion beam thinning and milling equipment to prepare TEM samples to less than 50nm thick.	Hitachi NB5000 FIB, Hitachi S4800 SEM, Hitachi 5300 STEN, Fischione ion mill and nano mill, Gatan PIPS II ion mill, Allied multiprep
Albina Borisevich	STEM	Developing techniques in electron microscopy and data analysis to expand understanding of the structure of materials and its evolution across phase transitions and transport processes.	
Miaofang Chi	STEM	Utilizing and advancing advanced Scanning Transmitting Electron Microscopy and Spectroscopy (STEM) for Energy and Quantum materials research	JEOL NeoARM
Ondrej Dyck	STEM	E-beam-based atomic fabrication techniques for graphene and other 2D materials	
Jordan Hachtel	STEM	Advancing monochromated EELS in materials science, both through the development of cutting-edge techniques and the application of these techniques to a wide range of systems.	US100, MAC-STEM
Chris Nelson	STEM	High-resolution electron microscopy, electronics and data analysis.	Nion and Thermo-Fisher electron microscopes.
Ray Unocic	MMA Group Leader	Developing novel in situ electron microscopy methods to understand and quantify dynamic transformations in functional nanomaterials	Nion UltraSTEM, JEOL NeoARM, Thermo Fisher Titan

Matthew Boebinger	MMA	Developing in situ and analytical electron microscopy techniques combined with automated workflows to investigate nanoscale transformations and transport phenomena.	Nion UltraSTEM, JEOL NeoARM, Thermo Fisher Titan
James Burns	MMA	Providing quality sample prep and support for the advancement of material science research.	Thermo Fisher Nova 200 FIB, Cameca Leap 4000 Atom Probe
David Cullen	MMA	Characterization of electrochemical devices for the hydrogen economy through automated electron microscopy	EDS, EELS, Tomography, JEOL NEOARM
Jon Poplawsky	MMA	I specialize in using atom probe tomography to image the 3D distribution of atoms within a material and linking these distributions to functional material properties.	LEAP 4000 XHR local electrode atom probe and Thermo Fisher Nova 200 dual beam scanning electron microscope/focused ion beam
Shawn Reeves	MMA	TEM, SEM, and EDS analysis of energy materials and TEM sample preparation by diamond knife ultramicrotomy.	
Kinga Unocic	MMA	Her current research focuses on developing and applying analytical and in situ/operando electron microscopy techniques to investigate environmental effects on material properties and behaviour with an emphasis on innovative materials processing, alloy development, mechanical behaviour, radiation effects, high temperature oxidation, corrosion and catalysis.	JEOL NeoARM, Titan, JEOL 2200
Alexix Williams	MMA	Incorporating structural biology and materials science electron microscopy techniques to study the 3D structures of biological macromolecules, engineered enzymes, and soft matter materials.	ThermoFisher G4 Krios, CryoEM sample preparation, HPC workstations
Haoran Yu	MMA	Developing analytical electron microscopy methods to understand and quantify properties and degradation phenomena for nanomaterials used in hydrogen energy	JEOL NeoARM, Thermo Fisher Titan
Michael Zachman	MMA	Advancing cryogenic, 4D, and automated electron microscopy methods to provide novel insights into quantum and energy materials and interfaces	Nion UltraSTEM, Nion MAC STEM, JEOL NeoARM, Thermo Fisher Krios
Neus Domingo	F-AFM Group Leader	Investigating functional properties of ferroic and multiferroic materials, topological structures and interfaces, with special emphasis to nanoscale electromechanic and electrochemical phenomena, using correlated multimodal SPM based tools combined with light.	Advanced AFM (CRF, C-AFM, PFM, nanoIR, SNOMs)

Liam Collins	F-AFM	Relating nanoscale structure and material functionality by understanding and quantifying charge-related dynamic processes through the development and application of advanced scanning probe microscopy methods	Advanced AFM (time resolved EFM & KPFM, PFM)
Anton Ievlev	F-AFM	Correlated multimodal studies of materials chemical properties and functional response by means of atomic force microscopy, optical spectroscopy and mass spectrometry, using AFM/FIB-ToF SIMs	AFM/FIB-ToF-SIMS
Kyle Kelley	F-AFM	Investigating functional properties and optoelectronics in materials, with special focus on multiferroics, utilizing scanning probe microscopy (SPM) at the mesoscopic and atomic level.	Advanced AFM (PFM, C-AFM, nanoIR)
Peter Maksymovych	F-AFM	Understanding nanoscale textures, emergent functions and dynamics of materials undergoing phase transitions on their fundamental length-scales using variable temperature AFM/STM advanced developed modes with atomic spatial resolution.	Omicron AFM/ Joule-Thomson STM
Sabine Neumayer	F-AFM	Micro- and nanoscale measurements of functional behavior including electronic, polar and ionic properties of a wide range of materials for neuromorphic systems, microelectronics, information storage and energy applications.	Advanced AFM (PFM, C-AFM, SMiMs)
Wan-Yu Tsai	F-AFM	Nanoscale interfacial characterization for batteries and supercapacitors	Advanced AFM (Operando Electrochemical AFM)
An-Ping Li	STM Group Leader	Understand the formation and behavior of quantum states through nanoscale control over defects, interfaces, and disorder	STM/STS, 4-probe STM, on-surface synthesis
Art Baddorf	STM	Surface structure, properties, and spectroscopies of complex and quantum materials	electron spectroscpy: XPS, UPS, LEED, STM/S
Zheng Gai	STM	Charactrization and understand of quantum states, nanoscale control over defects, interfaces, and disorder	STM/STS, MFM, on-surface synthesis, LEED, MOKE
Saban Hus	STM	Characterization and modification of individual atomic defects for microelectronic applications	STM, Multi-Probe STM
Jewook Park	STM	Correlation of structural, electrical, magnetic, and thermal properties of quantum materials at an atomic scale	milli-Kevin STM
Dave Geohegan	FHN Group Leader	Understanding and controlling the synthesis and processing of 2D materials, nanoparticles, and thin films through the development of time resolved laser spectroscopy and imaging *in situ* diagnostic techniques	PLD with in situ diagnostics, laser processing, CVD

Ilia Ivanov	FHN	Understanding correlation between structural and functional properties of thin films, composites and novel materials to further inteligent design of revolutionary systems	Lab-on-a-crystal, machine learning centered material charaterization,, Raman, Uv-vis-NIR, ellipsometry, impedance spectroscopy, luminesence spectroscopy, FTIR spectrosocpy, electrochemistry,quartz microbalance with dissipation for gravimetric and viscoelastic measuremnets of thin film response to environment, multimodal sensor response, reaction kinetics and mechanism, machine learning and AI for synthesis and multifunctional response, tracing the origins of macro-response to -nano scale
Ben Lawrie	FHN	Quantum optics, nanophotonics, and quantum nanophotonics	Cryo-optical microscopy and cathodoluminescence microscopy
Alex Puretzky	FHN	Optical spectroscopic characterization of nanomaterials, laser material interaction, in situ diagnostics of nanomaterial growth by PLD and CVD	Optical Characterization and Laser Spectroscopy – ultrafast dynamics, microRaman, PL lifetime .PLD with in situ diagnostics, laser processing, CVD
Chris Rouleau	FHN	Pulsed laser deposition of thin film and multilayer materials coupled with in vacuo diagnostics, automation, and artificial intelligence for materials discovery by autonomous synthesis	pulsed laser deposition, RHEED, PPMS, xray diffraction, afm
Ivan Vlassiouk	FHN	Growth mechanisms and large-scale synthesis of nanomaterials with a focus on high-quality 2D materials.	CVD furnace.
Zili Wu	FHN	Heterogeneous catalysis, photocatalysis and electrocatalysis, in situ and operando optical spectroscopy of surface chemistry and reaction mechanisms	Catalytic flow reactor systems, in situ FTIR and Raman spectroscopy systems
Kai Xiao	FHN	synthesis, processing, and assembly of functional nanomaterials such as 2D TMDs and hybrid perovskites for electronics and optoelectronics	CVD, 2D materials transfer station, thin film device fabrication in glovebox.
Gobet Advincula	Macro Group Leader	Polymers, nanoscience, macromolecule science and engineering, organic materials, hybrid materials, and ultrathin films	
Peter Bonnesen	Macro	The design, synthesis, and characterization of novel small molecules, particularly those of pharmaceutical interest; stable isotope labeling of small molecules, monomers, and polymers; and Nuclear Magnetic Resonance studies.	Bruker Avance Neo 500 MHz NMR Spectrometer; Shimadzu Analytical UHPLC; Pressure reactors for deuteration reactions
Jihua Chen	Macro	Electronic microscopy, Soft Electronics, AI	JEOL NeoARM, SEM
Jong Keum	Macro	Nanoscale and mesoscale structure and physics of soft matters and nanocomposites, where he primarily utilizes X-ray and neutron small-angle X-ray scattering, reflectivity and diffraction	X-ray diffraction and small-angle scattering

Brad Lokitz	Macro	Controlled Radical Polymerization, polymer self-assembly, and thin film characterization	FTIR, FTIR-ATR, Ellipsometry, Contact Angle Goiniometry
Yue Yuan	Macro	Yue's major research has focused on the bio-based polymers and nanomaterials synthesis, functionalization, and characterization of bulk and at material interfaces. She also has expertise in fibrous material formation from macromolecules, and characterization method development for nano- to submicron scale fibrous materials.	
Hanyu Wang	Macro	Electrochemistry and neutron reflectometry to investigate surface and interfacial structures of thin films.	
Yangyang Wang	Macro	Characterizing and understanding the dynamics of soft materials using rheology, dielectric spectroscopy, and scattering techniques	Novocrontrol broadband dielectric/impedence spectrometer; ALV Goiniometer System; ZetaSizer, RSA-G2 DMA; TA Q2000 DSC; Lecia DM4500P Optical Microscope; Linkam Shear Cell/Imaging Station; TA Discovery Hybrid Rheometer (HR2); RheoSense m-VROC Viscometer
Honghai Zhang	Macro	Organic synthesis and deuteration	Continuous flow reactors; Parrr reactor; NMR; GC-MS; Maldi-TOF
Steven Randolph	NRL Group Leader	Direct write focused electron, ion, and laser induced etching and deposition	HIM, Nova DualBeam
Dayrl Briggs	NRL	Atomic Layer Deposition and chemical vapor depositon of high quality dielectrics and semiconductors	ALD, LPCVD (Tystar), Reactive Ion Etchers
Pat Collier	NRL	Biologically inspired neuromorphics, memristive, and memcapacitive structures	Crossbar measurments, goniometer, droplet interface bilayer characterization
Sujoy Ghosh	NRL	2D Device fabrications and characterization, electron beam lithography	Electron beam lithography, photolithography, 2D materials transfer
Dale Hensley	NRL	Carbon nanomaterials synthesis and scanning electron microscopy	DC PECVD, Zeiss Merlin SEM, Phenom SEM
Ivan Kravchenko	NRL	Photonic devices and metamaterials, focused ion beam fabrication	Raith Velion FIB, electron beam lithography, atomic force microscopy
Nick Lavrik	NRL	2 Photon 3D lithography, advanced nanofabrication for sensing applications	Nanoscribe 2 photon lithography, Renishaw Raman microscope
Kevin Lester	NRL	3D Printing, chemical vapor deposition, CAD and mechanical design	LPCVD (Tystar), Dicing Saw
Bernadeta Srijanto	NRL	Electronic and optoelectronic transport properties of functional microelectronic devices	JEOL Ebeam Lithography, Suss contact aligner
Leslie Wilson	NRL	Microwave chemical vapor deposition of nanodiamond thin films	Nanodiamond CVD

Panchapakesan Ganesh	NTI Group Leader	Development and application of electronic structure , AI/ML and multiscale methods for understanding and prediction of materials, their properties and associated physical and chemical processes ranging from the nanoscale to the mesoscale in energy and quantum materials	Wide range of electronic structurre methods/codes, atomistic simulation methods, machine-learning methods, high performance and cloud computing
Tom Berlijin	NTI	First principles simulations of strongly disordered materials	DFT-codes, wannier90, LAPW,
Jan-Michael Carrillo	NTI	Atomistic and coarse-grained molecular dynamics simulations for soft matter systems.	classical MD codes, LAMMPS, coarse-grained and atomistic modeling of soft matter
Peter Doak	NTI	Scientific software engineer with expertise in implementing new electronic structure methods and maintaining codes on institutional and HPC platforms	QMCPACK, DCA++, ASE, BerkeleyGW
Addis Fuhr	NTI	Developing novel machine-learning approaches to bridge theory with nanoscale experiments	machine-learning packages, DFT-codes, high-performance and cloud computing
Jingsong Huang	NTI	Computational studies of surface reactions and interfacial phenomena in the field of chemistry, physics, and materials	CCSD(T), QCISD(T), ECD/VCD/ROA, DFT, TDDFT, EPT, GW, ACFDT-RAP, BSE
Jacek Jakowski	NTI	Development and application of DFT and DFTB based electronic strcuture, quantum dynamics to study electron dynamics, chemical reactions, spectroscopy of molecules and materials.	High performance computing, Nwchem, DFTB+, RMGDFT, Fortran, Python, C/C++
Paul Kent	NTI	Development, application and optimization of quantum and atomistic simulation methods to enable improved understanding and quantitative predictions of nanomaterials and nanoscale phenomena	High Performance Computing, major DFT codes, QMCPACK
Rajeev Kumar	NTI	Theory and simulations of polymers and soft matter systems using equilibirum and non-equilibrium statistical mechanics.	NTI cluster, LAMMPS
Liangbo Liang	NTI	Developing and applying large-scale theoretical/computational methods on supercomputers to study electronic, magnetic, optical, vibrational, and Raman scattering properties of quantum materials.	DFT-codes, wannier90, GW, Raman
David Lingerfelt	NTI	Development and application of first principles simulation techniques for electron and optical spectroscopies, and far-from-equilibrium dynamics of irradiated low-dimensional (nano)materials.	quantum chemistry codes, RMG-DFT
Thomas Maier	NTI	Numerical studies of strongly correlated quantum materials, focused on problems of superconductivity, magnetism, and charge order, and the interplay between correlations and electronic topology.	Quantum many-body theory, (cluster) dynamical mean-field theory, random phase approximation, high-performance computing

Eva Zarkadoula	NTI	Understanding the behavior of materials in extreme conditions, inluding the interactions of radiation with matter, microstructural evolution and mechanical behavior.	classical MD codes, reactive FFs, machine-learning FF
Rama Vasudevan	DNA Group Leader	Developing autonomous workflows for microscopy by combining machine learning, simulations and edge/cloud/HPC computing with automated systems to understand multi-scale materials dynamics, primarily at interfaces and heterogeneities in piezoelectric and ferroelectric materials	atomic force microscopy, scanning tunneling microscopy, Computing
Sumner Harris	DNA	Developing autonomous synthesis platforms combined with *in situ* diagnostics to accelerate the discovery/optimization of materials and to understand process-property relationships.	Nanomaterials synthesis and characterization tools, cloud computing
Yongtao Liu	DNA	Automated and autonomous scanning probe microscopy for optical, electrical and structural characterization of nanomaterials with machine learning and edge computing workflow development	Atomic force microscopy
Mark Oxley	DNA	Quantitative and high throughput electron scattering simulations primarily for scanning transmission electron microscopy / convergent beam electron diffraction, and machine learning approaches for analysis of 4D STEM datasets	Computing
Kevin Roccapriore	DNA	Electron microscopy and automation for atomic-level fabrication of structures, and structure-property relationships via machine learning enabled autonomous workflows	Scanning transmission electron microscopy
Maxim Ziatdinov	DNA	Machine learning algorithms, open source scientific software development, and designing coupled experiment-theory workflows for enabling autonomous physics and materials science	Computing