

Purdue Facilities and Resources for Environmental and Sustainability Research

Purdue University has world-class research and analytical resources to support current and future U.S.-China collaborations that address our interconnected challenges of environmental sustainability, climate change, and energy security. We encourage you to investigate the resource descriptions on the following pages, listed alphabetically, and contact us if you have any questions or would like assistance in facilitating collaborations.

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Agronomy Center of Research and Education

The Agronomy Center for Research and Education (ACRE), established initially as the Agronomy Farm in 1949, is a campus-based field research station for agronomic crops and soils research for the Agronomy Department and other departments working on field crops. At ACRE 53 scientists from 8 departments and USDA researchers conduct 180 studies ranging from basic to applied research. The research taking place includes plant breeding and genetics, crop production and soil tillage management, plant physiology, soil fertility, weed control, disease and insect resistance and control, and variety performance evaluation for corn, soybeans, small grains, sorghum and alfalfa.

<http://www.ag.purdue.edu/agry/acre/Pages/default.aspx>

Amy Analytical Instrumentation Center

The Amy Analytical Instrumentation Center is a core facility in the Department of Chemistry that supports instruments and information technology and manages the shared departmental instrumentation. The center handles instrument design, fabrication, repairs and consulting as well as IT-related installation, networking and support. The long-established philosophy of the facility is to understand the experimental problem in depth such that the appropriate measurement of technology can be applied. The Amy Analytical Instrumentation Center houses a large range of instruments that can be accessed by both departmental and non-departmental users.

<http://www.chem.purdue.edu/aaic/>

Animal Sciences Research and Education Center

The mission of the Animal Sciences Research and Education Center (ASREC) is to provide animals, facilities, technical assistance and labor to conduct research, provide instruction, and assist in extension educational activities. Research trials vary from basic to applied and involve many disciplines -- nutrition, physiology, behavior, genetics, reproduction, animal health, and product quality. Faculty utilize the Research and Education Center to facilitate teaching several Animal Sciences courses and to help provide hands-on experience for students. Additionally, the center houses extension education activities including the following: a Lambing School, an Animal Sciences Workshop for Youth, 4-H and FFA judging, Purdue Royal, and Tots' Day. <http://www.ag.purdue.edu/ansc/Pages/ASREC.aspx>

Biological Sciences Electron Microscopy Facility

The Biological Electron Microscopy Facility (BEMF) is intended to create the infrastructure for high-throughput structure determination of biological macromolecules and their assemblies by electron cryo-microscopy (cryo-EM) and three-dimensional (3D) image reconstruction. The scientific program of the Facility includes a variety of studies using cryo-EM for 3D structure determination of viruses, bacteriophage or other larger macromolecular complexes, as well as employing cryo-electron tomography to examine virus/cell interactions. Researchers using the Facility have published structures of human pathogens that cause diseases such as Polio, Dengue Hemorrhagic Fever and West Nile Fever.

http://www.bio.purdue.edu/molecular_biosciences/microscope_facility.html

Biophysical Analysis Laboratory (BAL)

The purpose of the Biophysical Analysis Lab (BAL) at the Bindley Biosciences Center is to provide complete biophysical analysis of macromolecules. In the lab, there are two analytical ultracentrifuges: Beckman-Coulter XLI and XLA, a Biacore 3000, an ITC, and a SEC-MALS platform. With these instruments we can determine kinetic parameters, stoichiometry of binding, size distribution, shape, oligomerization state and other biophysical measurements. Complementing these traditional biophysical methods, the BAL also provides mass spectrometric analyses at both the protein and peptide levels. The lab strives to establish long-term collaborations and deliver professional quality data that can be used for publications and grant proposals.

<http://www.purdue.edu/discoverypark/bioscience/facilities/bioanalytical/>

Bioscience Imaging Facility

The Bioscience Imaging Facility provides the instruments and expertise needed to visualize molecules in preparations ranging from single cells to entire animals. All facility users receive individualized instrument training as well as project specific advice for optimal data acquisition. Consultation on sample preparation, image rendering, and data analysis are also available as our knowledge base permits. Numerous instruments are available allowing users to perform microscopy (using a large range of microscopy techniques) and whole animal imaging.

<http://www.purdue.edu/discoverypark/bioscience/facilities/imaging/>

Birck Nanotechnology Center Electron Microscopy Facility

The Birck Nanotechnology Center provides resources and an extensive equipment set to support collaborative interdisciplinary research in nanotechnology. In the field of electron microscopy, BNC's laboratories house a Hitachi S4800 cold field-emission scanning electron microscope, equipped with STEM capability. It also houses the FEI Nova 200 Dual Beam system, equipped with a Klöcke nanomanipulator for site specific sample preparation. Another of its instruments is the FEI Field-Emission Environmental S/TEM 80-300 keV Titan. Cleanroom's at the BNC provide a JEOL dual-function scanning electron microscope with photolithographic capability and a focused ion beam analysis system.

<http://www.purdue.edu/discoverypark/nanotechnology/facilities/EquipmentOverview.php#EM>

Birck Nanotechnology Center Epitaxy Facility

The Epitaxy recharge center consists of three deposition tools for thin film research as well as a high resolution x-ray diffractometer for thin film characterization. Equipment in the recharge center includes a Nitride Sputter System (PVD Products) and an Oxide Pulsed Laser Deposition (PVD Products). Also available at the Epitaxy recharge center are a high-resolution x-ray diffractometer (HRXRD) (PANalytical), an Organometallic vapor phase epitaxy/Metalorganic chemical vapor deposition OMVPE/MOCVD (Aixtron), Laser annealing (Lambda Physik) and Laser lift-off (Lambda Physik).

<http://www.purdue.edu/discoverypark/nanotechnology/facilities/>

Birck Nanotechnology Center Microwave Plasma Chemical Vapor Deposition Facility

This Microwave Plasma Chemical Vapor Deposition system (SEKI-5200S) produces a variety of carbon-based nano- and micro-materials including carbon nanotubes, graphene, and diamond thin films. It operates at moderate pressure near 10 Torr with typical process gas mixtures consisting of hydrogen and methane. The system features an inductively heated stage, 1-2 inch active deposition area, temperature control through thermocouples supplemented by a dual-wavelength pyrometer, and recently added laser diagnostics of plasma species.

<http://www.purdue.edu/discoverypark/nanotechnology/facilities/>

Birck Nanotechnology Center Optics and Spectroscopy Facility

Under the discipline of optics and spectroscopy, the Birck Nanotechnology Center provides access to a collection of equipment. Such equipment includes the following: a Spectrophotometer Lambda 950; a Micro-Sample Spectrometer; a Raman Spectrometer T64000 with the excitation lasers: tunable Ar/Kr, CW 10 mW per wavelength, 10 wavelength across the visible range femtosecond/picosecond regenerative amplifier-OPA system; a Nanonics NSOM/ Luminescence Mapping with the excitations lasers: HeNe 633 nm, solid state 532 nm, Diode 785 nm.

<http://www.purdue.edu/discoverypark/nanotechnology/facilities/>

Birck Nanotechnology Center Surface Analysis

The Birck Nanotechnology Center provides resources and an extensive equipment set to support collaborative interdisciplinary research in nanotechnology. Laboratories at the BNC provide equipment geared toward surface analysis. One such equipment set is the Omicron Multi-Technique surface analysis cluster tool set which includes the High-Res electron energy loss spectrometer, a scanning electron microscope (SEM), a hemispherical electron spectrometer for XPS, AES, UPS, ISS, a scanning auger spectrometer and a focused ion beam. Additional surface analysis equipment includes a Kratos XPS and an Omicron ultra-high vacuum scanning tunneling microscope.

<http://www.purdue.edu/discoverypark/nanotechnology/facilities/EquipmentOverview.php#SA>

Campus-wide Mass Spectrometry Center

The Campus-wide Mass Spectrometry Center (CWMSC) is a Purdue facility created to coordinate the operation and maintenance of mass spectrometers and to provide research groups access to mass spectrometers across campus. The facility insures a high level of quality control for the more routine types of analyses, and provides a collaborative analytical mass spectrometry capability to the Purdue research community. All major mass spectrometric ionization techniques and sample introduction methods are available, including gas chromatography, liquid chromatography, electron impact, chemical ionization, electrospray ionization, inductively coupled argon plasma, matrix-assisted laser desorption ionization, atmospheric pressure chemical ionization and high resolution mass measurements. <http://www.chem.purdue.edu/cwmisc>

Center for Analytical Instrumentation Development

Analytical chemistry and its instruments provide the measurements and quantitative information underlying much of the research and commercial activity in chemistry, biology and medicine. A Center for Analytical Instrumentation Development (CAID) is being created in Discovery Park that brings together chemists, physicists, engineers, biologists and physicians from multiple Schools at Purdue University and other institutions in the region. The mission of the Center is to develop innovative "machine-tools of science" that enable discoveries across a broad spectrum of life science. These activities will lead to routine, point-of-need devices for use in drug discovery, clinical diagnostics, environmental monitoring and the fight against chemical and biological terrorism.

<http://www.purdue.edu/dp/caid/>

Center for Computational & Applied Mathematics (CCAM)

The Center for Computational and Applied Mathematics (CCAM) offers a comprehensive graduate educational and research program in applied and computational mathematics. CCAM promotes both fundamental research and scientific and engineering applications. At CCAM graduate students explore an interdisciplinary research environment encompassing materials science and nanotechnology, life sciences, geosciences, inverse problems and imaging, fluid dynamics, and other disciplines. Current research topics by the CCAM faculty members include: numerical analysis and applications of finite difference, finite element and spectral methods; applied analysis in materials science and condensed matter physics; mathematical biology and mathematical neuroscience; computational fluid dynamics; wavelet analysis, image and signal processing; nonlinear waves; stochastic differential equations, uncertainty quantification; earthquake prediction and modeling of seismicity; inverse problems; and numerical linear algebra.

<http://ccam.math.purdue.edu/>

Center for Environmental and Regulatory Information Systems

The Center for Environmental and Regulatory Information Systems (CERIS) provides agricultural information resource technologies and applications in the form of searchable databases with web interfaces, collaborative web sites with updating, and dynamic map resources of pest survey and plant diagnostic data. CERIS focuses on plant export regulations, pest survey data, plant diagnostic data, and pesticides and has collaborated with key federal and state agencies along with industry. A new project under development with Entomology and Plant Pathology is the creation of an iPhone application for ornamental diagnostics. <http://ceris.purdue.edu/ceris/>

Center for Global Trade Analysis

The Global Trade Analysis Project (GTAP) is a global network of researchers and policy makers conducting quantitative analysis of international policy issues. GTAP's goal is to improve the quality of quantitative analysis of global economic issues within an economy-wide framework. GTAP offers a variety of products, including: data, models, and resources for multi-region, applied general equilibrium analysis of global economic issues. It also organizes courses and conferences and undertakes research projects. The Center for Global Trade Analysis employs staff members and graduate assistants, as well as coordinating with CGE modelers and trade economists, to support and further GTAP's mission.

<https://www.gtap.agecon.purdue.edu/>

Center for Research & Engagement in Science & Mathematics Education (CRESME)

Directed by faculty from the Colleges of Education and Science, the Center for Research and Engagement in Science and Mathematics Education (CRESME) focuses on improving science and mathematics education for students from preschool to college. The center's mission is to research, develop, and implement exemplary mathematics and science programs in all grade levels and to facilitate collaboration among faculty in the Colleges of Education and Science to work towards the improvement of mathematics and science education locally and globally. CRESME provides a common intellectual home for science and mathematics education researchers at Purdue to: formulate and address both fundamental and applied science and mathematics education research issues of national and international significance; attract significant grant support for conducting interdisciplinary research and engagement; improve science teaching and learning for Purdue faculty and students, P-12 teachers and their students, and serve as a model for engagement and innovation at all levels nationwide; provide opportunities for graduate students to develop skills that will enable them to meet the pressing need for faculty with expertise in science and mathematics education.

<http://cresme.education.purdue.edu/> (website under construction, 3/19/2013)

Center for the Study of Lodging Operations

The mission of the Center for the Study of Lodging Operations (CFSLO) is to serve the hotel industry and related organizations by providing up-to-date and timely information as well as quality research related to lodging operations of all types. This includes hotels, timeshares, resorts, casino hotels, bed and breakfast operations, and assisted living facilities. The CFSLO seeks to advance the hotel industry at the local, national, and international level through the use of basic and applied research to deal with industry issues and challenges. They aim to be the leading source of high quality and value-added research to the lodging industry. <http://www.cfs.purdue.edu/htm/research/lodging/lodging.html>

Chemistry Department X-ray Crystallography Facility

The X-ray Crystallography Laboratory provides data collection, structure analysis, and crystallography consultation services. Equipment available at the lab include (1) a Rigaku Rapid II image plate diffractometer equipped with a MicroMax002+ high intensity copper x-ray source, (2) a Nonius KappaCCD diffractometer on a sealed tube molybdenum source, (3) Oxford Cryosystems low temperature device capable of temperatures from 400 to 90K, and (4) LINUX PCs for structural calculations and the Cambridge Structural Database. (Other computers are available for collection and processing diffraction data). <http://www.chem.purdue.edu/xray/default.asp>

Cyberforensics Lab

The Purdue University Cyber Forensics Lab provide (1) education and training for students, faculty, and law enforcement, (2) leading edge applied and basic research in cyberforensics, and (3) investigative support of digital and cyber forensics for federal, state, and local law enforcement. Its strength lies in the applied research and technological solutions for the technical and theoretical challenges that exists in its specific domains. A Memorandum of Understanding is in place with the National White Collar Crime Center (NW3C), the Indiana State Police, the Center for Education and Research in Information Assurance and Security (CERIAS/CS Department) and ITaP. <http://cyberforensics.purdue.edu/>

Envision Center for Data Perceptualization

The mission of the Envision Center for Data Perceptualization is to serve, support, and collaborate with faculty, students, and industry to be a leader in scientific visualization through learning, discovery and engagement. Researchers in the Envision Center explore novel computer graphics, advanced visualization, and human computer interface technologies, such as auditory, haptic, and multimodal interaction. These technologies are integrated with state-of-the-art advanced computation and networking, and high-end immersive visualization environments to assist researchers and industry in their quest for new knowledge and innovative products. The Envision Center serves as a window into computational aspects of science and engineering, providing effective means to communicate complex research results to students, researchers, and the general public.

<http://www.envision.purdue.edu/>

Flow Cytometry and Cell Separation Facility

The Bindley Bioscience Flow Cytometry and Cell Separation Facility provides advanced cell and particle analysis and sorting using flow cytometry based technology. The facility offers the following services: (1) Multiparameter flow cytometry data acquisition, (2) Flow cytometry instrument training, (3) Sterile and live cell sorting, (4) Data archiving and offline retrieval, (5) Data analysis using FlowJo WinList and ModFit LT software, (6) Consultation for assay or protocol development, and (7) Expert flow cytometry consultation and input for grant proposals or manuscripts. Instrumentation available through the facility includes two flow cytometry analyzers (the Quanta SC and FC500), an iCyt Reflection high speed cell sorter, and the Laser Enabled Analysis and Processing imaging cytometer.

<http://www.purdue.edu/discoverypark/bioscience/facilities/flowcytometry/>

Genomics Core Facility

The Purdue Genomics Core facility has more than a decade of experience in DNA sequencing. This facility offers data generation and wet laboratory services such as high and low-throughput sequencing services as well as first-pass informatics support. Specific services provided include “sanger” sequencing, next-generation sequencing, determination of the DNA sequence of plasmid or PCR product DNA using a standard vector primer or your custom primer, and web-based delivery of the sequence, its chromatogram and BLAST searches. Additionally, they provide statistical consulting services.

<http://www.genomics.purdue.edu/>

Geomathematical Imaging Group (GMIG)

The Geo-Mathematical Imaging Group (GMIG), managed by Purdue University's College of Science and the Department of Mathematics, is an industry and government funded, multi-disciplinary, inter-institutional graduate education and research program. Founded in 2007, the group works to develop improved technology to meet the complex challenges of modern day prospect evaluation, enhanced oil recovery, CO2 sequestration, and general geological study of the Earth's subsurface. They aim to accomplish this by expanding the boundaries of knowledge of seismic imaging, inverse scattering and tomography through collaborative scientific activities and breakthroughs. In the research program of the Geo-Mathematical Imaging Group, exploration seismology meets global seismology, integrating passive source, ambient-noise source with active source and controlled-noise source imaging. It consists of integrated analysis and very large scale computation with strongly interconnected theoretical, and algorithmic and HPC projects.

<http://gmig.math.purdue.edu/>

Hub Platform (virtual organizations)

HUBzero™ is an open source software platform for building powerful web sites that support scientific discovery, learning and collaboration. Originally created by researchers at Purdue University in conjunction with the NSF-sponsored Network for Computational Nanotechnology to support nanoHUB.org, the HUBzero platform now supports dozens of hubs across a variety of disciplines, including cancer research, pharmaceuticals, biofuels, microelectromechanical systems, climate modeling, water quality, volcanology, and more. Under the hood, powerful middleware serves up interactive simulation and modeling tools via your web browser. These tools connect you with rendering farms and powerful Grid computing resources. <http://hubzero.org/>

Indiana State Climate Office

The Indiana State Climate Office (Iclimate), established in 1956 to document and study the climate of Indiana, is the state archive of official daily and hourly weather observations recorded throughout Indiana. Iclimate maintains an online archive of many recent daily and hourly observations from both manual and automated networks. Older observations are being converted to an online database as part of an ongoing national effort. Since established, the climate office has been catering to the needs of different users, namely individuals, businesses, and government agencies. Its primary users belong to sectors such as agriculture, attorneys, construction, environmental monitoring, forensics, government insurance, news media, research, education and utilities. Iclimate not only assists in providing climate observations and summaries but also interprets and applies this data to solve climate related problems at hand.

<https://climate.agry.purdue.edu/climate/index.asp>

Interdepartmental NMR Facility

The Purdue Interdepartmental NMR Facility (PINMRF) is a university-wide resource dedicated to supporting NMR spectroscopy and to making this analytical technique available to researchers at Purdue and elsewhere in the scientific community. PINMRF currently has ten NMR spectrometers located in six laboratories in four buildings on the Purdue campus, with additional laboratory locations under consideration. PINMRF is set up to allow individual researchers direct access 24/7 to the spectrometers, after appropriate training and testing has been completed. However, they will gladly provide spectra of submitted samples, either on a service basis or as part of a collaborative research project. <http://www.pinmrf.purdue.edu/>

Laboratory for Applied Experimental Geophysics

The Laboratory for Applied Experimental Geophysics, located within the Physics Department at Purdue University, performs research related to synthetic and natural fractures. All rocks contain mechanical discontinuities on many length scales. These discontinuities, such as grain contacts, cracks, fractures, or joints, are sources of anisotropy and inhomogeneity that influence and control the mechanical and hydraulic behavior of a rock mass. The geometries of the voids and fracture networks control the transport of water, contaminants, gas, or oil through a fractured rock mass. Fractures and cracks are often planes of mechanical weakness and instability, and determine the success or failure of engineering structures built in or on a fractured rock mass. The research areas of the laboratory include wave propagation, fracture geometry, fluid flow, porous media and swarm physics and have the common aim of quantitatively establishing the links among the mechanical, hydraulic, and seismic properties of these discontinuities.

<http://www.physics.purdue.edu/rockphys/>

Laboratory for Renewable Resources Engineering (LORRE)

The Laboratory of Renewable Resources Engineering, LORRE, was established in 1978 to carry out research on transforming renewable resources to liquid fuels. The role of the Laboratory in multidisciplinary research evolved over its 33-year history from biofuels research to its current function as an Integrative Center for Biotechnology and Engineering which carries out multi-disciplinary research in bioenergy, bioprocessing, bioproducts, bionanotechnology, and biorecovery. LORRE has capabilities ranging from fundamental studies on the molecular genetics of yeast and bacteria to bioreaction and bioprocess engineering, and biotechnology that uses organisms, tissues, cells, or their molecular components to: (1) act on living things, (2) intervene in the workings of cells, including their genetic material, (3) provide templates for advanced non-living systems that emulate specific biological functions, and (4) manufacture bioproducts.

<https://engineering.purdue.edu/~lorre/16/overview/index.shtml>

Life Sciences Electron Microscopy Facility

The LSMF is a full service electron microscopy core providing equipment, training (Scanning Electron Microscope and Transmission Electron Microscopes courses), space, advice, and expertise so that researchers can come to the laboratories to conduct their research efficiently. The facility contains research equipment for use by students, faculty, postdoctorals, and service staff. Technology in the LSMF provides capabilities for light microscopy, transmission electron microscopy, scanning electron microscopy, and computer-based image analysis. Equipment is available for cryo sample preparation (high pressure freezing and freeze substitution, ultramicrotomy, critical point drying, vacuum evaporation, sputter coating, digital printing, and histological and cytological specimen preparation). Staff in the LSMF provides expertise in a wide range of specialized preparation techniques including immunocytochemistry and freeze substitution to assist researchers.

<http://www.ag.purdue.edu/facilities/microscopy/pages/default.aspx>

Life Sciences Fluorescence Imaging Facility

The Life Sciences Fluorescence Imaging Facility is a user-driven facility that provides basic training on state of the art equipment allowing users to perform their own experiments. Following training, the facility offers access to the following: (1) the Zeiss LSM 710 confocal spectral scanning laser microscopy (upright) with workstation for data processing, (2) the Zeiss Axio Observer epifluorescence microscope (inverted), and (3) the Intavis Insitu ProVS preparative robot, which can do dehydration series, hybridization incubations for in situ immunolocalizations, and rehydration series.

<http://www.agriculture.purdue.edu/clsm/index.shtml>

Long Term Hydrologic Impact Analysis (L-THIA)

L-THIA is a user-friendly assessment tool which assists decision makers in optimizing urban and rural land use planning to balance economic development with environmental sustainability. It is built on a GIS model and estimates long term average annual runoff, recharge and nonpoint source pollution resulting from past or proposed development (e.g. urbanization), in terms of land use and soil characteristics. The model is based on actual long term climate data for the interested area. Data can be entered through a web interface to run the model from GIS server. A version with Low Impact Development (LID) practices is also available. <http://engineering.purdue.edu/~lthia>

Material Science and Engineering Materials Preparation and Testing Labs

The School of Materials Engineering has an extensive array of tools available for materials preparation and characterization through their labs and testing facilities. These include facilities to perform microstructural analysis, materials processing, and mechanical testing of metals, ceramics, polymers, composites, and a wide range of materials. Other facilities include the powder processing lab which has ball mills, drying ovens, viscometer, injection casting apparatus, and mixers. The heat treatment lab contains a number of furnaces capable of operating at temperatures between 660C and 1400°C. There is also polishing facilities and an optical microscopy lab fully equipped with a range of Olympus microscopes. https://engineering.purdue.edu/MSE/Research/Facilities/General_Labs.html

Material Science and Engineering Microscopy Facility

The MSE Microscopy Facility contains two Transmission Electron Microscopes and three Scanning Electron Microscopes for use in research and analysis. The SEMs have Energy Dispersive X-ray Spectroscopy (EDS) capability, and one SEM also has Electron Backscatter Diffraction Analysis (EBSD). The facility contains a sample preparation laboratory with basic tools and supplies for EM sample preparation. In addition, there are two Atomic Force Microscopes, one small sample stage and one large sample stage that has a wide variety of attachments for a variety of experiments. The large stage AFM also has Piezoresponse Force Microscopy (PFM) and Scanning Thermal Microscopy (SThM) capability.

<https://engineering.purdue.edu/MSE/Research/Facilities/Microstructural/EM-Facility.html>

Material Science and Engineering X-Ray Characterization Facility

The X-Ray Characterization Facility offers a broad range of x-ray diffraction capabilities available within the School of Materials Engineering at Purdue. Three x-ray diffractometers are available through the facility. The Bruker D8 Focus X-Ray Diffractometer and the Siemens D500 X-Ray Diffractometer have measurement capabilities of qualitative and quantitative phase analysis, structure solution and refinement and crystallite size determination. Also available at the facility is the Bruker D8 Discover X-Ray Diffractometer with GADDS (General Area Detector Diffraction System), which has capabilities of rapid powder characterization, texture analysis, small angle x-ray scattering, residual stress analysis, and single crystal diffraction.

<https://engineering.purdue.edu/MSE/Research/Facilities/XRayFacility/index.html>

Metabolite Profiling Facility (MPF)

The Metabolite Profiling Facility (MPF) provides state-of-the-art technologies that enable both qualitative (defining all components of a metabolome) and quantitative (determining differential concentrations of metabolites) metabolomics in complex biological systems. This facility employs highly sensitive mass spectrometry coupled with liquid chromatography and multi-dimensional gas chromatography for precise sample analysis. Services that the facility offer are extensive, including high throughput metabolite profiling, sample preparation, solid phase extraction, HPLC Separation/small molecule isolation, instrument training, bioinformatics consultation, and robotics. The scientists working with the facility aim to empower researchers with new technologies, methods development, expert training and consultation. <http://www.purdue.edu/bbc/mpf>

National Test Facility for Fuels and Propulsion

The National Test Facility for Fuels and Propulsion is funded with a \$2.7 million grant from the U.S. Air Force and is housed in the Niswonger Aviation Technology Building at the Purdue Airport. The facility tests aerospace hardware in engines and aircraft and provides data related to fuel-sustainability and emissions goals and for economic assessments. Work of the facility focuses on jet engines but also includes some testing related to piston engines. The work will tackle four major bottlenecks to aerospace progress: access to hardware testing; development of control logic and systems permitting flex-fuel operation and realization of improved efficiencies; sustainability of biofuels related to crop productivity, as well as bio and synthetic fuels' ability to meet both near- and long-term aerospace requirements; and regulatory compliance. <http://www.tech.purdue.edu/at/NATEF/>

Network for Earthquake Engineering Simulation (NEES)

The Network for Earthquake Engineering Simulation (NEES) will enable engineers and scientists to develop effective ways of mitigating earthquake and tsunami risk using improved design, materials, construction techniques, and monitoring. The work of NEES is to advance earthquake engineering education and research, and contribute to making global communities more resilient to future disasters. The National Science Foundation awarded \$105 million to a Purdue-led team to spearhead a center that will serve as headquarters for the operations of the George E. Brown, Jr. Network for Earthquake Engineering Simulation, or NEES, which is an integral part of the U.S. National Earthquake Hazards Reduction Program (NEHRP). Purdue's NEEScomm Center manages 14 world-class NEES research equipment sites, which are networked with each other and with the earthquake engineering community using a powerful information technology infrastructure with a commitment to education, outreach and training related to earthquake engineering.

<https://nees.org/aboutnees/neescomm>

Pankow Materials Laboratories

The Charles Pankow Concrete Materials Laboratory provides facilities for the specialized chemical analysis of cement and concrete. The laboratory provides equipment for research using FTIR, thermal analysis, microscopy and surface area measurements. X-ray diffraction, scanning electron microscopy and calorimetry are some of the research tools available in the Laboratory. A "Personal SEM" and image analysis equipment provide tools for the characterization of cement microstructure.

<https://engineering.purdue.edu/Engr/AboutUs/Facilities/VirtualTour/CE/CIVL/Materials/Pankow/index>

Physics Department Instrument and Machine Shop

The Physics Instrument Shop at Purdue University uses leading-edge computer-aided design and manufacturing software integrally linked to CNC machines, to produce precision parts and assemblies from a wide variety of materials. It specializes in small parts fabricated to precise tolerances. The machine shop extensively uses the (Autodesk) Inventor software to design parts and to make final assembly drawings. It offers a wide variety of equipment, including multiple mills and lathes, and raw materials, as well as an extensive stock of steel and stainless cap screws.

<http://www.physics.purdue.edu/machineshop/>

Purdue Agriculture Air Quality Lab

PAAQL specializes in odor assessment using olfactometry, chemical analyses using gas chromatography, and continuous emissions monitoring of ammonia, hydrogen sulfide, carbon dioxide and particulate matter. Our core laboratory capabilities include: (1) Olfactometry in full compliance with both the ASTM and CEN standards regarding olfactometry technique, (2) Gas chromatography using their recently purchased Agilent 6890 Gas Chromatograph and 5875 Mass Spectrometer. Incorporation of a GERSTEL odor port also allows for the identification of individual compounds which are responsible for offensive odors, (3) Access to the Swine Environmental Research Building (SERB), a wean-to-finish swine facility which combines clean laboratory space with independent systems for ventilation, feeding, watering, and waste collection for up to 720 pigs, and (4) Environmentally controlled laboratory space, in which quality research can be performed under specific controlled settings.

<https://engineering.purdue.edu/~odor/facilities.htm>

Purdue Level II Doppler Radar

Purdue is a top level distributor of Level II Doppler radar data, high-resolution radar data from the national network of the Next Generation Radar (NEXRAD). The data represents the highest resolution picture of what the radar system is "seeing" in real time. As a result, faster, higher resolution and more detailed weather products can be developed. Using Unidata's LDM server technology, Purdue provides real time distribution of the data feed to the broader community. This data is distributed to the universities for free and to private sector and Federal government clients on a cost recovery basis.

<http://roskilde.eas.purdue.edu/~level2/index.html>

Purdue MRI Facility

Through a partnership of the Weldon School of Biomedical Engineering Imaging Facilities Committee and InnerVision Advanced Medical Imaging, the 3 Tesla Magnetic Resonance Imaging facility was established. The MRI facility jointly serves research and clinical purposes. It is accessible for research after 5 PM on Monday-Friday and all day Saturday and Sunday. The facility also offers training and support services for MRI, fMRI and MRS and can provide trained operators of the 3T MRI system to assist researchers. <http://mri.ecn.purdue.edu>

Purdue Proteomics Facility (PRF)

The Purdue Proteomics Facility (PPF) provides highly innovative methodologies and the most current technologies to generate high resolution protein profiles. As a shared facility of the Bindley Bioscience Center (BBC) and the Purdue Cancer Center, the facility enables never-before-possible analysis of post-translational modifications of the proteome. Coupled with new proteomics platforms and advanced scientific expertise, their facility provides unique opportunities to perform intact protein ('top-down') and peptide fragment ('bottom-up') analyses. Their services include mass spectrometry analyses of peptides and proteins and amino acid analysis. Another service typically offered is protein sequencing, but that service is currently suspended due to instrumentation issues.

<http://www.purdue.edu/bbc/ppf/>

Purdue Rare Isotope Measurement Laboratory (PRIME Lab)

The Purdue Rare Isotope Measurement Laboratory (PRIME Lab) is a dedicated research and service facility for accelerator mass spectrometry (AMS). AMS is an ultra-sensitive analytical technique for measuring low levels of long-lived radionuclides and rare trace elements. The accelerator is used to measure both man-made and cosmic-ray-produced radionuclides such as ^{10}Be (half-life 1,600,000 years), ^{14}C (5730 years), and ^{36}Cl (300,000 years) in natural samples having isotopic abundances down to one part in 1×10^{15} . <http://www.physics.purdue.edu/primelab/>

Purdue Stable Isotope (PSI) Geochemistry Facility

The Purdue Stable Isotope (PSI) geochemistry facility is a state-of-the-art multi-user, stable isotope geochemistry laboratory housed in the Department of Earth, Atmospheric, and Planetary Sciences at Purdue University. The PSI group conducts analysis for research in a range of environmental and climate-related areas, including biogeochemistry, hydrology, ecology, soil organic matter, air quality and paleoclimatology. Analytical services currently offered include: (1) C and N stable isotope analysis of natural abundance and enriched soil and plant samples by combustion elemental analysis - isotope ratio mass spectrometry (EA-IRMS) (2) H and O isotope analysis of waters at natural abundance or high enrichment by TCEA-IRMS, (3) H and O isotope analysis of organic solids by TCEA-IRMS, (4) C and O isotope analysis of carbonates by GasBench-IRMS, (5) N and O isotope analysis (including D17O) of atmospheric, soil, and fertilizer nitrate by bacterial denitrification-IRMS and (6) a range of chemical and physical sample preparation services for isotope analysis. The facility houses four gas IRMS systems, each accompanied by peripheral devices for conversion of various compounds into analyzable gases. It also houses four gas chromatography quadrupole mass spectrometer systems for biomarker analysis - specializing in lignin phenol extraction and analysis using alkaline CuO and ^{13}C -TMAH thermochemolysis. <http://www.eas.purdue.edu/psi/>

Purdue Tourism and Hospitality Research Center

The Purdue Tourism & Hospitality Research Center has been established to provide world-class tourism research. The center serves communities, tourism organizations and businesses with practical, up to date expertise and skills. Their research and planning projects for industry assist destinations to maximize the potential of tourism and organizations to improve their performance. The center also delivers professional development for tourism professionals and supports advancing the discipline of tourism and hospitality through research. The center provides hands-on research opportunities for tourism and hospitality students to develop their life-long learning skills and real world experience for students preparing to join the industry.

<http://www.cfs.purdue.edu/htm/research/tourism/tourism.html>

Research Machining Services at Discovery Park

Research Machining Services through Purdue's Discovery Park offers services and supplies in machining and welding, design and drafting, R&D prototyping to small production runs, and materials and hardware. A precision machine shop, open to all departments, provides both standard and CNC machining equipment, welding, and design services. Research Machining Services maintains a diverse inventory of the most common alloys of steel, stainless steel, aluminum, and brass in standard material sizes and structural shapes, plus offer special-ordering of exotic alloys and high-performance plastics. The Research Machining Services provides plating, anodizing, and water jetting services, along with many other services through vendors. They also specialize in one-of-a-kind research equipment and/or modifications. <http://www.purdue.edu/discoverypark/machineshop/>

Ray W. Herrick Laboratories

The Ray W. Herrick Laboratories is an institution dedicated to graduate education and engineering research with emphasis on technology transfer to industry. Within the laboratories there are four main technical areas of research with some overarching themes related to energy utilization and efficiency, reduction of pollutants in the environment, quality of life, and sustainability and safety. The main technical areas are: thermal systems and air quality, noise and vibration control, electromechanical systems including controls, signal processing, sensing, estimation, diagnostics and prognostics, and modeling of human response for machine and system optimization. There are a wide range of applications extending from smart buildings and alternative refrigerants to self-diagnosing systems and power generation. <https://engineering.purdue.edu/Herrick/AboutUs/index.html>

Rosen Center for Advanced Computing

The Rosen Center for Advanced Computing provides access to leading-edge computational and data storage systems, as well as expertise in a broad range of high-performance computing activities. The RCAC evaluates, deploys and supports hardware and software for large-scale scientific computing. They also promote the effective use of our computing systems and application software through training and education, consultation, and documentation, contribute to the discovery process through algorithm design and the development of effective computing techniques, and partner with researchers to develop grant proposals by providing expertise in the assessment of hardware and software requirements. A partner in their collaborative efforts, the Scientific Solutions group works with Purdue faculty and staff to develop proposals and specific research solutions including computation- and data-intensive applications, science portals and other web services.

<http://www.rcac.purdue.edu/projects/>

Scifres Nanofabrication Cleanroom

The Scifres Nanofabrication Laboratory is located in the heart of the Birck Nanotechnology Center. It is a 25,252 sq. ft. Class 1-10-100 Nanofabrication cleanroom coupled with a pharmaceutical-grade cleanroom. Part of the cleanroom is configured as a biomolecular cleanroom with separate entry and gowning areas and isolated air flow.

<http://www.purdue.edu/discoverypark/nanotechnology/facilities/cleanroom.php>

Superresolution Imaging Lab

This facility located in the Purdue College of Veterinary Medicine provides a high end confocal imaging system for versatile cell, whole mounted- tissue and animal microscope imaging. It's equipment capabilities are: (1) regular 5-color and DIC fluorescence confocal imaging; (2) 5 NDD (4RLD and 1 TLD) multi-photon confocal imaging; (3) forward and backward second harmonic generation imaging; (4) 70 nM STED superresolution imaging; (5) Regular and resonant scanning; (6) FRAP / FLIP / Photoactivation / FRET (ratio or accept or photobleaching) / Multi-time, ion concentration, ratiometric imaging; (7) Live cell imaging and tracking in Ludin Chamber with controlled CO₂ gas, light and temperature (8) Deep tissue imaging in live animals in an inverted position; and (9) Anesthesia machine for animal imaging (isoflurane gas). <http://www.vet.purdue.edu/imaginglab/index.php>