WELCOME TO ARGONNE'S COMMUNITY OPEN HOUSE

Saturday, August 29, 2009
9:00 am to 4:30 pm

Argonne NATIONAL LABORATORY

For your safety...

Argonne is dedicated to safety in all our activities. Observance of a few rules and safety precautions will make the 2009 Open House more enjoyable for everyone:

- Please adhere to all Illinois traffic laws. Helmets are required on site if you are riding a motorcycle, bicycle, or using any wheeled sporting equipment. Use of cell phones on site while driving is prohibited.
- In case of serious illness, injury, or vehicle accident, please use any Laboratory telephone to dial 911, or call 630.252.1911 from any cell phone. Contact any Argonne staff member to give you assistance.
- Alcohol, firearms, and weapons are not allowed on site.
- Incoming calls for information or emergency situations should be made to 630.252.2525.
- In the event of inclement weather, a siren will sound. Please follow an Argonne host wearing a white baseball hat imprinted with Argonne National Laboratory to the nearest building and seek shelter.

Have a question, need assistance, want more information?????

The information booths located near Buildings 203 and 362 are open throughout the day for questions about activities or services. Visitors are encouraged to stop by and sign up for our monthly e-newsletter highlighting the most current research at Argonne. Information is also readily available around the Laboratory from Argonne hosts wearing white baseball hats imprinted with Argonne National Laboratory.

Shuttle service

Free on-site shuttle service is available throughout the day. It is recommended that you park your vehicles and use the shuttle. Please see the map for the location of parking and shuttle stops around the site.

Free off-site shuttle service is available for visitors parking at Argonne Park, located on Cass Avenue. The off-site service will drop off and pick up visitors at the shuttle stop located by Building 362. This service will continue until 5 pm.

Parking

Several lots on site are designated as parking areas. See full map for locations.

Food service

Food and beverages are available for purchase at Buildings 213 and 401. Refreshments and snacks are available for purchase near Buildings 200 and 362.

Photos and videotaping...

Taking of photographs and videotaping is permitted.

If you only have an hour...

Limit your visit to either the 200, 300, or 400 areas. Each of these areas has numerous ongoing hands-on activities and presentations.

Most of the buildings in the ***200 area*** will take approximately 45 minutes to one hour to tour, depending on your interest.

In the ***300 area***, Advanced Transportation Technologies and High Energy Physics are highlighted.

In the ***400 area***, two of our user facilities, the Center for Nanoscale Materials and the Advanced Photon Source, are highlighted.

Featured presentations

The Featured Presentations provide light-hearted science entertainment for all ages. There is limited seating for all shows. Use the on-site shuttle service to all presentation locations.

Weird Science (as seen on CBS's Late Show with David Letterman) – Bldg. 401 auditorium, 30-minute show at 10 am, 12 pm, 2 pm

Glassblowing Demonstrations – Bldg. 362 auditorium, 30-minute show at 11 am, 1 pm, 3 pm

X-Ray Imaging of Laser-Controlled Molecular Motion – Bldg. 200 auditorium (stairs only to auditorium), 20-minute presentation at 9:30 am, 11:30 am, 1:30 pm

The Science of Hydrogen and Hydrogen Safety – Bldg. 200 auditorium (stairs only to auditorium), 30-minute show at 10:30 am, 12:30 pm, 2:30 pm

Argonne acknowledgments

Argonne acknowledges and thanks the following organizations for their assistance and/or participation in the 2009 Open House:

Bright Horizons Family Solutions
Chicago Area Clean Cities Network
Guckenheimer Enterprises, Inc.
Orland Park Fire Department
Park Systems
Richton Park Fire Department
Science Chicago
Sodexho
The University of Chicago
- Center for Elementary Math and Science Education
- Computation Institute (University of Chicago/ Argonne National Laboratory Joint Center)
- Howard T. Ricketts Regional Biocontainment Laboratory
- Institute for Genomics and Systems Biology (University of Chicago/ Argonne National Laboratory Joint Center)
- Kavli Institute for Cosmological Physics
- Science and Technology Outreach and Mentoring Program

United States Department of Energy
University of Wisconsin-Stevens Point

Look us up on the Internet

After your visit to the Laboratory you can find more information about the projects you have seen, as well as regularly updated news about Argonne's research findings, on our Web site at **www.anl.gov.** You can also follow us on

- **twitter.com/argonne**
- **flickr.com/photos/argonne**
- **youtube.com/user/ArgonneNationalLab**
- **Also find us on Facebook**

Join our mailing list

Stop by one of the information booths near 203 and 362 to sign up for our monthly electronic newsletter or sign up on-line at **www.anl.gov**

Take a survey

Tell us about your open house experience by completing our on-line survey at **www.anl.gov**

Events & Activities

202 Biosciences

Inside the building

- Learn about proteins from rust-breathing bacteria that clean up the environment and produce energy.
- See a demonstration of protein purification; observe protein crystals and learn how structures of proteins are relevant to human diseases.
- Learn how cells react to changes in their environment; participate in protein identification.
- Learn about next-generation DNA sequencing and how new technologies are revolutionizing environmental and medical research.
- See how a robot is used for molecular biology experiments; play "Race the Robot" in a speed challenge.
- Learn how nanotechnology is used to promote stem cell proliferation for use in advanced medical treatments and regenerative medicine.
- See how microalgae are being grown as a promising feedstock for advanced biofuels; learn about strategies for converting algae oils to hydrocarbon biofuels.

On the lawn

- Play the Bean Bag Enzyme game.
- Learn about microbes to the rescue – environmental remediation using naturally occurring processes.
- Watch a demonstration on the challenges of producing ethanol from cellulose.
- View membrane protein crystals under a microscope.
- Learn about the living soil and its role in regulating atmospheric carbon dioxide.
- Visit the University of Chicago's Howard T. Ricketts Regional Biocontainment Laboratory exhibit and learn about its research.

223 Educational Programs, Science Careers

Inside the building

- Strap on special 3-D glasses to explore the outer edges of the Universe, Mars, a black hole, ultra-high energy cosmic rays, and millions of galaxies.
- See demonstrations on cryogenics.

On the lawn

- See demonstrations on microscopy and the science of toys.
- Watch fuel cell-powered model cars race.
- Ride the energy bike to provide power for various types of lights.
- Learn about careers at Argonne.
- Find out about Argonne's diverse culture.
- Get a free blood pressure check by our medical staff and learn the difference between influenza and the common cold.
- Participate in interactive science experiments with members of Argonne's Postdoctoral Society.
- Visit with Argonne's Women in Science and Technology Program members and learn about the rewards and challenges of careers in science and engineering for women.
- Explore light and color and make rainbows using prisms, CDs, water tubs, spray bottles, and flashlights.
- Explore the mysteries of magnets and build your own electromagnet.
- Experiment with air cannons to explore air's mass.
- Communicate ideas about science through drawings.
- Explore survival characteristics by testing different types of bird bills to see which work best for different types of food.
- Discover the differences between electromagnets and permanent magnets.
- Do you eat nails for breakfast? Find out!

221 Mathematics and Computer Science, Argonne Leadership Computing Facility, Computation Institute

- See how advanced visualization resources are being used to enable anatomy students to explore data from computed tomography scans via a Web-browser.
- See a demonstration of Argonne's simulation and visualization supercomputers on our wall-sized display system, the ActiveMural.
- Watch as clusters of galaxies merge to form the universe in visualizations rendered from data simulated on Argonne's Blue Gene/P supercomputers.
- Learn how to solve any Black Belt Sudoku in 0.02 seconds, and discover how supercomputers, Sudoku, and science work together in solving logic puzzles.
- Interact with remote participants over the Access Grid Advanced Collaboration Environment, which enables groups of scientists from around the world to work together as if in the same room.
- Observe as high-performance computing, high-speed networking, and advanced displays are used together to provide astronomers with a new tool to investigate cosmic dark energy.
- Learn about the CIM-EARTH (Community Integrated Model of Economic and Resource Trajectories for Humankind) Project, which is used to understand the impact that energy usage, the economy, and climate change have on each other.
- Learn about the groundbreaking scientific and engineering research being done on one of the world's fastest supercomputers.
- See what's new with the TeraGrid Project, one of the world's largest, most comprehensive distributed cyber-infrastructures for open scientific research.

203 Physics, Environmental Science, Climate Research, Technology Transfer, Decision and Information Sciences

Inside the building

- See optics puzzles and illusions.
- Explore the valley of stability.
- Find surprising sources of radioactivity.
- Chat with a physicist about the Universe.
- Walk through an accelerator and learn how it is controlled.
- Learn about Ion-sourcery.
- Have fun with extreme cold.
- View a chain reaction.
- Turn matter into energy ($E=mc^2$).
- Visit the Gammasphere seen in the movie "The Hulk."

On the lawn

- Find out how computational models are being used to understand energy futures and the prospects for energy independence, and to solve problems such as public health and threat of emerging diseases, national security and prospects for global and regional conflict, and the rise and fall of ancient civilizations.
- Learn how Argonne teams up with industry and academia; see research results from prior partnerships and the benefits of working with Argonne.
- Visualize our local, national, and international environmental projects with interactive 3-D maps.
- Learn about weather and climate research.
- Explore projects in energy (wind energy, tar sands, ocean), the environment (chemical and radioactive remediation, meteorological measurements) and in national security (monitoring the conversion of Russian nuclear weapons).
- Calculate your environmental footprint.
- Participate in the "Where Does Your Electricity Come From?" contest.
- Create an Origami Earth.
- Learn and experience how scientists are using observations from the Atmospheric Radiation Measurement Climate Research Facility to gain consensus on climate change processes and provide accurate climate forecasts.

208 – Nuclear Engineering; National Security; Environment, Safety and Health

Inside the building

- Learn how a nuclear reactor works.
- Learn how nuclear energy can help meet America's needs for safe and secure energy without contributing to global warming.
- Visit the nuclear energy history exhibit that highlights our pioneering role in developing peaceful uses of nuclear technology used by major nuclear power plants throughout the world.
- Learn about Argonne's key role in the worldwide effort to use advanced nuclear technologies that enhance energy security and promote nonproliferation.
- Learn what is being done to convert research reactors around the world to the use of non-weapons-grade materials that will reduce the spread of nuclear weapons.

208 – Nuclear Engineering; National Security; Environment, Safety and Health

On the lawn (directly across from the building)

- Learn about Argonne's internationally recognized expertise in decommissioning reactors at their end of life.
- See the ice slurry technology that can save heart attack victims and surgery patients.
- Meet the Vulnerability Assessment Team; learn how the Team breaks into physical security devices, systems, and programs to expose their weaknesses in order to make them more secure.
- Find out about our National Security Programs; see demonstrations of technologies developed to keep our community and the nation safe.
- See an ergonomic office setup and learn about electrical safety at home.
- View instrumentation used to measure noise, organic vapors, and airborne particulates. Find out about your home's air quality.
- Learn how Argonne monitors its air, water, and soil to protect the environment at the Laboratory and in surrounding communities.
- Play "Is Science in Your Future?" Potential budding scientists can answer this question using an Argonne-designed and developed interactive video game.

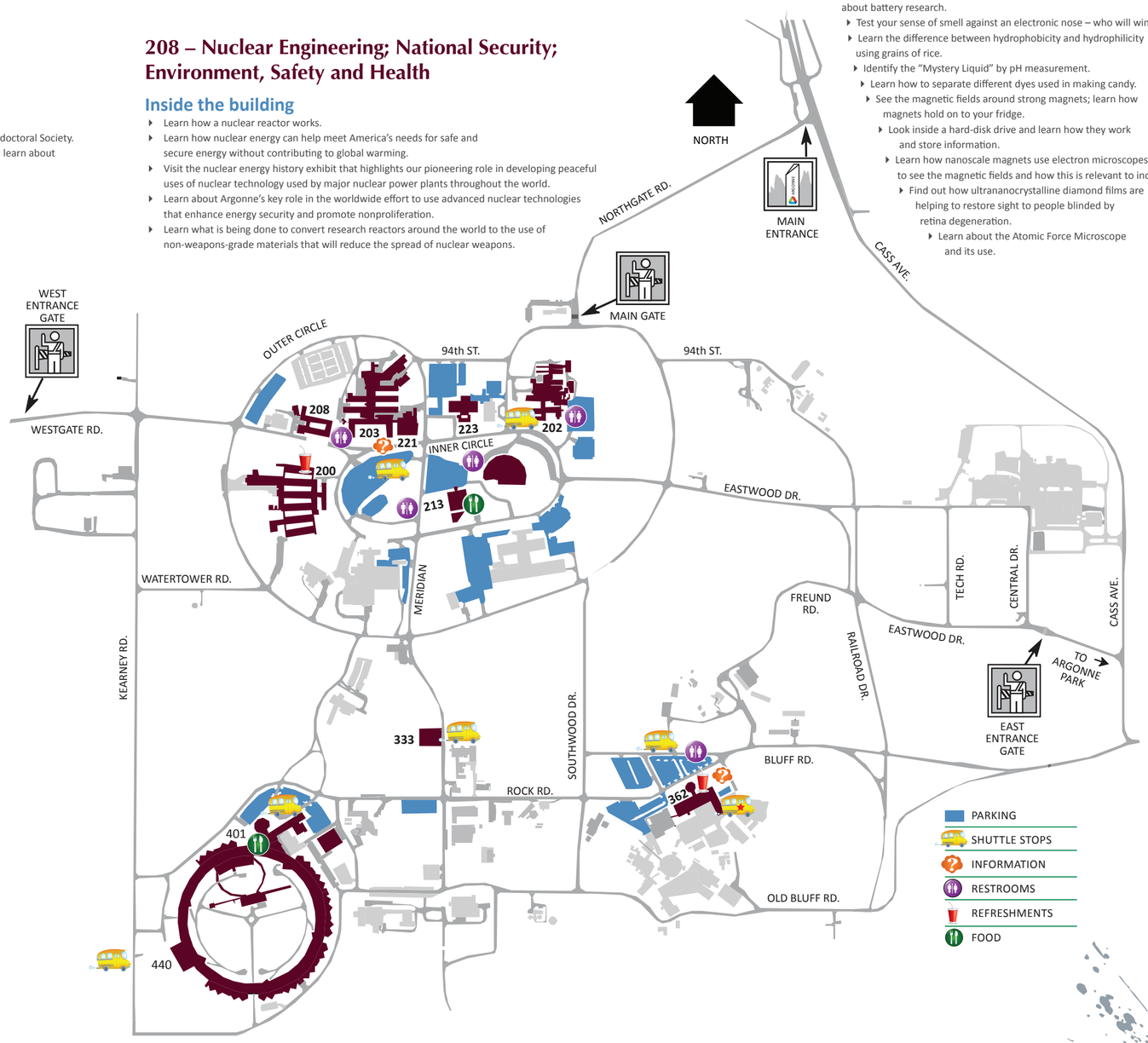
200 Chemical and Engineering Sciences, Materials Science

Inside the building

- See the "Science of Hydrogen and Hydrogen Safety" in the auditorium (see Featured Presentations for more information).
- Learn about "X-ray Imaging of Laser-Controlled Molecular Motion" in the auditorium (see Featured Presentations for more information).

On the lawn

- See demonstrations of a lithium-ion coil cell battery assembly and learn about battery research.
  - Test your sense of smell against an electronic nose – who will win?
  - Learn the difference between hydrophobicity and hydrophilicity using grains of rice.
    - Identify the "Mystery Liquid" by pH measurement.
      - Learn how to separate different dyes used in making candy.
        - See the magnetic fields around strong magnets; learn how magnets hold on to your fridge.
          - Look inside a hard-disk drive and learn how they work and store information.
            - Learn how nanoscale magnets use electron microscopes to see the magnetic fields and how this is relevant to industry.
              - Find out how ultrananocrystalline diamond films are helping to restore sight to people blinded by retina degeneration.
                - Learn about the Atomic Force Microscope and its use.



213 Partnerships

- Beyond Argonne… Hear about other programs and activities funded by the U.S. Department of Energy through you, the taxpayer.
- Find out how Argonne is spending money from American Recovery and Reinvestment Act funds.
- Learn how the Department of Energy is keeping you safe from terrorists.
- Visit with representatives from Bright Horizons Family Solutions and learn about Argonne's Child Development Center.

333 Fire Department

- View displays and interactive demonstrations of fire department apparatus and firefighting equipment.

440 Center for Nanoscale Materials – Nanotechnology

- Visit the Center for Nanoscale Materials (CNM), built with funds from the U.S. Department of Energy and the State of Illinois.
- Learn about the "nano" revolution – what do nanoscientists study?
- Hear how CNM research addresses the challenge of creating inexpensive, abundant, and efficient energy alternatives that meet America's energy security needs.
- See how scientists model the nanoscale world.
- Watch as gold nanoparticles change color depending on their size.
- See the nanoworld in three dimension with X-ray tomography.
- Discover Argonne's role in the evolution of tools for nanotechnology.

401 Advanced Photon Source

- Tour the Advanced Photon Source, the billion-dollar U. S. Department of Energy research facility where scientists use the Western Hemisphere's brightest X-ray beams to gather new information that promises to impact nearly every aspect of our lives.
- Watch the "Weird Science" demonstration as seen on CBS's Late Show with David Letterman in the auditorium (see Featured Presentations for more details).

362 Advanced Transportation Technologies, Energy Systems, Glassblowing

Inside the building

- See a "Scientific Glassblowing Demonstration" in the auditorium (see Featured Presentations for more details).

On the lawn

- Find out how an Argonne process recycles the plastic and foam from junked vehicles and home appliances to convert recycled materials into quality products.
- Learn about the Transportation Research and Analysis Computer Center, which provides high-performance computing resources to address priority national transportation issues.
- Learn how researchers are developing the technologies and standards that will help enable onboard "smart" charging of plug-in hybrid electric vehicles.
- Take a test drive with the Advanced Powertrain Research Facility's driving simulator.
- Hear about the development of advanced technology components, such as batteries, power electronics, and control systems, for application in plug-in hybrid and electric vehicles.
- Check out Argonne's omnivorous engine – it's been optimized to use any fuel!
- See the Mobile Automotive Technology Testbed for evaluating advanced powertrain technologies, including plug-in hybrid vehicles.
- Learn how low-temperature combustion in engines can reduce emissions and improved efficiency; see a video of the inside of an engine.
- See a demonstration of the laser ignition system that may replace spark plugs in natural gas-fired stationary engines for power generation.
- See the EcoCAR Saturn Vue; learn about the U.S. Department of Energy's advanced vehicle technology competitions for college students.
- View and learn about advanced clean diesel technology vehicles.
- Learn about the Clean Cities initiative, a grass roots effort of nearly 90 coalitions (including one in Chicago) that is advancing the use of alternative fuels and vehicles, hybrid vehicles, idle reduction technologies, and promoting fuel economy measures in their communities.
- Calculate your greenhouse gas emissions from your home to the Open House using a carbon calculator base on the GREET (Greenhouse gases, Regulated Emissions and Energy Use in Transportation) model.
- Learn about the battery research being done for advanced plug-in hybrid and electric vehicles.
- See and learn about the Through-the-Road parallel hybrid electric vehicle, developed by engineers to test advanced vehicle technologies.

366 High Energy Physics

Ride the special shuttle bus from the south end of the transportation tent by Bldg. 362 to reach Bldg. 366 – see the bus icon with a star on the map.

- Surf's Up! The Argonne Wakefield Accelerator accelerates electrons by having them surf on electromagnetic fields. Learn about this exotic accelerating mechanism, and get up close and personal to an experimental linear accelerator.
- See real-time detection and tracks of cosmic rays and terrestrial-charged particles that surround us every day.
- Learn about the Large Hadron Collider (LHC) at CERN and Argonne's major role in building the ATLAS detector.
- Curious about astronomy and astrophysics? Visit our hands-on displays and multimedia astronomy exhibit to learn more about them.
- Learn what is needed to detect elementary particles. Come see the various electronics that are involved in this detection.
- What is a Higgs boson? Can the LHC create black holes? Can we use antimatter as a weapon, as seen in the recent motion picture film "Angels and Demons"? Ask these questions and more at our "Ask a High Energy Physicist" booth.

ABOUT ARGONNE

Argonne National Laboratory is one of the U.S. Department of Energy's (DOE's) oldest and largest national laboratories for science and engineering research. Managed for DOE's Office of Science by UChicagoArgonne, LLC, Argonne employs roughly 2,900 employees including about 1,000 scientists and engineers, three-quarters of whom hold doctoral degrees. The Laboratory is located on 1,500 acres in southwest DuPage County and is completely encircled by the Waterfall Glen Forest Preserve.

Argonne applies a unique mix of world-class user facilities and leading scientific and engineering staff to develop innovative solutions to the grand challenges of our time: plentiful and safe energy, a healthy environment, economic competitiveness and a secure nation.

Collaboration is a critical dimension of Argonne research because it creates synergies and efficiencies in developing new ideas and approaches that advance innovation and discovery. Argonne staff actively seeks collaborative opportunities with colleagues in industry, academia and other national laboratories, as well as with their colleagues in other Argonne divisions. Since 1990, Argonne has worked with more than 600 companies and numerous federal agencies and other organizations.

Argonne's annual operating budget of around $540 million supports upwards of 200 research projects. Research at Argonne centers around three principal areas:

Energy > Argonne research and development programs in energy focus on three broad areas – Energy Storage, Alternative Energy, and Nuclear Energy -- all aimed at providing the nation with a safe, secure and reliable energy supply that is friendly to the environment and reduces our nation's dependence on petroleum.

Biological and Environmental Systems > Argonne produces integrated molecular-scale, hydrological, economic and social computational models to enable regionally focused ecological and climate assessments through metagenome analysis, protein discovery, regional climate prediction and integrated climate, energy and economic discovery.

National Security > Through research into the nonproliferation and forensics of weapons of mass destruction, decision sciences, new sensors and materials, and cyber security, Argonne provides critical security technologies that prevent and mitigate events that have the potential for mass disruption or destruction.

Scientific User Facilities > Argonne scientists and engineers carry out both fundamental and applied scientific projects and maintain a number of large scientific user facilities that enhance research, especially projects that use hard X-rays and advanced computers. Our user facilities include:

- Advanced Photon Source (APS)
- Center for Nanoscale Materials (CNM)
- Argonne Tandem Linac Accelerator System (ATLAS)
- Electron Microscopy Center (EMC)
- Argonne Leadership Computing Facility (ALCF)
- Transportation Research and Analysis Computing Center (TRACC)
- Atmospheric Radiation Measurement Climate Research Facility (ARM)