The CO₂ concentration is generally around 415 ppm but has spiked as high as 600 ppm. Jacobson says that everything from wind direction to seasons affect the measurements. For example, the CO₂ concentration is lower when the wind blows in from the east, across Lake Michigan. But concentrations increase when the wind blows north from downtown Chicago.

Even though these variables change, one thing is certain—the CO₂ is from the burning of fossil fuels. “When carbon dioxide is emitted, it has a unique carbon isotope composition that is diagnostic of its source,” Jacobson says. “When local CO₂ concentrations increase, the carbon isotope composition of the CO₂ trends toward a fossil fuel signature.”

Jacobson says he does not yet have enough data to make conclusions about long-term trends, but eventually his measurements will yield something similar to a Keeling Curve for Evanston.

Brad Sageman, Earth and planetary sciences, studies a spike in the Earth’s CO₂ levels that occurred 100 million years ago in the Cretaceous Period. By analyzing how the Earth responded to this perturbation in the carbon cycle, he hopes to improve our understanding of how the oceans and atmosphere behave when CO₂ and global temperatures are elevated. During the Cenomanian-Turonian event that Sageman studies, shallow seas flooded large areas of continental crust and oceans bloomed with explosive algal growth.

Are dramatically rising sea levels in our future? It’s a terrifying thought, but Ratner says there is still room for optimism.

“A lot of researchers are working on this problem, including many at Northwestern,” he says. “We are seeing more solar cells and windmills. I think we are building momentum in the right direction. It will require real advances in research and in policy, and the combined efforts of the people on the planet.”

IMSERC Celebrates Grand Opening

The Integrated Molecular Structure Education and Research Center (IMSERC) celebrated its grand opening on May 17. Originally known as the Analytical Services Laboratory, IMSERC opened in the 1960s and was housed in an old parking lot that was transformed into a makeshift workspace.

Now IMSERC lives inside of a two-story, 12,000 square foot laboratory on the north side of Tech between the B and C wings. It houses several state-of-the-art instruments, including nuclear mass spectrometers, mass spectrometers, and x-ray diffractometers.

“This space provides the infrastructure that was desperately needed to house the modern instrumentation to characterize the complex compounds that are synthesized at Northwestern,” says Andrew Ott, director of IMSERC. “In addition, this new lab provides an ideal learning and collaborative environment. The new IMSERC will not only facilitate education and research but will be a great recruiting tool for years to come.”

The design of the new space focuses on natural light, flexible open spaces, and an emphasis on cleanliness and safety. It also has a 25-person cyber-enabled classroom, giving students and researchers a quiet place to analyze the data they collected with instruments at IMSERC.

For more information about IMSERC, visit http://imserc.chem.northwestern.edu.
Core Facilities Receive Awards

The Office for Research selected three core facilities for the 2013 Outstanding Core Facility Award. The award recognizes the exemplary achievement of facilities that provide unique instrumentation and services to researchers at Northwestern University as well as to other academic and for-profit research organizations. In addition, three facilities were recognized for honorable mention.

Outstanding facilities are the Cell Imaging Facility (CIF), Dow-Northwestern-DuPont Collaborative Access Team (DND-CAT), and the Skin Diseases Research Center (SDRC) core facilities. Facilities that received honorable mention are the Integrated Molecular Structure Education and Research Center (IMSERC), Northwestern University Atomic and Nanoscale Characterization Experimental Center (NUANCE), and the Northwestern University Center for Atom Probe Tomography (NUCAPT).

Selections are based upon administrative services, research and technical staff, resource management, self-assessment, participation in educational and outreach activities, communication of services within and outside of the University, and results of a University-wide customer satisfaction survey. Phil Hockberger, director of core facilities, noted that this is the fourth year of the award and that the selection process has become more difficult each year due to the increasing number of excellent University facilities.

Outstanding facilities receive $2,000 for use related to the operation of the facility (e.g., professional development, hosting a workshop, seminar program) and a wall plaque honoring their achievement. In addition, the director, manager, and staff of each facility will be honored guests at an Awards Luncheon sponsored by the Office for Research in August.

To learn more about Northwestern’s core facilities, visit https://www.facilities.research.northwestern.edu.

2013 Core Crawl

The Chemistry of Life Processes (CLP) Institute will host its third annual Core Crawl next month. The lively and interactive event encourages researchers to socialize, network, and “crawl” between ten core facilities located in Silverman Hall. The event will take place from 3 to 5 p.m. on Thursday, July 18.

Core facility managers and staff will showcase the innovative research and discoveries taking place within Silverman Hall by leading tours through their facilities. Participants have the opportunity to learn how the cores work together to advance potential therapeutics from the discovery phase to prepare for human clinical trials. Participants will receive tickets from each core they visit to use for pizza, beverages, and raffles held in the Silverman courtyard at the end of the event.

Participating core facilities include: Center for Advanced Molecular Imaging; Center for Developmental Therapeutics; Center for Molecular Innovation and Drug Discovery; Integrated Molecular Structure Education and Research Center; Developmental Therapeutics Core; ChemCore; High Throughput Analysis Laboratory; Nanoscale Integrated Fabrication, Testing, and Instrumentation; Proteomics Center for Excellence; Proteomics Core; Quantitative Bioelemental Imaging Center; and Recombinant Protein Production Core.


OSR-Evanston Brown Bags

The OSR-Evanston Quarterly Network is a forum to update staff on current topics in sponsored programs administration. The ongoing topics include sponsor regulations and feedback, institutional policies and procedures, electronic platforms support research administration, and process and change management.

As a complement to the Quarterly Network, OSR-Evanston Brown Bags provide additional opportunities for OSR-Evanston to update staff on current topics in sponsored programs administration.

Upcoming OSR-Evanston Brown Bags:

“Sequestration and Sponsored Research,” noon to 1 p.m., Thursday, June 20 in the lower level of Chambers Hall.

“Proposal Routing Form,” noon to 1 p.m., Tuesday, July 16 in the lower level of Chambers Hall.

To keep informed of these events, sign up for the OSR listserv: www.research.northwestern.edu/osr/listserv.html.

For questions, please contact Kelly Morris at kellym@northwestern.edu.
IMSERC Gives Education and Research a New Home

When the Northwestern chemistry department decided to create the Analytical Services Laboratory in the 1960s for instruments involved in small molecule and structural characterization experiments, designers transformed an old parking lot into a makeshift workspace.

“The Technological Institute was completely renovated in the 1990s,” says Andrew Ott, director of the facility, which is now called the Integrated Molecular Structure Education and Research Center (IMSERC). “To my knowledge, this was the only section of Tech that was not a part of the renovation.”

Renovating the facility would have caused it to be closed for at least a year, delaying research already in progress.

Ott explains that new contrast agents for early cancer detection cannot be made without first synthesizing and characterizing the compound. In addition, some of our greatest environmental problems cannot be solved without understanding how to convert and store solar energy. These are merely two examples of the types of solutions being worked on here at the University.

With such important work being done at IMSERC, the University administration decided to invest $25 million into upgrading the facility.

Under a new name, which reflects a new vision, the core facility is currently experiencing a rebirth, slated for completion in 2011. A two-story, 12,000 square foot laboratory on the north side of Tech between the B and C wings will house several state-of-the-art instruments, including eight nuclear mass spectrometers, eight mass spectrometers, and four x-ray diffractometers.

“Originally the goal of the facility was to provide equipment and a service to help pay the bills, now education and research are our core goals,” Ott says. “We focus on problems based on scientific merit instead of based on income potential.”

The new location will not only have twice the space as the current setting, but it will also have twice the staff. Ott has hired three additional new staff members, so more one-on-one interactions can be made with research groups to help them find solutions and more training can be provided for undergraduate students. “We want undergraduates to have full access to and full understanding of our state-of-the-art equipment,” says Ott. “Hopefully it will make them more excited about science and chemistry and want to go on to graduate school.”

The design for the new facility, which will begin construction this summer, is similar to that of the Ford Center and Silverman Hall with a focus on natural light, flexible open spaces, and an emphasis on cleanliness and safety.

*IMSERC continued on the following page*
The lab is centered around utilities, ensuring there are the appropriate structures for gases to be properly routed and the correct type of ceiling to prevent contamination. There will also be a 25-person cyber-enabled classroom, so students and researchers have a quiet place to work after using the instruments to collect data.

“It needs to be a wonderful space because people spend long of hours in the lab,” explains Ott. “If you don’t like being here, then you’re going to try to get out as fast as you can. You’re not going to get that extra bit of data that might be the difference between making a discovery and leaving empty handed.”

Although the new name and new location are major changes for the chemistry department’s core facility, it will continue to undergo a constant reinvention as aging equipment is replaced and the face of science changes.

“Twenty years ago, you would hand a sample to a scientist in a white coat to work on it and give you the data. Today you can load the sample yourself, and we’ll email you the results. The turn-around time and direct access to instrumentation is incredible,” Ott says. “It’s similar to the transformation of computer technology where it used to be something behind closed doors and now is an everyday tool that you can’t imagine living without. It’s a good time to be a student.”

For more information about equipment, fees, and work being completed at IMSERC, please visit www.chem.northwestern.edu/imserc.

William Russin stands with a microscope at the Baylor College of Medicine. This model is similar to the one being built for Northwestern. Photograph courtesy of William Russin

The National Institutes of Health (NIH) has awarded Northwestern a $1.9 million grant to purchase a 300 kV (kilovolt) cryoelectron microscope. The JEOL 3200FS field-emission electron microscope will be one of less than a dozen of its kind in the United States.

The microscope, which is now being built in Japan, is designed to allow high-resolution examination of biological specimens at low temperatures. Researchers from Weinberg, McCormick, and Feinberg will take advantage of the instrument’s features.

“The beauty of this microscope is that you can observe frozen samples with no further processing and with less damage from the electron beam,” says William Russin, neurobiology and physiology, and principal investigator on the grant.

The microscope includes a wide range of features aimed at performing high-quality tomography, STEM (scanning transmission electron microscopy), dark field microscopy, EDS (energy-dispersive spectrometry), and EELS (electron energy-loss spectrometry).

The 3200FS is expected to arrive in August on the Evanston campus and will be installed in Silverman Hall.

Adapted from an article by Megan Fellman and Melissa Kreitner that appeared on the Northwestern NewsCenter.