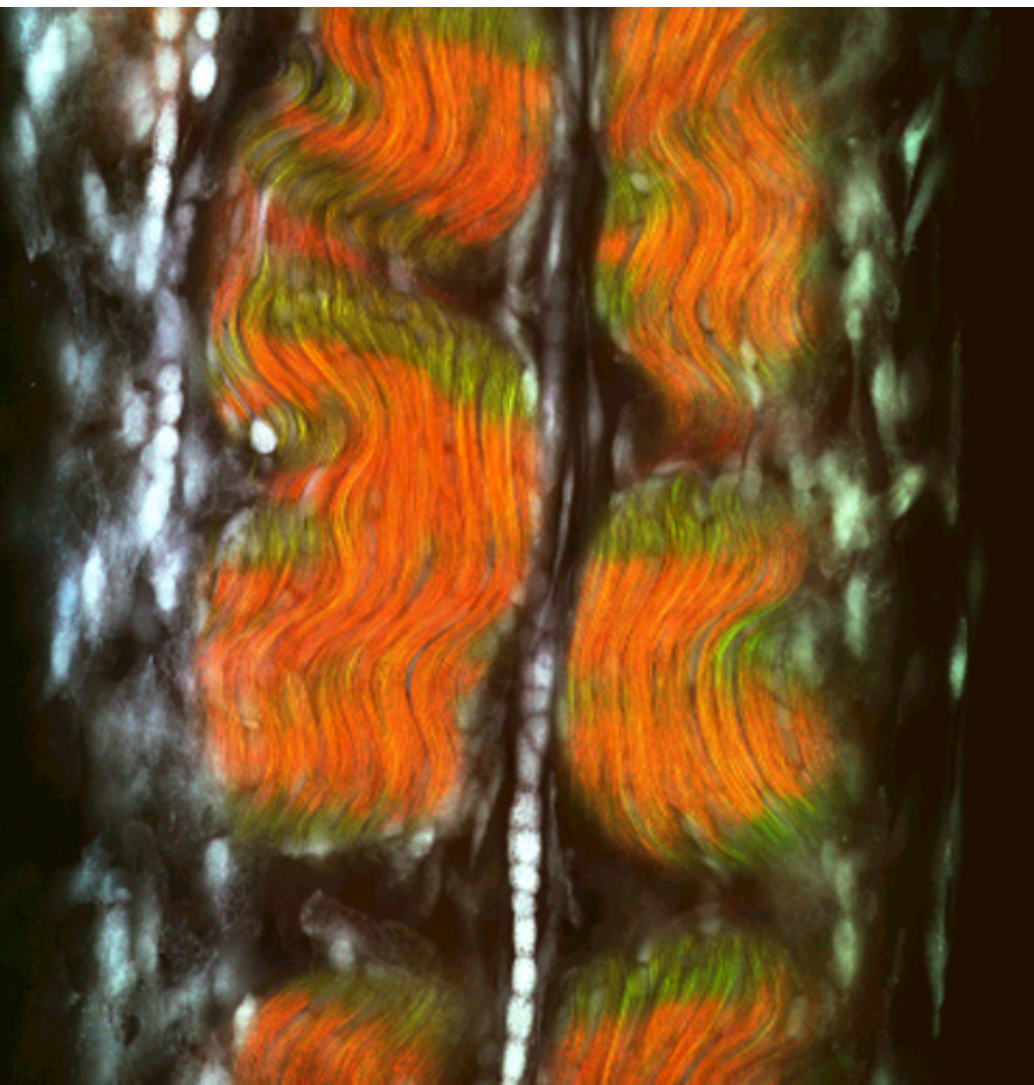


Structure of collagen protein seen at unprecedented level of detail



A view of a rat tail tendon using second-harmonic generation microscopy. The collagen fibers show up in green and red.

Jared Sagoff

The structure and behavior of one of the most common proteins in our bodies has been resolved at a level of detail never before seen, thanks to new research performed at the Advanced Photon Source (APS) at Argonne.

Illinois Institute of Technology biologist Joseph Orgel used the high-energy X-rays produced by the APS to examine the structure of collagen, a protein that composes more than a quarter of all protein in the human body and forms the principal component of skin, teeth, ligaments, the heart, blood vessels, bones and cartilage. In these tissues, collagen molecules pack themselves into overlapping bundles called fibrils. These fibrils, which contain billions of atoms each, entwine themselves into collagen fibers that are visible to the naked eye.

Scientists have known the basic molecular structure of collagen since the 1950s, when several different international groups of scientists discovered that it had a triple-stranded helical structure. However, researchers had never before had the ability to study the structure of an entire fibril in the same way that they could study an individual collagen

molecule, according to Orgel.

Orgel and his team performed diffraction studies on intact collagen fibrils inside the tendons of rat tails in order to understand just how the protein functioned within unbroken tissue. "We tried to draw a highly accurate map of the molecular structure of tissues," Orgel said. "By doing so, we hope to transform a very basic understanding that we have of the molecular structure of tissue into a much more tangible form."

Since the scientists kept the tendon tissue intact, they could see how the collagen molecule binds to collagenases, a class of enzymes which when working properly help to regulate the normal growth and development of animals but when malfunctioning can lead to the metastasis of cancerous tumors or rheumatoid arthritis. The visualization of this interaction could help drug developers to create an inhibitor to prevent the pathological action of the enzyme, Orgel said.

Previous studies of the structure of collagen had looked only at crystals of small fragments of the protein, so scientists had little idea of how it looked within intact tissue. "It's impossible to **See "Collagen" on page 2**

Five employees named Argonne Distinguished Fellows

Five employees have received the honor of being named an Argonne Distinguished Fellow. The 710 career level is Argonne's highest scientific and engineering rank.

Award of this rank confers the title Argonne Distinguished Fellow, which is comparable in stature to an endowed chair at a top-ranked university and recognizes exceptional contributions in a person's field.

The rank is given for sustained outstanding scientific and engineering research and can also be associated with outstanding technical leadership of major, complex, high-priority projects. A nomination process to be considered for career level 710 occurs annually.

The five new fellows are:

- James Laidler — Laidler has been at Argonne since 1988. Most recently he directed the entire national research program on nuclear fuel reprocessing in the capacity of National Technical Director for Separations for the DOE's GNEP programs. Laidler's present role is with the international component of GNEP where he leads U.S. bilateral technical engagement and collaboration on separations technologies.

- Ian Foster — As a member of the MCS Division since 1989, Foster has made outstanding contributions to high performance computing, including parallel programming tools and languages, parallel climate modeling and distrib-

uted computing. His pioneering research in the Globus middleware and his development of advanced cyber infrastructure has placed him at the forefront of computer science. Moreover, Foster has led major science and engineering projects such as GriPhyN (physics), NEESgrid (earthquake modeling) and caGrid (medical bioinformatics) and is currently principal investigator on large-scale efforts such as the DOE-funded SciDAC Center for Enabling Distributed Petascale Science.

- Andrzej Joachimiak — Joachimiak has been, and continues to be, an outstanding researcher in the fields of structural biology and structural genomics. From his description of the crystal structure of the trp repressor early in his career to his more recent achievements in the solution of key protein crystal structures from human pathogens such as *B. anthracis*, Joachimiak has earned both national and international renown as an outstanding scientist. In addition to his achievements and continued success as a researcher, Joachimiak also brings great enthusiasm, energy and scientific insight to his roles as director of the Structural Biology Center and the Midwest Center of Structural Genomics, both world-class organizations within Argonne.

- Donald Geesaman — Geesaman's leadership role in U.S. and world nuclear **See "Argonne Fellows" on page 2**

Spot, QASR awards recognize safety contributions

The laboratory is reinvigorating the Spot Award and Quality and Safety Recognition Award (QASR) safety award programs.

The Spot Award allows "on-the-spot" recognition of employees who exhibit good safety behavior or initiative. Managers will give a Spot Award card to an employee to recognize safe behavior or initiative. The employee will also receive an award form, which can be exchanged for a \$25 gift card at the Paymaster's window in Building 201. Spot Award winners will also receive recognition in *Argonne News*.

- Examples of safe behavior that might warrant a Spot Award include but are not limited to:

- Suspending work to improve hazard analysis or work planning
- Preventing an unsafe condition or

- SPOT Award recognizes rapid response to exposed wires - see page 3
- 'Safety@anl.gov' available to report safety concerns - see page 3

noncompliance with safety requirements

- Submitting practical safety questions or suggestions
- Exceeding expectations in safety involvement
- Demonstrating safety leadership in the workplace
- Presenting important information in a safety meeting
- Identifying unsafe equipment

The Quality and Safety Recognition (QASR) Award is presented to an employee who has made a significant contribution to the improvement of **See "Safety" on page 3**

INSIDE

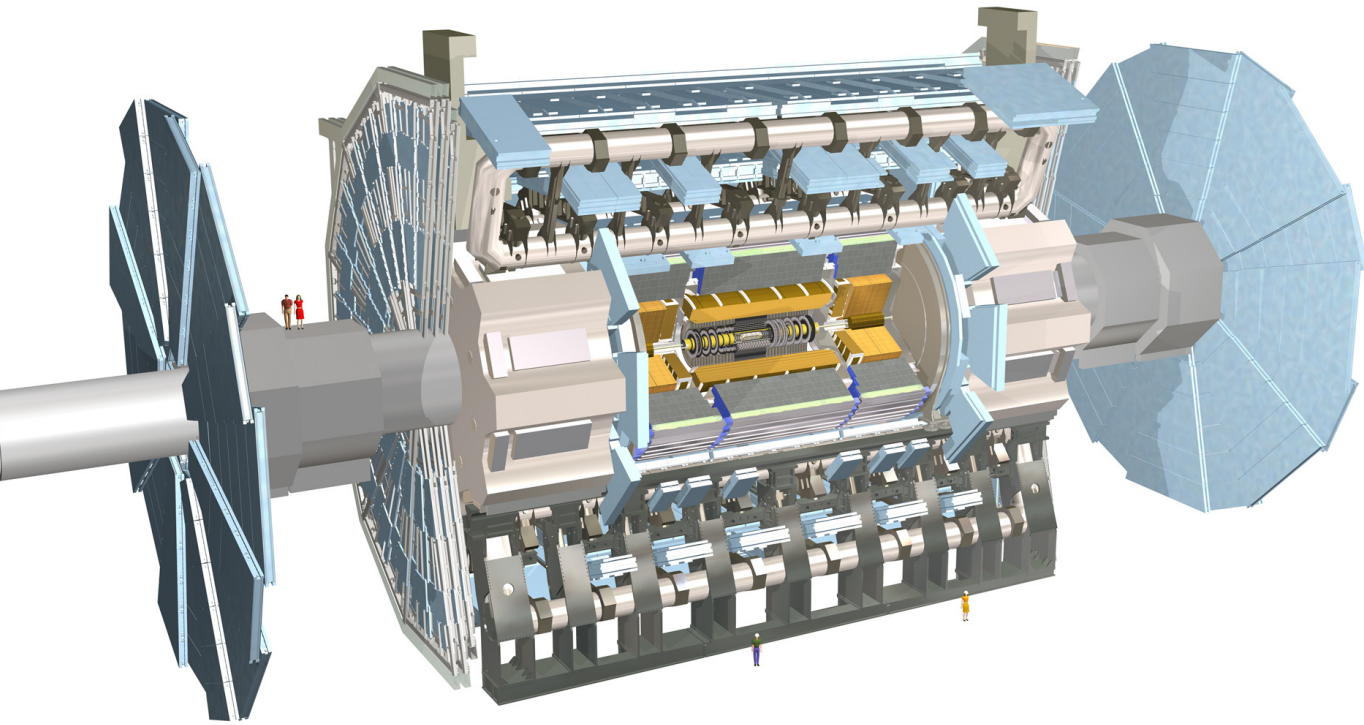
- LAST PIECE OF ATLAS DETECTOR LOWERED UNDERGROUND
- YOUNG WOMEN RECEIVE INTRODUCTION TO ENGINEERING
- WILMINGTON HIGH SCHOOL WINS 13TH ANNUAL RUBE GOLDBERG MACHINE CONTEST



UChicago
Argonne LLC



Last large piece of ATLAS detector lowered underground



The fully assembled ATLAS detector weighs about the same as 100 Boeing 747 jets, and is half the size of Notre Dame Cathedral. Argonne is among the 167 research institutions taking part in the detector's design, construction and eventual operation.

Researchers in the U.S. ATLAS collaboration joined colleagues around the world to celebrate a pivotal landmark in the construction of the Large Hadron Collider (LHC): the lowering of the final piece of the ATLAS particle detector into the underground collision hall at CERN in Geneva, Switzerland. Experiments conducted at this revolutionary LHC facility, poised to become the world's most powerful particle accelerator, may help scientists unravel some of the deepest mysteries in particle physics. The U.S. branch of the collaboration (U.S. ATLAS), which is based at Brookhaven National Laboratory and includes scientists and technicians from Argonne, built and delivered several key elements of the ATLAS detector.

"We're proud of the teams involved in this international scientific endeavor — one of the largest collaborative efforts ever attempted in the physical sciences," said Dennis Kovar, acting associate director for High Energy Physics in DOE's Office of Science. "This technical landmark brings us a huge step closer to unveiling a new level of understanding of our universe."

Of the almost 2,100 participants in the ATLAS collaboration, about 420 are U.S. physicists, engineers and graduate students. Hailing from 38 universities and four national laboratories, these U.S. collaborators are supported by DOE and the National Science Foundation (NSF).

The last piece of ATLAS lowered into the ATLAS experimental cavern is one of two elements known as the small wheels. The two ATLAS small wheels, though little in comparison to the rest of the ATLAS detector, are each about 30 feet in diameter and weigh 100 tons. The wheels are covered with sensitive detectors that will be used to identify and measure the momentum of subatomic particles called muons that are created in collisions at the LHC. The entire detector system has an area equal to three football fields, consisting of 100 million independent electronic channels. As charged particles pass through a magnetic field created by superconducting magnets, this detector has the ability

to accurately track them to the precision of the width of a human hair.

"This is a remarkable milestone in the complicated construction of the ATLAS detector," said Joseph Dehmer, director of the Physics Division at the NSF. "The LHC is one of the most exciting physics experiments for this decade and beyond. We are impressed by the hundreds of U.S. university and national laboratory scientists who are working hard to make this extraordinary project a reality. We look forward to the groundbreaking results that are now just around the corner."

Involving the work of 450 physicists from 48 institutions around the world, lowering this last small wheel marks the end of a decade of planning and construction of the muon spectrometer system.

Argonne has made significant contributions in all stages of acquiring, selecting, storing and accessing the data from ATLAS. Argonne physicists helped to design and construct the Hadronic Tile Calorimeter, which will measure the energy produced after tiny atomic particles called hadrons strike the sensor array.

The complicated network of data processing nodes that captures the signals from the array also owes its existence in part to work done by Argonne researchers. This network, called the "trigger," then selects the most interesting interactions for further analysis.

Argonne scientists also developed the software that permits the organization and sharing of the large amounts of data produced by the detector.

"Argonne's contributions to the ATLAS project illustrate the laboratory's long commitment to collaboration and show that we continue to work right at the leading edge of physics," said Argonne Senior Physicist James Proudfoot.

Experiments at the LHC will allow physicists to take a big leap in their exploration of the universe. The ATLAS detector may help its scientists unravel some of the deepest mysteries in particle physics such as the origin of

mass or the identification of dark matter. The ATLAS collaboration will now focus on commissioning the detector in preparation for the start-up of the LHC this summer. ▀

www.atlas.ch/

Firefighters team up to support cancer research



Fund-raiser participants (from left) Lieutenant Jay Rivette, and Firefighters Brandon Rinker, Randy Maurisak and Cecil Pinder.

Argonne firefighters have formed a team to help raise donations for childhood cancer research. Team members will shave their heads in a show of support for children undergoing cancer treatment.

Funds raised through St. Baldrick's events are helping some of the world's finest researchers to find cures for childhood cancer. The St. Baldrick's Foundation became an independent charity in late 2004 and began making grants in 2005. Funding applications are reviewed by a scientific advisory committee, and funds are made available to pediatric cancer researchers in the form of grants and fellowships.

The event will be held at the Orland Chateau March 14 beginning at 6 p.m. Everyone is welcome to attend.

Donations can be made online. ▀

www.stbaldricks.org/participants/team_info.html?TeamKey=2008-1709

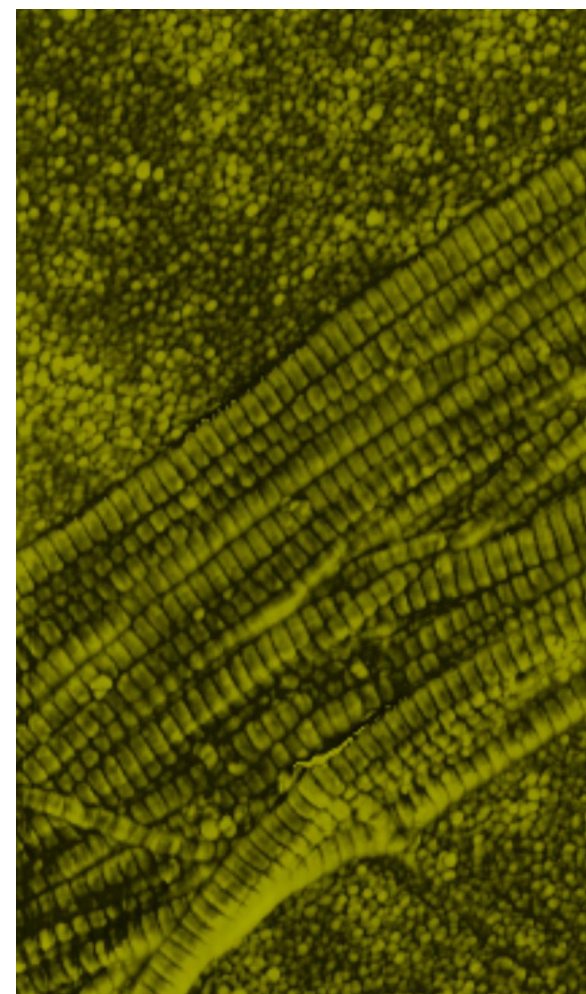
Argonne fellows

Continued from page 1

physics has been at the highest possible levels for two decades. He has made enormous contributions to the field both through his advice to the agencies and institutions within the country and to institutions in the international field. He is one of the leading nuclear physicists in the world. His frontier research spans a wide spectrum of nuclear and hadronic physics, ranging from nuclear reactions with ions and pions in the 1970s and 1980s to the quark structure of nucleons and nuclei in the 1990s and beyond.

• Michael Norman — Norman has made remarkable contributions to high temperature superconductivity and correlated electron systems. His accomplishments are all the more remarkable considering the competitiveness of the field. Solving the mechanism of high temperature superconductivity stands out as a grand challenge of condensed matter physics, with broad implications not only for superconductivity but for all of the strongly correlated electron physics. Norman's outstanding science has brought worldwide recognition to Argonne. ▀

Collagen



An atomic-force-microscopy image of collagen fibrils in a collagen fiber.

Continued from page 1

get the information that we did by removing tiny chunks of the tissue," Orgel said. "We couldn't obtain this data by single-crystal crystallography. This research was made possible only because of the BioCAT beamline provided by the APS."

The research appears in the Feb. 26 issue of the *Proceedings of the National Academy of Sciences*, and is available online. ▀

www.pnas.org/cgi/reprint/0710588105v1

SPOT Award recognizes rapid response to exposed wires



Rita Vanderwall receives her SPOT Safety Award from Rick Janik, APS Site Operations group manager.

Vigilance and rapid response to a potentially dangerous situation earned Rita Vanderwall of the Site Operations Group in the Advanced Photon Source Engineering Support Division (AES) a SPOT Safety Award.

SPOT Safety Awards, presented by Argonne's Environment, Safety, Health and Quality/ Performance Assurance, are presented to recognize "behavior that not only contributes to a better workplace, but keeps us strong."

Vanderwall was nominated by APS Site Operations group manager for "Stepping up to resolve safety issues quickly" when she received a report of a broken light fixture near a machine-shop door in the APS Experiment Hall. Her investigation revealed that the light was still powered (in fact, it was lit) with exposed wires at the base. She immediately called the on-shift FMS-BM foreman and secured the area with orange safety cones until a repair crew arrived to lock out power to the fixture and make repairs.

Nominations for SPOT awards can be sent directly to safety@anl.gov.

'Safety@anl.gov' available to report safety concerns

Employees can report concerns or submit suggestions related to safety online to safety@anl.gov. Messages sent to that address will be read by several members of the EQO organization. If action is needed, they will contact the appropriate person or organizations.

Safety suggestions submitted through safety@anl.gov will be eligible for Quality and Safety Recognition Awards.

To submit suggestions or concerns anonymously, employees should use the IMPACT system. IMPACT forms are located on all bulletin boards. ▀

Radiological postings changing site wide

An update to radiological postings site wide is taking place through April. The primary goal of this effort is to improve contamination control through postings that are clear, simple and uniform. In addition, many new postings require a signed radiological work permit (RWP) prior to entry so that work is permitted only with required controls, leading to better contamination control. Better postings are expected to improve safety by reducing the number of people exposed to contamination.

The primary changes in the new postings are as follows:

- Reduce excessive wording on signs
- Clearer information about what is required for entry, such as General Employee Radiation Training, Rad Worker I training or a signed Radiological Work Permit that specifies the permitted activities and required controls, including training, personal protective equipment and Health Physics tech coverage.

- Designation of a radiological buffer areas surrounding contamination areas

Safety awards

Continued from page 1

safety or quality at the laboratory. Unlike the Spot Award, the QASR Award is not immediate. Nominations are to be processed without notifying the employee and must be approved before the award is issued.

- Examples of safe behavior that might warrant a QASR Award include but are not limited to:
 - Identifying a safety-related, industrial hygiene-related, or environment-related hazard
 - Identifying suspect or counterfeit parts
 - Identifying a process improvement that results in enhanced safety or quality
 - Implementing safety changes that result in a significant cost savings

The QASR Award winners will receive a \$50 gift card, available for a variety of local stores and services; QASR Award Certificate; recognition by the laboratory, and recognition in *Argonne News*.

Designated managers and supervisors will be authorized to make the Spot awards or nominate employees for the QASR award.

- Posting of a large number of fume hoods and glove boxes as a contamination area, high contamination area, radiation area or high radiation area, if the levels mandate such posting per 10 CFR 835.

For additional changes, review a summary of information provided at the Radiation Safety Office Web site.

For more information, contact Mary Jo Ridenour (EQO), health physicist, at mridenour@anl.gov, at ext. 2-6786, or Sheri Minnick (EQO), deputy radiological safety officer at sminnick@anl.gov, ext. 2-6829. ▀

www.anl.gov/ESH/rad_safety

Young women receive introduction to engineering

Young women from throughout the area learned about opportunities in science and engineering during the annual Introduce a Girl to Engineering Day, held at Argonne Feb. 21.

"It's an opportunity for young women to be exposed to engineering in a fun and educational way," said Organizing Committee Chair Sandra Bittner (CIS). The girls spent the day with a mentor, toured the laboratory, participated in hands-on activities like constructing these balloon-powered race cars, and attended an interactive presentation about engineering careers. *Photos by George Joch.* ▀



'Social engineering' attacks rely on deception

Employees need to be extremely cautious when they receive e-mail messages and phone calls from individuals who appear to represent companies seeking new employees.

Information is being harvested from job posting sites targeting government employees and people who post résumés with government experience. Users should be on the lookout for suspicious requests for personal information.

Recently, a fraudulent e-mail representing a job-posting site was sent to an employee. The message requested further information. Upon clicking on the embedded hyperlink within the e-mail, a malicious program was installed on the user's computer system.

The laboratory is constantly at risk of falling prey to "social engineering:" the practice of obtaining confidential information through deception. Often, the hacker is looking for any possible way into a company's network. Recognition and proper reporting of such attacks is integral to the laboratory's defense strategy and starts with employees.

Employees who think they have been targeted should contact the Cyber Security Program Office immediately at cyber@anl.gov or ext. 2-3456.

To read more about social engineering, visit the Cyber Security Program Office Web site. ▀

inside.anl.gov/cis/groups/cybersecurity/

FSA claims filing deadline draws near

2007 flexible spending account claims must be postmarked by Monday, March 31.

Claim forms can be found in the Benefits department, on the WageWorks Web site and on Inside Argonne (from the home page, go to tools and tasks, click on benefits, then Flexible Spending Accounts, then forms).

The claim forms can be faxed to WageWorks at (877) 353-9236.

For more information, contact WageWorks customer service at (877) 924-3967, Monday – Friday, 8 a.m. to 8 p.m. Eastern time or e-mail help@wageworks.com. ▀

Argonne Club to host St. Patrick's Day party

The Argonne Club will sponsor a St. Patrick's Day party at the Building 617 Lower Level Thursday, March 13, from 4:30 to 8 p.m.

There will be dancing, a raffle and Guinness, Reuben sandwiches and corned beef and cabbage, as well as a prize for the most creative use of green.

There is a \$3 cover and all guests need to be badged by the AIC prior to the event.

More information can be found on the Argonne Club Web site. ▀

www.argonneclub.anl.gov

Wilmington High School wins 13th annual Rube Goldberg Machine Contest



The team from Wilmington High School celebrates winning first place in Argonne's 13th annual Rube Goldberg machine contest.

A team from Wilmington High School won Argonne's 13th annual Rube Goldberg Machine Contest held at Chicago Children's Museum on Navy Pier.

The team defeated five other teams by building a complex machine that took at least 20 steps to assemble a hamburger consisting of no less than one pre-cooked meat patty, two vegetables and two condiments, sandwiched between two bun halves.

Second place in the competition was won by Alan B. Shephard High School, Palos Heights, and third place went to team number one from Maine Township South, Park Ridge.

The People's Choice Award, chosen by popular vote by people attending the contest, went to Wilmington High School. The team received a trophy.

Other teams in the contest were:

- Gardner South Wilmington H.S., Wilmington
- Maine Township South, Park Ridge team #2
- Illinois Math & Science Academy, Aurora

The winning team received a traveling trophy to display until the 2009 contest and a tour of Argonne, which will include the Advanced Photon Source and lunch with Argonne scientists.

The first-place team also will demonstrate its winning machine at Argonne on the day of its tour. In addition, each team member and the team's faculty advisor received an Argonne National Laboratory Rube Goldberg Machine laptop backpack and an Argonne Rube Goldberg Machine Contest T-shirt.

Second-place team members and their faculty advisor received laptop backpacks and Argonne Rube Goldberg Machine Contest T-shirts.

Third-place team members and their faculty advisor received Argonne National Laboratory Rube Goldberg Machine Contest T-shirts.

These top three teams will compete in the 2008 Illinois State Championship Rube Goldberg Machine Contest Saturday, March 22, at the Chicago Children's Museum. They will compete against the

top three teams from the Friday, March 7, high school Rube Goldberg Machine Contest at the University of Illinois, Urbana-Champaign's Engineering Open House. The top two teams in the Illinois State Championship will advance to the National Championship Saturday, April 5, at Purdue University.

Rube Goldberg machine contests are inspired by Reuben Lucius Goldberg, whose cartoons combined simple household items into complex devices to perform trivial tasks. The machines combine the principles of physics and engineering, using common objects such as marbles, mousetraps, stuffed animals, electric mixers, vacuum cleaners, rubber tubes, bicycle parts and anything else that happens to be on hand.

Argonne's Division of Educational Programs and Communications and Public Affairs Division sponsor the March event in collaboration with Chicago Children's Museum and the National Rube Goldberg Machine Contest. The event is licensed by Rube Goldberg, Inc. "Rube Goldberg" is a registered trademark and copyright of Rube Goldberg, Inc. ▀

Classified ads

MISCELLANEOUS

BASEBALL BAT - Youth Baseball Bat, Easton scandium alloy model Triple 7. 30 inch, 21.5 oz, 2 3/4" full barrel. \$30. Mark Knickelbein. (708) 848-6536.

POOL - Swimming pool and deck-28 ft. round, 54 in. deep with cartridge filter, pump, automatic chlorine feeder, ladder and extras. Like brand new. Also 14 by 16 deck. \$500. Rod Habbe. (815) 735-3531.

CAMERA - Olympus Stylus 600 camera; 6 Mp; 15X zoom; 2.5" display; in original box with charger; software; manual (English, Spanish, French); USB and video cables; wrist strap; like-new condition. \$100. Ira Charak. (630) 325-2205.

Scholarship fund commemorates students killed at NIU

Argonne employees can donate to the Northern Illinois University February 14 Student Scholarship fund through the Argonne Credit Union.

The February 14 Student Scholarship Fund will receive gifts through the NIU Foundation for the general scholarship fund and work through the NIU Scholarship Committee to distribute scholarships to deserving students in the name of those who lost their lives in the shooting at Cole Hall.

Checks can be sent by inter-office mail to the Argonne Credit Union, or visit the credit union office and ask about the Argonne-NIU February 14 Scholarship Fund. For hours and locations, see the credit union's Web site. ▀

<https://www.argonnecu.org/>

TICKETS - 2 "Jersey Boys" tickets for Sunday 3/23/08 2PM performance. Ticketmaster price paid \$102.99. First \$50 takes them. Mike Thommes. (630) 983-8394.

COCKATIELS - 10-year-old Cockatiels, 4 males @ \$45 each, 6 females @ \$65 each. 3 cages available. Eugene Gruber. (630) 323-0117.

BOAT - 1986 Lund Tyee, 18'6", new canvas, new 76 lb. trolling motor, completely rebuilt trailer braking system, rod holders, marker buoys, travel top, 150 hp, everything in great shape. \$6,500. Chris Oldanie. (708) 226-1866.

NINTENDO DS GAMES - Diddy Kong racing DS, My Sims DS, 4 game fun pack (Monopoly, Boggle, Yahtzee, Battleship), Drawn to Life, The Sims 2 DS, Spectrobes DS, Pokemon Ranger DS, used in original packages. \$20 each. Dawn Ferrazzi. (815) 836-8359.

DOG - 4-1/2 yr old puggle. Loving, cuddler, house trained, up to date with all shots. Cage, bowls, etc. included. \$300. Liz Rizzo. 708-301-3685

HOUSING

HOUSE/SALE - Evergreen Park, totally updated 3 bedrooms, 2 baths brick split level home with sub-basement and gleaming hardwood floors. Brand new stainless steel appliances, windows and garage. \$239,000. Mary Dzielski. (630) 730-3007.

HOUSE/SHARE - Close to the lab., fully furnished, private bath, utilities included. \$450/month. Rose Lee Pausche. (630) 739-0126.

CONDO/SALE - Orland Park, 1st floor, 2 BR, 2 BA, New Appliances, new windows. \$150,000. Paulette Hubbard. (630) 257-6952.

AUTOMOBILES

2003 VOLVO - V40, 31k miles, all

Submissions sought for NIH Director's New Innovator Award

Submissions for the NIH Director's New Innovator Award are currently being accepted.

The award was created in 2007 to support a small number of new investigators of exceptional creativity who propose bold and highly innovative new research approaches that have the potential to produce a major impact on broad, important problems in biomedical and behavioral research. The research proposed need not be in a conventional biomedical or behavioral discipline but must be relevant to the mission of NIH. The New Innovator Awards complement ongoing efforts by NIH and its institutes and centers to fund new investigators through R01 grants, which continue to be the major sources of NIH support for new investigators. Thirty awards were made in 2007. ▀

grants.nih.gov/grants/guide/rfa-files/RFA-RM-08-014.html

power options including moonroof, leather, heated seats. \$13,600. Efim Gluskin. (630) 271-9923.

1997 ACURA - 2.2CL, dark green, 109k miles, Good condition, Emission warranty until 150k miles. \$ 4,500. Jeongmin Kim. (630)457-6958.

WANTED

APARTMENT/RENT - Looking for apartment near Argonne from April 25 to October. Gang Li. (650) 854-3227.

TREADMILL - Anna Bukowski. (708) 203-1913.

Employees bring musical comedy to congregation



A trio of Argonne employees are helping bring the musical comedy "Passover, the Musical" to Congregation Beth Shalom in Naperville.

Linda Gaines (ES), the show's producer; Adam Cohen (PS), assistant director; and Jeff Rest (NE) will appear in the show.

Curtains rise Saturday, March 15, at 8 p.m. and Sunday, March 16, at 3 p.m. Advance tickets are \$10 for adults, \$5 for children and \$25 for families. All are welcome. Call Congregation Beth Shalom (772 W. Fifth Avenue, Naperville) for more information at (630) 961-1818. ▀