News

Argonne NATIONAL LABORATORY

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New bottle cap thwarts wine counterfeiters

An offshoot of tamper and intrusion detection research, this new cap invented by Argonne's Vulnerability Assessment Team can detect fraudulent or tampered wine. By plugging the cap into a computer through a USB cable, a wine buyer or auctioneer can determine if the wine inside is genuine. New generations of the cap will contain a color sensor that detects a particular tiny section of a tie-dye pattern located under the cap. Photo by George Joch.

By Jared Sagoff

When the Roman historian Pliny the Elder wrote "in vino veritas" — in wine, there is truth — he must not have been drinking from a counterfeit bottle. Argonne researchers Roger Johnston and Jon Warner (both NE) have created a device to ensure that modern wine connoisseurs can have faith that they are drinking what they pay for.

In the past few decades, bottles of rare premium vintages have begun to command tens of thousands of dollars apiece at auction, and thousands of other wines retail for hundreds to thousands of dollars a bottle. Although there may be no match for quality of the product inside, the ease and accuracy with which fraudsters can pass off bottles of "two-buck Chuck" with ritzy labels have allowed wine counterfeiting to grow into a booming criminal enterprise.

This work represents an offshoot of the work by the Vulnerability Assessment Team (VAT) in Argonne's Nuclear Engineering (NE) Division. While the VAT conducts R&D on broad security issues, including nuclear safeguards, the NE division has a long history of addressing nuclear safeguards and security issues.

"As often happens," Johnston said, "R&D on one problem can lead to unexpected inventions; that is what happened here. We were working on tamper- and intrusion-detection projects for nuclear safeguards, courier bags and cargo security, and also on security for pharmaceuticals. Various concepts and technologies that were developed for those projects led to the current wine application."

"One of the biggest problems buyers of very expensive wines have at auctions is that they have no way of being absolutely sure if the bottle contains the wine it purports to without actually opening the bottle and taking a swig," said Johnston.

To combat this problem, Johnston and his colleagues in Argonne's Vulnerability Assessment Team (VAT) have created a cap that winemakers can fit over the bottle's cork. The cap contains a small circuit that completes when it is removed, triggering an electric pulse that creates electronic evidence someone has tampered with the bottle. "There's no alarm that screams at you if the wine's been opened," Johnston said, "but there's no way of getting rid of the evidence of tampering because basically, when tampering occurs, information is erased—a kind of anti-alarm."

By connecting the cap to a laptop through a USB cable, the auctioneer or the consumer can check whether or not the wine has already been opened or altered. Each cap has a unique bottle number that is registered to the winemaker, preventing wine counterfeiters from putting the Argonne caps on their fake Bordeaux and Burgundies.

In addition to the outright counterfeiting of fine wine, buyers face another

See "Counterfeit wine" on page 2

New process extracts pure hydrogen from contaminant in unrefined oil

By Angela Hardin

A commercial-scale process to extract and reuse pure hydrogen from the hydrogen sulfide that naturally contaminates unrefined oil, including oil sands, is one step closer to reality thanks to a collaboration between Argonne and Kingston Process Metallurgy Inc. (KPM) of Kingston, Ontario.

Argonne and KPM researchers have invented a molten copper reactor, an innovative process technology that is more energy-efficient than existing methods, according to Gregory Krumdick, an engineer in the Energy Systems Division. Moreover, the pure hydrogen gas stream that it extracts can be used to upgrade and clean crude oil and petroleum products and aid in a number of refining processes, KPM President Boyd Davis said. Krumdick, Davis, Alain Roy, KPM's vice president of operations, and former Argonne researcher John Hryn invented the technology.

In the reactor, hydrogen sulfide gas is first separated from the crude oil stock, using technology already in place. This gas is then bubbled though molten copper, which releases pure hydrogen. The hydrogen is then captured for use as a valued product. As the sulfur reacts with the copper, the copper is gradually turned into copper sulfide.

Open-pit mining uses shovels and large trucks to remove oil sand — a thick and sticky form of crude oil — in Fort McMurray, Canada. (Photo by Melina Mara/The Washington Post, reproduced with permission.)

Argonne is collaborating with KPM, a bench-scale process development firm,

See "Hydrogen sulfide" on page 2

Argonne scientist to take part in annual U.S. Frontiers of Engineering symposium

Bakhtiari

Argonne scientist Sasan Bakhtiari (NE) is one of the 82 young engineers who have been selected to take part in the National Academy of Engineering's (NAE) 14th annual U.S. Frontiers of Engineering symposium. The two-and-a-half day event will bring together engineers aged 30 to 45 who are performing exceptional engineering research and technical work in a variety of disciplines. The participants — from industry, academia, and government — were nominated by fellow engineers or organizations and chosen from more than 230 applicants.

The symposium will be hosted by Sandia National Laboratories at the University of New Mexico in Albuquerque Sept. 18-20, and will examine emerging nanoelectric devices, cognitive engineering, drug delivery systems and understanding and countering the proliferation of weapons of mass destruction.

"America's competitiveness will largely depend upon the next generation of innovators," said NAE President Charles M. Vest. "The U.S. Frontiers of Engineering program brings some of the country's rising-star engineers, from a diverse range of disciplines, together for an exchange of ideas that will surely help contribute to keeping us at the forefront of technological advancement and may even spark a breakthrough that changes the way we live."

The National Academy of Engineering, established in 1863, is an independent, not-for-profit institution that serves as an adviser to government and the public on issues in engineering and technology. Its members consist of the nation's premier engineers, who are elected by their peers for their distinguished achievements.

Sponsors for the 2008 U.S. Frontiers of Engineering are the Air Force

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ARGONNE NATIONAL LABORATORY IS MANAGED BY UCHICAGO ARGONNE, LLC FOR THE U.S. DEPARTMENT OF ENERGY

Computation Institute to bulk up data analysis capability with $1.5 million grant

By Angela Hardin

The Computation Institute, a joint effort of the University of Chicago and Argonne, has received a grant for a computer system that will enable researchers to store, access and analyze massive datasets.

The system is made possible by a $1.5 million grant from the National Science Foundation, which includes cost-sharing support from the University of Chicago. The new system is called the Petascale Active Data Store (PADS), which has been optimized for rapid data transactions, both on campus and around the globe.

Petascale computing involves the manipulation of petabytes of data. A petabyte is the equivalent of data contained on 1.5 million CD-ROMs.

The PADS design results from a study of the storage and analysis requirements of groups in astronomy and astrophysics, computer science, economics, evolutionary and organismal biology, geosciences, high-energy physics, linguistics, materials science, neuroscience, psychology and sociology.

For these groups, according to the PADS team, PADS represents a significant opportunity to look at their data in new ways, enabling new scientific insights and new collaborations across disciplines. PADS will also serve as a vehicle for computer science research into active data storage systems and will provide rich data with which to investigate new techniques.

Results will be made available as open source software, which can be freely downloaded and adapted for other purposes by interested users.

"PADS will bring a significant analysis resource to the University of Chicago campus and provide a testbed for research on high-performance analysis, a likely bottleneck in the scientific pipeline of the future," said Michael Papka, deputy associate laboratory director for Computing, Environment, and Life Sciences at Argonne. Papka led the interdisciplinary team of University of Chicago researchers who developed the PADS proposal.

Several nVidia Tesla graphics processing units (GPUs) will be integrated with traditional CPUs in the PADS system. These GPUs are capable of computing certain operations many times faster than general-purpose personal computers.

"The Tesla nodes will allow us to experiment with algorithms that combine traditional CPUs and special-purpose GPUs to extract results from data faster than in the past," said Ian Foster, director of the Computation Institute and the Arthur Holly Compton Distinguished Service Professor in computer science at the University of Chicago. "For example, in neuroscience, we will be using the system to accelerate magnetic resonance imaging algorithms to diagnose traumatic brain injury."

PADS will be a hybrid system with many layers of storage. These layers range from a large, tape-based system at Argonne to individual computers on campus and elsewhere. The intermediate layer is a rack of computer disks at Argonne containing duplicate data sets as insurance against hard-drive failure.

To University of Chicago scientists, PADS represents a dramatic improvement over current practice, which requires them to quickly analyze data and then remove it from the system to make room for new datasets. With the storage that PADS provides, groups will be able to keep data active for longer periods of analysis.

"PADS will allow us to share unique datasets with a larger community of researchers, enabling analysis of the data in different ways without the necessity to quickly remove the data because we need the space," said Don Lamb, director of the Center for Astrophysical Thermonuclear Flashes and the Louis Block professor in astronomy and astrophysics at the University of Chicago.

The Computation Institute was founded in 2000 as a joint effort between Argonne and the university. Its mission is to address the most challenging problems arising in the use of strategic computation and communications.

More technical specification and other information on PADS is available online.

www.ci.uchicago.edu/pads

'Father of the Internet' speaks at colloquium

Vinton Cerf (center), vice president and "chief internet evangelist" at Google, spoke at a Director's Special Colloquium Aug. 22. He was welcomed by Argonne Director Robert Rosner (left) and Chief Information Officer Charlie Catlett. Cerf's talk, "Things We Haven't Finished Yet in the Internet Infrastructure" focused on technologies and applications that will help the Internet handle the bandwidth and data needs of future users. Cerf is the co-designer of TCP/IP protocols and the architecture of the Internet. Photo by Wes Agresta.

Hydrogen sulfide

Oil sand comprises sand, water and bitumen. (Photo by Melina Mara/ The Washington Post, reproduced with permission.)

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under a work-for-others agreement. KPM is supported in part by Natural Resources Canada, which has provided $600,000 (Canadian) for the research over the last three years.

In addition to generating pure hydrogen, the process creates another valuable product, concentrated sulfuric acid, which is used widely in the chemical industry and which has become a valued agricultural commodity. The concentrated sulfuric acid is created when copper sulfide is reacted with air to recover the pure copper, releasing a concentrated stream of sulfur dioxide which is then reacted with water. The copper is then reused in the process with negligible losses, Krumdick said.

The reactions between the hydrogen sulfide and copper and the copper sulfide and air release energy that helps to heat the system, enable researchers to harvest the products efficiently, Krumdick said. The system operates at a temperature of about 1,200 degrees Celsius.

"Technologies that are in use today, including the widely used Claus process, are more energy- and capital-intensive," Krumdick said. "In addition, they also lose the hydrogen in the process. Instead of capturing the hydrogen from the hydrogen sulfide, the Claus process ends up converting it into water."

The multi-step Claus process was invented more than 100 years ago and is the most widely used method for removing the hydrogen sulfide that is present in crude oil and raw natural gas. The Claus process is also believed to be more limited than the Argonne-KPM process in terms of the other types of impurities it can handle. Costly energy-intensive modules that scrub other contaminants, such as ammonia, methane and carbon dioxide from raw oil and natural gas must be separately attached to Claus processing facilities.

Argonne computer modeling strongly indicated that the Argonne-KPM process would deal with those other impurities, a conclusion that was later experimentally proven. Contaminants such as ammonia and various hydrocarbons are reformed to their elemental constituents, providing an added benefit to the process, Krumdick said.

Argonne and KPM continue to scale up their experimental work to further test the process. "Our goal is to develop a pilot scale reactor," Krumdick said. "If a pilot plant demonstrates that the process is a major improvement over existing technology — and we believe it is — it will spur the interest of industries that use a process to separate hydrogen sulfide," Davis added.

"Companies will be able to retrofit their facilities with the process technology or construct new plants that incorporate it," Davis added. "In the meantime, we are working with Argonne to use the technology for other energy applications, such as gas cleanup for Integrated Gasification Combined Cycle plants."

Argonne and KPM began working on the technology in 2003 as a laboratory-directed research and development proof-of-concept project.

KPM is an industrial process research and development company. It focuses on providing quantitative data to support the development of novel processes and explores business opportunities in collaboration with customers and partners. It has clients from around the world who use KPM's expertise in process development and laboratory experimentation.

Counterfeit wine

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potential problem when assessing the purity of a bottle. To preserve the life of some of their wines, some winemakers will remove the cork from the bottle and blend in a small quality of wine from a newer vintage in a process known as "reconditioning."

Although reconditioned wines may have longer shelf lives, some winemakers try to pass off their reconditioned bottles as purely the older vintage, Johnston said. With the Argonne cap, bottles cannot be reconditioned without the buyer eventually finding out.

Because the vast majority of wine fraud targets the very highest tier of wine manufacturing, the Argonne cap could become a "status symbol" among wineries potentially interested in the Argonne technology, said systems engineer Jon Warner, who works alongside Johnston in the VAT. "Our device may be able to generate a certain snob-appeal factor among winemakers; they can say, 'our wine is so good, we needed to spend money on this security device,' although only a few dollars of parts are used in the device."

Johnston and Warner plan to enhance the security of the cap even further by connecting it to a high-quality color sensor chip. The top of the cork would then bear a tie-dye pattern of color swirls that the chip would have to recognize. According to Johnston , the sensitivity of the color sensor would make it extraordinarily difficult for someone to open the cap and put it back close enough to the original position to fool the sensor.

Organizational conflicts of interest

Recently a federal jury found Science Applications International Corp. (SAIC) guilty of violating the False Claims Act. The company was ordered to pay the government $6 million in damages.

The basis of the violation was that SAIC failed to disclose an organizational conflict of interest that potentially biased the advice it provided to the Nuclear Regulatory Commission (NRC). The NRC had contracted with SAIC to provide input for a rule to govern the recycling of radioactive waste from nuclear facilities. The federal jury found that SAIC had improperly concealed its relationship with several private firms that potentially would benefit from the advice they provided to the NRC.

This case highlights the importance of proper disclosure of organizational conflicts of interest (OCI). The laboratory has a clause in its contract with the U.S. Department of Energy (Clause I.80) that addresses OCIs. This clause in turn is included in contracts the laboratory executes with firms that provide advisory or assistance services. The intent of the clause is to ensure that Argonne or its contractors and their affiliates are not actually biased or do not appear to be biased due to financial, contractual, organizational or other interests.

Argonne has an existing OCI avoidance and mitigation plan in order to avoid any actual or apparent conflicts with respect to work to be performed for the NRC. This includes a screening mechanism by which the Office of Technology Transfer and the Legal Department review scopes of work that Argonne seeks to perform for the NRC, to ensure that Argonne and its industrial partners have no organizational conflicts of interest.

Questions regarding organizational or personal conflicts of interest should be directed to Greg Wojciechowski, Legal Department, at ext. 2-3047.

Argonne sends first shipments to Waste Isolation Pilot Plant

Employees who helped ready the first shipments of Remote-Handled Transuranic (RH-TRU) waste to leave the Argonne site in 13 years pose with the lead-lined shipping cask that contains the waste for transport to the Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico.

Employees are from the U.S. Department of Energy's Argonne Site Office, Argonne's Nuclear Operations Division, Facilities Management and Services, Environment, Safety and Health/Quality Assurance and subcontractors to Carlsbad DOE Central Characterization Program/Washington TRU Solutions.

Two shipments departed Argonne Aug. 14, and arrived at the WIPP site early Aug. 16. Argonne is only the second DOE site to ship RH-TRU waste to WIPP.

WIPP is a DOE facility specifically designed and built for the safe disposal of transuranic radioactive waste. WIPP is located a half-mile below the Chihuahuan Desert.

RH-TRU shipments from Argonne are projected to continue into October and begin again next spring. *Photo by Wes Agresta.*

Music club plans 'Blues and BBQ'

The Argonne Music Club will host an evening of "Blues and BBQ" Friday, Sept. 12.

The ticket price includes an outdoor barbecue buffet and music provided by the Big Eddy Springs Blues Band. The event begins with a cash bar at 5 p.m.; music begins at 6 p.m.

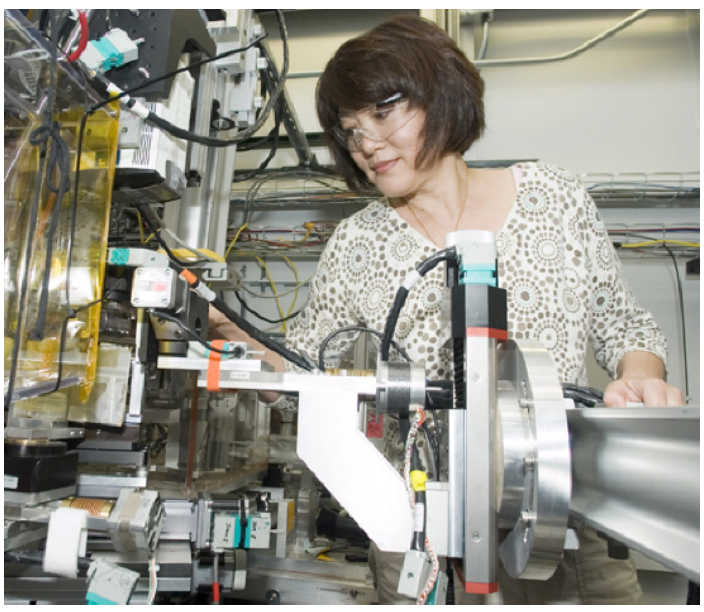
The menu will include barbecue pulled pork, barbecue chicken wings, burgers, hot dogs, baked beans, coleslaw, grilled corn on the cob, fresh fruit and assortment of fresh cookies.

The Big Eddy Springs Blues Band, fronted by George Joch (TSD), was formed at Argonne in 1993. The band regularly performs at several area establishments.

The Big Eddy Springs Blues Band, fronted by TSD's George Joch.

Tickets are $10 ($12 at the door) and will be sold this week in the Building 213 Cafeteria from noon to 1 p.m.

APS X-rays reveal strange oxygen molecular clusters



Yue Meng (Carnegie Institution's Geophysical Laboratory and HP-CAT) in the HP-CAT 16-ID-D research station.

Oxygen, the third most abundant element in the cosmos and an essential element to life on Earth, changes its form dramatically under pressure, transforming to a solid with spectacular colors. Eventually it becomes metallic and a superconductor. The underlying mechanism for these remarkable phenomena has been fascinating scientists for decades, especially the origin of the recently discovered molecular cluster $(O_2)_4$ in the dense, solid, red oxygen phase.

Now, researchers using a recently developed synchrotron technique — high-pressure inelastic X-ray scattering — at the High Pressure Collaborative Access Team (HP-CAT) beamline and the GeoSoilEnviro-CARS beamline at Argonne's Advanced Photon Source, found that, under pressure, the oxygen molecules interact through their outermost electron clouds or "1πg* orbitals." This interaction increases as ever-greater pressure is applied, leading to electron delocalization and, ultimately, intermolecular bonding that brings four oxygen molecules together to form the $(O_2)_4$ clusters at a pressure about 100,000 times atmospheric pressure (10 gigapascals).

The study was published in the *Proceedings of the National Academy of Sciences*. This work also demonstrates how new research tools can be used to probe subtle interactions between atoms and molecules at high pressure, potentially leading to new materials and technologies.

The researchers, from the Carnegie Institution's Geophysical Laboratory (GL), the University of Chicago, the University of Saskatchewan and the National Synchrotron Light Source, found that the interaction of these half-filled orbitals increases as greater and greater pressure is applied. This changes the location of the orbitals, and brings the four oxygen molecules together to form the $(O_2)_4$ clusters.

"The molecular interaction in oxygen revealed by this study is due to the unique fact that oxygen's outmost orbital is half-filled with two unpaired electrons," explained Yue Meng of the GL and HP-CAT and lead author of the study. "As the molecules are squeezed into smaller volumes at high pressure, electrons in the orbital inevitably move about, trying to pair with electrons in the neighboring molecules."

To study the dense solid phases of oxygen, the researchers applied the high-pressure inelastic X-ray scattering technique, which uses a synchrotron X-ray beam to probe the electronic bonding change as a diamond anvil cell subjects a sample to many hundreds of thousands of atmospheres. The researchers combined their experimental results with theoretical calculations by collaborators from the University of Saskatchewan to further reveal that there is an increasing interaction between the neighboring $(O_2)_4$ clusters in the red-colored oxygen, providing a mechanism for forming new bonding between the oxygen clusters in still higher pressure phases.

"The behavior of oxygen at high pressure demonstrates one of the most profound effects of pressure on matter, which transforms the colorless air we breathe into colorful dense solids," continued Meng. "The drastic change in the appearance of this familiar gas is due to the bonding changes in oxygen induced by high pressure."

Bakhtiari

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Office of Scientific Research, Defense Advanced Research Projects Agency, Department of Defense (DDR&E-Research), the National Science Foundation, Corning Inc., Cummins Inc., The Grainger Foundation, Intel Corp., Microsoft Research, Sun Microsystems Inc., Sandia National Laboratories, and numerous individual donors.

A meeting program and more information about Frontiers of Engineering is available online.

www.nae.edu/frontiers

Argonne NATIONAL LABORATORY

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Health Fair to have physical, mental and financial health exhibits

"Health Fair 2008" will be held at Argonne, Wednesday, Sept. 10, from 11 a.m. to 2 p.m. in the Building 213 Cafeteria. Exhibitors will be located in the Cafeteria and in Private Dining Room A. The fair will expand this year to include financial health in addition to physical and mental health.

Argonne health plan vendors, Argonne retirement plan vendors, medical department staff and other healthcare vendors will present information in a fun, interesting and interactive manner.

Free activities and educational topics will include chair massages; analysis of your ideal weight; basic exercises to keep you alive and fit; innovative and economical fitness tools for everyday use; blood pressure checks and talks with Argonne doctors and nurses; yoga; oral health and smoking; foot scans and analyses; saving for retirement; keeping fit by getting involved with the Argonne Exercise Club; acupuncture and Oriental medicine; personal energetic health screenings and more.

And don't forget about the raffle prizes. Stop by exhibitor tables, enter their raffles and you might win. Raffle prizes will include two $50 gas cards; one personal training package including four half-hour training sessions with an Argonne Exercise Club instructor and a personal training plan; one 2009 Argonne Exercise Club Membership ($30 value); one $25 gas card; one Sonicare Electric Toothbrush; one zippered tote bag filled with stuff; two duffle bags; one complimentary Natural Medicine Clinic new patient history and evaluation; one stadium blanket; one gym bag; one women's tote bag; a one hour Right Fit private fitness training session and a set of Indian Clubs for weight training ($150 value) and more.

The Health Fair is sponsored by Human Resources.

SPOT awards

The SPOT Award recognizes employees' contribution to safety and quality at the laboratory. The award recognizes employees "on-the-spot" who exhibit good safety behavior or initiative. Congratulations to the following employees who have recently received SPOT awards.

• Marvin Kirshenbaum (AES/CF) noticed insulation around a steam pipe in Building 330 that was degraded and asbestos spilling onto the ground. Kirshenbaum immediately contacted EQO to have the situation remedied so asbestos was not dispersed.

• Steven Jones (ASD/OA) discovered that an alternate lockout/tagout procedure for the APS linac was improperly followed. Upon his discovery, actions were taken to make sure the lockout/tagout was performed properly and that APS management was notified of the situation.

Employees also receiving SPOT Awards include:

• Sandra Kalina (LEG)
• Kevin Brown (TSD)
• Geralyn Becker (HR)
• Tamra Lagerwall (MCS)
• Gaylen Kuehl (FMS)
• Wes Agresta (TSD)

Classified ads

MISCELLANEOUS

COMPUTER – HP Pavilion, 192 MB RAM, Celeron processor (564 MHz), ethernet 10/100 NIC installed, Windows OS installed, also some software installed. Capable of running Windows XP SP2 and Microsoft Office XP, includes mouse, keyboard and speakers. $75 OBO. Marshall Mendelsohn. (630) 852-7092.

WALKER – Model 30755P Guardian walker with either 5" wheels or fixed legs. Never used with original ticket labels. Original cost $93. $70 or best offer. Bert Toppel. (630) 355-3323.

PHOTOGRAPHY EQUIPMENT – Manfrotto 3 section aluminum tripod w/level ($210 new) and Arca Swiss ball head ($400 new). Best offer over $300. Also a wide assortment of filters. Joe Falout. (630) 964-0368.

HIGH CHAIR – Chicco Poly Discovery green folding high-chair, used just one week, like new. $60. Jay Johnson. (630) 378-1248.

MISCELLAENOUS – Never used even-flow six 8 oz ventair baby bottles, new $25. Asking $5. Barely used bassinet with many features, new $100. Asking $30. Barely used bottle warmer, new $40. Asking $10. Dog crate for up to 75 lbs, new $100. Asking $50. Two expandable gates. $5 each. Sheila Trznadel. (630) 321-1301.

PUPPY – Five-month old tan and white pure bred female Brittany Spaniel in need of a good home. Craig A. Patterson. (815) 478-3653.

TV – Insignia 42" television with stand, three glass shelves, HD-ready, with four-year warranty. Mary Lipowski. (815) 671-7085.

FUTON – Queen size sleeper futon sofa. Approx. 85" long, prairie-style design, cherry finish. Very nice condition, recent futon cover. $100. Jim Fuerstenberg. (847) 394-3952.

GARAGE SALE – Friday and Saturday, Sept. 19-20, 9 a.m. - 3 p.m. at 21W131 Monticello Road, Lombard. Small appliances, kitchen items, collectables, books and lots of miscellaneous items. Some furniture including sewing machines and tables. Everything must go. Betty Iwan. (630) 953-0324.

HAY – $4.50 per square bale, grass variety includes timothy, rye and orchard, clover and alphalpha also. Nicole Green. (815) 462-4272.

GYROPLANE – Air Command gyroplane w/tandem 2-seat conversion kit. (not installed). 582 DCDI Rotax engine (70 hrs.), 68" dia. Warp Drive prop., 25' McCutcheon rotor blades. Complete set engine and airframe manuals. License as experimental or light sport aircraft. $15,000. Mark Malek. (708) 447-6782.

MISCELLANEOUS – Recliner sofa, two years old from Harlem, pictures available. $300 OBO. End tables, dining table and chairs, unit air conditioner and electrical fans, desktop and 19" flat monitor. Ruobing Xie. (630) 945-5656.

PHONE CHARGERS – Motorola RAZR car charger and two wall wart home chargers. $15. Chuck Mansfield. (815) 409-2183.

MISCELLANEOUS – Queen-size sleeper sofa. $250. Coffee table. $50. Porch furniture set. $300. Student violins, ½-size. $100. Full-size. $200. Wooden bookshelf. $10. Desk. $30. TV stand. $10. Two stools. $10 each. Desk lamp. $10. Shigemi Sasaki. (630) 790-4507.

TRAILER – 1983 Layton Travel trailer, 24.5 feet, sleeps seven, full bath with tub/shower, needs one new roof vent and minor repairs. Equalizer hitch included. Located in Pound, WI. $2,000. Karen Kerwin. (630) 739-4283.

LAWN MOWERS – Sears 22-inch aluminum deck, side discharge. Sears 20-inch mulcher/rear bagger with bag. Both are push mowers in good condition. $40 each. Jim Emerson. (815) 436-2145.

POP-UP CAMPER – Older Starcraft pop-up camper, sleeps six. Great canvas ad pulls well. $150. Pat Herman. (815) 436-5680.

AUTOMOBILES

2006 CHEVY – Monte Carlo LT with leather, AC, power everything, 31K miles. $12,000. Nancy Brennan. (708) 424-2948.

1999 FORD – Contour SE sport, 2.5 liter, automatic, red, gray cloth interior, six-disc CD changer and in-dash cd/mp3/radio, remote starter, 188k miles. $1,500. Kimberly Greskoviak. (815) 514-3715.

2005 CHEVROLET – Cavalier 2D coupe LS, blue, 55,000 miles (mostly highway), great on gas, very clean, CD and AM/FM radio, power steering, cruise, cloth seats, rear spoiler, automatic transmission, AC, rear defrost, ABS, moonroof, no rust, no dents. $8,000 OBO. Kelly Shaeffer. (815) 467-1068.

1978 SEARS – Free Spirit moped made by Puch of Austria. Great condition, 1,810 mi, 2hp, 30 mph, 150 mpg, mag. alloy wheels, w/assembly and service manuals. $550 OBO. Mark Malek. (708) 447-6782.

2002 MERCURY – Cougar, 67,000 miles, 2D sport hatchback, PS, PB, AC, AM/FM/CD, good condition, VIN 1ZWHT61L625608545. $7,000. Nestor J. Zaluzec. (630) 881-6038.

1998 MERCURY – Villager, seven-passenger van, new brakes and tires, front power seats, AC, cassette, power windows/mirrors. Minor dings on the left front fender. One owner, garage kept, highway miles (94K). Blue/silver exterior and gray cloth interior. Runs great! $2,500 OBO. Art Guelis. (630) 670-5499 evenings.

2005 TOYOTA – Corolla, $24,000 miles, cruise control, power locks, CD player, good condition. $13,000. Jan Buckley. (630) 605-2627.

HOUSING

ROOM/RENT – Bolingbrook, close to I-55, within 15 minutes drive of Argonne. $500/month including utilities. Xiang Sun. (630) 226-1719.

HOUSE/SHARE – 15 minutes from lab, furnished, utilities included. $380/month. Moonkyu Park. (630) 991-6594.

HOUSE/SALE – Minooka, 2 bedroom, 1.5 baths, loft overlooking two-story foyer, quiet private drive, full walk-out partially finished basement. $192,500. Jennifer Seivwright. For more information and pictures call (815) 467-4496 or e-mail *kgsmama28@att.net*.

TOWNHOUSE/SALE – 2 BR, 2 BA with Jacuzzi tub, heated ceramic tile, carpeting in bedrooms and two-car garage. All brand new appliances. Perfect starter house, everything finished and ready to be enjoyed. North of Wilmington between the Kankakee River and Midewin State Park. $200k OBO. Cathy Peters. (630) 863-4263.

HOUSE/SALE – Green Trails 3 BR, 2.5 BA, School District 203. Great outdoors (25 miles of trails, tennis courts, parks). Move-in condition, vaulted living and dining rooms, fireplace, full finished basement. New hardwood and Italian ceramic floors, new brick patio. Lisle. $385,000. Maria Iavarone. (312) 593-7247.

HOUSE/RENT – Unfurnished, 3 BR, 2 BR, finished basement. 2 1/2 car detached garage, large backyard, appliances included. 1.8 miles from Argonne. $1,600/month plus $1,600 security deposit. Ron Shepard. (630) 312-8506 or *peggy-shepard@comcast.net.*

HOUSE/SALE – Clarendon Hills, 3 BR, 2 BA ranch with finished basement and large backyard. Hinsdale Central school district, seven miles from Argonne, MLS 06900818. Nima Jahedi. (630) 706-0646.

WANTED

RECUMBENT BIKE – good shape & reasonably priced. Nancy Wunderlich. (708) 301-2635.

LOST AND FOUND

LOST – Tuesday, Aug. 19 a pair of wire-rimmed bifocal prescription sunglasses. Between the Building 213 Cafeteria, Building 201 and Human Resources. If found please contact Marge Collins. (630) 325-5505.