CCS News Bytes

LALP-06-059 **June-July 2006**

Former LANL Director Robert W. Kuckuck (center, facing camera), chats with Rashit Shagaliev, leader of the VNIIEF delegation.

Years of Effort Led to VNIIEF-LANL Conference

When the Cold War was still in deep-freeze mode, it could never have happened….

In May 2006, a team of Russian computer scientists from VNIIEF, a laboratory in Sarov, Russia, sat down with a room full of Los Alamos National Laboratory (LANL) scientists from the Transport Methods Group (CCS-4) and other computer science organizations and talked—through translators—about the problems they work on and how they approach their tasks. Each team gave a presentation on its work, and as the conference continued, little groups of three—a Russian scientist, an American scientist with a laptop, and a translator—huddled in adjoining rooms to share knowledge.

Robert W. Kuckuck, then interim director of LANL, dropped by on one of his last days in Los Alamos and visited at length with those attending the conference. The response from the Russians was warm and friendly, and before he left, Kuckuck asked them what he should pack for a planned visit to Sarov.

How did we reach this rapprochement?

(Please see RUSSIANS, page 3.)

DRC Rates CCS Division '*Outstanding*/Excellent'

The final report from the Division Review Committee (DRC)—which provided help for the Computer, Computational, and Statistical Sciences Division (CCS) May 2-4, 2006—has now arrived. As expected, the committee rated CCS "*Outstanding*/Excellent."

In the executive summary of its final report, dated July 11, the DRC said, "…The division has continued to make progress in difficult circumstances. As in past years, the DRC was impressed by the quality of the research conducted by CCS, the transfer of new technologies to laboratory practice, and the increased engagement by CCS with other divisions."

In its fifth report, the DRC emphasized again some of the same concerns that it had mentioned in past reports. It said in the executive summary:

"…There remain areas of concern that need attention from LANL management. These include easier access to foreign nationals and universities for non-classified research (…particularly important to CCS given the rapid changes in computing); the lack of adequate, high quality space; unstable staffing and the loss of key staff; and a more conducive environment for external research interactions."

(Please see DRC, page 2.)

Trident Wins R&D 100 Award

Justin Tripp of CCS-1, the principal developer of Trident, was out of town when the word came: Trident had won an R&D 100 award.

He and his wife, Megan, were in Roswell, where she participated in a 10K race on July 1. When he returned, Tripp said, "I came into my office, and there was a fax sitting on my desk." It was a letter from Tim Studt, editor-in-chief of R&D 100 Magazine, informing him that Trident had won.

(Please see R&D 100, page 2.)

R&D 100 (Cont'd from p.1.)

Tripp said his reaction was "utter amazement." He said he was very pleased. "Yes, it was good," he said—but, he added, "It's still somewhat unreal."

"All sorts of people knew before me," he said. When he started reading his e-mail, he found that he had messages telling him about the award from Maya Gokhale in CCS-1 (one of Trident's co-developers) and from the Laboratory's Technology Transfer Division. He also had e-mail congratulations from many other people.

Gokhale had already informed the other Trident co-developers: Kristopher D. Peterson, Jeffrey D. Poznanovic, Christine Ahrens, and Neil J. Steiner.

One of the first things Tripp did was to send an e-mail of thanks to Charmian Schaller, the editor on the Trident submission, and to Donald Montoya, the graphic designer who created the cover.

Tripp is now arranging to get pictures taken for the magazine, which will officially announce all of the winners in its September 2006 edition. (Five of the Laboratory's 16 entries won.)

Tripp has received an invitation to the R&D 100 banquet in Chicago on October 19. It's a "black-tie event," he said, and he plans to go and take his wife.

Trident's victory was mentioned in the "Technical Highlights" portion of Associate Director Alan Bishop's Theory, Simulation & Computation Weekly Update for July 10. As the update said, "Trident is a high-level language compiler that supports floating-point data types and operations. It translates into field-programmable-gate-array hardware scientific algorithms in the C computer programming language that contain floating-point mathematics. Without a compiler such as Trident, computational scientists cannot access the reconfigurable hardware. In the future, Trident, combined with tools to locate computationally intensive regions, may be used to identify through the use of reconfigurable-logic arrays blocks of code suitable for acceleration."

Trident is the latest in a series of CCS-1 R&D 100 winners. Among the previous winners were Clustermatic, the 10-Gigabit Ethernet Adapter, and mpiBlast in 2004, and Green Destiny in 2003.

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DRC (Cont'd from p.1.)

Later in the report, the DRC expressed concern "about the balance between short-term and long-term research and development," noting that the long-term success of CCS "depends on its ability to recruit new talent…." It also said, "The funding model at LANL looks like a University in which all the funding is soft money. This inhibits the development of capabilities for the future."

Repeating a concern that it had raised several times in the past, the committee said, "The current distribution of CCS across multiple buildings makes it challenging to carry out collaborations with other divisions and between different groups within the division. Innovations in computer and computational science most often arise from the collaborations that begin serendipitously because researchers see each other every day… LANL management should take steps to bring together all (or almost all) of the CCS division staff in a single building that is located close to the principal divisions with which it collaborates."

The DRC expressed concern about recruitment and retention. It also expressed concern about morale, saying, in part, "The main issue currently is the uncertainty over what the future holds when weapons programs are declining and the details of the contract transition are not completely understood."

The DRC called for one major change right at the top of the new Los Alamos National Security (LANS) hierarchy, saying:

"At a very high level, we believe computing at LANL is so strategic to the laboratory's future that a Principal Associate Director for Computing is needed. This individual and office should have a broad strategic view and authority, as well as personal knowledge of computing and consequent credibility, reporting at the highest level. Computing is a fundamental strength and key capability of the laboratory and is of increasing salience as new problems are undertaken."

The report also expressed concerns about the new LANS management structure, "as it separates science, mission, and operation," and, "…there is no stable and stabilizing funding for science."

The DRC report provided brief, positive reviews of CCS-1, 2, 3, 4, and 5.

(Please see More DRC, page 3.)

More DRC (Cont'd from p.2.)

The DRC expressed support for RoadRunner, saying, "Projects like RoadRunner are risky, but various CCS projects have showed the benefits of heterogeneous computing. These benefits, coupled with prudent project management, will reduce risk and provide a sustained petaflop system."

To read the entire nine-page report, visit the CCS Division Office Internal website (http://int.lanl.gov/orgs/ccs) and click on "2006 DRC Report," which appears in the upper left, under the heading "Review Committee."

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RUSSIANS (Cont'd from p.1.)

Todd Urbatsch, left, talks with people from the conference and a translator outside University House.

In a recent interview, Todd Urbatsch, group leader of CCS-4, said that he knew two of the Russians—Rashit Shagaliev and Igor Belykov—before the conference began. "I met them in their hometown, Sarov, when we went over in 2003," he said.

Urbatsch recalled that a former Laboratory Director, Sig Hecker, began to be deeply involved in exchanges with the Russians in the 1980s.

Los Alamos, New Mexico, and Sarov became Sister Cities, and a whole series of visits began. Medical doctors from Los Alamos went to Sarov. People from Sarov visited Los Alamos businesses, including the Los Alamos newspaper, and a science writer from the paper visited Sarov. One visiting Russian group held a public meeting at Fuller Lodge, sharing photographs and describing Sarov in detail, telling about the city's background as a religious center venerating St. Seraphim before the Communists ruled Russia (and changed the city's name to "Arzamas-16").

In the 1990s, Urbatsch said, "They started a numerical methods technical exchange." It died out—but in January 2003, it was revived.

Irv Lindemuth, a Laboratory scientist who was leading the Russian-American exchange, had set up a visit to Sarov for late 2002. Ray Alcouffe of the Transport Methods Group planned on attending, but lack of Department of Energy approval postponed the visit twice. Alcouffe could not participate in the final scheduled time, so he got Urbatsch involved. Urbatsch said that Jim Kamm and Bill Rider (of CCS Division at that time, X Division now) were involved in the computational physics exchange, and, "There were a bunch of materials guys"—Tony Zocher, Walt Atchison, Dean Preston, and Bob Reinovsky from X and P Divisions and Jim Goforth (now in the Shock and Detonation Physics Group, DE-9). Goforth had made over a dozen trips to Sarov by that time.

Urbatsch said that in his January 2003 trip to Sarov, in addition to exchanging information on mathematics and computer science, he visited Red Square, shopped at GUM (the state-owned indoor mall), and went to a flea market outside Moscow with Zocher, who speaks Russian.

Later, in a nine-page report on his trip, Urbatsch observed that at VNIIEF, "The 900-person strong division, led by Dr. Rashit Shagaliev, consisted of three departments, pertaining to methods and algorithms, code development, and computer hardware." Urbatsch wrote at length about "several interesting and surprising observations" on the radiation transport efforts at VNIIEF.

He described extensive meetings at which he and other LANL delegates gave three talks and the Russians gave many presentations. He spoke about how VNIIEF and LANL used different approaches to some of the same problems, and he recalled with amusement that one talk was introduced as "'Dessert for Dr. Urbatsch, who wants to apply Monte Carlo to everything!'"

Urbatsch wrote in detail about two proposed contracts between VNIIEF and LANL.

He also included considerable description of Sarov, its history, and his experiences as an official tourist. Following are a few excerpts:

(Please see More RUSSIANS, page 4.)

More RUSSIANS (Cont'd from p.3.)

"…The monastery in Sarov was a major monastery in the network of monasteries throughout Russia. The network consisted of a monastery every 30 miles … During World War II, the director of Sarov decided to remove any tall structures that might attract an air attack. He destroyed many of the monasteries in Sarov … He wanted to remove the bell tower, but the bell tower also housed the water supply, so it was allowed to stand. He wanted to destroy the St. Seraphim Monastery, but it was being used by the Theater, so it was allowed to stand—a very interesting comment on Russian priorities. Fortunately, the director got promoted to Moscow before he could do more damage. For the celebration (of the 100th anniversary of the canonizing of St. Seraphim on July 31, 2003), Sarov is hurriedly refurbishing the St. Seraphim Monastery. They began by building a Drama Theater in order to get the artists out of the monastery. As is often the case, they are rediscovering beautiful artwork behind false ceilings, etc."….

"…We ate lots of beef, but I never saw a single cow…."

"…Our tour of Sarov included the plaza, the statue of St. Seraphim, and the bath house. The bath house is where Nicholas II … came when his wife could not bear him a child … (She) bathed in the Sarov waters and, one year later, produced the prince. Sarov's water comes from a glacier-fed, underground reservoir. They bottle the water (natural and carbonated) and ship it all over Russia and abroad. I've always thought Los Alamos' water was good, but Sarov's was better…."

"…I often use the phrase 'degenerate analytic test problems' here at home. At VNIIEF, 'degenerate' got translated as 'mentally retarded,' and they all laughed at me….."

Urbatsch toured the Sarov Nuclear Weapons Museum and was interested to note that their version of Fat Man was on display. He said the Russians responded with good-natured amusement when he asked them whether the model was "on loan from Sandia." There were also pictures of J. Robert Oppenheimer and Gen. Leslie Groves.

Urbatsch wrote in detail about the décor of the "House of Scientists," where the Americans and Russians met together, and about the three elaborate meals each day—good, but very unusual by American standards.

Former CCS Division Leader Bill Feiereisen (left), visits with Shagaliev (center) and a translator.

He noted that the Americans attending the meeting in Sarov were lucky to experience relatively warm weather.

Urbatsch also attended a transport methods meeting at Lake Tahoe, Nevada, in 2004. "Igor and Rashit were there," he recalled.

Fast forward to May 2006.

Urbatsch said that during a recent trip to Sarov, Bill Feiereisen (then division leader of CCS) and James Peery (now in Hydrodynamic Experiments) invited the Russians to visit Los Alamos. Originally, the meeting was supposed to be in January, but the visas were delayed, and the date slipped four months.

Kamm did a lot of work for the hydrodynamics talks. Bryan Lally of CCS-2 helped. A long list of speakers participated. Peggy Vigil of Protocol handled thousands of essential details. Mike Stevens, in charge of foreign programs for the Associate Directorate for Weapons Programs, participated, as did Paul White from the Director's Office. There were three translators.

The major goal was "to write contracts for collaboration," Urbatsch said, noting that in the past, the two laboratories had shared contracts involving materials, and contracts involving numerical methods for radiation transport and hydrodynamics. This time, he said, "We added a lot of computer science topics," notably those involving "huge, parallel computers."

(Please see SIMILARITIES, page 5.)

SIMILARITIES (Cont'd from p.4.)

"We will be sharing information about computer techniques," he said—"how we do our numerical methods and computer methods." We will look for "shared ways to advance the field." And, he said, "We're still looking at methods that can be analyzed on test problems (in numerical methods)."

"In the near term," he said, "I'm hoping that each party can benefit without homogenizing both programs."

"In the long term," he added, "we're going to continue to have to have world alliances. Diplomatic relations are so important…."

Asked if the conference was successful, Urbatsch said, "It *did* go well." He said he especially enjoyed a contest called the "Buggy Pageant."

He admitted that the Russians told him that they didn't sleep well the night that he told them about the proposed contest. As a result, he couldn't sleep the *next* night—but the pageant was successful.

On the day of the pageant, he asked the Russians to talk together during lunch and come back with the hardest "bugs" they could think of to insert into the Milagro code. Urbatsch, Aimee Hungerford, and Tim Kelley quietly inserted the Russian bugs into the code and handed it to Tom Evans, Jeff Densmore, and Scott Mosher, who sat down across the big conference table from the Russians. In less than an hour, the American team had found the four bugs. The Russians seemed impressed. One key to the success of the game, however, was that the translators explained emphatically that it was just meant to be fun….

The world has changed—but not entirely. People from different countries still have much in common—and a few interesting differences.

Protocol provided the Russians with a tour of Santa Fe, an ancient city in which the downtown plaza is dominated by Bishop Lamy's beautiful cathedral.

The Americans scheduled the conference in University House, a comfortable, beautiful facility featuring New Mexican art.

Everyone noted how lovely the weather was—warm and sunny.

The food was abundant and excellent—but exotic by Russian standards.

And translators were still essential, although it was clear that several of the Americans spoke a little Russian and some of the Russians spoke a little English.

During a break, one of the Russians—who had gotten separated from the translators—tried to ask a Protocol representative about a chafing dish filled with something that smelled just wonderful. Her answer, like the food in question, was complex. She mentioned "leeks." Looking baffled and a little desperate, he turned to another American who happened to be sitting nearby, and she whispered, "Onion soup." He broke into a smile, turned back to the table, and dipped himself a portion….

D-1 Brings Proud History to CCS—Its New Division

The Computer, Computational, and Statistical Sciences Division (CCS Division) has a new group, Statistical Sciences (CCS-6)—which was, until recently, D-1 in the Decision Applications Division (D Division).

What CCS-6 Does

D Division's progress report for 2005-2006 explained that D-1 (now CCS-6) works with "scientists, engineers, and policy makers within and outside of the Laboratory to bring statistical reasoning and rigor to multidisciplinary scientific investigations and to apply them to problems of national importance."

The report also said in its section on D-1:

"Our work includes developing, understanding, representing, and communicating cutting-edge statistical techniques for decision making under uncertainty. The group has extensive experience in developing techniques for collecting, analyzing, combining, and making inferences from diverse qualitative and quantitative information sets such as experiments, observational studies, computer simulations, and expert judgment.

"Core competencies of the group include computationally intensive statistical methods, Bayesian methods, hierarchical methods, statistical reliability, uncertainty quantification, experimental design, spatial-temporal methods, degradation/aging methodology, Monte Carlo methods, and applications of statistics to general science."

A few of the recent projects led by CCS-6 are listed below:

- CCS-6 does "Design Agency System Point of Contact for Reliability work" for the Nuclear Weapons Program.

(Please see CCS-6, page 6.)

CCS-6 (Cont'd from p.5.)

- It does enhanced reliability modeling for the Nuclear Weapons Program.
- It does computer model evaluation in Weapons Physics for X Division.
- It heads the Joint Munitions Project for the Department of Defense.
- It develops sampling strategies for BioNet for Defense Threat Reduction Agency/Department of Homeland Security.
- It develops model evaluation methods for Procter & Gamble.
- It does shelf-life modeling for formulated products for Procter & Gamble.
- It provides design of experiment construction and assessment for Laboratory-Directed Research and Development.
- It does design and analysis of experiments and sampling for Institutional Program Development.
- It does TOW (M-220 Tube-Launched, Optically Tracked, Wire-Guided) missile analyses for Marine Corps programs.
- And it does work involving ballistic missile defense for the Missile Defense Agency.

People and History

In a joint interview with CCS News Bytes on July 7, CCS-6 Group Leader David Higdon and Deputy Group Leader Joanne Wendelberger said that the group has approximately 40 people—including students, postdoctoral researchers, guest scientists, and affiliates. In addition, Wendelberger said, CCS-6 has "an extensive list of visiting faculty."

The group is located in Building 1405, a three-year-old structure on the northeast corner of the intersection of Bikini and Mercury.

Higdon said that about half of the group's funding comes from nuclear weapons work. The remaining money comes from work involving predictive capabilities, surveillance, reliability, and materials.

Wendelberger said that the technical staff members in the group are "primarily statisticians," but she added, "Our group also has some computer scientists and sociologists."

Higdon noted that the group, founded in 1967, "has a history of being a pioneer in reliability." It has been the Laboratory home, he noted, to people such as Ray Waller and Harry Martz. It also has "a pioneering history of working computer models," many of which were developed at the Laboratory—and he mentioned Dick Beckman and Michael McKay.

The list of employees in CCS-6 includes several fellows of the American Statistical Association, among them Wendelberger, Martz, Michael Hamada, and Scott Vander Wiel. A fifth employee of the group, Christine Anderson-Cook, will become an ASA fellow in August.

William H. Press—a member of the National Academy of Sciences, a JASON, a Laboratory Senior Fellow, and former deputy Laboratory director for Science, Technology, and Programs—is also a staff member in CCS-6.

Why the Change?

Asked about the reasoning behind shifting D-1 into CCS Division, Wendelberger said that it appeared to her that in reorganizing the Laboratory, Los Alamos National Security (the new Laboratory manager) had most of D Division's groups focused on threat reduction. However, D-1—like CCS Division—was "a capability organization" that worked with groups from throughout the Laboratory.

She added, "There is a computational aspect to the work we do," and it includes some code development. In other words, the group's work "fits nicely within CCS."

She also commented, "We think the division has been very welcoming."

Asked about past collaborations between D-1 and various groups in CCS Division, Wendelberger mentioned work with CCS-4 on Monte Carlo transport codes—a collaboration that Higdon said looks good for the future as well. Higdon also mentioned work in computer reliability and work with John Hogden of CCS-3 on image analysis.

Asked about potential future collaborations, they listed potential work in predictive science, large models (perhaps ocean models), and "activity in Homeland Security."

The CCS-6 Leadership

On a more personal level, Higdon and Wendelberger offer an interesting and varied blend of backgrounds and interests.

Higdon attended high school in Hawaii and California; obtained a bachelor's degree in mathematics from the University of California-San Diego; and earned his doctorate in statistics at the University of Washington. He was a professor in the Institute of Statistics and Decision Sciences at Duke University in

(Please see More CCS-6, page 7.)

More CCS-6 (Cont'd from p.6.)

Deputy Group Leader Joanne Wendelberger and Group Leader David Higdon of CCS-6, the former D-1. *(Photo courtesy of CCS-6.)*

Durham, North Carolina, for seven years before joining the Laboratory in 2001. He has spent his entire Laboratory career in D-1/CCS-6.

Higdon's wife, Lynne, teaches physical education at Barranca Mesa Elementary School in Los Alamos. They have two children—Marissa, 12, a student at Los Alamos Middle School, and James, 10, a student at Barranca.

Higdon's hobbies are swimming and tennis.

Wendelberger grew up in Brookfield, Wisconsin, a community near Milwaukee. She obtained an undergraduate degree in mathematics and economics ("mostly statistics") at Oberlin College in Oberlin, Ohio. Her master's degree and doctorate in statistics are from the University of Wisconsin in Madison. She worked for the General Motors Research Laboratories in Warren, Michigan, before joining the Laboratory.

Wendelberger's husband, Jim, is a statistician and telecommuter. He works for Urban Science Applications, which has a home office in Detroit, Michigan, but maintains smaller offices around the world.

The Wendelbergers—who met in graduate school—have three daughters: Barbara, 18, who will attend Notre Dame this fall; Beth, 14, who will be starting at Los Alamos High School; and Laura, 11, who will be in the sixth grade at Barranca when school reopens.

Joanne Wendelberger's primary interests outside work and family are swimming and travel. She is also a girls' soccer coach.

(For more details on CCS-6 and its work, please consult the slides presented June 21 during a CCS Division all-hands meeting. They are posted on the group's website at http://www.stat.lanl.gov .)

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'Starquakes' of J0537 May Be Predictable

When John Middleditch of the Modeling, Algorithms and Information Group (CCS-3) started working on a paper for *Astrophysical Journal* about PSR J0537-6910 and the prediction of its "starquakes," he had no idea how much interest his work would attract.

Only about 100 people looked at his poster at the American Astronomical Society meeting in Calgary, Canada, in early June 2006—but among those were "all the real pulsar people," he recalled during a recent interview.

A news release had gone out—and soon he started hearing from the media.

"Imagine the Universe News" ran an article on June 5.

NewScientist.com news service had one on June 6.

There was a front-page article in the June 9 Los Alamos Monitor.

There was a story in the June 19 issue of the Los Alamos National Laboratory Newsletter.

And the June 26 issue of the Department of Energy Pulse carried an item on his work.

"This is the story that refuses to die," he said.

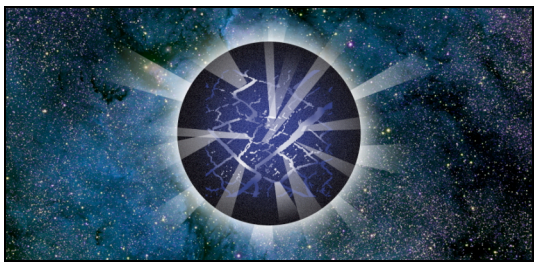
He is still working on his paper (co-authored with F.E. Marshall and W. Zhang of NASA/Goddard Space Flight Center, E.V. Gotthelf of Columbia University, and Q.D. Wang of the University of Massachusetts-Amherst)—but he is both surprised and pleased at the number of people who have already found his results fascinating.

Middleditch, who holds a doctorate in physics from the University of California-Berkeley, reports in his paper—"Predicting the Starquakes in PSR J0537-6910"—on the results of more than seven years of monitoring PSR J0537-6910, a pulsar/neutron star in the Large Magellanic Cloud. The data he is analyzing was acquired with the Rossi X-ray Timing Explorer.

During the time that he and his colleagues have been "watching" J0537 (as the 62 Hz pulsar is nicknamed), the pulsar has experienced 22 sudden increases in frequency. Each "glitch" is preceded by a series of small "jitters." When the glitch occurs, the rate of spin of the pulsar increases slightly and then slows down again.

(Please see STARQUAKES, page 8.)

STARQUAKES (Cont'd from p. 7)



An artist's conception of J0537. *(Picture courtesy of Darlene McElroy, IST-AUBAD.)*

Strongly magnetized neutron stars—like J0537—are what remains after a massive star explodes. J0537 is a sphere approximately 20 miles across that contains 30% more mass than the Sun. Such stars are so dense that their electrons and protons are crushed together to form neutrons.

The dominant theory about starquakes in these stars—which are born spinning but gradually slow down—says that they have a solid crust that covers a "superfluid core" that flows without frictional resistance. The neutron star's magnetic field is locked into the solid crust and superfluid core and emits radiation that slows them down over time. But the superfluid deep within the solid crust does not slow with the rest of the pulsar. The two get out of synchronization. When the crust cracks, the disturbance dumps excess superfluid rotation into the solid crust, causing the pulsar to speed up again, and the process repeats.

J0537, associated with the 4,000-year-old supernova remnant N157B in a crowded stellar nursery called the Tarantula Nebula, is the most rapidly spinning young pulsar and the most frequently glitching pulsar known. In a few more years, J0537's observed glitches will outnumber those from all other pulsars combined.

By accumulating and analyzing data over many glitches, Middleditch and his colleagues believe they have detected a pattern and determined how to predict the next glitch in J0537.

As Middleditch says in the abstract of his paper, "The time interval from one glitch to the next obeys a strong linear correlation to the amplitude of the first glitch … such that these intervals can be predicted to within a few days, an accuracy which has never before been seen in any other pulsar." In other words, the time until the next glitch is proportional to the size of the previous glitch—and that time can be determined mathematically.

Middleditch is predicting that the next glitch will occur on August 7—give or take a few days.

For readers who would appreciate more detail, here is the full abstract of the poster Middleditch presented in Calgary (with acronyms explained in parentheses):

"We report the results of almost 7 ½ years of monitoring of PSR J0537-6910 (J0537), the 16 ms (millisecond) pulsar in the LMC (Large Megellanic Cloud), using data acquired with the PCA (Proportional Counter Array) of the Rossi X-ray Timing Explorer. During this campaign, the pulsar experienced some 21 glitches of at least 8 microHertz in amplitude, amounting to a total gain of over 6 ppm (parts per million) in its 62 Hz spin frequency, superposed on its spindown of -0.2 nHz/s (nanoHertz per second). The time interval from one glitch to the next obeys a strong linear correlation to the amplitude of the first glitch, with a mean slope of about 400 days/ppm, such that these intervals can be predicted to an accuracy of a few days. The ability to predict the time of the next glitch to this accuracy has never before been seen in any other pulsar. There appears to be an absolute upper limit of ~40 microHertz for the size of glitches in all pulsars. The change in spindown across a glitch also appears to have a hard lower limit of -0.15 pHz/s (picoHertz per second), again in all other pulsars as well as J0537. The longterm trend in the spindown of -10^{-21} Hz/s/s (Hertz per second per second), the low magnitude of the spindown (wrt [with respect to] the Crab), and the singly-peaked pulse profile suggest that J0537 was born as a nearly aligned rotator and that its magnetic pole may be migrating away from the rotation axis at a rate of about a radian (50 degrees) in 10,000 years. The initial spin frequency of J0537 4,000 years ago was 75-80 Hz, and its initial spindown rate was considerably lower than the present day value of 0.2 nHz/s."

So what comes next? Middleditch said, "We'll keep observing until the spacecraft dies out."

In the short term, he said, analysis of existing data suggests that, "The next glitch could be a superglitch"—perhaps 50% bigger than the next largest glitch. "Maybe history is repeating itself after 7 ½ years," he said, pointing to a similar pattern early in observation history that ended in an unusually large glitch. "We'll find out in August," he said.

(Please see More STARQUAKES, p.9)

More STARQUAKES (From p.8)

He also noted that, "The X-ray photons themselves are at 3 to 20 kilovolts, and that is 1,000 to 7,000 times the energy of a blue photon. They go into the Proportional Counter Array and dump their energy. We could analyze the light curve of the pulsar. This light curve repeats itself every 16.1 milliseconds. We have enough data so that we could answer questions about how the light curve changes with X-ray photon energy. That could tell us a lot about the physical conditions of the space next to the pulsar where this is being generated."

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Meet Our New People

CCS Division Hosts 41 Summer Students

We have 41 students joining CCS this summer. Please welcome them to Los Alamos and to the division. Here is a list of their names, their fields, their universities, their groups, and their mentors.

Teresa Bailey, graduate student in nuclear engineering, Texas A&M University; CCS-4; Kelly Thompson, mentor.

Eric Baker, undergraduate in nuclear engineering, Oregon State University; CCS-4; Jon Dahl, mentor.

Brian Barrett, graduate student in computer science, Indiana University; CCS-1; David Daniel, mentor.

Nader Berchane, graduate student in mechanical engineering, Texas A&M; CCS-2; Malcolm Andrews, mentor.

Vaddadi Chandu, graduate student in computer science, Georgia Tech; CCS-1; Matthew Sottile, mentor.

Giuseppe Colantuono, graduate student in geophysical fluid dynamics, Florida State University; CCS-2; B. Nadiga, mentor.

Jarrod Edwards, graduate student in nuclear engineering, Texas A&M; CCS-2; Robert Lowrie, mentor.

Sean Escola, post master's degree student in medicine/theoretical neuroscience, Columbia University; CCS-3; Ilya Nemenman, mentor.

Erin Fichtl, graduate student in nuclear engineering, University of New Mexico; CCS-4; James Warsa, mentor.

Ece Gelal, graduate student in computer science, University of California-Riverside; CCS-5; Stephan Eidenbenz, mentor.

Bruno Goncalves, graduate student in computer science, Emory University; CCS-5; Gabriel Istrate, mentor.

Josh Hursey, graduate student in computer science, Indiana University; CCS-1; David Daniel, mentor.

Scott Izu, graduate student in mathematics, New Mexico State University; CCS-3; Chris Brislawn, mentor.

Jangeun Jun, graduate student in computer science, North Carolina State University; CCS-5; Stephan Eidenbenz, mentor.

Shiva Kasiviswanathan, graduate student in computer science and engineering, Pennsylvania State University; CCS-5; Gabriel Istrate, mentor.

Alina Kline, graduate student in statistics, University of New Mexico; CCS-6; Christine Anderson-Cook, mentor.

Wayne Kraft, graduate student in mechanical engineering, Texas A&M; CCS-2; Malcolm Andrews, mentor.

Elliot Krop, graduate student in mathematics, University of Illinois at Chicago; CCS-3; Leonid Gurvits, mentor.

Arkadiusz Kuczaj, graduate student in mathematics, Twente University, Netherlands; CCS-2; Darryl Holm, mentor.

Tianchao Li, post master's degree student in computer science, Technical University of Munich; CCS-1; Craig Rasmussen, mentor.

Shao-de Lin, graduate student in computer science, University of Southern California; CCS-3; Cornelia Verspoor, mentor.

Gustavo Marfia, graduate student in computer science, University of California-Los Angeles; CCS-5; Sunil Thulasidasan, mentor.

Alex Maslowski, post master's degree student in nuclear engineering, Texas A&M; CCS-4; Kent Budge, mentor.

Keith Mosher, Los Alamos High School student; CCS-1; Justin Tripp, mentor.

Nicholas Moss, undergraduate student in computer science, University of California-Santa Cruz; CCS-3; Scott Pakin, mentor.

Carl Nygaard, undergraduate student in computer science, Harvey Mudd College; CCS-1; John Patchett, mentor.

Alexander Olshevsky, graduate student in computer science, Massachusetts Institute of Technology; CCS-3; Leonid Gurvits, mentor.

Melih Onus, graduate student in computer science, Arizona State University; CCS-5; Hristo Djidjev, mentor.

(Please see STUDENTS, page 10.)

STUDENTS (Cont'd from p.9)

Collin Powell, graduate student in applied mathematics, University of Colorado-Boulder; CCS-2; Thomas Asaki, mentor.

Rajiv Raman, graduate student in computer science and engineering, University of Iowa; CCS-5; Anders Hansson, mentor.

Ivan Ramler, graduate student in statistics, Iowa State University; CCS-6; Lisa Moore, mentor.

Michael Reed, graduate student in nuclear engineering, Texas A&M; CCS-4; Randal Baker, mentor.

Marko Rodriguez, post master's degree student in computer science, University of California-Santa Cruz; CCS-3; Cliff Joslyn, mentor.

Massimiliano Rosa, graduate student in nuclear engineering, Pennsylvania State University; CCS-4; Jae Chang, mentor.

Peter Rosenberg Maffia, graduate student in computational neuroscience, University of Chicago; CCS-3; Cornelia Verspoor, mentor.

Kari Sentz, graduate student in systems science; Binghamton University, Binghamton, New York; CCS-6; Alyson Wilson, mentor.

Mikhail Shashkov, Los Alamos High School student; CCS-2; James Sicilian, mentor.

Ramkumar Srinivasan, graduate student in computer science, New Mexico State University; CCS-3; Olaf Lubeck, mentor.

Brian Van Essen, post master's degree student in computer science, University of Washington; CCS-1; Justin Tripp, mentor.

Michael Watson, graduate student in applied mathematics, University of Colorado; CCS-2; Beth Wingate, mentor.

Brian Weaver, graduate student in applied mathematics; Iowa State University; CCS-6; Alyson Wilson and Harry Martz, mentors.

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In Case You Missed It….

At the direction of Division Leader Stephen Lee, the Computer, Computational, and Statistical Sciences Division (CCS) held six all-hands meetings in June and July featuring **group overviews**.

These summary sessions provided a timely opportunity for CCS staff members to share information about the major research interests in their groups and to spot potential opportunities for future collaboration.

The newest group in the division, CCS-6 (formerly D-1) led off on June 21, followed by CCS-3 on June 26, CCS-4 on June 28, CCS-5 on July 6, CCS-2 on July 10, and CCS-1 on July 12. The meetings were held in the Physics Building Auditorium.

All of the speakers provided slides. These sets of information were sent by e-mail to all CCS staff members. In case you missed one, each set of slides is also being posted on the appropriate individual group website as soon as S-7 security clearance can be obtained. To view these slides, go to the group website and click on the heading on the right that says: "All-Hands Slides: Overview of CCS-X (pdf)."

CCS-4 Group Leader **Todd Urbatsch** gave his overview presentation on June 28—despite the fact that he and his wife, Amy, had a brand new baby. Grafton Todd Urbatsch, their healthy baby boy, was born on June 27, 2006.

Associate Director Alan Bishop of Theory, Simulation & Computation (TSC), has announced that **Andy White** will be his principal deputy. In an e-mail announcing the appointment, Bishop said, "Andy brings considerable experience in high-performance computing strategy and will also be helping us drive forward in the practices and methodologies of 'Science-Based Prediction for Complex Systems.'"

Program management for the Computational Systems and Software Environment (CSSE) program element of Advanced Simulation and Computing (ASC) has been placed in CCS Division—and **John Thorp**, previously CCS-1 deputy group leader, has been appointed as the acting program manager. Thorp will be based in the CCS Division Office.

In an e-mail announcing Thorp's appointment, Division Leader Stephen Lee said, "John brings strong managerial and fiscal management experience into this position, having led external organizations from start-ups to multinationals." He noted that Thorp had served as a project leader in the ASC program; as de facto deputy program manager for the ASC PSE (Problem Solving Environment) program element; and as executive director of LACSI (the Los Alamos Computer Science Institute).

(Please see IN CASE, page 12.)

CCS Division Picnic

The annual CCS Division Picnic was held June 29, 11 a.m. until 1 p.m., in Urban Park. Big Dawgs Restaurant of Española provided enchiladas, rice, beans, posole, green chile stew, drinks, and desserts. The line was already long by 11:30, and the shelter was full by noon. The event drew an unusually large number of family members. The kids were cute, the food was abundant, and the conversation was pleasant….

Photos by Charmian Schaller

IN CASE (Cont'd from p. 10)

His background also includes work for Thinking Machines. He holds a master's degree in computer science from Johns Hopkins University and has participated in the Senior Executive Program at the Graduate School of Business at Stanford University.

Rich Graham, who had been "dual-hatted," serving in the CSSE role as well as serving as acting group leader for CCS-1, will now have full time to devote to CCS-1. Lee commented, "I'd like to thank Rich for his service to the program and the institution during this time … I know it was difficult to manage dual roles during this transition."

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Hengartner Appointed Acting Head of CCS-5

The Discrete Simulation Science Group (CCS-5) has a new leader.

Nick Hengartner, appointed June 5 as acting group leader in CCS-5, brings to his new position an international background and experience in both academia and the Laboratory.

In announcing the appointment of Hengartner, Division Leader Stephen Lee wrote, "I am committed to CCS-5 as a separate group and as a key capability for CCS Division and for the Laboratory. To this end, I am pleased to announce Nick Hengartner (CCS-6) as the acting group leader for CCS-5 … Many of you know Nick as a top-flight scientist and researcher … Nick brings an excellent technical background and reputation to this position, and I look forward to working with him in this role…."

Looking to the future, Lee said, "I plan to issue a new solicitation for a permanent group leader as soon as the LANS process for doing so is in place. Nick and Jim (Smith, the former group leader) will work together to ensure a smooth transition, and I will be helping both Nick and Jim in any way that they need me. Please offer your support to both Nick and Jim as they assume their new roles."

Hengartner earned his undergraduate degree in mathematics from the Université Laval in Quebec City, Quebec, Canada. He received his master's degree in statistics from the University of Waterloo in Waterloo, Ontario, Canada. And he holds a doctorate in statistics from the University of California-Berkeley.

From 1993 until 2002, he served on the faculty of the Department of Statistics at Yale University in New Haven, Connecticut.

In 2002, he joined the Statistical Sciences Group (then D-1) as a technical staff member. His work there involved network modeling, mathematical epidemiology, supercomputer reliability, and muon radiography—among other fields. Since 2004, he has also been an adjunct professor of statistics at Simon Fraser University in Burnaby near Vancouver, British Columbia, Canada.

His work in D-1 (which recently became CCS-6) involved collaboration with CCS-5 on several projects, including EpiSimS, a tool for simulating the spread of epidemics that takes into account individual contact patterns and disease transmission characteristics.

What drew him to CCS-5? Hengartner said, "It's the best group at the Lab. It has a very interesting portfolio of work that's relevant to Homeland Security." The group's work was directly related, he said, to what he had been doing in D-1.

Asked how he views his move into administration, he said, "When it's a good group of people, it's a pleasure to do it." He noted that he was asked to serve as *acting* group leader, and his selection was agreeable to the group. The position had fallen vacant when Smith became program manager for the National Infrastructure Simulation and Analysis Center at the Laboratory (NISAC), the major funding source for CCS-5. Hengartner said the move to NISAC was "a natural progression for Jim."

Lee also commented on Smith's transfer. He said, "I am pleased because this is a good move for Jim, and he will be able to work with the institution as a whole in the stewardship and growth of this important program. I am saddened at the same time, however, as this means Jim will be leaving us. I can't say enough about Jim and how well he has done, jumping into a very difficult situation in the wake of the departure of CCS-5 group staff and leadership and dealing with multiple line and program issues. I wish the best for Jim and know that he will do an outstanding job in his new role."

Assessing CCS-5 and its future, Hengartner said, "This group is naturally poised to take the lead in sensor network research that has been promoted by (Laboratory Director Michael) Anastasio." Hengartner added, "The role of this group has always been Homeland Security-type research." He said he hopes that CCS-5 can continue to pursue and increase its current portfolio, seeking additional sponsors to diversify its role.

CCS Division plays an important role not only in Hengartner's life but in the life of his wife as well. Leticia Cuellar-Hengartner (originally from Mexico) now works in the CCS Division Office. Her fields are applied probability and statistics. They met in graduate school at UC-Berkeley and have been married for 16 years. Both of them are trilingual in Spanish, French, and English. They have two daughters, both bilingual in English and Spanish: Andrea, 12, who will be a student at Los Alamos Middle School this fall; and Astrid, 9, a student at Barranca Mesa Elementary School.

Asked about his hobbies, Hengartner said, "I love to ski." He also enjoys traveling with his family.

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