SCIENCE AND TECHNOLOGY CORPORATION

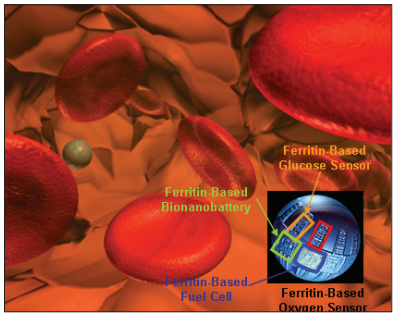
NEWSLETTER

... An Innovative Advanced Technology Company

Vol. 14, No. 1 | Hampton, Virginia | SPRING 2005

The Beginning of a 'Small' Revolution on BioNanotechnology at NASA Langley Research Center

The United States government recently announced a $3.7 billion nanotechnology research initiative. Since 2000, NASA Langley Research Center (LaRC) has organized a task team with various scientists from STC, the National Institute of Aerospace, and Brigham Young University for the development of a bio-power system. The Nano-Bio-Electro Advanced Materials & Systems (NanoBEAMS) team, directed by Dr. Sang H. Choi at NASA LaRC, was tasked to find a way to develop a bio-power/bio-sensors system that is biologically friendly and suitable for autonomously monitoring humans' health, especially astronauts, using a biomolecule-tailored system operating under physiological conditions. This team has focused on developing both a bionano-battery and a biofuel cell as essential components of a bio-power system. They successfully proved the bionanobattery concept and completed the fabrication of biofuel cell electrodes as first steps to the realization of a biofuel cell model. Long-duration human space exploration requires enabling technologies that offer solutions to many real and potential challenges as listed in NASA's Bioastronautics Critical Path Roadmap. One critical change in an astronaut's body is the significant reduction in muscle mass and



Autonomous bio-power/bio-sensors health monitoring system embedded inside blood vessel.

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STC Edgewood Supports U.S. Army Chemical Demilitarization Program

Since the end of WWI and through the cold war the U.S. Army amassed a stockpile of rockets, bombs, projectiles, spray tanks, land mines, and bulk containers filled with highly toxic and lethal chemical agents such as HD (mustard), VX (nerve agent), and GB (Sarin). This stockpile was stored at various locations within the Continental United States and in the Pacific. The Chemical Demilitarization Program was formed to carry out the destruction of the stockpiles of chemical agents.

STC teamed with SAIC in 1991 under the Program and Integration Support Contract and currently supports the Chemical Materials Agency (CMA) with over 30 personnel. In this highly visible program, agent destruction at the Johnson Atoll was completed and the site closed. The destruction of the HD stored in ton containers at the Aberdeen site is now complete. The

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Honors and Awards

U.S. House of Representatives Resolution Recognizes Contributions of IIT Graduates

HR 227 - In the House of Representatives, U.S., April 26, 2005.

Whereas the United States is deeply enriched by its Indian American residents;

Whereas the Indian American community and the graduates of the Indian Institutes of Technology [IIT] in the United States have made valuable and significant contributions to society in every profession and discipline; and

Whereas IIT graduates are highly committed and dedicated to research, innovation, and promotion of trade and international cooperation between India and the United States: Now, therefore, be it

Resolved, That the House of Representatives—

(1) recognizes the valuable and significant contributions of Indian Americans to American society; (2) honors the economic innovation attributable to graduates of the Indian Institutes of Technology; and (3) urges all Americans to recognize the contributions of Indian Americans and have a greater appreciation of the role Indian Americans have played in helping to advance and enrich American society.

Attest: Clerk.

At the helm of STC's operations, **Chand Deepak**, STC's Chief Operating Officer, is a 1966 graduate of IIT, Chenai, one of the now six IITs in India.□

Kirby Receives Commemorative Medallion

On 1 March 2005, **Brian Kirby** was presented a Chemical Materials Agency (CMA) commendation and commemorative medallion for consistently providing professional and exemplary service within the Chemical Weapons Convention (CWC) Treaty Support Task to Program Manager Non-Stockpile Chemical Material. The award, typically given only to government employees within that agency, singled Brian out for exceptional service to the program. Brian had previously been recognized by name for his CWC treaty expertise in a letter from Mr. Pat Wakefield, Deputy Assistant to the Secretary of Defense (Chemical Demilitarization and Threat Reduction).□


Brian Kirby being congratulated on his award by Bob Conners, SAIC Non-Stockpile Program Director.

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remaining 20,000 tons of agent will be destroyed at eight locations within the United States. The Chemical Demilitarization Program also includes destruction of: buried/recovered munitions, the four remaining former chemical agent production plants (originally 13), and over 20,000 chemical agent identification sets (CAIS) or equivalent items.

In addition to Abingdon, MD, STC PAISC personnel work at Newport, IN (**Mark Tyler,** Project Management Professional – LAN Administrator, internet and intranet security compliance) and Tooele, UT (**Dave Manzione** – Earned Value Management System and Laboratory Quality Control). Key programs include destruction of recovered chemical weapons and former chemical weapons destruction facilities by the Non-Stockpile Chemical Materiel Project Manager, as well as destruction of chemical weapons by the Chemical Stockpile Disposal and Alternative Technologies and Approaches Projects.

STC Dept. 23 quarterly All Hands Meeting. Flanked by Dick Gilligan, Edgewood Region Senior VP at far right, and Bob Lackey, PAISC Program Manager at far left.

Task Manager **Celeste Lloyd** supports the collection of documentation of recovered suspect chemical items for the Material Assessment Review Board (MARB). Her team orchestrated a data system upgrade that provides a web-enabled database for use in field data collection efforts, for data presentation to the MARB membership, and for data recall by other affected functional teams. New hire **Karen Liebowitz** recently joined the MARB team.

As part of the SAIC Monitoring and Chemistry Dept., **Dr. Art Denny** has been studying the chemistry of arsenic, a major component in the chemical agent Lewisite, to identify methods of safe destruction of Lewisite in chemical munitions.

Dr. Dick Travis developed the 2005 Field Sampling and Analysis Plan for assessing potential effects of Tooele Chemical Weapons Destruction facility operations on or near soil, vegetation, and fish. Supporting Dick, **James Cullison** develops transportation plans for the safe movement of stored chemical weapons to the destruction facility in Utah and has authored engineering change proposals for the Rapid Response System and training documents. **Renato Alfaro** provides technical support in the development of the environmental documentation and/or permitting process by Resource Conservation and Recovery Act (RCRA) for chem demil activities at various military installations.

Dick Travis at his desk.

Working with the mobile Explosive Destruction System (EDS), **Jason Britton** supported destruction of recovered chemical munitions at Spring Valley (Washington, DC), Dugway Proving Ground, UT, Dover Air Force Base, DE, and Camp Siebert, AL.

As a member of the EDS team, **Vo Cheng** manages the training for EDS operations. He updates EDS lesson plans and materials, including operator training for hazardous waste handling requirements, develops hazardous waste management training for EDS and other non-stockpile systems.

Jason Britton beside an Explosive Destruction System.

Jared Varaly wrote standard and maintenance operating procedures for the Single CAIS Access and Neutralization System and provided training to the Technical Escort Unit at Edgewood on new methods for neutralizing the contents of CAIS. He now supports the PM, Elimination of Chemical Weapons Integration Task by providing data tracking and analysis for acquisition reporting for DA, DoD, and the annual report to Congress.

While **John McWilliams** has been providing engineering support for the start-up, systemization and testing, **Merel Meyer**, and **Bill Ferguson** have been writing standard operations for the new Munition Assessment and Processing System (MAPS) to be operated by the Edgewood Chemical and Biological Center, MD. All three are involved in data collection as the system goes through the various stages of "coming on line."

As Technical Secretariat for Configuration Management **Maryann Clark** processes engineering changes for the NonStockpile Chemical Materiel Project (NSCMP) systems, facilities, and processes. She interfaces with various government managers and contractors to coordinate the receipt, completion, review, approval, and distribution of engineering change proposals and revised technical documents for six deployable systems.

Senior (engineer) Analyst **Barry Ellenberger** participates in developing acquisition documents, test plans, management plans, operation and maintenance documentation, and reports for the chemical warfare materiel assessment and destruction systems as part of the NSCMP. He also assists the PM for Assembled Chemical Weapons Alternatives and the Director of the Chemical Materials Agency (CMA) in the chemical surety and security functional areas.

The NSCMP Data Management System, a large web-based application supporting DoD users worldwide, requires a special type of configuration management. **Mary Roso** tracks and reports the status of proposed and actual software configuration changes of any assigned software development activities.

The web-based Data Management System (DMS) requires constant updating. **Gail Azore** prepares DMS Modules containing technical specifications and interface control documents for uploading into the DMS website database. She also coordinates system contractor documents through acceptance and maintains closeout of document transmittal for the Alternative Technology Roster Database.

Brian Kirby and **Bill Cyr** provide support to the Project Manager for Non-Stockpile Chemical Materiel Treaty Compliance Team. They have developed treaty compliance documents to support non-stockpile systems used to destroy recovered chemical weapons, binary chemical weapons, and former chemical weapons production facilities across the United States. Brian has authored papers and presenta-

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The STC NEWSLETTER is published by the Science and Technology Corporation, 10 Basil Sawyer Drive, Hampton, VA 23666.

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AMS/STC Scholarship Award

The American Meteorological Society (AMS) named Kathleen E. Dougherty as the recipient of the AMS/STC Undergraduate Scholarship for 2003/2004. She is currently majoring in meteorology at the University of Oklahoma. The scholarships, which are based on merit, are awarded for the junior and senior years and are designed to encourage outstanding undergraduates to pursue careers in the fields covered by the awards. Ms. Dougherty will graduate in 2006. STC has sponsored this scholarship since 1992.□

Kathleen Dougherty with Dr. Adarsh Deepak, STC President, at the 2005 AMS Annual Meeting.

PAISC (*Continued from page 2*)

tions for audiences that include the Chemical Weapons Agreements Implementation Working Group, Inspectors from the Organization for the Prohibition for Chemical Weapons, and Chemical Weapons Demilitarization Conference attendees in Gifu, Japan.

Brian Kirby (left) at Texas commercial facility where PMNSCM destroyed a phosgene-filled mortar.

With new destruction facilities coming on line, **Howard Barrett** has provided new facility systemization Test and Evaluation (T&E) support for the Working Test Integrated Product Teams at Umatilla, OR, Pine Bluff, AR, Newport, IN, and Anniston, AL. This required participating in creating and distributing T&E Master Plans, Test Concept Plans, Systemization Demonstration Plans, and plans for systemization and ramp-up activities. He is responsible for the archiving of T&E related documentation in the CMA's Document Control System Library and leads a special study reviewing mechanical component life cycles in the caustic neutralization process.

The development and maintenance of detailed and programmatic schedules for the destruction of chemical weapons at the stockpiles at Tooele, Anniston, Umatilla, and Pine Bluff is a part of **Kent Billings**' task. For each location, he provides a monthly schedule analysis to indicate trends and future projections. He develops and maintains the Project Office Estimate schedules that include the current work scope and known risk factors, and form the basis from which programmatic funding needs are calculated.

As a Program Analyst supporting the Project Manager for Alternative Technologies and Approaches (PMATA), **Mia Nance** provides technical, cost, and programmatic support of In-Process Reviews, DA and DoD Acquisition reporting, National Research Council updates, and other briefings. She and new hire Technical Analyst **Christina Carr** provide PMATA support for closure activities reporting, Chem Demil site reports, technical briefing material, and Special Studies. Christina splits her time to provide administrative support for the STC PAISC/Guardian office.

Kurt Lawrence is a trainer on the SETH (Simulation Equipment Test Hardware) Program. SETH is inert simulant-filled munitions that mimic actual chemical weapons for testing and training. Kurt has developed training materials for nine training modules and conducts classes at Deseret Chemical Depot, UT. He contributes to SETH Labelling Specifications documents, Comparison Reports, and the development of the SETH Program Policies and Procedures. Kurt also supported the testing of the Large Item Transportable Neutralization System in the UK. **Laura Greuter** also supports the SETH task by assisting government client identification of SETH storage needs, policies and procedures requirements, and documentation.

Patrick Weldon supports both the non-stockpile training efforts and recruiting new associates into the STC family. His most recent training activities supported the MAPS pre-operations work. His successful recruiting efforts over the past 12 months resulted in 12 new employees for the Abingdon operation.□

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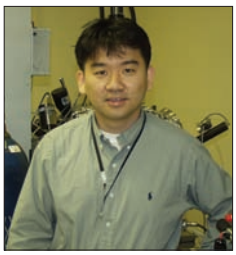
strength after long-duration space flight. Cortisol, one of the steroids produced by adrenal glands, increases in the human body during space flight, leading to loss of amino acids from the muscles. These extra amino acids in the body lead to increased glucose levels in the liver, resulting in diabetes and further reduction in muscle mass. To monitor the astronaut's condition, the biopower/biosensor health monitoring system is embedded in a blood vessel. To be minimally invasive, system miniaturization and compact integration are equally important. Miniaturization of electronic devices has been a trend in many high technology areas to enhance efficiency, reduce power consumption and increase performance speed and functionality.



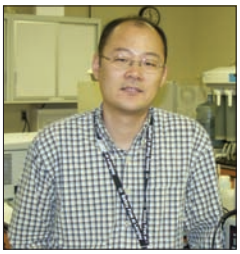
Yeonjoon Park

Conventional power infrastructures are generally based on a centralized stand-alone system. Microelectronic devices are a model case for a single centralized power source. As feature sizes shrink and they are more application-specific, a new energy power system will function more efficiently than a centralized power source.

The developed bio-nano power system, based on bio-inorganic proteins, has uncommon features, such as a system unit size in micro- or nano-scale, integration with biosensors, distributed power storage, thin-film fabrication and integration with biofuel cells as energy harvesting units using glucose and oxygen. It is essential to embed or integrate bio-sensors and energy-harvesting features such as the biofuel cell, especially when it comes to autonomous health monitoring systems.

Dr. Yeonjoon Park and **Dr. Jae-Woo Kim** , STC staff scientists, are members of the NanoBEAMS team at LaRC, working on the bionanobattery project funded by the Creativity & Innovation Program.

Their current work has focused on micro-power generation, micro-energy storage and micro-sensors for measuring health-related variables. Each of these components represents an important part of a micro-sensing system suitable for monitoring the condition of an astronaut during extended space travel.



Jae-Woo Kim

The bionano-battery concept is based on ferritin proteins—naturally occurring iron storage proteins consisting of a segmented protein shell with an outer diameter of 12 nm and an inner diameter of 8 nm. By the reconstitution process of site-specific biomineralization within the protein cage, ferritins are loaded with different core materials such as cobalt, nickel, manganese and platinum (each with a different redox potential) and are fabricated into three-dimensional, multilayered arrays for high-energy capacity.

The NanoBEAMS team-developed prototype bio-power system will be the beginning of a ***small*** revolution on bio-nanotechnologies in the near future.□

New Contracts

STC is very pleased to announce two recent prime contract awards totaling over $95 million from the U.S. Government: (1) A 5-year $88-million contract award from the U.S. Army to provide data collection and management services for all tests conducted at the U.S. Army's Aberdeen Test Center (ATC) in Maryland; and (2) a 5-year, $8-million contract from NASA Langley Research Center to provide Electronics and Fabrication Support (EFS) Services (see full article on page 4).

Other notable awards include new contracts and subcontracts valued at over $13 million from our Government and commercial/prime customers, with aggregate orders totaling over $3 million awarded under our GSA IT and PES contracts. Most notable GSA awards include $2.66 million from NOAA, $0.46 million from CRREL, $0.42 million from USCG, and $0.27 million from NAVAIR.

STC Recognizes Staff at STC With Over 15 Years Service

Frank Klein
January 1989

Gary Hansen
April 1989

Bruce Gilbert
June 1989

Steve Freudenberger
August 1989

Zia-Ur Rahman
August 1989

Norman Green
December 1989

STC Wins NASA Langley Electronics Fabrication Contract

In March 2005, STC was awarded the Electronics Fabrication Services (EFS) contract by NASA Langley. This contract is a five-year contract involving approximately 20 new employees. The EFS contract broadens the scope of the wide variety of scientific, technical and management services that STC has been providing during its long relationship with NASA Langley. **Dick Gray** is the Contract Manager reporting to **Dr. George Wood**, Vice President for NASA Programs.

Dick Gray

The EFS contract provides NASA with technical support to fabricate research-oriented electronics circuitry including circuit assemblies for ground support, aircraft, space flight, laboratory, and research facility instrumentation requirements. Four functional work areas with daily support services are General Electronics Fabrication, Aircraft Electronics Fabrication, Microelectronics Fabrication and Special Fabrication Processes. Special Fabrication Processes include screen-printing, photo-plotting, photo-processing, metal photo processing and other computerized graphics support. STC's engineering technicians are NASA Certified in soldering, wire wrap and harness, and circuit board fabrication and assembly.□

Supporting the Troops Overseas

STC employees are showing their support for the troops by contributing to the Any Soldier Inc. program. Any Soldier Inc. was started by an Army Infantry Soldier in Iraq who agreed to distribute packages addressed to "Attn: Any Soldier" to the soldiers in his unit who weren't getting any mail. Since its inception the program has grown from just 7 contacts to over 821 contacts that help over 40,000 soldiers.

Since May 2004, STC employees have donated and shipped over 85 lbs of mail and personal items to the 312th Military Intelligence Battalion near Baghdad, the 1st Infantry Division in Tikrit, the 25th Infantry Division in Kandahar, and the 304th Material Management Command near Mosul. The donations include snacks, magazines, playing cards, beef jerky, baby wipes, and other personal items that are often unavailable to the troops. Most importantly, the boxes show our support for the troops.

Maryann Clark with some 'goodies' for the troops.

Maryann Clark oversees the STC effort. The e-mails she receives often shed light on the challenges of serving in Iraq and the physical and emotional difficulties our soldiers face every day.

To learn more about the Any Soldier Inc. program, visit their website at http://www.anysoldier.com.□

STC Pursuing ISO 9001 Quality Registration

STC is aiming to become ISO (International Organization for Standardization) 9001:2000 registered by the end of summer 2005. ISO 9001:2000 is the most up-to-date international quality standard applicable to our type of industry. The basics of such a quality management system are to "say what we do," "do what we say," do what we do "effectively," and continually "improve our quality system." STC has been "compliant" with the earlier ISO 9001:1994 standard for several years. This means that STC has had the required policies and procedures in place and has been following them, but has not been audited by an approved outside auditor.

Initially, STC will be seeking registration for four sites: STC Corporate office and Electronic Fabrication Services (EFS) in Hampton, Virginia; and Edgewood and Columbia, Maryland. Registration at these sites includes activities at the other sites and for all contracts managed from the registration sites (for instance, NASA Langley and Hanover contracts). Gradually, the remaining STC sites will also be officially ISO registered. However, because STC Corporate will be one of the registered sites, all employees will be affected by these standards from the beginning even if located at another site.

The STC ISO Implementation Team consists of **Chand Deepak**, Executive Vice President and COO; **Rink Wood**, Vice President – Contracts and Accounting; **Richard Gilligan**, Sr. Vice President – Edgewood Regional Office, Maryland; **James St. John**, Program Manager for STC Columbia, Maryland; **Shawn Marston**, Director of Human Resources; **Tonda Winston Parham**, Accounting Manager; **Carol Lightner**, Facilities Manager; **Althea James**, Project Manager – Millimeter Wave; and **John Andersen**, Fabrication and Quality Manager for EFS.□