

BNL-Developed Sensor Shows Promise in Detecting Chemical Weapons



When New York City's Office of Emergency Management staged a drill in December to test the city's response to a possible terrorist attack involving chemical weapons, BNL demonstrated a novel chemical sensor as a part of the exercise. The Brookhaven sensor successfully detected the chemical used in the drill — acetone, the active ingredient in nail polish remover — from a distance of about 15 feet.

BNL Scientist Arthur Sedlacek, Department of Advanced Technology, who was instrumental in designing the sensor system, said, "The sensor performed well in just eight minutes, under difficult conditions, specifically, at night, in driving rain. We are excited about its potential as an invaluable tool for assessing unknown chemicals in the field."

Besides using the sensor in response to terrorist attacks, potential applications include identifying chemical weapons production, monitoring industrial emissions, investigating environmental crimes, determining the effectiveness of environmental cleanups and assessing the hazards

of chemical fires.

The BNL-designed mini sensor, the size of a two-foot cube, works at short distances of a few feet to tens of feet. The device combines the latest laser and detector technology with a phenomenon known as Raman scattering.

To detect chemicals, laser light is aimed at a target and scattered off its molecules. An instrument called a spectrometer analyzes the scattered light, revealing a chemical fingerprint. That signature fingerprint is then compared with a computerized library of chemical fingerprints.

The mini sensor is an offshoot of a large chemical sensor system developed at BNL — a 33-foot-long mobile detection van that can identify chemicals in the atmosphere from several miles away (see story on Brookhaven Lecture, below left).

While the larger sensor system is best used for atmospheric applications, the mini sensor is most efficient in determining ground or surface contamination. A big advantage is that it can identify chemicals from a safe distance. — Diane Greenberg

Roger Stoutenburgh

Art Sedlacek (left) and Mark Ray of the Department of Advanced Technology with the mini chemical sensor they developed that works at short distances (see story at right). Behind them is the BNL-developed 33-foot-long mobile detection van from which chemicals can be identified in the atmosphere several miles away (see story below left).

337th BNL Lecture Laser Sleuthing — Fingerprinting Chemicals From Afar

To find out whether certain chemicals are lurking in the atmosphere miles away, you might use a specially equipped airplane to fly up and take air samples for analysis.

Or, you can stay on the ground and use a technique studied at BNL that can detect and identify chemical effluents from far away.

Chemical detection from long distances has been the focus of research by Scientist Arthur Sedlacek of the Department of Advanced Technology (DAT). He will discuss this work when he delivers the 337th Brookhaven Lecture, "LIDAR: Chemical Analysis From Afar," on Wednesday, May 27, at 4 p.m. in Berkner Hall. He will be introduced by DAT's Safeguards, Safety & Nonproliferation Division Head Joseph Indusi.

One of Sedlacek's research concen-
(continued on page 2)

Community Involvement & Public Affairs: New Deputy

Robert Kinkead, an experienced communications professional with substantial background in media relations and internal communications, joined BNL on May 15, as Deputy to Marge Lynch, BNL's Assistant Director for Community Involvement & Public Affairs (CI&PA).

In this position, Kinkead manages CI&PA's day-to-day operations, with a particular focus on press contacts and BNL's internal publications and periodicals.

"Bob's impressive mix of communications experience is an important complement to the talent we already have assembled in CI&PA," said Lynch. "I am happy to welcome him to BNL."

Kinkead is "just delighted" to be here. "I have always been attracted to science, and Brookhaven is a magic name. There are a handful of places on the planet that you would say, 'Yes, I would like to work there' sight unseen, and this one of them."

BNL also meets another Kinkead criterion: "If you're going to be a com-

municator, be a communicator for someone who has something to say. Brookhaven really has something to say."



Bob Kinkead

Roger Stoutenburgh

Bob Kinkead has a B.A. in communications from Seton Hall University and an M.S. in management from Pace University. He comes to BNL after 18 years at American Telephone & Telegraph Co. (AT&T), where he was the Technology System's Division Manager-Executive Communications when he left in 1988. After that, he served seven years as General Manager, Corporate Communications & Advertising, with the Public Service Electric & Gas Company of New Jersey (PSE&G). He left PSE&G in 1995, to serve as President of CS&A Services, Inc., a family-owned business providing water-recycling and industrial-cleaning equipment to major industries in the New York metropolitan area.

Now that he's at BNL, Kinkead looks forward to working with people at the Lab, learning more about Brookhaven's research, and then "helping to communicate the exciting things being done here, to the community and the public." To reach him, call Ext. 5322. — Anita Cohen

Experienced Consulting Firm to Conduct Survey of BNLees

Right now, in the Chicago offices of International Survey Research (ISR), the final tweaks are being made to the Organizational Survey that all BNL employees will have the opportunity to complete between June 16 and 19.

The more employees who participate in the survey, the better ISR will be able to measure BNLees' attitudes and opinions about the Lab as a workplace and about its management and policies. With that information, ISR will identify BNL's strengths and areas that need improvement.

That sounds like a tall order, but ISR has had lots of experience designing and implementing employee/manager surveys for large national and multinational organizations. The independent consulting firm has clients worldwide, including more than 1,900 companies in over 106 countries. Since 1974, ISR has surveyed more than 29,000,000 employees.

Starting with a concept similar to that used at the other U.S. Department of Energy national labs that ISR has surveyed, including Lawrence Livermore, Los Alamos, Pacific Northwest and Sandia, ISR has worked with many people at BNL to tailor a survey that fits Brookhaven Lab.

This interaction has included initial planning with the BNL Survey Steering Committee chaired by Lorraine Merdon, Diversity Office (see Brookhaven Bulletin, May 1, 1998), followed by meetings with members of BNL management, the Human Resources Division, and employee focus groups representing a variety of departments and divisions, positions and employment classifications.

After incorporating the thoughts and opinions gathered from these groups into a preliminary survey, ISR administered a pretest to a small but

diverse group of BNLees. After the pretest, this group critiqued the survey, prompting additional revisions by ISR.

Mark Royal, an associate project director with ISR, emphasized that the names of those completing both the pretest and the actual survey will be kept strictly confidential and anonymous.

Employees are encouraged to take the survey and will be given time away from their jobs to complete it. Average completion time will be about one-half hour, though employees may take as long as they need. Completed surveys will be placed first in a sealed envelope and then in an ISR ballot box, which will go to ISR intact so no one at BNL will see its contents.

Though the coding section of the survey asks for information about an employee's work area, job classification and status, and a voluntary section inquires about length of service, gender, ethnic/racial background, education and age, the data will be used only for statistical purposes: ISR will not report any individual responses and will not attempt to identify individual respondents.

For that reason, ISR will report statistical summaries to BNL only for groups of 20 or more respondents. The responses of those who work in an area with fewer than 20 employees will be combined with other such areas.

For more information about ISR, check out the firm's home page on the World Wide Web at <http://www.isrsurveys.com>. To see a sample of a typical ISR employee survey, go to <http://www.isronline.com>.

If you have questions about the survey at BNL, call Lorraine Merdon, Ext. 3318. — Anita Cohen

BNL Lecture (cont'd.)

trations is a remote sensor technique involving laser light and a phenomenon known as Raman scattering. It is one of the several laser-based chemical sensor systems referred to as LIDAR, for Light Detection And Ranging, that are being explored by a group of national laboratories in a U.S. Department of Energy program. LIDAR techniques promise applications that range from detecting the presence of chemical weapons or illegal narcotics to verifying environmental cleanup.

As Sedlacek will explain, the LIDAR technique studied at BNL is based on the known phenomenon of Raman scattering, in which laser light aimed at a target is scattered off the molecules in the target, then collected by a telescope and analyzed by an instrument called a spectrometer. Because the pattern of scattered light is different for each chemical species, it provides a "fingerprint" that identifies the chemical.

With his Optical & Remote Sensing (ORS) Group, Sedlacek first developed a specialized laser laboratory and performed experiments to build up a fingerprint library of the chemicals of interest. Then, by finding a way to intensify the scattering signals, and, using state-of-the-art advanced technology and instruments, they produced a technique to detect chemicals in the atmosphere from several miles away.

Sedlacek will describe this work and how, by selecting the best lasers, computers and software for portability, the group was able to set up a prototype mobile detection van for use in the field. Additionally, the group developed a mini chemical sensor that works at short distances that is described in story on page 1, but which will not be discussed in the lecture.

Sedlacek received a B.S. in chemistry from the University of Wyoming, 1983, and his Ph.D. in physical chemistry from the University of Utah, 1988, then joined BNL's Chemistry Department as a research associate in 1989.

After working on energy transfer mechanisms and reaction dynamics in the gas phase using tunable diode laser spectroscopy, he moved to the then Department of Nuclear Energy, now DAT, to help establish BNL's first remote-sensing program, becoming an assistant scientist in 1992. Named Scientist in 1996, he leads the ORS Group.

After the lecture, all are invited to join Sedlacek for discussion and refreshments. To accompany him for dinner at a restaurant off site, call Liz Seubert, Ext. 2346, by noon on Wednesday, May 27.

— Liz Seubert

Honors for Teacher With BNL/DOE Ties

For several years, Arthur Sedlacek, Department of Advanced Technology (see stories above and at top of page one), was a sponsoring scientist in the U.S. Department of Energy's Teacher Research Associate Program at BNL, which ran from 1989 to 1996, and was organized by the Educational Programs Office.

One of the teachers he worked with was Eric Cohen, a Manorville resident who teaches 9th grade earth science at Wantagh High School and advises on the school's science research program — and who has won the July 1998 "Teacher of the Month" award given by Hofstra University and News 12.

Under Sedlacek's guidance, Cohen, did research on remote sensor technology, during the summers of 1994, 1995 and 1996.

BSA Awards Scholarships to 15 BNL Sons & Daughters

Brookhaven Science Associates (BSA) this week announced the 15 winners of the first BSA Directors' Scholarships, which go to children of BNL employees in continuation of a tradition instituted 33 years ago by Associated Universities, Inc. (AUI).

In anticipation of BSA's continuing the scholarship, AUI had invited students to submit applications last fall,

then assured that the applications were registered with the College Scholarship Service (CSS).

As a result, in April, when the BSA Board of Directors agreed to sponsor a scholarship program, CSS was ready to move ahead with the selection of winners from the 48 students who had applied.

E. Gail Williams, Manager of the

Office of Scientific Personnel, which administers the scholarship at BNL, thanked "AUI for its foresight and BSA for its understanding of the importance of the scholarship program to Lab personnel."

Each BSA Scholar is a high school senior who will receive \$2,500 per year for up to four years of study at the college or university of his or her choice.



Christina Blas, daughter of Gladys Blas, Relativistic Heavy Ion Collider (RHIC) Project, is a senior at Sachem High School and lives in Holbrook. At Pace University, she will probably major in business studies.

Stephan Bosshard, son of Heinz Bosshard, Biology Department, is a resident of Yaphank and will be graduating from Longwood High School. He will attend The Johns Hopkins University, where he is likely to study engineering.



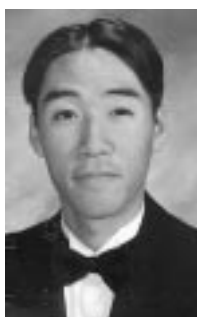
Meena Fatimi is the daughter of Khem Fatimi, Medical Department. She lives in Bellport, where she is a senior at Bellport High School. With the goal of becoming a family doctor, she will do her undergraduate work at the University of Pennsylvania.

Tomoko Fujita, the daughter of Etsuko Fujita, Chemistry Department, is in her last year at Earl L. Vandermeulen High School. A resident of Port Jefferson, she will major in music performance and liberal arts as a Shepherd Society Award Scholar at Rice University.



Alix Gmur is the daughter of Eloise Gmur, Community Involvement & Government Relations Office, and Nicholas Gmur, National Synchrotron Light Source (NSLS) Department. As a resident of Bellport, she attends Bellport High School. She will major in math at Haverford College.

Bethe Gordon, the daughter of Howard Gordon, Physics Department, lives in Southampton and goes to Riverhead High School. She has not decided on her major, but she will matriculate at Barnard College.



Maximilian Jo is the son of Jae Jo, Department of Advanced Technology, and a resident of Setauket. After graduating from Ward Melville High School, he will study economics at the University of Michigan.

Austin Johnson, son of Brant Johnson, RHIC, resides in Wading River and is a senior at Shoreham-Wading River High School. At the College of William and Mary, he will major in medieval history, languages, theater, music or theoretical physics.



Vanitha Krishna is the daughter of C.R. Krishna, Department of Applied Science (DAS). Living in Mount Sinai, she goes to Mount Sinai High School. She will matriculate at Boston University to study biology.



David Parsa Marciano, the son of Zoreh Parsa, RHIC, and William Marciano, Physics, resides in Port Jefferson and is a senior at Port Jefferson High School. To pursue pre-medical studies, he will major in physics and biology at the University of California, San Diego.

Courtney Ka'ohinani Rowe, daughter of Mona Rowe, Media & External Publications Office, and Michael Rowe, retired from DAS, is a senior at Westhampton Beach High School. This fall, she leaves East Moriches for Brown University, where she plans to create an independent major to combine mathematics, writing and the dramatic arts.



Giles Siddons is the son of Peter Siddons, NSLS, and lives in Shoreham. After his graduation from Shoreham-Wading River High School, he will study electrical engineering at Union College.

Lisa Tannenbaum, daughter of Michael Tannenbaum, Physics, is a resident of Belle Terre. Now in her last year at Earl L. Vandermeulen High School, she will matriculate at Yale University, majoring in chemistry and classics.



Lotje Van Asselt, the daughter of Willem Van Asselt, Alternating Gradient Synchrotron Department, is a senior at Longwood High School and lives in Yaphank. She will attend a university in Holland, where she may undertake biomedical studies.

Emily Weinert is the daughter of Michael Weinert, Physics, and a resident of Bellport. After being graduated from Bellport High School, she will attend Duke University to major in biology or biochemistry.

Computer Class: PERL

The Computing & Communications Division will offer a three-day class in PERL programming, Monday-Wednesday, June 8-10, in the seminar room, Bldg. 515. To register, send an ILR for the training fee of \$450 to Pam Mansfield, Bldg. 515, by Monday, June 1. For more information, contact Mansfield at pam@bnl.gov or Ext. 7286.

Quality Training Offered

The next series of training sessions offered by the Quality Management Office to quality-assurance representatives and other interested Lab personnel will start on Wednesday, June 10.

The first session will cover an introduction to quality concepts and the BNL approach to quality. It will be held in the conference room, Bldg. 426, at 51 Bell Avenue. The remaining 11 sessions will run on successive Tuesdays, usually in Berkner Hall, Room D. All sessions will start at 9:30 a.m. and last for approximately 1½ hours.

The sessions are open to Quality Representatives and other interested Lab personnel. If you plan to attend or would like a course schedule, contact Gina Bernard, Ext. 3689, or e-mail ginab@bnl.gov by Wednesday, June 3.

Classified Ads (cont'd.)

quest consideration for themselves, and, second, for open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people.

Except when operational needs require otherwise, positions will be open for one week after publication.

For more information, contact the Employment Manager, Ext. 2882; call the JOBLINE, Ext. 7744 (344-7744), for a complete list of all job openings; use a TDD system to access job information by calling (516) 344-6018; or access current job openings on the World Wide Web at <http://www.bnl.gov/JOBS/jobs.html>.

The following vacancies are exempt from the Director's hiring freeze.

SCIENTIFIC RECRUITMENT - Doctorate usually required. Candidates may apply directly to the department representative named. Send C.V. to M. Kipperman, Bldg. 185.

POSTDOCTORAL RESEARCH ASSOCIATE - In the Imaging & Neuroscience Group, to examine the effect of dopamine neuron activity on the binding of PET and SPECT radiotracers to dopamine receptors. The project will examine radiotracer binding using both in vivo rodent models and in vitro rat brain slice model. Objectives include evaluating the potential for using PET and SPECT radiotracers to monitor and quantify endogenous levels of synaptic dopamine in the brain during imaging experiments. Background in neuroscience or pharmacology required and experience with small animal studies, binding assays and/or autoradiography preferred. (reposting) Under the direction of Drs. S.J. Gatley and A.N. Gifford. Medical Department.

POSTDOCTORAL RESEARCH ASSOCIATE - Strong background in the use of ultrahigh vacuum techniques for surface characterization and chemical reactors for catalytic studies under high-pressure conditions. Will participate in studies of the structural, electronic and chemical properties of metal and metal-oxide surfaces. Experiments will be carried out at beamlines of the National Synchrotron Light Source: UV ring (single crystals, photoemission, NEXAFS) and x-ray ring (high-surface area catalyst, XRD, EXAFS, high-pressure reaction kinetics). Under the direction of J.A. Rodriguez. Chemistry Department.

SCIENTIST - Will head a theory group of the Accelerator Test Facility in support of the research planned on plasma wakefield acceleration, Compton backscattering for the production of picosecond x-rays and similar projects. Requires significant previous experience, an established reputation in field of strong laser, electron beam and laser, plasma interaction theories and simulations. Position will require guiding research associates and students, and collaboration with other groups both inside and outside the Laboratory. Under the direction of Ilan Ben-Zvi, National Synchrotron Light Source Department.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

MK 2579. INDEPENDENT OVERSIGHT ASSESSOR - Requires a BS in science or engineering and at least several years' experience in implementing a quality-assurance program and/or self-assessment programs. Experience in the implementation of DOE Order 5700.6C Quality Assurance is also required. Lead auditor certification and/or knowledge of ISO 14000 preferred. Management and policy development experience, and a working knowledge of the Malcolm Baldrige process desirable. Responsibilities will include conducting formal evaluations of Laboratory programs, processes, systems, Directorate self-assessment programs, as well as special studies. Will assist in the development, coordination and execution of an Independent Oversight Assessment Program. (reposting) Independent Oversight Office.

MK9999. TELEPHONE OPERATOR - (substitute position) Under general supervision, places incoming and outgoing local, toll and long-distance commercial and FTS calls in the operation of multiple position switchboard. Must be familiar with Laboratory organization, personnel and methods of locating unlisted individuals and contacting emergency personnel at all times. Maintains necessary records of toll charges and performs telephone-related clerical duties. (reposting) Computing & Communications Division.

DD7780. SECRETARIAL POSITION - Requires an AAS degree in secretarial science or equivalent experience, excellent communication and interpersonal skills, and a thorough knowledge of Lab policies and procedures. Experience with IBM PC, Windows 95 and IPAP, and the ability to make travel arrangements also required. Knowledge of DBase, Excel and Access desired, as is previous accounting experience. Duties will include handling telephones, supplies, mail and filing. Will provide backup support to the Administrative Office. (reposting) Computing & Communications Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

MK7014. SPECIAL ASSISTANT TO THE ASSISTANT DIRECTOR FOR COMMUNITY INVOLVEMENT & PUBLIC AFFAIRS - Requires a bachelor's degree in an engineering-related discipline and significant experience in nuclear facility operations, health physics, chemistry and project management. Significant experience in all aspects of public and community affairs, particularly with local community organizations is necessary. Skills in developing and conducting training and public presentations is highly desirable. Will be directly accountable to the Assistant Director for Community Involvement & Public Affairs to provide technical assistance in developing and implementing strategic communications and community-involvement programs. Will be expected to provide technical assistance in planning and implementing communications programs in connection with the BGRR, the HFBR and the CERCLA process, and will assist in the preparation of briefing books, position papers, press releases and fact sheets. Will also assist in the preparation of performance-measure project management, oversight of divisional training activities, and activities supporting the Citizens Advisory Committee and Brookhaven Executive Roundtable. Director's Office.

DD7852. TECHNICAL POSITION - (term appointment) Requires an AAS in mechanical technology or equivalent experience and demonstrated mechanical aptitude, including a knowledge of machine tools, precision assembly and gluing techniques. Previous experience with construction of wire-chamber detectors highly desirable. Will participate in the fabrication of time expansion chamber detectors with a small team of physicists and technicians for PHENIX experiment at RHIC. (reposting) Relativistic Heavy Ion Collider Project.

DD7857. TECHNICAL POSITION - (term appointment) Requires an AAS in an electrical or mechanical discipline, or equivalent experience in one or more disciplines, such as mechanics or electromechanical assembly. Must be able to work from prints, sketches and verbal instructions. Work involves the construction of prototypes through final testing and installation. Responsibilities will include working directly with engineering in the design, fabrication and maintenance of power supplies and related equipment. Relativistic Heavy Ion Collider Project.

DD7640. TECHNICAL POSITION - (term appointment) Requires an AAS and a knowledge of mechanical construction and shop techniques, as well as general knowledge of simple electrical circuits. Duties will include mechanical assembly, as well as the maintenance of turbo pumps and foreline pumps for various vacuum systems used in the Electron Spectroscopy Group. Physics Department.

DD7323. PLUMBER A POSITIONS - (temporary) Under minimum supervision lays out, constructs or installs, repairs, and maintains water and gas distributions systems, related facilities and auxiliary equipment and equipment utilizing water, gas and heat distribution services. Plant Engineering Division.

DD7325. ELECTRICIAN A POSITIONS - (temporary) Under minimum supervision, lays out, constructs, installs, maintains, repairs and operates (in accordance with the National Electrical Code, or as otherwise directed) electrical systems, equipment, controls and related devices. May be required to perform similar duties on other than maintenance division equipment and facilities. Plant Engineering Division.

DD7854. TECHNICAL POSITIONS - (temporary) Requires a high school diploma or equivalent and the ability to work well as a member of a team. Under direct supervision, will perform routine functions, including cable installation, fabrication, installation, assembly, operation or maintenance of equipment or facilities. Agility, stamina and the ability to work at heights of up to 25 feet also required. Prior technical work experience is a plus. Relativistic Heavy Ion Collider Project.

NS7444. CNC PROGRAMMER - (term appointment) Requires a minimum of five years' programming experience using manual and computer-assisted methods. Under general supervision, is responsible for preparing programs of moderate complexity for computerized numerically controlled equipment. Determines the most economical and expeditious methods for use of numerically controlled equipment dealing primarily with two and three axes, occasionally four axes. Prepares and verifies numerical control programs for machine uploading, along with numerical control methods operation sheet, including setup information and sketches. Performs other related assignments as required. Central Shops Division.

NS7698. ENGINEERING POSITION (term appointment) - Requires an advanced degree in an appropriate engineering field, Ph.D. preferred, and training in thermal sciences and cryogenics. Proficiency with computational analysis on thermodynamics, mass and heat transfer, fluid mechanics and gas dynamics required. A strong background in cryogenic systems and techniques, including large helium refrigerators and small cryocoolers (GM coolers), necessary. Work will include the design analysis of the cryogenic systems for superconducting magnets, which include helium two-phase flow calculations, cryocooling analysis against thermal and nucleus particle heating fluxes, magnet cooling flow circuits analysis, magnet quench pressure and temperature calculations, and design analysis for electrical power leads of magnets. Alternating Gradient Synchrotron Department.

NS7476. P&GA SCANNING CLERK B - (term appointment) Under direct supervision and administrative direction, performs routine scanning, indexing, and electronic file and CD creation functions, including preparation of documents for scanning, key-boarding of indexed fields, inspecting scanned images to ensure quality and legibility, and generating or duplicating electronic files for CDs containing scanned images and indices. Required qualifications include experience working with a personal computer and keyboarding skills. Experience with scanning and indexing desirable. Information Services Division.