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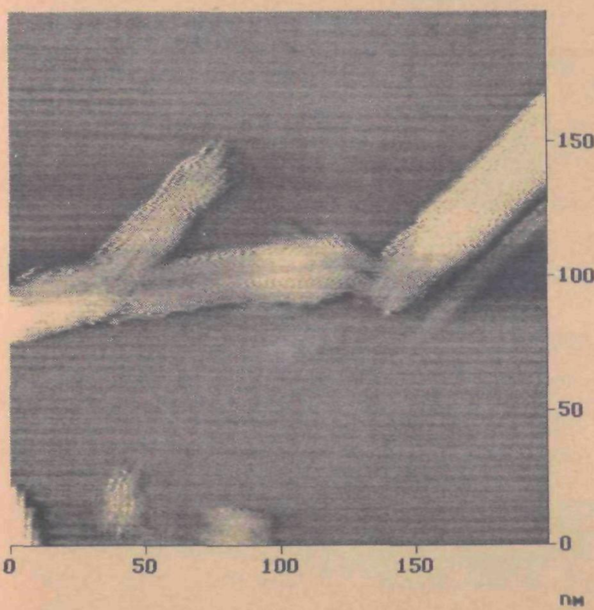
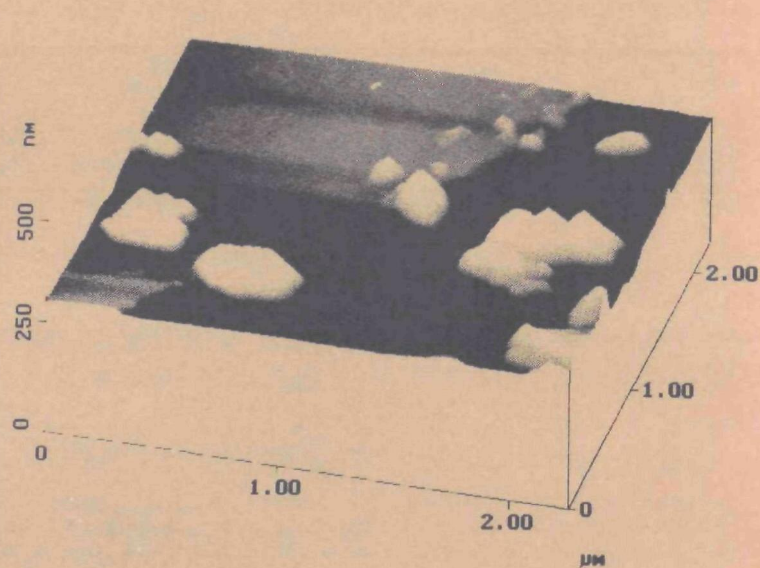
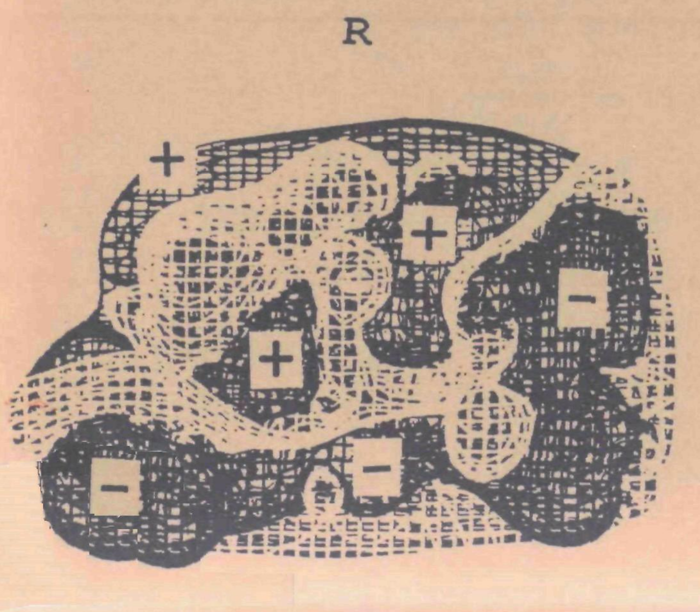
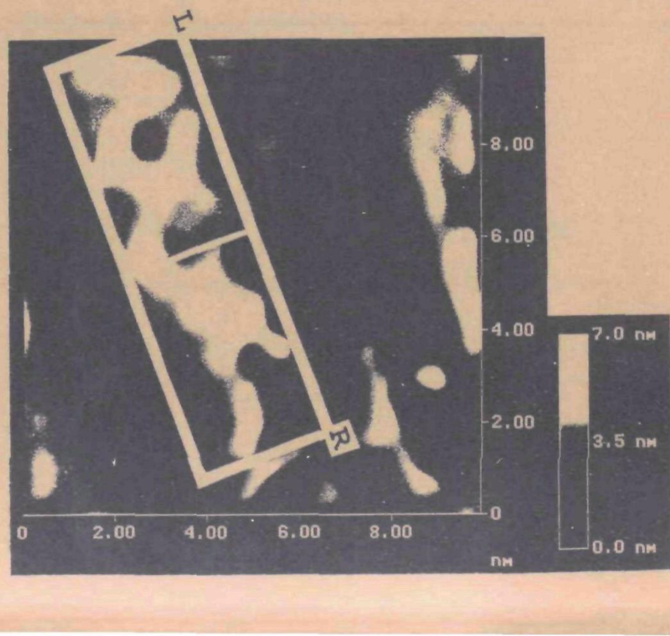
Environmental Research Laboratory—Athens, GA

1994 Highlights









Cover: *Images from scanning probe microscopy research.* **Upper left:** *scanning tunneling microscopic image of the nitro-reductase enzyme-monoclonal antibody interaction on the surface of graphite;* **Upper Right:** *atomic force microscopic image of a lead precipitate on the surface of muscovite (pH 8.18);* **Lower Left:** *electrostatic equipotential surfaces around an aggregate of citric acid molecules as in the box R of the experimental image on the opposite figure. The regions of repulsion and attraction of a negatively charged particle are marked with "-" and "+" signs, respectively;* **Lower Right:** *scanning tunneling microscopic image of citric acid on graphite. Areas subjected to computer reconstruction are placed in boxes.*

The U.S. Environmental Protection Agency's Environmental Research Laboratory at Athens, Georgia, conducts research on chemicals, ecosystems, biogeochemical cycles, and land use perturbations that create risks to humans and ecosystems. ERL-Athens conducts field and laboratory experimental research to understand the fate of chemicals in multimedia environments, to quantify the interactions of the climate system and the biosphere, to evaluate the causes of ecological stress within a watershed context, and to create and evaluate remediation systems for contaminated sites. ERL-Athens develops, tests, and applies exposure models within the risk assessment framework for both humans and ecosystems.

ERL-Athens researchers identify and characterize the physical, chemical, biological, and biochemical processes needed to predict the rates of transformation and products produced, and the transport and ultimate distribution of chemical pollutants in multimedia environments and in organisms. This research is also the foundation of the Lab's soil/sediment/aquifer remediation technology program involving microbial, plant, chemical and combination process components. Researchers work to:

--identify, characterize, and predict pollutant and ecosystem properties and environmental factors that determine pollutant exposure, impact and risk, including use of computational chemistry and artificial intelligence/expert systems.

--incorporate scientific understanding of environmental processes and ecosystem behavior into computerized techniques for predicting probable environmental concentrations and human and ecological risk from pollutants under various management, land use or policy options.

--develop, field-test and document the reliability of single and multimedia management methods, pollution prevention strategies and remediation techniques, and the fate, exposure, and risk assessment models on which they were based.

--identify, characterize, and predict the biogeochemical and hydrologic processes needed to determine net greenhouse gas emissions, and the impacts on those processes/fluxes due to climate and land use changes, and to delineate potential remediation techniques.

EPA's Center for Exposure Assessment Modeling at ERL-Athens distributes models and user guides to environmental managers in Federal, State and local agencies in the United States and throughout the world by mail and via electronic bulletin board and Internet.

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The Office of Research and Development (ORD) conducts an integrated program of scientific research and development on the sources, transport and fate processes, monitoring, control, and the assessment of risk and effects of environmental pollutants. These activities are implemented through its headquarters offices, technical support offices, and twelve research laboratories across the country. The research focuses on key scientific and technical issues to generate knowledge supporting sound decisions today, and to anticipate the complex challenges of tomorrow. With a strong and forward-looking research program, less expensive, more effective solutions can be pursued and irreversible damage to the environment can be prevented.

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PROGRAM HIGHLIGHTS

Applying Scanning Probe Microscopy to Environmental Contaminants

Scanning probe microscopy, an exciting new technology that consists of scanning and atomic force microscopy, allows investigators to characterize the morphology and atomic structure of environmental surfaces at the nanoscale level. Researchers at ERL-Athens are the first Agency scientists to apply this new technology in their efforts to expand scientific knowledge of the behavior of metals in the environment.

Over the past 3 years, Lab researchers have characterized surfaces of such environmental materials as lignins, fulvic acids, humic acids and model organic humic substances, phyllosilicates, and sulfides. The products of geochemical reactions on mica surfaces also have been examined. Surface images have been produced of sulfides, metal oxides, halomethanes sorbed on pyrite and graphite surfaces, nitro-reductase enzyme-monoclonal antibody interactions, and the reduction of chromium on natural surfaces.

In on-going work, researchers are developing techniques for using scanning tunneling spectroscopy and electro-chemical scanning tunneling microscopy to better define the electronic properties of metal oxide surfaces and their redox characteristics. Chemical reactivities of different environmental surfaces are being characterized in terms of oxidation-reduction/electron transfer reaction rates, surface polymerization of metal ions, and the surface precipitation/dissolution of metal oxides coating other metal surfaces. Surface characterization parameters include surface roughness, bearing ratio, areal and angular dimensions of structural units, and fractality. (Fractality is involved in predicting chemical reactivity of the surface).

Thinking Small: Surface Chemistry at the Nanoscale Level

The general methodology of computer-assisted representation and interpretation of scanning probe microscopic images has been developed and demonstrated using citric acid as a model humic substance. High resolution (nanoscale) scanning-tunneling microscopic images of citric acid were interpreted on the basis of SYBYL software. A combination of molecular mechanics/dynamics and semi-empirical quantum mechanical calculations were used to perform an energetical analysis of surface-molecule/ion-solvent interactions. Simulations were produced describing the partitioning behavior of a model organic molecule or inorganic metal species of known electronic properties at an environmental surface of given specific structure, morphology, and electronic properties.

Results from these studies will be used to develop selection rules for the "a priori" prediction of the partitioning of organic and inorganic pollutants to environmental surfaces from the solution phase. *(G.W. Bailey, 706-546-3307).*

Remediation Using Plants and Plant Enzymes: A Progress Report

Sediments have been shown to contain active enzymes that can degrade nitroaromatic compounds such as TNT or chlorinated solvents such as TCE. Five classes of proteins have been isolated and partially characterized. Three of the enzymes have been used for the production of monoclonal antibodies to determine the possible sources of these proteins. In every case, the sources are plants growing near the sediment. The use of plants for remediation of hazardous materials such as TNT or other munitions like RDX and HMX has led to a new approach to remediation--phytoremediation. Investigators have developed a field test to indicate which locally grown plants can be used at each contaminated site.

Pilot scale testing of the concept of phytoremediation is being funded by the Strategic Environmental Research and Development Program. Created wetlands containing appropriate plants will be used to remove TNT from ground water.

TNT half life of minutes

Halflives of TNT with the appropriate plants are on the order of minutes in the laboratory compared with 15 to 20 days for composting and 80 days for bacterial breakdown. Investigations have shown that the TNT is reduced one nitro group at a time to triaminotolune (TAT) by one enzyme, a nitroreductase. A second enzyme present in some plants, a lactase, adds oxygen across the ring structure and opens it up. The reaction after ring opening is very rapid, and no TNT remains, and the components of the TNT molecule may be incorporated into the plant, perhaps as lignin.

Phytoremediation is also applicable to the cleanup of TNT-contaminated soil. Auburn University, in cooperation with EPA, has conducted a series of batch pilot studies at an abandoned ammunition plant in Alabama. The Georgia Institute of Technology, Rice University, and Louisiana State University will conduct soil cleanup pilot studies in 1995 using soils contaminated up to 5000 ppm, under an EPA grant to the Hazardous Substance Research Center/South and Southwest. (*N.L. Wolfe and S.C. McCutcheon; 706-546-3429)*

Restoration of the South Florida Ecosystem

In September 1993, EPA and other Federal agencies that have major land management and regulatory responsibilities, signed an agreement in Orlando, Florida, to establish a coordinated Federal effort to restore the Everglades and other parts of the South Florida ecosystem. Federal responsibilities in the area include three national parks, a national preserve, eleven national wildlife refuges, the Florida Keys National Marine Sanctuary, and reservation lands of the Seminole and Miccosukee Tribes.

Computer system aids ecosytem management analysis

Water built the Everglades, and ecological restoration must begin with hydrological restoration. Beyond the immediate legal, financial, and social barriers stands, however, the central challenge of adaptive management: reducing uncertainty in the myriad of potential risks to a level at which the relative benefits of competing policy options can be clearly articulated and understood. One of those risks is contamination of the Everglades biota by methylmercury.

Beginning with the detection of elevated levels of mercury in largemouth bass in 1989, it has become increasingly apparent that the South Florida ecosystem is extensively contaminated. In response, the State of Florida has issued human health advisories that ban or restrict consumption of freshwater fishes from more than 2 million acres of the Everglades and the Big Cypress Swamp. Although mercury contamination has been detected at levels of concern in largemouth bass throughout the state, maximum concentrations found in Everglades largemouth bass (4.4 mg/kg) and bowfin (>7 mg/kg) are the highest mercury contaminant levels thus far reported from Florida waters. Mercury accumulation through the food chain may reduce the breeding success of wading birds and the viability of the endangered Florida panther.

In 1994,ERL-Athens began the design of a computer-based capability for adaptive ecosystem management analysis. This system will integrate comparative risk assessment techniques, monitoring data, and process-based predictive simulation modeling in a Geographic Information System framework for analysis and contrast of competing management and policy alternatives. The development of this system will focus on the integration of multiple modeling studies by several agencies with mercury biogeochemistry and bioaccumulation models created at ERL-Athens to develop ecological risk assessments for mercury contamination that will help in resolving ecosystem restoration problems. *(L.A. Burns, 706-546-3511)*

Greenhouse Gases and Boreal Forests

Scientists from the Athens Laboratory participated in the joint United States-Canada project called the Boreal Ecosystem-Atmosphere Study. BOREAS is a cooperative field study involving elements of terrestrial ecology, trace gas biogeochemistry, modeling, and land surface climatology. Current models project that the boreal forests in high latitudes will experience pronounced changes in temperature and precipitation in response to the global buildup of greenhouse gases. The goal of BOREAS is to understand the interactions between the boreal forest biome and the atmosphere that affect global climate change. Eight Federal agencies and departments in the United States and five agencies and ministries in Canada are participating in BOREAS.

Burned soils promote CO_2 release

During 1994, three intensive field campaigns of BOREAS centered on two major sites located in the Canadian provinces of Saskatchewan and Manitoba. The sites are located near the northern and southern limits of the boreal forest. The primary focus of the Athens Laboratory research at the Manitoba sites was the post-burn impact of the intense stand-replacement fires on soil biogeochemical cycles and the soil-atmosphere exchange of carbon dioxide, carbon monoxide, and methane. The studies also examined the effects of changing solar ultraviolet radiation on emissions of carbon monoxide from exposed litter and from wetlands, including beaver impoundments. Related ancillary data such as soil moisture and temperature, soil diffusivities, and depth to water table also were determined. The EPA scientists worked closely with scientists from the National Aeronautics and Space Administration (USA), Forestry Canada and Environment Canada.

Three preliminary findings are apparent. First, the consistently higher temperatures in the soils of the burn sites may enhance soil organic matter decomposition, promoting the release of carbon dioxide to the atmosphere. Second, soil consumption of methane was enhanced at the burn sites compared to the controls, particularly at the sandy sites. Third, carbon monoxide production from the surface soils was strongly enhanced by exposure to solar ultraviolet radiation. These results are being used to refine models that describe the effects of climate change on biosphere-atmosphere exchange of atmospherically important trace gases. (*R.G. Zepp, R.A. Burke; 706-546-3146*)

New Process for Treating Solvents, Pesticides

A new sulfur-iron system promotes the treatment of groundwater that is contaminated by hazardous chemicals. The process prevents the buildup of vinyl chloride and other dangerous products in the "funnel and gate" technology for in situ treatment. The sulfur-iron catalyst properly controls pH and completes the reaction of chlorinated solvents, the most pervasive contaminants at many hazardous waste sites. In addition to treating a large number of chlorinated solvents, the new catalyst has proven extremely effective in treating selected pesticides. This research is funded by the Strategic Environmental Research and Development Program conducted jointly by the EPA, the Department of Defense, and the Department of Energy. The Air Force's Armstrong Laboratory at Tyndall Air Force Base is a senior research partner, along with Hill Air Force Base, and DoE's Savannah River Plant. More than 1000 Federal facilities are contaminated by these chlorinated solvents, ranging from nuclear weapons machining facilities to jet cleaning operations. (*N.L. Wolfe, S.C. McCutcheon; 706-546-3429*)

Government/Industry Study Pesticide Drift

EPA (through the Athens and Research Triangle Park laboratories), the Department of Agriculture, and 32 agricultural chemical companies formed a consortium in March 1994 to evaluate environmental problems caused by sprayed pesticides drifting on the wind onto non-target fields, lakes and streams. The Cooperative Research and Development Act project links the data collection and modeling of the agricultural chemical industry's Spray Drift Task Force, the spray drift exposure modeling efforts of EPA, and the spray drift field studies of the USDA. The goal is to develop a validated assessment tool for use in evaluating the risk of off-site drift under different scenarios, and identifying the critical parameters that determine the extent of pesticide drift. (*S.L. Bird, 706-546-3476*)

Model assesses off-site drift of pesticides

Multimedia Models for Regulatory Impact Analysis

A new class of mathematical models is being developed as scientific understanding of the pathways by which humans are exposed to pollutants increases. These new multimedia models simulate the movement of pollutants between media (air to soil, water to air, etc.) to give a better understanding of the degree of exposure likely to occur and a better estimate of resulting human health and ecological effects. EPA and the Department of Energy are developing an interagency consensus as to the comparability and applicability of a series of multimedia models and merging the models where appropriate and feasible. (*G.F. Laniak, 706-546-3310*)

Sediment-Associated Reactions of Aromatic Amines

Athens Laboratory studies of aniline and substituted anilines in pond sediments have demonstrated that these pollutants sorb to sediments irreversibly through chemical reactions. This new information will assist in the Agency's efforts to predict the behavior of this important class of environmental contaminants in aquatic and soil ecosystems. Aromatic amines can enter the environment from the reduction of azo dyes, polynitroaromatic munitions (e.g., TNT), and dinitro herbicides, and hydrolytic degradation of numerous agrochemicals.

Structure-activity relationships indicate that the strength of the amine's basicity (its pKa) will be a useful predictor for determining to what extent chemical sorption will occur. The rate and extent of chemical sorption will increase with the magnitude of the aromatic amine's pKa. Studies are currently focusing on extending the list of aromatic amines being investigated and enhancing our ability to predict the behavior of this class of chemicals in environmental systems. (*E.J. Weber, G.L. Baughman, D. Colon; 706-546-3154*)

Identification of Ozonation Byproducts

Ozonation of high-bromide water produces bromohydrins

Researchers at the Athens Laboratory discovered the formation of about 20 different bromohydrins and related compounds when natural water with elevated concentrations of bromide is treated with ozone, an alternative disinfection treatment for drinking water. Although the potential human health significance of bromohydrins is unknown, the formation and identification of these compounds provides new insight into formation mechanisms and methods of identification of these unusual compounds. Now that these compounds have been identified, they can be specifically monitored for in evaluating the efficacy of ozonation as a drinking water disinfectant.

Of particular interest is that chiral carbons are common among the compounds. Structures with chiral compounds usually are indicative of the existence of "mirror image" compounds (enatiomers) that cannot be separated with commonly used separation techniques, although they may exhibit significantly different toxicological properties. Failure to recognize these enantiomers can result in misinterpretation of the toxicity potential of chemicals.

Separate studies, using chiral chromatographic columns with "dummy compounds," demonstrated the presence of enantiomers among such structures. Infrared spectroscopy and computational chemistry played a more significant role than in most multispectral identification studies, indicating the breadth of laboratory information that is needed to explore fully the formation of drinking water disinfection byproducts. (*T.W. Collette, 706-546-3525*)

Predicting Reactivity from Molecular Structure

A highly reliable model for predicting the alkaline hydrolysis transformation rates for organic compounds from their infrared spectra has been developed. Based on the mathematical theory of rough sets, the model further substantiates the feasibility of estimating environmentally important reactivity rates from infrared spectra.

Reliable chemical reactivity rates are essential to predicting the fate of chemicals in the environment in order to evaluate potential exposure to humans and sensitive ecosystems. Literally thousands of man-made chemicals find their way into the ambient environment. Because laboratory measurements of the necessary chemical and physical properties for estimating potential exposure costs thousands of dollars per chemical and often takes several weeks for a single measurement, it is essential that we develop reliable means of estimating these properties from easily and inexpensively obtained data.

Model predicts alkaline hydrolysis from infrared spectra

Infrared spectra are readily available for more than a hundred thousand chemicals, and laboratory generation of spectra for chemicals is both fast and inexpensive. More recent evaluation of the model indicates that the general approach is applicable to the estimation of ten equilibrium constants that are important in predicting chemical fate. Additional benefits of this research are a better understanding of the reaction process, of important trends in spectral data, and of underlying relationships between the two. (*T.W. Collette, 706-546-3525*)

Bioremediation of Oil Spills

In response to the need to evaluate bioremediation products for application to oil spills, ERL-Athens is participating with other EPA Laboratories and with members of academia and industry in an effort headed by the National Environment Technology Application Center. Protocols were developed for testing the effectiveness of products in open waters, beaches, and wetlands. ERL-Athens has the lead in the wetlands effort.

The protocols for evaluation of the efficacy of remediation products are microcosm-based, with supporting toxicological and analytical protocols for determining risk for product application and indicators of product effectiveness. As part of the protocol development process, ten bioremediation products, including nutrients, surfactants, active microbial agents and enzymes, were submitted to NETAC for anonymous testing.

Although some of the products increased the biodegradation of oil with respect to ambient rates, none has outperformed the addition of inorganic nutrients. The protocols have been released in draft form for testing and use by industry. Within the Agency, the microcosms developed as the core of the protocols are being used to investigate the ecological interactions between degrader bacteria, either indigenous or introduced, and nondegrader natural bacteria populations. An understanding of those interactions will lead to optimization of bioremediation processes with minimal disruption of the natural microbial processes. (*R. Araujo, 706-546-3468*).

HSPF Used in Public Education Project

HSPF, a water quality model developed through Athens Laboratory research, has been used in a new application--to estimate the effectiveness of a public education program to reduce nonpoint source pollution. Maryland's Prince George's County used the Hydrological Simulation Program--FORTRAN (HSPF) to calculate the reduction in nonpoint source pollutants in the Kettering community if residents curtailed the use of fertilizers and pesticides on lawns and the improper disposal of detergents, oil, grease, and antifreeze in automobile maintenance. The project included a survey that showed that Kettering residents lacked a general understanding of water quality issues. For example, 58 percent of the residents did not know that stormwater runoff from residential areas causes water pollution. The County plans to apply this survey, education and impact modeling approach to other communities on a small watershed scale. (*T.O. Barnwell, 706-546-3180*).

Environmental Science Workshop for Teachers

Workshop draws high school teachers

Twenty-five high school teachers representing school districts from across Georgia participated in an intensive, 6-day workshop entitled "Environmental Science in the Classroom As It Relates to the Community" at the Athens Laboratory in June. The workshop, now in its fourth year, is sponsored by EPA and the American Chemical Society and is organized and coordinated by Ms. Kate McDaniel, the Lab's Environmental Education Program Manager. The workshop was presented by ChemCom (Chemistry in the Community) high school teachers who are certified by the American Chemical Society. The participants hear guest lecturers, perform laboratory exercises, join in role playing and creative planning, and tour science facilities. The workshop allows teachers to enhance their capabilities to teach science and motivate students to pursue a career in science. (*V.K. McDaniel, 706-546-3524*)

Staff Honors and Awards

McCutcheon Receives Engineering Award

Dr. Steven C. McCutcheon is the 1994 recepient of the Richard R. Torrens Award from the American Society of Civil Engineers. The award, presented by ASCE President James W. Poirot at the Society's annual convention in September, recognizes Dr. McCutcheon's "far reaching and innovative" contributions to the ASCE publications program. He was editor of the ASCE's *Journal of Environmental Engineering* for 1993-94.

One of the youngest editors in the history of ASCE, Dr. McCutcheon originated the idea of the first known joint editorial about a new engineering discipline--ecological and environmental engineering. He joined with Dr. William Mitsch, editor of Elsvier's *Ecological Engineering* in publishing the editorial in the two journals. In the new discipline, engineers must learn ecology and ecologists must help in adapting engineering methods to preserve and restore ecosystems.

In addition to his own editorials on the need to handle the cleanup of hazardous waste sites better and prevent cancer-causing agents from being formed during the disinfection of drinking water, Dr. McCutcheon opened the journal's editorial page to guests to write about the "Future of Environmental Engineering". He also provided emphasis to bioremediation articles and other new topics, setting in motion a publication policy that streamlines the dissemination of this information.

Lab Articles Win Awards

Wolfe Receives Level I Award

Four Lab-authored articles received recognition in the Office of Research and Development's 1993 Scientific and Technological Achievement Awards competition. Receiving one of only three Level 1 awards in the competition was Dr. N. Lee Wolfe's article "Structure-Activity Relationships in Dehydrohalogenation Reactions of Polychlorinated and Polybrominated Alkanes", which was coauthored with Dr. A.L. Roberts and Dr. P.M. Gschwend of the Massachusetts Institute of Technology and Dr. P.M. Jeffers of the State University of New York at Cortland. Level III awards went to Dr. Ray Lassiter for "Sublethal Narcosis and Population Persistence: A Modeling Study of Growth Effects", which was coauthored with Dr. T.G. Hallam of the University of Tennessee, and to Dr. Richard Zepp for "Formation of Carbon Monoxide from the Photodegradation of Terrestrial Dissolved Organic Carbon in Natural Waters" written with Dr. Richard

Valentine of the University of Iowa. Dr. Roger Burke received an Honorable Mention for "Possible Influence of Hydrogen Concentrations on Microbial Methane Stable Hydrogen Isotopic Composition".

The STA Awards are granted by ORD upon the recommendation of the Agency's Science Advisory Board. In the 1993 competition, the SAB reviewed 131 submissions and selected 42 for awards.

Wolfe, McCutcheon Win Science Award

Agency awards to Wolfe, McCutcheon and Kellum

Dr. Lee Wolfe and Dr. Steve McCutcheon received the 1994 EPA Science Achievement Award in Waste Management. The award recognized their "...outstanding leadership in establishing new phytoremediation research and ecological engineering methods to clean up Federal facilities and other hazardous waste sites". Each year, as part of the EPA Honors Award Program, Agency scientists and engineers are recognized for outstanding contributions in several scientific-technical fields.

Administrative Excellence

Ms. Maxine Kellum, Personnel Management Specialist, received a 1994 Administrator's Award for Excellence. She was recognized for "extraordinary dedication and service to the Agency for outstanding accomplishments and demonstrating unusual ability in addressing and resolving complex human resources issues".

Seven Win Bronze Medal

The Agency awarded a Bronze Medal in July to the Lab's Pathways Analysis Team for its work in providing chemical behavior information in support of the Hazardous Waste Identification Projects of the Office of Solid Waste and Emergency Response. The Bronze Medal winners were Dr. Jackson Ellington, Dr. Sam Karickhoff, Ms. Brenda Kitchens, Mr. Heinz Kollig, Dr. Mac Long, Dr. Eric Weber, and Dr. Lee Wolfe.

Russo Named to Labor Council

EPA Administrator Carol Browner appointed Dr. Rosemarie Russo, Lab Director, to the Agency's National Partnership Council. The Council, which includes EPA managers and representatives of all of the Agency's active labor organizations, was established as a means of exploring new ways of conducting labor relations.

Prieto Takes Affirmative Action Posts

Ms. Lourdes Prieto assumed duties as the Lab's Equal Employment Opportunity Officer, Hispanic Program Coordinator, and Black Employment Coordinator. She takes over from Ms. Janice Sims, who had completed her 2-year appointment in our Lab's affirmative action and special emphasis programs.

Russo Joins Science Committee

Dr. Rosemarie Russo, Laboratory Director, was named to the Steering Committee for the Agency's newly formed Science Policy Council. The Council was created by Administrator Carol Browner to guide Agency decision makers in their use of scientific and technical information. The Steering Committee is composed of career scientists and managers who will assess science policy needs on an ongoing basis, plan for meetings of the Science Policy Council, resolve issues that do not require the full Council's attention, and oversee and evaluate the success of implementing new and existing Agency science policies.

Rogers Advises on Arabian Oil Spill

Dr. John Rogers was EPA's representative on an advisory mission to the United Arab Emirates following an oil tanker spill in April. Dr. Rogers and representatives of the National Oceanic and Atmospheric Administration and the U.S. Coast Guard assisted the UAE in setting up a management team to select methods for cleaning up the beaches fouled by the oil spill. The EPA assistance project was organized by the Office of Solid Waste and Emergency Response.

Garrison Chairs RAB

Dr. Wayne Garrison became Chair in 1994 of the Lab's Research Advisory Board, taking over from Mr. George Baughman. The RAB assists Lab Management in determining the Lab's research directions. The Board includes Dr. Roger Burke, Dr. Rochelle Araujo, Dr. Jim Hill, Dr. Steve McCutcheon, Dr. Mac Long, Dr. John McGuire, Dr. Wayne Garrison, Dr. Bob Swank, and Mr. George Baughman.

Byrne Joins Staff

Mr. Christopher Byrne joined the staff in May in the newly established position of Acquisition Manager. Mr. Byrne has oversight responsibilities for all acquisition instruments and assistance agreements. He came to the Athens Laboratory from EPA's Office of Administration and Resources Management.

NRC Program Grows

National Research Council sets nine associates

Nine scientists began joint research at the Laboratory in 1994 under the National Research Council Associates Program. Dr. Benjamin Magbanua is working on dehalogenation reactions and transport kinetics involved in the biochemical remediation of trichloroethylene and perchloroethylene. Dr. Said Hilal is extending the SPARC program to charged organic compounds. Dr. Rasul Chaudry is conducting research on the biodegradation of toxaphene. Dr. Leah Matheson is examining enzymatic aspects of oxidative coupling of anilines. Dr. Ronald Holser is performing research on waste site remediation and groundwater treatment. Dr. Vincent O'Malley is carrying out compound-specific carbon isotope analysis of polycyclic aromatic hydrocarbons produced from biomass burning. Dr. Dingi Ye is isolating and characterizing microorganism response in the reductive dechlorination of polychlorinated biphenyls. Dr. Surma Mitra is examining the use of bacteria in the biodegradation of DDT. Dr. Thomas Poiger is conducting research on metal-complex dyes in surface waters. In May, the NRC accepted Ms. Sandra Bird, research environmental engineer at the Athens Laboratory, as a new adviser for the Associates Program. Dr. Matt Tarr, an NRC Associate here since 1993, was named the Northeast Georgia Section of the American Chemical Society's Chemist of the Year for 1994.

Through a national competition, the NRC provides postdoctoral scientists and engineers of unusual promise and ability with the opportunity to pursue research that meets their interests and the needs of the sponsoring federal laboratories. Since 1979, the Athens Laboratory has benefitted from the contributions of 41 recent doctoral graduates and senior investigators who participated in the Associateship program.

International Visitors

Dr. Bernhard Berger of the Institute for Plant Pathology and Plant Protection in Gottingen-Weende (Germany) began a year-long research visit to investigate enzyme-mediated degradation pathways of sulfonylurea pesticides. Ms. Pilar Hernandez of the University of Alicante (Spain) completed a 3-month collaboration with Lab scientists and engineers to develop and test a simulation model for a mesotrophic reservoir. Mr. Daniel Schultz-Jander from the University of Kassel

(Germany) studied the degradation of nitrogen in soil and vegetation. Mr. N.C. Ghosh of the National Institute of Hydrology in Roorkee (India) completed a 4-month project on the application of the QUAL2 and WASP5 models to Indian rivers. Dr. Nadia Ananyeva of the Institute of Soil Science and Photosynthesis (Russia) began a 5-month research project under the Fulbright Program studying the biotransformation of organics in soils and sediments. The Lab also hosted day-long visits by scientists-engineers from Poland, Great Britain, People's Republic of China, and El Salvador.

AIHC Visits

The Environmental Risk Assessment Subcommittee of the American Industrial Health Council visited the Laboratory in March. The visit allowed for the exchange of information about research of mutual interest in areas of human exposure, bioremediation, and environmental review of new chemicals.

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