



President's Letter

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The "Environment" certainly seems to be on everyone's radar screen these days. Over the last couple of weeks there has been an incredible flurry of e-mails and hallway discussions about what issues constitute Grand Challenges in Environmental Sciences. The National Science Foundation has formally posed this question to the National Research Council and in response the NRC has established the Committee on Grand Challenges in Environmental Science (GCES) to identify and prioritize those areas that have the greatest scientific importance, research potential, and practical value over the next 10-30 years.

A description of the project and a list of the committee members are available on the Web at <www.nas.edu/gces>. The committee is seeking advice from the scientific community on what types of research initiatives and programs are needed to address scientific uncertainty in environmental science. The definition of environmental sciences is broad, and includes the natural sciences, the social sciences, and engineering. The definition of a grand challenge is an idea that is compelling to scientists and the public, must require a sustained research effort, and must be intellectually exciting. The committee invites submission of ideas and wanted to have received them by February 26th. However, according to an e-mail from the National Academy of Sciences, it is likely that suggestions received even as late as the beginning of May will be considered. One printed page of suggestions should be sent by e-mail to <GCES@nas.edu>.

About one year ago the National Science Board passed a resolution stating that there was a need for expanded environmental research, education, and assessment. Since NSF has a legitimate role in these activities, The Task Force on the Environment (TFE) was established to advise NSF on defining the scope of its role with respect to these needs. A description of the activities and membership of the Task Force is available on the Web at <www.nsf.gov/nsb/tfe/>. In order to inform its deliberations, the Task Force assembled approximately 195 environmental reports and documents from 1969 to the present and considered their recommendations. The Research Frontiers in Environmental Engineering Report, sponsored in part and written by AEESP members, is included on this list. The Task Force is soliciting input and will receive comments at TFE@nsf.gov.

There are also other environmental initiatives afoot. NSF and DOE are considering the future role of chemistry in energy and environmental science. A workshop is being organized to examine how chemistry, with its focus on molecular level understanding, can address the opportunities and challenges of energy use in an environmentally constrained world. Given that the Chemistry Division at NSF has just established three Environmental Molecular Science Institutes with funding for at least 5 years, their interest in environmental issues appears to be sustained.

The February issue of ASM News contained an impassioned letter recommending the creation of a new Division of Environmental Prokaryotic Biology within the Directorate of Biological Science at NSF. According to the author increased knowledge of environmental

**August 2,
1999
is the
submissions
deadline for
the
September
1999
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microbiology is absolutely essential if we are to solve the pressing problems associated with human health, food supply and safety, pollution control and abatement, national security, global warming, and nutrient cycling.

Although it is widely recognized that interdisciplinary collaboration is essential to solve environmental problems, there are no engineers on the NRC's GCES Committee, nor the NSF TFE. Furthermore, despite numerous new research initiatives to fund environmental study, few originate in environmental engineering. Many of us worry that as the environmental pie is cut into more and more pieces, the leadership of environmental engineers in the environmental area is slipping. I personally think that this situation calls for strengthening our ties to fundamental science, while at the same time seeking to establish new partnerships with industry and in other areas of practice.

We in AEESP must work harder to influence the future direction of environmental research. Later this spring Bruce Logan will take an AEESP delegation to meet with Rita Colwell, the director of NSF, in order to present the findings of the Frontiers Workshop. Mort Barlaz also worries that the interests of environmental engineering are not being represented adequately in Washington and has volunteered to chair and revive our long defunct committee on Legislative Affairs. At a minimum, Mort and the committee will try to keep us better informed about important developments in the environmental area and to track what other groups are doing. Your ideas and help are welcomed as we work to heighten the profile of environmental engineering and seek to increase our research allocation.

Yet, our efforts to influence the research agenda must rest on the shoulders of volunteers. I frequently hear appeals from our members that AEESP needs to be more "proactive." Joe Delfino recently told me that "environmental engineering is without portfolio at the national and international level" and suggests that we join the American Association of Engineering Societies in order to gain a collective voice in Washington. Chuck Haas and many others want to see AEESP work toward the creation of a professional environmental engineering organization that could better position environmental engineers in the race to establish national environmental priorities in both research and education.

In response to what I wrote in the January Newsletter, Harvey Ludwig, one of AEESP's founders, wrote to remind us that the original mission of the organization was to "enable meaningful political representation" that would provide resources for teaching and research. As we look for ways to increase our presence in Washington, we are also searching for ways to sharpen our approach to environmental education. At our executive meeting in January it suddenly became apparent that we no longer have an education committee. We have moved to resurrect this committee as well. There is always a lively debate on the issue of ABET accreditation, and among our members, this is the one topic that rivals concerns about research funding. The newly reinstated Education Committee, consisting of Bob Baillod, Steve Dental, Kim Hayes, and Mike Switzenbaum, has been asked to meet with representatives from AAEE in order to discuss our views on how environmental engineering should be taught and programs accredited.

Uncertainty and at times misunderstanding continue to surround our interactions with AAEE. We still do not have a Partner Agreement with them. Dave Dzombak recently reported that approximately 10% of our members are also members of AAEE. I am concerned, though, that there are so few young or female members in AAEE's ranks. I think it is critical that we improve our lines of communication with AAEE and develop a more synergistic view of our respective roles in setting the environmental engineering agenda.

Finally, I hope you like the changes we have made in the Newsletter. Roger Ely has started a column called "Views" to feature the thoughts and opinions that our members have on various issues. Robin Autenrieth and Debra Reinhart will write a "Board Highlights" column to provide a summary of AEESP board meetings. We would also like to start a column called "Comings and Goings," to try to keep track of where active careers in environmental engineering and science are taking our members, and another called "Programs and Places," for announcements about new programs, opportunities for graduate students, new institutes, etc. We encourage you to use the Newsletter as a place to announce important events and to showcase new and exciting developments in environmental programs. If you are going to write one letter about environmental engineering and science in the next month, make it about what you think the challenges in environmental study are and send a copy to the NRC GCES Committee and also to us. It would be very interesting to print in our next Newsletter those issues our members perceive to be the Grand Environmental Challenges of the next century.

Kimberly A. Gray, Northwestern University
k-gray@nwu.edu

Who is lobbying for environmental engineers?

Several months ago while reading the monthly newsletter of a scientific society, I realized that I frequently read about their work to increase federal support for fundamental research related to the environment. While increased funds for environmental research are a good thing, I began to wonder whether a fair share of these funds was being allocated to the engineering research required to take the knowledge developed through basic scientific research and apply it to engineering problems. I suggested to the AEESP board that the legislative affairs committee needed to be reinvigorated to evaluate whether our collective interests had adequate representation.

I am pleased to announce that the legislative affairs committee has been reformed. Our initial charge is to assess whether we are adequately represented amongst various societies that might be lobbying for increased federal spending on either engineering or environmental research and to evaluate what role AEESP should play. Our activities could be as simple as informing members of relevant activity in Washington or as complex as approaching key politicians. I look forward to reporting on the progress of our deliberations over the months to come. Please contact me with your ideas.

Morton Barlaz, North Carolina State University
e-mail: Barlaz@unity.ncsu.edu; phone: 919-515-7676

AEESP logo contest

The logo that appears on the front of this newsletter was designed when we were known as AEESP. Now that we are AEESP we need a new logo. We are soliciting ideas from you, the membership, for a **NEW** logo design. This is a competition! The winning logo designer will receive a one year **FREE** membership to AEESP and a plaque of appreciation. All entries will be displayed at the Research Conference in August where conferees will be asked to vote. The final decision on the winning logo will be made at the October meeting and announced at the AEESP-WEFTEC Meet-and-Greet. Send your designs by July 1, 1999 to: Robin Autenrieth, Dept. of Civil Engineering, Texas A&M University, College Station, TX 77843-3136; r-autenrieth@tamu.edu.

O'Melia to present special seminar

In honor of his appointment as Abel Wolman Professor at Johns Hopkins University, Professor Charles R. O'Melia will present a special seminar to the academic and professional community on "The Redress of Environmental Engineering." The seminar will begin at 3:00 p.m., April 30, 1999, in Schaffler Auditorium, Bloomberg Building, Johns Hopkins University. A reception will follow the seminar and both are open to the public. If interested in attending and for directions or more information, please contact Ms. Isabelle Miles, (410) 516-7093; isie@jhu.edu.

In Memoriam...Mriganka Ghosh

Dr. Mriganka Ghosh, Goodrich Chair of Environmental Engineering at the University of Tennessee, Knoxville, passed away February 10, 1999 from a sudden heart attack. The family requests that memorials be sent to the American Heart Association in his honor.

AEESP members, we want your news!

One of the goals of AEESP is to provide a forum for networking among its members. With our own conferences occurring only every ~3 years, the AEESP Newsletter is an excellent way of filling the intervening time with news of our membership. Changes starting with this edition of the newsletter include two new sections. The "Comings and Goings" section features new appointments, promotions, awards, retirements, etc. News describing and promoting new programs, research institutes, etc., at your university will be included in the "Programs and Places" section. Please help us spread your news by sending your contributions to "Comings and Goings" and "Programs and Places." "Comings and Goings" news should be a short 1-3 sentence blurb. "Programs and Places" can be one-two paragraphs. Submissions should be sent to Roger Ely, Newsletter Editor, ely@uidaho.edu.

Thanks for your submissions!
Susan Powers
Member, Board of Directors

Format for Newsletter submissions...

Please note that the preferred file formats for electronic newsletter submissions are Microsoft Word format for text (.doc) and tif format for photos (.tif). When sending news items via e-mail, please send as Word file attachments. When possible, scan photos at 300 dpi or greater resolution and send as .tif file attachments. Please identify and provide names of all subjects in photos. Submissions should be sent to Roger Ely, Newsletter Editor, <ely@uidaho.edu>.

AEESP Members elected to NAE

We would like to proudly congratulate three AEESP members newly elected to the National Academy of Engineering:

☆ Richard G. Luthy, Thomas Lord Professor of Environmental Engineering, Carnegie-Mellon University, for leadership in the treatment of industrial waste waters, contaminated soils, and aquifers.

☆ Jerald L. Schnoor, University of Iowa Foundation Distinguished Professor, University of Iowa, for research and engineering leadership in development, validation, and utilization of mathematical models for global environmental decision-making.

☆ Robert V. Thomann, Professor Emeritus, Manhattan College, for contribution to the prediction and management of water quality in streams, estuaries, lakes, and oceans.

As stated in the NAE's news release (Feb. 16, 1999), election to the National Academy of Engineering is among the highest professional distinctions accorded an engineer. Academy membership honors those who have made "important contributions to engineering theory and practice, including significant contributions to the literature of engineering theory and practice," and those who have demonstrated "unusual accomplishment in the pioneering of new and developing fields of technology." For more information please see the Academy's web site (www.nas.edu). Our warmest congratulations to these esteemed colleagues.

1998 AEEP Awards Recipients

Note from the Editor: AEESP awards photos usually are included in the January issue of the *Newsletter*. They are being included in this issue because we received them too late for the January issue. Our apologies to those recipients whose photos were not available.



Eric W. Aitchison (right), First Place winner of the AEEP/Montgomery-Watson Master's Thesis Award, with his advisor, Jerald L. Schnoor.



Annika Van Gelder (center), Second Place winner of the AEEP/Montgomery-Watson Master's Thesis Award, with her advisor Desmond F. Lawler (left) and Rudy Tekippe, Senior Vice President of Montgomery-Watson and presenter of the award.



Laura J. Ehlers (left), winner of the AEEP/Parsons Engineering Science Outstanding Doctoral Dissertation Award presented by Nick Presecan (right).



Walt Weber (left), advisor to Weilin Huang, winner of the AEEP/CH2M Hill Outstanding Doctoral Dissertation Award presented by Jay Witherspoon (right).

- On January 17, 1999 the AEESP Executive Board met at the O'Hare Hilton for a day-long meeting. Present were Bruce Logan (Past President), Kimberly Gray (President), Robin Autenrieth (Vice President), David Dzombak (Treasurer), and Kurt Paterson (Secretary). Since October 1998, twenty new members were added, bringing the total membership to 716.
- The preliminary itinerary for the Research Conference in August begins Saturday with workshops (Teaching and Diversity, Mentoring, Electronic poster session on teaching tools), Sunday morning relaxation, Sunday afternoon introductory talks and posters. Monday will be special sessions talks. Tuesday will be concurrent discussion sections, followed by a summary discussion. To date about 30 abstracts have been received. The conference fees will be about \$140 for early registration, \$165 for late registration. Attendance is limited to 250 attendees. Early registration deadline will be May.
- A Strategic Planning Meeting will be held August 3-4, at Penn State University following the Research Needs Conference.
- The May 1999 Board Meeting will be held May 2 in Chicago at the O'Hare Airport. The WEFTEC meeting will be October 9-10 in New Orleans with a Saturday afternoon start (12 noon – 5pm) and a Sunday morning second session (8 am – 11 am).
- The WEF/AEESP Scientists Luncheon speaker is Nancy Rabalais of the Louisiana Marine Science Consortium.
- The AEESP Meet-and-Greet at WEFTEC will be Monday October 11.
- Additional AEESP Meet-and-Greets for the upcoming year include AWWA in June, AWMA in June, and ACS in August.
- The speaker for the AEESP lecture at AWWA is Gordon Finch.
- In the Publication Survey most respondents rated revision of the Environmental Processes (Unit Operations) a top priority. The Environmental Chemistry and Environmental Microbiology manuals rated second and third highest, respectively.
- The executive Board decided to establish a new position, Communication Facilitator, to coordinate Committee Liasons, coordinate speakers not covered by standing committees, and to provide Newsletter oversight. This two-year position will be held by the Board member not elected to another office.
- A contest will be initiated for a new AEESP logo design. Entries will be displayed at the Research Conference.



Bruce E. Logan, recipient of the AEESP Distinguished Service Award as 1997-1998 AEESP President.

AEESP Members:

Does AEESP have your correct address? Send address changes to Joanne Fetzner at the AEESP business office:

Joanne Fetzner
AEESP Business Office
2208 Harrington Court
Champaign, IL 61821
e-mail: jfetzner@s.psych.uiuc.edu
phone: (217) 398-6969
fax: (217) 333-9576

Comings and Goings

S.E. Guigard, T. Yu

The Department of Civil and Environmental Engineering at the University of Alberta has recently hired two new Environmental Engineering faculty members, Prof. S.E. Guigard and Prof. T. Yu, as part of a program and facility expansion. These two new appointments compliment the existing eight faculty members that currently make up the Environmental Engineering Group, providing expertise in the areas of water and wastewater treatment, solid waste management, industrial waste management, cold regions engineering, air quality and exposure and risk assessment. Prof. Guigard's research and teaching interests will focus on soil remediation, supercritical fluid extraction and environmental chemistry. Prof. Yu's research and teaching interests will focus on wastewater treatment, structure and function of biofilms, microsensor technology and their environmental applications.

David F. Hill

David F. Hill joined the faculty of the Department of Civil and Environmental Engineering at Pennsylvania State University in the Spring of 1999. Dr. Hill's dissertation topic at UC Berkeley (1997) was "The Subharmonic Resonance of Internal Waves by Progressive Surface Waves." His research interests are in the areas of wave mechanics, coastal engineering, and stratified flows, and he is currently investigating how surface and internal waves contribute to turbulence and mixing in oceans and lakes.

Thomas M. Holsen

Thomas M. Holsen, former Associate Professor and Associate Chairman of the Environmental Engineering Division in the Department of Chemical and Environmental Engineering at the Illinois Institute of Technology, recently joined the faculty at Clarkson University as a Full Professor in the Department of Civil and Environmental Engineering

David Jenkins

Professor David Jenkins will retire from the University of California at Berkeley at the end of this academic year. Professor Jenkins has been actively involved in environmental engineering research, practice and education for many years. For his work, he has received many honors including AEEP Distinguished Lecturer in Environmental Engineering, AEEP Outstanding Publication Award and Simon Freeze Award. Professor Jenkins also has been active in the Water Environment Federation and has won five medals (three Eddy Medals, Camp Medal and Gascoine Medal). He is involved in the activities of the California Water Environment Association and the International Association on Water Quality which awarded him the Honorary Life Membership and the Samuel H. Jenkins Medal. To honor his achievements a one-day symposium is planned for Saturday,

September 11, 1999 at the University of California at Berkeley. To receive more information about this event please contact: Professor Slav Hermanowicz, Department of Civil and Environmental Engineering, #1710, University of California, Berkeley, CA 94720-1710; fax: 510-642-7483; e-mail: hermanowicz@ce.berkeley.edu.

Gene McCall

Gene McCall, formerly an assistant professor of civil engineering and adjunct assistant professor in the School of Public Health at the University of South Carolina, is the head of the environmental practice group of the Leatherwood Law Firm in Greenville, South Carolina. He also is a registered patent attorney and works in the areas of chemical and environmental patents. He is president of the Friends of the Greenville Zoo and immediate past president of the Greenville Chamber of Commerce Environmental Issues Committee.

Charles R. O'Melia

The Department of Geography and Environmental Engineering is pleased to announce the appointment of Charles R. O'Melia as the Abel Wolman Professor of Environmental Engineering. This chaired professorship has been made possible through the generous donations of alumni and friends. (Abel Wolman was awarded a bachelor of engineering science degree from Johns Hopkins University in 1915 as a member of the first graduating class in the new engineering department. He later became professor of environmental engineering at Hopkins in the School of Engineering and in the School of Hygiene and Public Health, when these departments were established under his leadership in 1937. Although officially retired in 1962, he continued to lecture and participate in seminars at the university until his death in 1989.)

C.H. (Herb) Ward

Herb Ward, Foyt Family Chair of Engineering and Professor of Environmental Science and Engineering at Rice University, was presented the Founders Award at the Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC). Herb was selected for SETAC's highest science award based on his many contributions to the environmental sciences, as researcher, science advisor, and technology developer. He focused his acceptance presentation on environmental remediation technology development and encouraged the young professionals in the audience to "step outside the mold" and develop unique ways to contribute their technical expertise to society. Herb is Director of the Energy and Environmental Systems Institute at Rice, where he is now completing a major environmental technology development program sponsored by the U.S. Department of Defense.

University of Missouri-Rolla

The Environmental Engineering Program in UMR'S Department of Civil Engineering is seeking additional applicants for the GAANN Fellowship Program offering a \$15,000 annual stipend, tuition and fees waiver and a research stipend. We will be adding the students for the 1999-2000 academic year. For more information, please email messages to Dr. Craig Adams, adams@umr.edu; Dr. Joel Burken, burken@umr.edu; or contact our web site at www.umr.edu/~environ.

Michigan State University

ENVIRONMENTAL ENGINEERING GRADUATE FELLOWSHIPS. The Environmental Engineering Program at Michigan State University has graduate fellowships available beginning August 1999 in the following areas:

- environmental chemistry
- environmental microbiology
- environmental systems analysis
- environmental measurements
- hydrology and environmental fluid mechanics
- environmental policy & management
- risk assessment

We have developed a graduate study program that centers on a risk assessment/risk management framework, dealing collectively with health effects, science and engineering aspects, and the social context of environmental problems. Students enrolled in the program will receive training in the basic physics, biology and chemistry of environmental systems, in the quantitative and design skills necessary to develop engineering solutions for environmental problems, in the related subjects of environmental health and toxicology, and in environmental policy, economics and management. Our intent is to produce graduates who understand not only the technology, but also how large environmental systems interact, how contaminants directly and indirectly affect human and environmental health, and how science and the seemingly conflicting societal issues are weighed in order to develop sound public policy. The risk management/risk assessment fellowship program at Michigan State University will emphasize multidisciplinary study, faculty mentoring, student collaboration, and a comprehensive learning experience including the potential for fieldwork and international study. A supervised teaching component will provide the students with the experience and feedback needed to become competent practitioners and educators. We seek students who have completed either a bachelor or master's degree in engineering or related science, are eligible to enroll in the Environmental Engineering Program, and desire to pursue a Ph.D. in environmental engineering. The program will fully utilize the resources and expertise provided by

research-intensive laboratories and centers housed within the university, including the Great Lakes and Mid-Atlantic Center for Hazardous Substance Research and the NSF Center for Microbial Ecology. Applications are sought immediately for fellowships beginning August 1999, and are open to U.S. citizens and permanent residents of the U.S. The program is especially targeted to assist those students who are members of under-represented groups, namely women and ethnic minorities. Each three-year fellowship provides an annual \$15,000 living stipend and covers tuition, fees, and health benefits. If you are interested, contact Prof. David C. Wiggert, Department of Civil and Environmental Engineering, Michigan State University, by phone (517-355-5155) or by email (wiggert@egr.msu.edu).

University of Central Florida

The Civil & Environmental Engineering program at the University of Central Florida has recently formed a Membrane Focus Group. Led by Dr. James S. Taylor, the other faculty involved include Dr. S.K. Hong and Dr. Andrew A. Randall, as well as Dr. Saleh Naser from the department of Molecular & Microbiology. The research group has had or currently has a number of active external grants from AWWARF, the EPA and a variety of industrial sources studying pesticide rejection, integrated membrane systems, organic fouling of membranes, and the effects of membranes on biological stability of drinking water. The interests of the group also include integration of membrane systems for solids-liquid separation in activated sludge systems and pathogen rejection.

New Environmental Molecular Science Institutes at Columbia, Princeton, Northwestern

Last fall, the National Science Foundation and the Department of Energy awarded three grants to start new Environmental Molecular Science Institutes (EMSI). These institutes are located at Columbia University, Princeton University, and Northwestern University.

The institute on Chemical Sources and Sinks at Liquid/Solid Interfaces at Columbia is organized into three collaborative research groups: 1) molecular scale processes on mineral surfaces and in pores; 2) fundamental chemical and biological reactions and transport processes in microscopic porous media, and 3) macroscopic chemical transport and dispersal. The results acquired at the three length scales (molecular, microscopic, macroscopic) will provide input to a chemical and transport model that will be tested in the "real world" by partners at industrial laboratories and at Pacific Northwest National Labora-

tory (PNNL). A particular emphasis will be placed on organic contaminants on iron oxide surfaces and their degradation by enzymatic or photochemical processes. The 22-member team of investigators includes 16 faculty from five Columbia departments and the Lamont-Doherty Earth Observatory, plus one faculty member from Barnard College and five researchers from PNNL. Additional collaborators are located at GE, IBM, DuPont, Exxon, and Inrad. In addition, the institute will develop a wide range of educational activities, including special programs for K-12 teachers, high school students, and the public. It is directed by Profs. George W. Flynn and Richard M. Osgood.

The Center for Environmental BioInorganic Chemistry at Princeton brings together bioinorganic chemists, geochemists, environmental microbiologists, and industrial researchers to elucidate the molecular mechanisms of the function, fate, and effect of trace metals in the environment. The central scientific objective of the institute will be to elucidate the structure and function of important natural metalloenzymes and metal-binding compounds at the molecular level, and create new tools to study them in the environment. The research program addresses interrelated questions dealing at the molecular level with the fate and function of trace metals in aquatic systems, particularly marine systems. The results of interconnecting laboratory, field, and modeling studies will be incorporated into an overall model of metal dynamics and carbon cycling. The 23 member team of investigators includes 10 faculty from 4 Princeton departments, 3 from Rutgers University, 4 from the University of California (Santa Cruz, Santa Barbara, and San Diego), 1 from McGill (Canada), plus 4 researchers from Exxon Research and Engineering Co. and 1 from Brookhaven National Laboratory. The institute will be supporting a wide range of educational activities like summer workshops for K-12 teachers, public lectures, conferences, and a web site: <http://www.princeton.edu/~cebic>. It is directed by Prof. François M. M. Morel.

The Institute for Environmental Catalysis at Northwestern has been established in collaboration with Argonne National Laboratory and the Pacific Northwest National Laboratory. It involves scientists and engineers, and a partnership with five major chemical companies (Allied Signal, Dow Chemical, Engelhard Corp., Union Carbide, and UOP Research Center) using an Internet-based communication system designed by PNNL. The objectives of this institute are to study the essential chemical pathways by which contaminants can be neutralized either at their source or in the environment, and define new catalytic structures that can enhance industrial processes and/or reduce environmental impact. The institute is composed of three process-oriented research groups: Chemical Processing, Emission Treatment, and Natural Environment that focus on specific real world applications, and a core group investigating the relevant molecular aspects. In addition to its research mission, the institute will train scientists and engineers in state of the art

molecular techniques and educate the public about the role of catalysis in manufacturing by developing a new interdisciplinary curriculum in environmental molecular science and K-12 community outreach. The IEC brings together about 50 senior researchers with backgrounds in chemistry, chemical and environmental engineering, material science, and microbiology. The directors of the institute are Profs. Peter Stair and Kimberly Gray.

University of Tennessee

GRADUATE RESEARCH ASSISTANTSHIP IN ENVIRONMENTAL ENGINEERING. The University of Tennessee's Civil and Environmental Engineering Department (<http://www.engr.utk.edu/civil/>) in association with the Center for Clean Products and Clean Technologies (CCPCT) (<http://eerc.ra.utk.edu/divisions/clean/default.html>) is accepting applications for a one-year graduate research assistantship, with potential for an additional year's extension. Undergraduates in civil or environmental engineering, environmental science, or others considering graduate study in environmental engineering are invited to apply. Review of applications will begin April 1st for fall semester. The position carries a \$1,300 per month stipend, provides tuition and fees, and offers research opportunities applicable to a master's thesis or special project.

The CCPCT assistantship will provide the successful applicant with experience in cleaner production, pollution prevention, design for the environment, and/or risk assessment. For example, CCPCT projects have involved the U.S. Environmental Protection Agency's Design for the Environment program and cleaner technologies substitutes assessment; Saturn Corporation and development of a life-cycle design tool for automakers; and Green Seal product evaluation for environmental labeling.

Interested candidates may contact Chris Cox, Associate Professor, Department of Civil and Environmental Engineering, 73F Perkins Hall, The University of Tennessee, Knoxville, TN 37996-2010; Ph: 423-974-7729; FAX: 423-974-2669; e-mail: ccox9@utk.edu; or Mary Swanson, Research Scientist, 311 Conference Center Building, The University of Tennessee, Knoxville, TN 37996-4134; Ph: 423-974-0642; FAX: 423-974-1838; e-mail: mwsanso1@utk.edu.

Letter to the Editor:

Being one of the founders of AEESP (then ASEP) some 35 years ago, I was very interested in the President's Letter in the January 1999 Newsletter, particularly in two items:

- (1) Change of name from AEEP to AEESP: It is worth noting that the classification of graduate degrees used in Indonesia (established by the Netherlands) recognizes that Scientists often practice Engineering, hence they have two titles of degrees for Scientists, namely as "Scientist" if the degree program focuses on teaching and research, and "Engineer" if it focuses on applying science to solve man's problems, which is consistent with the basic definition of engineering. This system seems realistic for use in all countries for the 21st Century.
- (2) Regarding the "Mission" of AEESP, when first formed 35 years ago, the Mission was to enable meaningful political representation (especially the USA Congress and State Legislatures) for the sanitary engineering graduate academic community, including resources for teaching and research. (See AEEP's book on "AEEP, 25 Years.") This need certainly continues.

A basic question for AEESP at this time is definition of the field of environmental technology to be practiced by practitioners in environmental protection operations. In the developing countries this field is now clearly established as comprising four basic components, (1) natural physical resources, (2) natural ecological resources, (3) human economic resources, and (4) human quality of life values, and the EIA team for new major environmental protection projects now includes expertise in environmental engineering, environmental economics, environmental ecology, and environmental sociology. In my view, the ecologists and sociologists are in fact practicing like engineers.

To meet the needs of the 21st Century, the university graduate programs in the USA in environmental engineering/

science need to be re-evaluated in terms of meeting the four types of skills noted above.

Sincerely,
Harvey F. Ludwig, Consulting Engineer
SEATEC International Consulting Engineers
P.O. Box 8-101
Bangkok 10800, Thailand
e-mail: ludwig@mozart.inet.co.th

Letter to the President:

Dear Colleagues:

Below is an edited copy of a letter I sent to Kimberly Gray following her President's Letter in the January issue of the AEESP Newsletter. She asked me if it could be reprinted here so I corrected the spelling errors and added a bit more information. I hope some of you find it interesting and informative and decide to contribute your knowledge and energy towards solving the difficult problems associated with the support of human life in microgravity and on other planets.

*Robert M. Cowan
March 1999*

January 1999

Kimberly:

I read with interest your comments on NASA waste treatment research that you incorporated into your President's letter in the January 1999 AEESP newsletter. Your comments prompted me to write to let you know of my involvement in the Advanced Life Support (ALS) community and to invite you to join in our efforts to improve NASA's ability to efficiently support the human exploration of space.

I would say that you are right to a certain extent in your assessment that NASA has often persisted with too much of a

Letters to the Editor may be sent to:

Roger L. Ely
Department of Civil Engineering
University of Idaho
Moscow, ID 83844-1022
ely@uidaho.edu

Letters to the President may be sent to:

Kimberly A. Gray
Department of Civil Engineering
Northwestern University
2145 Sheridan Road
Evanston, IL 60208-3109
k-gray@nwu.edu

modular approach to the development of ALS systems, but several efforts are being made to correct this, notably the NASA Specialized Centers of Research and Training (NSCoRTs).

If you are interested in learning more about the work of the NJ-NSCORT on Bioregenerative Life Support, please take some time to visit the following web sites:

<http://www.rci.rutgers.edu/~biorengg/njnscore/> (this site contains an overview of the NJ-NSCORT projects and links to several other ALS web sites); and <http://nj-nscort.rutgers.edu/acesys/> (this site serves as the front page to a list of reports and discussion pages related to the NJ-NSCORT's work).

I hope you will take the time to look at this and get involved in ALS research because NASA really does need the help of the Environmental Science and Engineering community.

Sincerely,
Robert M. Cowan
Assistant Professor of Environmental Engineering
Team Leader, NJ-NSCORT Waste Processing and Resource Recovery
Department of Environmental Sciences
14 College Farm Road, Cook College
Rutgers, The State University of New Jersey
New Brunswick, NJ 08901-8551

Office: 732-932-8750 Lab: 732-932-9075 Dept: 732-932-9185 FAX: 732-932-8644; email: cowan@envsci.rutgers.edu

P.S. NASA posts information on the Office of Life and Microgravity Sciences and Applications including its basic science, and technology development research grant announcements on the Web at <http://peer1.idi.usra.edu/>. I know that this community of scientists and engineers would welcome the involvement of more Environmental Engineers and Scientists. If you would like to discuss NASA ALS opportunities or just ask me some questions concerning my knowledge of the ALS community, just send me an email and I will do my best to respond.

P.P.S. The major sources of literature on the past and current work of ALS researchers are the technical papers from the annual International Conference of Environmental Systems (ICES) which are published by the Society of Automotive Engineers (SAE) and the International Journal of Life Support and Biosphere Science (Editor: Harry W. Janes, Director, NJ-NSCORT, Foran Hall, Cook College, Rutgers University, New Brunswick, NJ 08903. 732-932-8978).

Organizations of Interest

Tau Chi Alpha

Dear AEESP colleague:

The recently elected officers of Tau Chi Alpha would like to announce the formation of Tau Chi Alpha as a national honor society for environmental engineers, under the auspices of the American Academy of Environmental Engineers and AEESP. Tau Chi Alpha bylaws were modeled after those of Chi Epsilon. Membership and other matters are to be conducted similarly. Student initiates are to pay a one-time initiation fee of \$50. The motto of the society is *Restore, Conserve, and Protect* (Rho Chi Pi), and the name of the publication is to be the *Sphere*. The objective of the society is: "to advance the environmental engineering profession by: a) identifying and placing a mark of distinction on those environmental engineering students and engineers who have demonstrated high scholastic achievement, ethical character, practicality, and sociability or significant achievement in the environmental engineering profession; and b) contributing to continuing development and improvement of the profession."

All programs offering a baccalaureate or graduate degree "in environmental engineering or in a closely related curriculum which is approved by the Supreme Council" are cordially invited to submit an application to host a chapter. There is a one-time fee of \$150 for chapter initiation, to defray expenses. A list of eligible student members, and a faculty advisor, are required. For more

information, contact William C. Anderson, Executive Secretary, by telephone at 410-266-3311, or by e-mail at aace@ea.net.

Sincerely,
Robert Sharp, President
James D. Englehardt, Vice President
William C. Anderson, Executive Secretary
Eugene A. Glysson, National Marshall
William C. Boyle, Councilor
John A. De Filippi, Councilor
Hector R. Fuentes, Councilor

AWRA introduces new journal

The American Water Resources Association has introduced a new journal, *Water Resources IMPACT*, dealing with watershed management issues. "Our operation is going to be like a technical conference," states editor-in-chief N. Earl Spangenberg. "Each issue will feature a selection of articles on a single topic. In addition to the technical articles, we will have regular features. Some of the features are old friends from our predecessor, *HYDATA*."

For subscription information, contact American Water Resources Association, 950 Herndon Parkway, Suite 300, Herndon, VA 20170-5531, phone (703) 904-1225, e-mail awrahq@aol.com.

University of Washington

ENGINEERING EDUCATION SPECIALIST. Center for Engineering Learning and Teaching (CELT). The recently established Center for Engineering Learning and Teaching at the University of Washington has two goals: to conduct cutting edge research on how engineering students learn, and to facilitate pedagogical change in University of Washington College of Engineering courses and classrooms. The UW College of Engineering seeks an individual to develop and lead programs to facilitate pedagogical change. Requirements: Ph.D. in engineering, science, cognitive psychology, education, sociology, or related field and experience in an academic setting. In addition, it is desirable that candidates have experience and/or training within two or more of the following fields: engineering, cognitive psychology, education research or education technology. It is also desirable that they have knowledge of the recent education literature. Candidates must have a willingness to learn and develop knowledge in areas beyond current training or experience. Candidates must have strong interpersonal and organizational skills combined with an ability to facilitate organizational change; a demonstrated ability to work effectively with a wide range of individuals including colleagues, members of the staff and faculty, and university administrators; and excellent oral and written communication skills. Candidates must also have a strong commitment to the success of the Center's goals. Equivalent education/experience may substitute for stated requirements. Salary: Commensurate with qualifications and experience. To apply, send a CV and letter describing relevant experience to: Dr. Cynthia J. Atman, Director, CELT (Attn: Ed Spec), University of Washington, Box 352180, Seattle, Washington 98195-2180; <http://www.engr.washington.edu/~celtweb/>. This position will remain open until filled. *The University of Washington is an equal opportunity, affirmative action employer.*

University of Vermont

TENURE TRACK POSITION. The University of Vermont (UVM) seeks candidates for a tenure track position at the Assistant Professor level. The successful candidate will hold a primary appointment in the Department of Civil & Environmental Engineering (CEE), and the appointee will also have a secondary appointment in the School of Natural Resources (SNR). The candidate must possess a Ph.D. in Engineering or a closely allied field in environmental sciences. The candidate will be expected to teach undergraduate and/or graduate courses in both CEE and SNR, including an upper level course in ecological risk assessment. Research expertise should include quantitative risk assessment and reliability analysis as it applies to aquatic and terrestrial ecosystems and engineered environmental systems. The successful candidate will be expected to develop cross-disciplinary research with faculty in CEE, SNR, and other environmentally oriented units on campus. Documented evidence of multi-disciplinary experiences in research and excellence in teaching is strongly encouraged. Opportunities for cross-disciplinary research exist at UVM. Current examples include groundwater

assessment and remediation and a variety of investigations related to Lake Champlain. Funding opportunities at UVM are enhanced by the University's EPSCoR and Sea Grant (Lake Champlain) status. The search committee will begin reviewing applications on March 15, 1999 and will continue until the position is filled. Send a curriculum vitae, a statement of teaching and research interests and capabilities, and the names of five references to: Search Committee, Department of Civil & Environmental Engineering, 213 Votey Hall, University of Vermont, Burlington, VT 05405. Address E-mail correspondence to: <currier@emba.uvm.edu>. *The University of Vermont is an Equal Opportunity/Affirmative Action Employer. Women and people of color are encouraged to apply.*

Utah State University

FACULTY POSITION. Environmental Engineering. Utah State University is seeking applications for a tenure track position at the Assistant/Associate Professor level starting in July 1999. Requires a Ph.D. in Environmental or related engineering discipline. The new faculty member will be expected to teach graduate (physical, chemical, or biological processes) and undergraduate (solid and hazardous waste management or air quality and a third course in the candidate's area of expertise); and develop and support a strong externally funded research program. Candidates with interest and research experience in air or water quality, toxicology/risk assessment, and pollution prevention are particularly encouraged to apply. Send a letter of interest, current resume, or curriculum vitae, and the names of three references to Prof. David K. Stevens, Chair of the Search Committee, Department of Civil and Environmental Engineering, 4110 Old Main Hill, Utah State University, Logan, UT 84322-4110, (435) 797-3229 (voice), (435) 797-1185 (fax), <stevens@quito.cee.usu.edu>. Review of applications will begin on April 1, 1999, although applications will be accepted until the position is filled. AA/EOE.

University of Illinois

FACULTY POSITION. Environmental Microbiology and Engineering. The Department of Civil and Environmental Engineering, College of Engineering and the Department of Animal Sciences, College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign invite applications for a full-time, tenure-track position at the Assistant Professor level in Environmental Microbiology and Engineering with a strong background in modeling of microbially mediated processes. A Ph.D. in Environmental Engineering or Microbiology or a closely related discipline is required. The ideal candidate should have training and research experience in biological process modeling and have sufficient background in experimental work to develop interactions with existing research programs at the University of Illinois. Essential are expertise and research interests applicable to the study of diversity, structure, and function of microbial communities in engineered and natural environments, for example those influenced by current and future agricultural and industrial practices. The successful candidate will

be expected to develop a strong sponsored research program which complements existing strengths in the Department of Civil and Environmental Engineering and the Department of Animal Sciences and will develop and teach selected undergraduate and graduate courses in their area of specialization. The University of Illinois offers a competitive salary, a highly interactive, interdisciplinary research environment and state-of-the-art research support facilities. This search is part of a commitment by the University Environmental Council for significant growth in the environmental sciences. Applicants should submit curriculum vitae, statements of research and teaching interests, selected prints of publications, and a list of at least three references to Professor Robert A. Easter, Head, Department of Animal Sciences, 116 Animal Sciences Laboratory, 1207 W. Gregory Drive, Urbana, IL, 61801. For full consideration, applications should be received by May 31, 1999. The proposed starting date for the position may be as early as January 6, 2000. *The University of Illinois at Urbana-Champaign is an Equal Opportunity Affirmative Action Employer.*

University of Idaho

THE BIOLOGICAL AND AGRICULTURAL ENGINEERING DEPARTMENT. Position: Assistant Professor of Biological and Agricultural Engineering and State Climatologist. Starting Date: September 1, 1999, or as soon thereafter as a suitable applicant is selected. Responsibilities: Teaching (40%) courses encompassing applied hydraulics, erosion control, hydrology, irrigation systems design, soil-water-plant relations, and water management at the undergraduate and graduate level in engineering and agricultural disciplines. Development of innovative teaching methods and distance education materials is expected. Developing a recognized research (40%) program in applied hydrology/climatology including topics such as seasonal water yield predictions, water balance research and estimation of spatial and temporal distribution of hydrologic and climatic parameters at the watershed scale and beyond, hydrologic modeling, and decision support systems. The function of the State Climatologist (20%) is to lead and direct an extension program delivering climatic information to consumers, working with producers and users of climatic data to benefit Idaho and the Pacific Northwest. Qualifications: (Required) Ph.D. in Agricultural, Biological, Civil, Environmental Engineering or related discipline; a strong background in hydrology, atmospheric sciences or climatology, irrigation systems, remote sensing and GIS; demonstrated computer skills in research and teaching, ability to communicate effectively, ability to develop and conduct a research program, and aptitude and interest in teaching; registered Professional Engineer or eligible to take the P.E. Exam; and demonstrated interest in service and outreach. (Desired) Experience in teaching at the undergraduate and graduate level, and advising/directing graduate students; ability and interest to work cooperatively; knowledge of climate and hydrology in the Pacific Northwest; experience in preparation of successful research proposals, conducting (field) research, publishing in refereed journals, giving presentations of research results at technical meetings. Closing Date for Applications: Review of applications will begin after May 14, 1999, and may continue until the position is filled. Contact/Application Procedure: Submit application letter including a statement of interests and goals, curriculum vitae, transcripts of university courses, and the names, addresses, telephone numbers, and e-mail of three references to: Dr. Jan Boll,

Biological and Agricultural Engineering, University of Idaho, EP 408, Moscow, ID 83844-0904 USA; Tel. (208) 885-6182; <http://www.uidaho.edu/bae>. *To enrich education through diversity, the University of Idaho is an equal opportunity/affirmative action employer.*

University of New Hampshire

RESEARCH ASSISTANT PROFESSOR & OUTREACH PROGRAM PROJECT DIRECTOR. The Civil Engineering Department at the University of New Hampshire invites applications for a joint Research Assistant Professor and Outreach Program Project Director position in the newly established Recycled Materials Resource Center in the Environmental Research Group (please see <http://www.unh.edu/erg/>) in Civil Engineering (please see <http://www.unh.edu/civil-engineering/index.html>). The Center, authorized by the Transportation Efficiency Act for the 21st Century, was created to serve as a national research and resource center to encourage appropriate uses of waste and recycled materials in the highway environment (please see <http://www.rmrc.unh.edu>). The Center is authorized for at least six years. This will be an appointment that has two principal responsibilities: researcher and Outreach Program Project Director for the Recycled Materials Resource Center (RMRC). It is expected that the appointment will be approximately 50% research and 50% administration. As a researcher, the position will principally involve grant writing, successful external funding, publications, and graduate student support. It should also involve, but to a lesser extent, service and some form of participation in the academic mission of the Department. Activities as the Outreach Program Project Director may include, but are not limited to: general outreach program management and administration; staff supervision; interaction with the highway community and standards-setting organizations; and oversight of subcontractor research projects. The RMRC is a team-oriented venture where all team members will work towards the success of the Center. Applicants should have a Ph.D. degree in Environmental Engineering, Civil Engineering, Geotechnical Engineering, Transportation Engineering, Materials Science, or a related field; a high degree of interest in scholarship; the ability to manage and administer a national outreach program; a high degree of self-motivation, initiative, and ability to work with diverse constituencies; administrative and supervisory experience; and the ability to interface with state agencies. Experience in the field of use of alternative materials in the highway environment would also be beneficial. The position is grant-funded for six years and fully benefitted and will begin immediately. The University subscribes to excellent benefits programs. The starting salary is expected to be \$55,000 for a nine-month appointment. Please submit a curriculum vitae, examples of grantsmanship and scholarship, and the names of at least three references to: Dr. Taylor Eighmy, Environmental Research Group, A115 Kingsbury Hall, University of New Hampshire, Durham, N.H. 03824. The initial review of applications will begin April 5, 1999. The University (see <http://www.unh.edu/>) is located in the scenic seacoast of New Hampshire, close to Boston, and to the White Mountains of New Hampshire and Maine. *The University of New Hampshire is an AA/EEO employer and looks forward to applications from qualified minority and women candidates.*

Environmental Protection: Solving Environmental Problems from Social Science and Humanities Perspectives

Nancy Collola, Norbert Elliott, David Geithman, Nancy Jackson, Eric Katz, Burt Kimmelman
Kendall/Hunt Publishing Co., Dubuque, Iowa, 1997

Engineers often try to enhance their own status by throwing as much daylight as possible between themselves and the great unwashed, particularly the “soft” disciplines.

The sub-title of this book, “Solving Environmental Problems”, can therefore be expected to raise hackles. “Indeed!” you say. “Balderdash!” you say. “Environmental problems may be defined, articulated, analyzed and described by science and the humanities, but it is the engineers who SOLVE the problems,” you say.

The argument, of course, centers on the definition of “solve.” From our earliest training, “solve” meant to discover and communicate THE right answer, often to three significant figures. As we understood engineering better, “solve” began to mean finding an answer that met the needs of the client, recognizing that there were many possible right answers. But in all cases the problem was defined for us. Someone else decided that a wastewater treatment plant was necessary, or that the contaminated site had to be cleaned up, or that the power plant had to reduce its sulfur emissions.

But who are these people who decided that these were the projects we should spend our money on? Most of the time they are people without technical training who nevertheless perceive a problem and set about to solve it. This book talks to those masses — talks to them about solving environmental problems from the non-technical perspective. Yes, they will eventually need engineers, but the big decisions by that time have already been made.

This book, as one reviewer put it, responds to educators who have “desperately needed a textbook that demonstrates the relationships among various disciplines and ecological awareness.” The six (count them, SIX) authors have organized an amazingly coherent book. The chapters are listed as:

1. History and the Environment
2. Communications and the Environment
3. Philosophy and the Environment
4. Literature and the Environment
5. Economics and the Environment
6. Geography and the Environment
7. Aesthetics and the Environment

Each chapter begins with a short case study, followed by a synopsis of the field (for example, history) and how it relates to the environment. In the case of history, the flooding of the Hetch Hetchy Valley is used with the purpose of showing how

history can be used to understand present decisions. An excellent student assignment concludes each chapter in which students are asked to complete independent investigations of environmental issues. In the case of the history chapter, the student is asked to imagine that he or she is working as a summer intern for a pharmaceutical manufacturer in New Jersey and is given the assignment of preparing a paper on the Pollution Prevention Act of 1990, suggesting how pharmaceutical companies have complied or can comply with the act. In order to respond to this assignment, the student is required to do independent research and to use a systematic approach to writing the report.

All of the authors are members of the Department of Humanities and Social Sciences, Center for Policy Studies, New Jersey Institute of Technology. Their specific disciplines vary, but most prominent are technical writers and communicators, giving the book a good feel and seamless presentation. Somewhat disappointing are the typographical errors in a book that should have been carefully edited by at least six people.

The best chapter in the book is on economics. It is worth the price of the book by itself. Engineers will not find a better exposition of environmental economics.

Most disappointing is the chapter on environmental philosophy. It is painfully obvious that the authors have not wrestled with the questions of “why,” and present a mish-mash of environmental philosophies without criticism. There are also some glaring mistakes. For example, the authors claim that the Endangered Species Act came about because of our concern for non-human species. This is simply untrue. The operative argument for passage of this act was always anthropocentric — the endangered species may have some utility to humans and this is the reason we do not want to destroy them.

With its disappointments, this is a courageous book — trying to close the gap between hard science and engineering on one hand and social science and humanities on the other, and as such, the attempt should be applauded. By articulating environmental protection problems from the “soft” disciplines, the authors do their share in closing the gap between us.

Surface Water-Quality Modeling

Steven C. Chapra, WCB McGraw-Hill, 1997

Years ago Ed Lewis, then the president, founder and sole proprietor of Ann Arbor Science Publishing Company, called me on the telephone.

“Aarne, how do you write a book?”

I had published several books with Ann Arbor Science and Ed and I had become good friends, often talking for hours on wide-ranging issues having little to do with publishing. (I discovered later that he had a speaker phone in his office and he was conducting other business while he had me on the line to keep him company!)

“I got invited to give a presentation about how to write books,” he said, “How do you write books?”

I had never really thought of it before and was not prepared to tell him how the process worked for me. But as I was babbling along, stalling for time, I began to realize that there was a pattern. I first taught the course many times, got the notes in order, got all the topics in the right sequence, found all the reference material, and often distributed the stuff to the students for their use. Only after having taught the course several times was I in a position to begin to write a book. So I told Ed:

“I don’t write. I teach.”

He seemed satisfied with that and I presume his presentation went well.

I thought of this exchange when I began reading the excellent book by Steve Chapra. The difference between my efforts in which I tried to disguise the process, and Steve’s book is that Steve is up front with it. He is first a teacher. In his preface he says:

In keeping with the lecture format, I’ve adopted the active voice and first-person singular in an attempt to speak directly to the students as I do in my lectures. In addition, although I avoid the editorial “we,” I employ the interactive “we” extensively to reflect the active participation I try to stimulate in my lectures. Although I

might risk alienating more traditionally minded readers, I feel that the risk is worth taking in order to connect with students.

The risk was not only worth taking, it produced an effective and highly readable book.

The book is presented in seven parts, with the first two covering modeling fundamentals including numerical methods, reaction kinetics, and diffusion. Enough introductory material is presented to make it possible for senior undergraduates or first year graduate students to get right into the material. The third part of the book relates to water quality environments, including rivers and streams, estuaries, lakes and impoundments, and sediments. Part four deals with dissolved oxygen and pathogens and includes BOD and the dissolved oxygen sag curve, nutrient loadings, and pathogen survival. Part five is on eutrophication and temperature, including heat budgets and thermal stratification of lakes. A particularly good chapter is on predator-prey and nutrient/food-chain interactions, a science that many engineers often ignore. Part six is on chemistry, with discussion on equilibrium chemistry, and pH. (I am not sure why this material is in the book since it should be taught in the regular environmental chemistry course.) The book concludes with part seven on toxics including mass-transfer mechanisms of sorption and volatilization, reaction mechanisms of photolysis, hydrolysis and biodegradation, radionuclides and metals, and finally toxicant modeling.

Steve has written a beautiful book, full of excellent technology, but also full of history and insights about our profession. What emerges more than anything from his prose is his commitment to the art and science of water quality modeling and his passion for explaining it to the reader. Steve demonstrates once again that great books are written by great teachers, and Steve is a great teacher.

Transport Modeling for Environmental Engineers and Scientists

Mark M. Clark, John Wiley & Sons, 1996, \$69.95

I wish I could think of a better title for this book, for the present one does not speak to me. I opened the book expecting to find an array of chemical engineering stuff of little interest to me in my courses. Transport modeling? Isn’t that what they do in transportation engineering? What I found instead is a super compilation of the very essence of our craft.

The book is a compilation of material used in a senior/graduate course taught at the University of Illinois. The problems are useful and imaginative, and the graphics are excellent. But this book is not for the faint-hearted. Although Mark suggests that a “course in thermodynamics, physical chemistry, and fluid mechanics would be useful, ... they are not required,” I disagree, especially with the fluid mechanics part. Some of the stuff like boundary layer theory is pretty advanced and a student

either has to be brilliant or have a strong background in fluid mechanics to master it. It would also be necessary for students to have a familiarity with spreadsheets and graphics packages.

With all that out of the way, here is what’s in the book: conservation laws and continua; low-concentration particle suspensions and flows (drag on a sphere, particle motion, rotating flows, centrifugation); interaction of small charge particles (a particularly excellent treatment of coagulation); adsorption, partitioning and surfaces; fluid mechanics and environmental transport; diffusive mass transport; convective diffusion, dispersion and mass transfer; filtration and mass transport in porous media; reaction kinetics; and mixing and reactor modeling.

As an example of the level of the book, consider the chapter on fluid mechanics. Although a section entitled "Joy of Fluid Mechanics" introduces the topic, no student will find any joy whatever in the next section, the presentation of the Navier-Stokes equation. This is a mind-numbing experience for the novice. Students do not learn top down. They learn bottom up, coming to the Navier-Stokes equation after understanding concepts of viscosity, viscous flow, momentum and body forces. To be fair, the Navier-Stokes equation is not used except to show how its simplification can lead to concepts of fluid statics, for example. For those students who have seen the Navier-Stokes

equations before in a fluid mechanics course, this is a wonderful approach. But beware the problems of the uninitiated. There will be no joy in fluid mechanics.

If I could change the title of the book, I would choose *How Things Work* because this is what this book is all about. Understanding how things work. It is a wonderful book and highly recommended for courses dealing with physicochemical processes.

Mark Clark is with the Department of Civil and Environmental Engineering at the University of Illinois.

Small and Decentralized Wastewater Management Systems

Ronald W. Crites and George Tchobanoglous, WEB McGraw-Hill, 1998

In the 1970s there was a series of books published by the National Sanitary Foundation (not to be confused with the other NSF) on how to build on-site wastewater treatment systems. The difference between those books and the one by Crites and Tchobanoglous is like the difference between a lightning bug and lightning (who said that? I'm shamelessly stealing again).

This book is for engineers. It is designed for those who are called on to plan, design, and construct on-site and small community wastewater treatment systems. According to the authors, over 60 million Americans depend on such systems, so the market is substantial. What the authors do not mention, however, is that this is exactly the book that would be most useful to the great majority of the global population and for engineers who have to design wastewater treatment systems under often adverse and highly restrictive conditions. While there is no hint of "alternative technologies" in the book, it is in fact a great handbook on how to design local and individual systems in any country all over the world.

The topics in the book include an overview of wastewater management, constituents of wastewater, fate of wastewater constituents in the environment (mass balances, reactions, reaction rates, reactors), process analysis and design, pretreatment operations, alternative wastewater collection systems, biological treatment and nutrient removal, lagoon treatment systems, wetlands and aquatic treatment systems, land treatment, intermittent and recirculating packed-bed filters, effluent repurification and reuse (particularly in agriculture and landscape applications, effluent disposal from decentralized systems, biosolids and septage management, and a chapter on the management of decentralized systems.

If any universities have the luxury of offering a course in decentralized wastewater treatment systems, this is the book to use. It is a solid work, full of good problems and examples. The graphics are excellent and lots of photographs enliven the presentation. The amount of material is much too much for one semester, of course (a Tchobanoglous disease), but the diversity of topics makes it possible to design a course for individual needs. I can see this book being used in engineering technology

programs and those graduate programs serving international engineering students from developing countries.

On a more personal note, I am pleased that the authors make the distinction between sludge (the solids residuals from wastewater treatment) and biosolids (that which is taken out of the plant). Actually I don't care what they call the stuff once it leaves the plant, but while it is within the treatment plant, it is and always will remain sludge, my favorite four-letter word.

Ron Crites is a managing engineer with Brown and Caldwell and George Tchobanoglous is professor emeritus at the Department of Civil and Environmental Engineering at the University of California, Davis.

P. Aarne Vesilind

Briefly Noted:

Solid-Phase Extraction: Principles and Practice, E. M. Thurman and M. S. Mills, John Wiley & Sons, 1998

This book is No. 147 in the series entitled Chemical Analysis, Monographs on Analytical Chemistry and its Applications.

Solid-phase extraction (SPE) is the concentration and purification of analytes from solution by sorption onto a disposable solid-phase cartridge. The analyte is then eluted with a solvent suitable for analytical measurement. SPE is carried out using a polymeric sorbent resin in columns. The liquid sample is passed through the column and the resin captures the analyte. Following a series of purifying steps the analyte is finally eluted, ready for analysis.

Where the principles and theory in this book come into environmental engineering focus is in the use of soils as a means of sorbing compounds, and then eluting these with proper solvents. While this book is really for analytical chemists, the possible applications of this technology for remediation engineers would be obvious.

E. M. Thurman is with the U.S. Geological Survey in Lawrence, Kansas, and M. S. Mills is with Zeneca Agrochemicals in Jealott's Hill, U.K. They have no first names.

Metals in Surface Waters, Herbert E. Allen, A. Wayne Garrison, and George W. Luther III (Eds), Ann Arbor Press, Chelsea, Michigan, 1998

This is the fifth in the series of books from presentations at the workshops on metal speciation, this one being Metal Speciation and Contamination of Surface Waters, held in June of 1995. The topics include: trace metals in estuaries, metals and colloids in urban runoff, industrial discharges of metals to water, waste load allocation for metals, development of site-specific marine copper criteria, accuracy in metal sampling and analysis, determination of metal speciation in seawater using cathodic stripping voltammetry, plasma mass spectrometric detection, metal binding by humic substances, modeling metal speciation in aquatic systems, partitioning of metals to suspended particles, and redox-pH chemistry of chromium.

Herb Allen is still at Delaware, while Art Garrison is with the EPA National Exposure Research Lab in Athens, and George Luther is a marine chemist at the University of Delaware.

Ionic Equilibrium: Solubility and pH Calculations, James N. Butler, John Wiley & Sons, 1998, \$69.95

Funny how some books are memorable. For instance, the small paperback called Solubility and pH Calculations by some guy named James Butler. In the 1960s this was revolutionary stuff — that you could use graphics to solve solubility and pH problems. I still have that little sucker. Great book.

The James Butler of that little paperback is the same guy who has authored this updated version of his original 1964 classic *Ionic Equilibrium*. The book includes chapters on activity coefficients and pH, strong acids and bases, monoprotic acids and bases, polyprotic acids and bases, solubility, complex formation, organic complexes, oxidation-reduction equilibria, carbon dioxide, pH in brines, and a chapter on automated computation methods by David R. Cogley.

Here is your modern update of the basic text with lots of great examples and homework problems.

James Butler is the Gordon McKay Professor of Applied Chemistry in the Division of Engineering and Applied Sciences at Harvard University.

Wastewater Reclamation and Reuse, Water Quality Management Library, Volume 10

Edited by Takashi Asano, Technomic Publishing Company, Inc., 1998, 1528 pp, ISBN 1-56676-620-6

Water reuse is a topic that is ostensibly simple and has had appeal to the public. The latter was evident during the 1970's as we pursued ecological goals as a nation and interest in wastewater reuse was encompassed in the Clean Water Act Amendments of 1977. In reality, however, water reuse is complex in that it has so many facets. There is much more to the topic than simply diverting wastewater to treat and then putting it to some use. Questions arise at each step.

Modern Techniques in Applied Molecular Spectroscopy, Francis Mirabella (Ed), John Wiley & Sons, 1998, \$59.95

'Fess up. How many of you still have a Spec 20 in your lab?

This book is several generations advanced from that cute little yellow box, but the basic principles are the same. In this edited volume, part of the series on techniques in analytical chemistry, the contributors cover topics such as transmission infrared spectroscopy, specular reflection spectroscopy, attenuated total reflection spectroscopy, diffuse reflective spectroscopy, photoacoustic spectroscopy, infrared microspectroscopy, Raman microspectroscopy, emission spectroscopy, and fiber optics in molecular spectroscopy.

Francis M. Mirabella is with Equistar Chemicals in Cincinnati, Ohio.

The Sea: The Global Coastal Ocean: Processes and Methods, Kenneth H. Brink and Allan R. Robinson (Eds), John Wiley & Sons, 1998, \$145.00

This is the tenth book in the ambitious John Wiley & Sons series on The Sea, subtitled Ideas and Observations on Progress in the Study of the Seas.

I am not easily impressed, but this book is impressive. The understanding of ocean currents, especially in the near shore region, is incredibly difficult. This volume, partially funded by UNESCO, brings together some of the most prominent researchers from all over the world. Part 1 is devoted to physical and dynamic processes, part 2 is on global and interdisciplinary processes, and part 3 is on model development and data analysis. I have not seen the other books in this series, but I can imagine that this series would be a must for anyone seriously studying the oceans.

Kenneth Brink is with the Woods Hole Oceanographic Institution, and Allan Robinson is with Harvard University.

P. Aarne Vesilind

Authorship includes some 73 persons, all recognized in their respective fields that support reuse. As the topic is broad and complex, the respective authors have adapted their knowledge to the many niche aspects of reuse as well as to the broad picture. With 31 chapters and 1528 pages, these authors cover virtually every aspect of the topic.

The first two chapters set the stage with an overview of reuse as a topic and then look at the important issue of planning for reuse. The latter includes institutional considerations and economic analyses — more often than not the limiting factors in planning.

The technical issues are presented in a thorough manner starting with a review of the spectrum of technologies applicable to reuse in the context of small systems. Waste stabilization ponds for agriculture and aquaculture is another topic. Other treatment guidelines include coagulation and filtration, which is handled in one chapter theoretically and in another from a practical standpoint. Characteristics of wastewater effluents, a problem often requiring individual literature search, are described comprehensively. Reverse osmosis provides a primer on membrane technology. As a wish, the role of microfiltration, ultrafiltration, and nano-filtration would have been helpful to round-out the role of membrane technology. Ultraviolet disinfection is another technology primer. Rather than so much on the basics of these technologies, however, the main questions remain: What are the special issues in their applications to wastewater reclamation and reuse? While the primers are done well, the issues of their specific applications to reuse would have been apropos for a book of this nature. In membrane treatment, for example, the problem of pretreatment is an issue; biofouling should be addressed specifically with respect to reuse. The case studies help to address some of these issues. The problem of penetration of ultraviolet light in wastewater is a salient question. What about cleaning of lamps? What organisms can be reduced and to what extent?

Health issues are considered with several chapters devoted explicitly to this topic. Organisms found in various waste waters, and their removals, are reviewed along with infectious diseases and their associated risk assessment. The San Diego health effects study is reviewed as a specific comprehensive case which covers almost every aspect of this issue. Application of wastewater to crops is pertinent to many cases of reuse, especially in the irrigated areas of the western United States. Lacking in most reuse applications are criteria, a complex topic in itself as there are a spectrum of possible uses of reclaimed water, depending on the particular context. As is well known, setting standards is sometimes arbitrary, but at the same time, important. Dealing with this topic in a forthright fashion is often the key to matching the treatment technologies used in a specific reuse case to the uses of the water. This topic is dealt with further in using tertiary treated water for irrigation of raw-eaten vegetables, a topic that is of widespread interest.

A variety of case studies, eleven in all, provide a perspective of reuse projects in the United States and in several countries. These cases open up a manifold list of issues that would not have been possible by contemplation alone. The experiences

recounted are the key to understanding reuse as an engineering problem area. They illustrate in a tangible way many of the principles of implementing reuse as a practice. Each case has its own unique characteristics and how these are dealt with is instructive in understanding the topic.

The legal framework for reuse is what either impedes or enables a reuse practice. California is considered a world leader in reuse, a practice that was enabled by legislation. The role of legislation is reviewed in Chapter 30 by Gordon Cologne and Peter MacLaggan. The former is of course one of the sponsors of the 1969 Porter-Cologne Water Quality Control Act which established the legal context for water reuse in California, among other water quality related legislation.

Any public project, and especially water reuse, can fail or succeed based upon public support or opposition. Chapter 31 outlines the essentials of communication with the public with case studies to illustrate.

Appendices include three documents that will be useful for reference as other states and other countries consider laws, regulations, and guidelines for reuse. Appendix I reviews the status of regulations in the European Union, Appendix II provides the wastewater reclamation criteria in California, and Appendix III provides health guidelines from a WHO scientific group.

The negative aspects are minor compared with the value of a definitive book on reuse. As one minor issue, a consistent convention of SI/metric as the main units with US Customary in parentheses would have increased the value of the book internationally and would conform better to US practice in many journals.

Throughout the world and in every other state in the USA where issues of reuse develop, California is considered the starting point for guidance on the state-of-the-art of reuse. This book is a definitive source on virtually all issues of reuse. Instead of having to seek-out various documents through searches, the book will answer many questions directly and will provide a higher level starting point for individual literature searches where further amplification is needed. The book should have a universal appeal world-wide as the principles are the same country to country, even with varying cultures, physical contexts, and needs.

The book is edited to provide coordination between chapters, but the integrity of each author's work was maintained. Some three years of effort were required by the editor, Dr. Asano, in orchestrating the content and compiling the chapters into a unified book.

Takashi Asano is an Adjunct Professor, Department of Civil and Environmental Engineering at the University of California at Davis (e-mail: tasano@ucdavis.edu). The book is Volume 10 of the Water Quality Management Library of Technomic Publishing Company.

David W. Hendricks
Department of Civil Engineering
Colorado State University,
Fort Collins

Conferences, Calls for Papers

AEESP Research Frontiers Conference and Preconference Workshops

Pennsylvania State University

July 31, August 1-3, 1999

The Association of Environmental Engineering and Science Professors sponsors a research-focused conference only once every six years. The next conference will be at The Pennsylvania State University main campus on August 1-3, 1999 (Sunday afternoon through Tuesday morning). Preconference workshops with a teaching emphasis will be held separately on July 31, 1999 (Saturday afternoon).

The Conference and Preconference programs will consist of invited and contributed talks and posters. The conference theme of "Research Frontiers" builds upon the research categories

identified at the NSF/AEEP Workshop on "Research Frontiers in Environmental Engineering," held in January 1998 in Monterey, California. The program topics for the Frontiers Conference include 1) A Sustainable Environment, 2) Complex Environmental Systems, 3) Analytical Tools in the Molecular Sciences, and 4) Process Technologies. The preconference workshops will focus on 1) Teaching Methods in Environmental Engineering, and 2) Family, Gender, and Diversity Issues.

For more information, contact Fred Cannon (fcannon@psu.edu) or Bruce Logan (blogan@psu.edu).

Specialty Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States

Atlanta, Georgia

May 10-12, 1999

The American Water Resources Association will host a Specialty Conference entitled "Special Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States" May 10-12, 1999 in Atlanta, Georgia.

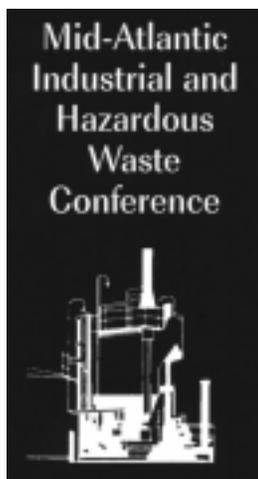
A National Assessment of the Potential Consequences of Climate Variability and Change (NACC) is underway, and the American Water Resources Association has been mobilized to help by sponsoring a Specialty Conference which will provide a forum to review the latest research linking water resources and climate. The conference will produce answers to these key NACC questions:

1. What are current stresses on water resources systems?
2. How might those stresses change if climate changes?
3. What information is needed to better understand the

answers to these first two questions?

4. What strategies are available to cope with both current and future stresses?

All members of the water resources community are invited to join us in Atlanta to learn about the latest climate change research and to assist in the Water Resources component of the NACC. The Atlanta Specialty Conference represents a new role for the American Water Resources Association in peer review of critical scientific issues of national importance. We are looking forward to a challenging three days in May and hope you will join us. For a detailed Preliminary Program, contact the American Water Resources Association headquarters at 703-904-1225 or check the association's web site (www.awra.org).



31st Mid-Atlantic Industrial and Hazardous Waste Conference

University of Connecticut

Storrs, Connecticut

June 20-23, 1999

For more information, please view the conference homepage at <http://www.eng2.uconn.edu/environ>.

Barth F. Smets, Asst. Professor
Environmental Engineering Program
Dept. of Civil and Environmental Engineering
Microbiology Program/Dept. of Molecular and Cell Biology
University of Connecticut
Storrs, CT 06269-2037



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R-AUTENRIETH@TAMU
.EDU

Secretary:

Kurtis G. Paterson
Civil and Environmental
Engineering
Michigan Tech University
1400 Townsend Drive
Houghton, MI 49931-1295
Tel: (906) 487-3495
Fax: (906) 487-3292
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Engineering
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Civil and Environmental
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Pennsylvania State
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Please send address changes to
Joanne Fetzner at the above
address, or e-mail
jfetznr@s.psych.uiuc.edu
phone (217) 398-6969
fax (217) 333-9576

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Roger Ely, Editor
Civil Engineering Department
University of Idaho
Moscow, Idaho 83844-1022
ely@uidaho.edu
phone (208) 885-2980
fax (208) 885-6608
<http://www.uidaho.edu/aeesp>

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Roger L. Ely, Editor
University of Idaho
Department of Civil Engineering
Moscow, Idaho 83844-1022

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