AEESP Newsletter
Association of Environmental Engineering and Science Professors
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2005 AEESP Research and Education Conference

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AEESP Membership Application

The AEESP membership application is available online at: **http://www.aeesp.org/org/membership.html**

Environmental Engineering vs. environmental engineering

[President's Note: Chuck Haas, who has been a driving force behind the 2005 AEESP Conference to be held at Clarkson University, provides this newsletter's commentary. - Marc Edwards, AEESP President]


Chuck Haas

Previous discussions in these pages have focused upon trying to craft a definition of environmental engineering. The striving to define our field has occupied environmental engineering for many years – why is this so? I would argue that a principal reason is that we are struggling against a possible loss of identity.

Since the 1970s, as society has increasingly recognized the need to seek solutions to environmental problems, the challenges of solving such problems have been taken up by many disciplines (e.g., chemical engineers design "green chemistry" processes, mechanical engineers design improved combustion systems). Engineers who work to solve (or prevent) environmental problems are more numerous than "Environmental Engineers."

For "Environmental Engineering" to survive as a discipline (differentiable from the broader group of those who are engaging in engineering to solve environmental problems), we must not only define what it is that we do, but also develop a consensus on the body of knowledge (BOK) that forms the core of our discipline and that differentiates us from other branches of engineering. Other disciplines (e.g., civil and chemical engineering) are similarly engaged in defining their BOK.

What might such a body of knowledge look like? Clearly, Environmental Engineers need to know how to characterize the natural environment and its variability (physical, chemical, and biological characteristics). We need to know about basic conservation principles and how to apply them to achieve treatment goals. We need to know the capabilities of some of the tools (processes) we have in our armamentarium. We need to understand how social, political, legal, and cultural forces may constrain or facilitate implementing solutions. We need to know how to communicate with diverse constituencies. We need to understand economics, costs, benefits, and risks associated with environmental impacts (broadly defined, including human health), and controversies associated with deciding on environmental policies (equity, precaution, justice, etc.). We need to understand how developments in our ability to analyze and model various environmental features may change over time to impact the nature of the problems that we may encounter and also our ability to design more effective solutions. We also need to know enough about other branches of engineering (and social, life and physical sciences, and health) with whom we frequently interact to be able to understand when we need to "call in a specialist" and also to understand their languages. We need to know how to manage a diverse team of individuals from many backgrounds to understand a problem and to implement its solution.

Can all this be done in the context of an undergraduate degree – certainly not! In this regard, the Environmental Engineering profession is to some degree ahead of our civil engineering colleagues in recognizing the importance of an M.S. or "equivalent" to engage in significant practice. What is the best preparation for such an M.S.? In my opinion (and it is a point of controversy amongst us), it is an Environmental Engineering B.S. As Environmental

Newsletter submissions

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Engineering educators, we need to rethink these issues (what we are, what is our BOK, and how do we best prepare those who will practice, teach, and research in the 21st century?) – the 2005 Conference at Clarkson would be an ideal venue to do so.

- Chuck Haas, Drexel University

AEESP Publication Committee

Call for volunteers and ideas

The AEESP Publication Committee is planning to carry out three main projects over the next two years. These projects are:

- Finishing the Spanish translation of the Laboratory Processes Manual (edited by Susan Powers et al.), and perhaps organizing work toward its translation to other languages (e.g., Russian or Chinese).
- Editing a similar manual on methods for field observation and environmental assessment. This manual, to be used as a complement or a resource for college courses, would also include an introduction to teaching via problem-based or case-based approaches, and a practical guide to their implementation in courses on environmental assessment.
- Editing a manual on methods used in environmental microbiology, including the arsenal of gene probing and DNA fingerprinting techniques developed over the last few years. As with previous manuals, committee members will serve as co-editors.

The committee is looking for a few individuals who would be interested in joining the committee and assisting with one or more of these projects. Beyond this call for membership, the committee is also welcoming ideas on what should be included in the two manuals on environmental assessment and environmental microbiology. We want to hear from colleagues who currently teach courses in these areas and have ideas about chapter topics, names of individuals to write chapters on specific topics, and anything that would make the manuals appealing to use in undergraduate and graduate courses. Also, if there is a project that AEESP members feel that the Publication Committee should take the initiative to carry out, we want to hear about it.

To volunteer for the Publication Committee, or to propose ideas about topics or publications, please send an e-mail to the Publication Committee chair, Philippe Baveye, at Philippe.Baveye@Cornell.edu.

Sponsors upgrade AEESP Awards

CH2M Hill, Malcolm Pirnie, MHW, and Parsons have upgraded AEESP awards effective 2005. The upgrade is aimed at increasing the prestige and visibility for each award, enhancing attendance at the awards ceremony, and streamlining award administration. To help achieve these objectives, our sponsors will increase the financial backing for each award by 333-500%.

Future recipients of the CH2M Hill Outstanding Dissertation Awards, Malcolm Pirnie Frontier of Research Award, MHW Outstanding Thesis Awards, or Parsons Outstanding Dissertation Award will receive an allocation of $750 to offset any travel expenses to the awards ceremony. Moreover, the typical student cash prizes will increase by 300% and the cash prize for the Frontier award will increase by 400%. The cash prize for the advisor for Outstanding Dissertation and Outstanding Thesis Awards will remain unchanged. Specifics will be detailed in the January Newsletter.

The first AEESP award was given in 1966 by Engineering Science (now Parsons) with a cash prize of $1000 for "excellence in sanitary engineering education." In 1982, the Parsons award was converted into an outstanding dissertation award, with a cash prize of $1000 for the student and $1000 for the advisor. In 1988, CH2M also started to sponsor a dissertation award, and prize amounts for each dissertation award were unchanged for the student and were decreased to $500 for the advisor. The first thesis award was given by JMM (now MHW) in 1991 with a total prize of $1500 (split between the 1st and 2nd place advisors and students). The Malcolm Pirnie Frontier of Research Award was first offered in 2000 with a prize of $1000.

As the field of Environmental Engineering has grown, the types of conferences at-

tended by AEESP members have become more numerous, and a lower percentage of our members attend WEFTEC each year. Consequently, attendance at the WEFTEC ceremony by award recipients has been decreasing due to the economic burden of travel. Moreover, over the years the monetary value of some awards was substantially eroded by inflation. The upgrades will directly address these concerns.

We are deeply indebted to our award sponsors for their continued financial and logistical support, which allows AEESP to recognize outstanding achievement by our members and Environmental Engineering graduate students. AEESP acknowledges the leadership of Glen Daigger (CH2M), Mike Kavanaugh and Doug Owen (Malcolm Pirnie), John Koon (Parsons) and Rudy Tekippe (MHW) on this important issue.

New board members

We are pleased to announce the results of the election of three new members of the AEESP Board of Directors.

Serving three-year terms beginning October 2004 are:

William Ball, Johns Hopkins University

Menachem Elimelech, Yale University

James Mihelcic, Michigan State University

Our congratulations to all of them! We also extend our appreciation to all of the candidates for their willingness to serve our association. The election was remarkably close this year.

Member news

AEESP members may submit 'Member News' items to:
Amy E. Childress
AEESP Newsletter Editor
amyec@unr.edu

The submissions deadline for the January 2005 AEESP Newsletter:
December 1, 2004

In memoriam...

John Henry Austin, age 75, longtime resident of Arlington, VA, died peacefully at home with his wife at his side August 17, 2004, of colon cancer. He studied engineering at Syracuse University where he earned his bachelor's degree. He went on to obtain his master's from MIT and his doctorate from UC-Berkeley. Dr. Austin's 50-year career as an environmental engineer included academic positions at the University of Illinois, Clemson University, the University of Maryland, Colorado State University, and a Fulbright Scholarship at Delft Technical University. From 1980 until the time of his death, he was a water and sanitation development specialist with the U.S. Agency for International Development Global Health Department.

John was a longtime summer resident of Chautauqua Park in Boulder where he pursued his avid interest in hiking. He had many ties in the Boulder community and was mentor to faculty at the University of Colorado and other academic institutions.

John joined AEESP in 1965 and maintained his membership as both a faculty member and Affiliate since then. He is survived by his beloved wife, Rita C. Klees (M.S., Ph.D., in Civil Engineering, University of Colorado, 1986 and 1991), and four children from a previous marriage: Eric Austin (Lexington, MA), Kirstin Austin (Silver Springs, MD), Shawn Austin (Burbank, CA) and Bryn Austin (Boston, MA). He is also survived by six grandchildren (Hadas, Tamar, Kendra, Klara, Taylor and Ryan); two sisters, Nan Doggett (Myersville, MD) and Mary Ann Harlan (Staunton, VA); and a host of other relatives and friends.

A memorial service was held August 28 in Arlington, VA. Contributions may be made to Capital Hospice, 9300 Lee Highway, Suite 500, Fairfax, VA 22031.

Newsletter policies

Submissions deadline

The AEESP Newsletter is published three times a year in January, April, and September. The deadline for newsletter submissions is one month prior to the publication date. Please keep in mind when submitting items with deadline dates that members receive issues four to six weeks after the submissions deadline.

Advertising policy

Any advertisement, including faculty, post-doc, or student ads, or other types of announcements submitted by an AEESP member, will be free for the first 250 words (approximately 1/4 page) and then charged at $1 per word for additional content, if formatted to fit in a column. Non-members will be charged at the per word rate for any size column-formatted ad. Full page formatted advertisements will be charged at $500 for members and $1,000 for non-members. Formatted full page ads will be accompanied by a free web ad.

Photo submissions

Photo submissions to the AEESP Newsletter are encouraged. Please submit your photos electronically (to amyec@unr.edu) in jpeg format at the highest dimension for downsizing to print resolution (preferably less than 750 KB). Also, please include captions with names, locations, and dates.


Eric Hoek

UCLA

The Civil and Environmental Engineering Department in the Henry Samueli School of Applied Engineering and Applied Science (HSSEAS) at the University of California, Los Angeles is pleased to announce the appointment of **Dr. Eric M. V. Hoek** as Assistant Professor and HSSEAS Fellow. Professor Hoek's research integrates knowledge of aquatic colloidal and interfacial chemistry, microhydrodynamic and electrokinetic transport, and interfacial engineering to improve existing and to develop novel processes for desalination and water reuse. Current research involves using direct visual observation and advanced surface analyses to study microbial deposition and adhesion in membrane processes, applying numerical modeling and atomic force microscopy to study impacts of nanometer scale surface roughness on colloid-membrane interactions, developing molecular recognition membrane processes to selectively remove scaling metal ions, and synthesizing hydrophilic and antimicrobial reverse osmosis membranes to combat biofouling in wastewater reclamation.

Professor Hoek received a B.S. in Civil Engineering from Penn State University (1995) and an M.S. in Environmental Engineering from the University of California, Los Angeles (1996). He worked for two years in industry and consulting prior to obtaining a Ph.D. in Chemical and Environmental Engineering at Yale University (2002). His doctoral dissertation, "Colloidal Fouling Mechanisms in Reverse Osmosis and Nanofiltration," under the supervision of Menachem Elimelech was granted the CH2M-Hill/AEESP Doctoral Thesis Award. Before joining the faculty at UCLA, he was Assistant Professor of Chemical and Environmental Engineering at the University of California, Riverside. For more information about Prof. Eric M.V. Hoek or the Civil and Environmental Engineering Department at UCLA, visit http://www.cee.ucla.edu/.

Clarkson University

Clarkson University Professor of Civil and Environmental Engineering **Susan E. Powers** was a recipient of the National Science Foundation (NSF) Director's Award for Distinguished Teaching Scholars. This is the foundation's highest honor for teaching and research excellence. Powers is one of only eight professors nationwide chosen by the NSF this year to receive the prestigious award that honors individuals who have made outstanding contributions to research in their discipline as well as the education of undergraduates or K-12 teachers and students. Powers and the other recipients were honored at a ceremony on June 2 at the National Academy of Sciences in Washington, D.C.


Susan Powers

Since joining the faculty of Clarkson's Department of Civil and Environmental Engineering in 1992, Powers has been at the forefront of studies on the movement of petroleum fuels and other complex mixtures in groundwater. Her research has been widely published in professional and scientific journals, and funded through grants from the Department of Energy, the National Science Foundation, and the Environmental Protection Agency.

Powers is also the director of Clarkson's K-12 Project-Based Learning Partnership Program, an innovative program that has increased middle school students' interest and participation in the sciences and engineering through hands-on projects and partnerships with college mentors. Through this program, trained college students have worked with teachers and students at local school districts. The program has led to the development of solid waste and energy-related curriculum currently being piloted in these schools and considered for national distribution though Project Lead the Way.

University of Connecticut

Effective Sept. 1, **Barth F. Smets** will be leaving the University of Connecticut to join the Danish Technical University (DTU) in Lyngby, Denmark. He will assume the position of Professor of Environmental Microbiology in the Environment & Resources Department. He will retain an adjunct appointment at UConn, and has also been appointed as Adjunct Professor in the Via Department of Civil & Environmental Engineering at Virginia Tech. He plans to continue his research at DTU in the area of Applied and Molecular Microbial Ecology. He can be reached at bfs@er.dtu.dk.

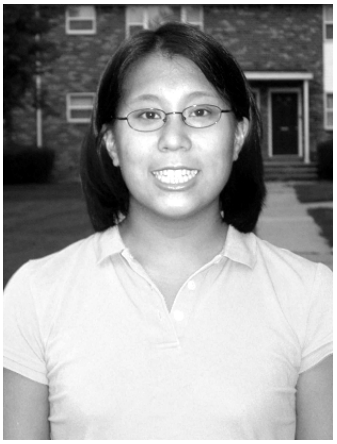
Duke University

Claudia Gunsch joined the Department of Civil and Environmental Engineering at Duke University as assistant professor in microbial engineering systems. Gunsch earned her Ph.D. from the University of Texas at Austin, and conducts research on pollutant degradation as applied to groundwater and air pollution treatment. At Duke, Gunsch plans to continue research to link biotechnology to environmental engineering applications including development of biosensors capable of pathogen and


Claudia Gunsch

contaminant detection in water and air, use of DNA chips to study the microbial ecology of groundwater and air treatment systems, isolation and identification of novel genes in environmentally relevant microorganisms, and development of methods to control the release of genetically engineered microorganisms in natural and controlled environments. Gunsch will teach basic and advanced classes in environmental engineering.

Heileen Hsu earned her Ph.D. from the University of California at Berkeley and will join Duke's CEE department in 2005 as assistant professor after completing a one-year post-doctoral position at the University of Delaware's Graduate College of Marine Studies. Hsu's research interests focus on the chemical processes that determine the transport, transformation and toxicity of pollutant metals in aquatic systems, an area of research with important implications for improving the removal of mercury during wastewater treatment and for the biogeochemistry of mercury in aquatic systems. At Duke, Hsu plans to study the effect of speciation on the transport and transformations of metals in engineered and natural systems, and to develop sensor technology for monitoring and remediation of contaminated sediments. Hsu will teach introductory environmental engineering classes and advanced classes in areas related to environmental aquatic chemistry.


Heileen Hsu

Princeton University

The School of Engineering and Applied Science (SEAS) at Princeton University is pleased to announce that **Dr. Catherine A. Peters** is the new Associate Dean for Academic Affairs. This administrative appointment complements her existing appointment as an associate professor in the Department of Civil and Environmental Engineering. Under the leadership of Dean Maria Klawe, Princeton has a bold new agenda for reshaping engineering teaching and research to better address the needs of society. Catherine Peters will take a lead role in implementing the new strategic plan. The SEAS vision calls for greater integration between the traditional pursuit of technological innovation and broader consideration of societal, economic and environmental concerns. The strategic plan grew out of a year-long process involving input from more than 750 professors, students, staff, and alumni. The school held eleven workshops on topics ranging from nanotechnology to graduate and undergraduate education. The resulting vision statement is available online at www.princeton.edu/~seasweb.


Catherine Peters

Northwestern University

Dr. Martina Hausner recently joined the Department of Civil and Environmental Engineering at Northwestern University as an assistant professor. Dr. Hausner's Ph.D. is in Biology from the Ludwig-Maximilians University in Munich. She has a B.S. degree in Microbiology from the University of Toronto and an M.S. degree in Biology from the University of Waterloo. Prior to joining Northwestern, Dr. Hausner was the Coordinator of the Microbiology Group in the Institute of Water Quality Control and Waste Management at the Technical University of Munich, Germany. Dr. Hausner is a microbiologist who works at the interface between molecular biology and environmental engineering. For instance, she is a leader in the use of confocal laser scanning microscopy (CLSM) to study the spatial relationships among microorganisms in biofilms. Particularly noteworthy is her expertise with fluorescent *in situ* hybridization (FISH) and image analysis, methods that are ideally complementary to CLSM. Dr. Hausner also investigates the transfer of genetic information among different microorganisms, one of the keys to understanding community function, as well as its structure.


Martina Hausner

Employment Opportunities

University of Central Florida

FACULTY POSITION IN ENVIRONMENTAL ENGINEERING. The Civil and Environmental Engineering (CEE) Department seeks applications for an anticipated faculty position in Environmental Engineering. The successful candidate will join an active group of faculty involved in both experimental and analytical research. Applications are accepted at the ranks of Assistant, Associate, or Full Professor. Candidates must demonstrate interest in and potential for excellence in teaching of undergraduate and graduate courses in environmental engineering with emphasis in water or wastewater treatment, initiating and maintaining externally funded research, publishing, and performing professional service. Outstanding applicants in other specialized areas are also encouraged to apply.

The CEE Department has 20 full-time faculty members and approximately 550 undergraduate and 150 graduate students. The Department offers Bachelor's, Master's, and Ph.D. degrees in Civil Engineering and Environmental Engineering. Additional information on the department is available at www.cee.ucf.edu. Applicants must possess an earned doctorate in Environmental Engineering or a closely related engineering discipline at the time of appointment, and must be a registered engineer in the State of Florida, or become registered in Florida within three years after appointment. Applicants should send a letter of interest and resume, which includes the names, addresses, and phone numbers of at least three (3) references to: Chair of the Search Committee; Civil & Environmental Engineering Department; University of Central Florida; Orlando, FL 32816-2450. Screening will begin on October 19, 2004 and continue until the position is filled. Application materials including transcripts are available for public review upon request. UCF is an equal opportunity employer.

Cornell University

Located in the Finger Lakes region of New York State, Cornell University is committed to creating a more diverse and inclusive campus in which to work, study, teach, and serve.

TENURE TRACK FACULTY POSITION IN ECOHYDROLOGY. Cornell University invites applications for a tenure track faculty position in Ecohydrology. We are primarily interested in applicants at the Assistant Professor level. This individual will investigate and mathematically model the hydrology of ecological systems. Responsibilities for the position include support of the undergraduate and graduate curricula in environmental engineering. Courses taught will reflect her/his areas of expertise and meet departmental needs. Mentoring of undergraduate and graduate students and securing external funding are expected. A Ph.D. with a strong background in quantitative hydrology and/or engineering and the ability to work with ecological systems is required. The candidate must demonstrate proficiency in teaching and have a strong research record. The academic home for this position is expected to be the Department of Biological and Environmental Engineering in the College of Agriculture and Life Science.

Applicants are to submit a letter of application, vita, transcripts and names of three references (including telephone numbers and email addresses) to: Beth Ahner, Co-Chair Search Committee, Biogeochemistry and Biocomplexity Initiative, Biological and Environmental Engineering, 320 Riley-Robb Hall, Cornell University, Ithaca, NY 14853-5701. We will begin reviewing applications September 15, 2004. For more details, see www.bee.cornell.edu/ABOUT/Position.html.

Cornell University is an affirmative action, equal opportunity employer. Applications from women and minorities are encouraged.

University of Tennessee-Knoxville

ASSISTANT/ASSOCIATE PROFESSOR, AIR QUALITY. The University of Tennessee-Knoxville, Department of Civil and Environmental Engineering is seeking applicants for one position in Air Quality. This position is full-time, tenure track and will be filled at the Assistant/Associate Professor level. An earned doctorate in Civil Engineering, Environmental Engineering or a closely related discipline is preferred. Applicants must have a background in air quality management, air pollution control process design, computer modeling, and/or waste management. Applicants are expected to have an interest in funded research, scholarship, and professional organizations. Professional registration and US citizenship or permanent residency are desirable. Major duties include undergraduate and graduate teaching, advising, obtaining and directing funded research, producing scholarly works, and serving on committees. Salary is negotiable depending on experience. Several interdisciplinary research opportunities are available in a growing UTK/ORNL research community.

Applicants are invited to send a resume and three references to: Search Committee Chair, Department of Civil and Environmental Engineering, University of Tennessee, Knoxville, TN 37996-2010 or e-mail to cee@utk.edu.

Review of applications will begin September 1, 2004, and continue until the position is filled. The position is available for either a January 2005 or August 2005 start. Nominations are welcome, and females and minorities are especially encouraged to apply.

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services.

The Indiana University
School of Public and Environmental Affairs
Making A World of Difference.

Indiana University, Bloomington

TENURE TRACK FACULTY POSITIONS IN ENVIRONMENTAL AND ECOLOGICAL SCIENCES. Indiana University invites applications for two new tenure-track faculty positions in environmental and ecological sciences as part of a comprehensive new program in Interdisciplinary Environmental Sciences. The focus of this program is on the biogeochemical cycling of oxygen, carbon, nitrogen, or water, the movement of natural or anthropogenic compounds through ecosystems, or the energy balance of linked forest watershed systems, using experimental and/or numerical modeling approaches.

Successful candidates are expected to help lead the development of this Interdisciplinary Environmental Sciences program, including the selection of future new faculty hires, the utilization and implementation of the Indiana University Research and Teaching Preserve, and the design of the new Multidisciplinary Science Building. Successful candidates are expected to develop an extramurally-funded research program and participate in undergraduate and graduate teaching.

The applicant's expertise is expected to complement and strengthen existing faculty research and teaching in ecology, the atmospheric sciences, biogeochemistry, hydrology, or environmental chemistry in the School of Public and Environmental Affairs or in the College of Arts and Sciences.

Applicants should hold a Ph.D. in a suitable field. Information on the Research and Teaching Preserve can be found at http:/www.Indiana.edu/~preserve. The appointments are expected to be at the Assistant Professor level, but a more senior appointment is possible for exceptionally qualified candidates.

Bloomington is located in the heavily forested hills of South-Central Indiana and is renowned for its attractive quality of life, cultural activities, and modest cost-of-living. Indiana University offers a comprehensive benefits program and is an equal opportunity/affirmative action employer.

Review of applications will begin on November 1, 2004, and continue until the position is filled. Applications should include a curriculum vitae, a statement of research and teaching interests, and full contact information for three potential referees. Please submit application materials to: Jeffrey R. White, Professor and Associate Dean of Bloomington Programs, SPEA, Room 300, 1315 E. 10th St., Indiana University, Bloomington, IN 47405-1701.

For more information see http://www.iu.edu/~speaweb/faculty/open.html. Indiana University is an Equal Opportunity, Affirmative Action Employer, Educator and Contractor, M/F/D and strongly committed to achieving excellence through cultural diversity. The university actively encourages applications and nominations of women, persons of color, applicants with disabilities and members of other underrepresented groups.

Programs

Penn State Harrisburg

Penn State Harrisburg has preliminary approval for a two-year EPA project entitled "Optimizing Lime Stabilization Treatment for Biosolids." This project consists of six phases: 1. Literature Review, Data Collection, and Inventory Generation; 2. Bench Scale Study for Lime Stabilization of Biosolids; 3. Full Scale Demonstration in WWTPs; 4. Evaluation, Conclusions, and Recommendations for Final Report; 5. Development of a Manual of Practice; and 6. Technology Transfer in Terms of Training. The project will be under the direction of Drs. Baker and Li and the Pennsylvania Department of Environmental Protection.

The Environmental Programs will support two Masters students working towards either an Environmental Pollution Control Degree or Environmental Engineering degree for up to two years. The Assistantship includes tuition, stipend, and summer support. Students will need to immediately apply to the program and request assistance through the program and Dr. Baikun Li. Program details may be found at http://www.hbg.psu.edu/etc/ and Admission Details at http://www.hbg.psu.edu/. Inquiries may also be addressed to either Dr. Li or Dr. Cole at their email addresses.

AEESP members

Have you moved or has your address changed? Send address changes to:

Joanne Fetzner
AEESP Business Office
2303 Naples Court
Champaign, IL 61822

Thinking Like an Engineer

Michael Davis, Oxford University Press, New York, 1998

A chap was in a hot air balloon and lost in a fog. He decided the best thing to do would be to slowly descend and try to find out where he was. As he approached the ground he saw a man walking along a road.

"Where am I?" the lost balloonist yelled down.

"You are up in a balloon," came the reply.

After a moment of silence, the balloonist yelled down.

"Are you a philosopher?"

"Yes," came the reply. "How did you know?"

"Because your answer is correct but not useful."

Philosophers are used to being right, but not useful. Only rarely have some been both right and useful. John Rawls comes to mind. In the 1960s when this country was searching for a rationale for affirmative action and for giving some segments of our population an unfair advantage, Rawls wrote *A Theory of Justice* in which he provided a powerful argument for allowing more of society's resources to be distributed to the least advantaged, thus justifying President Johnson's Great Society. But he was a rare philosopher, and most of his breed labor for their entire careers without contributing much to the general welfare.

Michael Davis is a philosopher who believes that it is both right and useful that we develop a philosophy of engineering, and this book is intended to add to this scholarship. Unfortunately, *Thinking Like an Engineer* does not further this objective, and might even set the movement back. Not only are most of Davis' arguments in this book of little value, but often they are just plain wrong. Davis has tried to think like an engineer but has pretty much missed the boat. A far better title for the book would have been "Thinking like a philosopher who thinks he knows how engineers think."

The book begins with a section entitled "Introduction to Engineering" in which Davis tries to define the profession, but soon gets entangled in basic engineering concepts. He has difficulty with "efficiency," for example, and suggests that this concept often drives engineering. He apparently does not understand that it is not efficiency that is important to engineers, but the **quest** for efficiency. It is the **challenge** of it that drives engineering, as so ably described by Samuel Florman in the now classic *The Existential Pleasures of Engineering*. Engineers develop clever new designs that squeeze out higher efficiencies because this is **fun!**

Instead of focusing on the human face of engineering, Davis seems to believe that engineers are robots, doing their preprogrammed things, without concern for social consequences. For example, he makes the following outrageous statement: "Engineers should not be blamed for failing to take into account social consequences about which they can only guess." It appears, from the bibliography at the conclusion of the book, that Davis has not read *The Ghost of the Executed Engineer* by Loren Graham that describes engineering in the Soviet system, where engineering ceased to be fun. I would highly recommend this book to Davis before he writes his next book on engineering philosophy.

A chapter on the history of engineering is history as written by a philosopher – substituting opinion for fact and drawing insights from the obvious. For example, he contemplates why engineering societies did not have codes of ethics before the beginning of the last century, and then answers his own musing with the insight: "My guess is that engineers…did not see the need (to have them)." Heavy.

The third chapter discusses the case of software engineers and the question of whether or not they can be logically classified as engineers. Here again he misses the whole point of engineering – making knowledge useful. Engineers are people who design useful things, and have great fun doing so. It is that simple, but Davis seems to not understand this motivation. The book continues with an extended discussion of the loss of the space shuttle Challenger, focusing on the decisions by Bob Lund, the vice president of engineering at Morton-Thiokol who was convinced by his colleagues to vote against the engineers and to approve the launch. Davis then cuts into a discussion of engineering codes of ethics and suggests that Lund, an engineer, ought to have adhered to the Code. But this discussion misses the subtleties of Lund's decision. Even if Lund had thought about the code, would it have been useful to him at that moment? Davis goes on to describe the actions of Roger Boisjoly who became the primary whistleblower during the Rogers Commission hearings. Davis calls Boisjoly a hero, but ignores the fact that Boisjoly knew, right after the explosion, that he ought to have done more than just fold his tent and go home after the decision to launch had been made. I had dinner with Roger some months after the event and asked him why he was spending his time speaking at universities. His eyes became moist and he said that this was the way for him to seek personal forgiveness for his unfortunate decision to accept the Morton-Thiokol management decision. Boisjoly is a good man, but he himself will admit that he is no hero.

The most egregious problem in this chapter is that Davis goes on to equate Lund's decision to support the Challenger launch with the price-fixing scandal in the 1950s where several General Electric engineers where convicted of criminal activity. To suggest that this is the same kind of wrongdoing as the decisions by Lund and Boisjoly simply demonstrates a total lack of understanding of how engineers work.

In the same chapter Davis makes a statement that curls my toes: "Engineers do not, in general, balance risk against benefit."

The book concludes with a chapter on professional autonomy that is clearly written for another audience. This chapter is classical philosophy-talk, essentially impenetrable for the uninitiated. I wonder how the editor let this happen. Oxford publishes many fine books on philosophy and generally holds to high standards, but this is not one of their finest efforts.

I could go on, but you get the idea. This is a book by a philosopher who convincingly demonstrates that he does not think like an engineer. But in his defense, if I had written a book entitled "Thinking like a philosopher" I would no doubt have been hammered for having produced something that was not useful and also profoundly wrong. Give Davis credit for having had the courage to start the conversation.

Michael Davis is Senior Fellow at the Center for the Study of Ethics in the Professions, Illinois Institute of Technology.

— P. Aarne Vesilind, Bucknell University

Navigating Rough Waters: Ethical Issues in the Water Industry

Cheryl K. Davis and Robert E. McGinn, Editors, AWWA, 2001

Engineering is essential to the waging of war, and, because warfare has been a part of human behavior since the earliest humans roamed the earth, the earliest engineers were no doubt military engineers who worked on both defensive structures and offensive machines for warfare. One does not necessarily need lawyers, or accountants, or journalists to wage war, but engineers are indispensable. This idea was brilliantly exemplified by the unforgettable scene in Stanley Kubric's movie *2001: A Space Odyssey.* Kubric suggested that war and disagreement among our ancestors originally was nothing but bluster and snorting, but then some engineer (?) discovered that if a club was used to hit the enemy over the head, the enemy died. Technological war was born.

During the 18th century the best engineers in the world were French. They had the theoretical skills to apply technology to warfare and understood the importance of technology in warfare. Because of France's geographical location, war for France was always possible and invasion was a constant threat. Most significant engineering advances were therefore directed to military purposes. Because so many engineers in France worked for the government in military matters the word "engineer" was presumed to mean "military engineer". Even the development of the most basic technology was controlled by the government. For example, the use of orthographic projection in the expression of engineering machinery and facilities was invented by Gaspard Monge in the 1770s while he was employed by the French government. However, because his work involved the drawing of fortifications, the government censured his book and he was not able to publish his discoveries until 1795.

Across the English Channel in Great Britain, the evolution of engineering was driven by the need for industrial power and economic development. With little concern for invasion from other European powers, English engineering developed for the purpose of increasing productivity and industrial efficiency and this engineering eventually evolved into what we now know as civilian (or civil) engineering, or the use of our technical skills for non-military uses.

During the recent years there has been a strong movement here and in other parts of the world to put engineering skills to use in a pro-active way to enhance global peace. I would like to call this work **peace engineering** to differentiate it first from military engineering and also from civilian engineering. The former is directed at warfare and defense, the latter is work for non-military purposes, but peace engineering is something different – its aim is the active and purposeful quest for peace. If the French invented military engineering, and the English developed civilian engineering, is it not perhaps time for Americans to proclaim peace engineering as a legitimate engineering

Paying homage to Gaspard Monge in Paris. The legend reads: "To Garpard Monge, from his students and colleagues."

option? Perhaps in time peace engineering will evolve and mature and eventually take its proper place alongside military and civilian engineering.

Peace engineering is born when engineers recognize that war is evil and then decide to work for peace. Meaningful careers are available in organizations such as Engineers Without Borders, or the Peace Corps, or the World Bank, or hundreds of other groups devoted to peace and justice. In academia, as most of us know, teaching about and promoting the peaceful use of engineering skills is also a highly rewarding career.

For a young engineer seeking a career path, the decision to practice peace engineering can be based on any number of considerations, from religious to political, but most likely this will be based on a realization that, as President Carter said in his Nobel Peace Prize acceptance speech, "War is evil." He acknowledged that sometimes war is necessary, but that it is always evil. And if war is evil, perhaps some good can be achieved by practicing pro-active peace engineering.

It is such "thinking out of the box" ideas that permeate the fine book published by the American Water Works Association and ably edited by Cheryl Davis and Bob McGinn. What they basically ask the reader to recognize is that water supply engineering began essentially as a military necessity and then evolved into a civil utility. Leon Uris described the military importance of water in his wonderful novel *The Source* in which cities survive sieges only if they have an independent and protected water supply. Water engineering was therefore first military, and then it became civil with the construction of aqueducts such as in Rome and much later the Croton Aqueduct in New York City. Our industry has been successful in providing water to our cities, but Davis and McGinn ask if it is not time to look at the wider picture. Do we engineers and managers also have a responsibility to not only provide water to our clients but also to do this in a fair and ethical fashion, taking into account the needs of all people? In other words, the "public" is not necessarily the people who pay our salaries, but the public ought to be **all** people.

In the preface, the editors state: "Historically, the water industry has been the province of engineering and science. However, in recent decades the issues we face have broadened to include political, legal, environmental, management, human relations, and public education concerns." I would add that the water industry still **is** the province of engineers and scientists, but now we have to be able to understand and apply the issues Davis and McGinn list. We can no longer get away with just doing our technical jobs and pretending that such issues are for "others" to worry about. One of the authors, Jack Ward, reflects that engineers "speak calmly in science to communicate with the public that speaks passionately in values" … and that "we should bring passion, vision, and the courage to act" to our jobs.

The book begins with an excellent summary on the language of ethics by ethicist David Schmitz. It is quite readable and instructive even for the uninitiated. Robert McGinn then talks about some ethical issues faced by professionals. Two papers on the international perspective follow, and while these chapters are good, the major international hot spot of water rights is not addressed. The entire Jordan/Israeli/Palestinian water rights question may well lead us into a wider regional conflict in the coming years, and this problem ought to have been prominently discussed.

The book continues with chapters on water supply planning and water quality, concluding with an excellent chapter by Blanca Jiménez and Hector Garduño on the social, political, and scientific dilemmas for massive wastewater reuse in the world. A section on sustainability is followed by six chapters on management issues, including a very readable paper by William Mills on the ethical dilemmas in converting wastewater into drinking water, which recounts the problems the Orange County Water District had with the presence of N-nitrosociumethylamine (NDMA) in the recharge water from Water Factory 21. In this plant, wastewater was treated and chlorinated before injection as a barrier against saltwater intrusion, and it was discovered that the chlorine was responsible for the formation of NDMA. I wonder why no consulting engineer worth his or her salt (sorry) would not have cautioned about this eventuality earlier. We have known for 50 years that chlorine added to water containing organic compounds will produce all manner of undesirable chemicals. And nobody questioned the use of chlorine before the water was injected into a drinking water aquifer? But I digress.

Three chapters cover some of the ethical dilemmas faced by consulting engineers, including a chapter by Dan Okun decrying the loss of professionalism. Rounding out the book are two chapters on manufacturing, including an instructive paper by David Schwartzel on the ethical dilemmas from an equipment manufacturer's standpoint, a paper that should be required reading for all municipal water engineers and consultants.

This book hangs together very well, thanks to the masterful editing job by Davis and McGinn, and is a pleasure to read from cover to cover. It could easily be a reader (of perhaps selected chapters) in a water treatment technology course, and certainly some of the chapters will someday assume "canon" status in our field. It is a groundbreaking book, establishing a new paradigm in our field. If the stodgy old AWWA can break new ground, I wonder if we American engineers cannot similarly break new ground in the engineering profession and establish peace engineering as a legitimate field of study and practice.

Cheryl Davis is with the San Francisco Public Utilities Commission, and Robert McGinn is professor of Management Science and Engineering and runs the Program in Science, Technology and Society at Stanford University.

— P. Aarne Vesilind, Bucknell University

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Nutrient Management in Wastewater Treatment Processes and Recycle Streams

September 18-21, 2005
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The Conference is organized by two IWA Specialist Groups: "Design, Operation and Costs of Large Wastewater Treatment Plants," "Nutrient Removal and Recovery," and LEMTECH Krakow. University of Manitoba and a number of universities in Poland, led by Poznan University of Technology, support the conference. Topics cover research, operation, management, construction, and financing of the wastewater facilities. Notification of intent to submit papers: November 15, 2004. Full papers as per IWA requirements are due January 15, 2005. Details at www.bnr2005.krakow.pl.

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