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Educational Initiatives

Preparing future engineers for challenges of the 21st century: Sustainable engineering

Cliff I. Davidson ^b ... Sharon Austin ^g

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Abstract

The field of engineering is changing rapidly as the growing global population puts added demands on the earth's resources: engineering decisions must now account for limitations in materials and energy as well as the need to reduce discharges of wastes. This means educators must revise courses and curricula so engineering graduates are prepared for the new challenges as practicing engineers. The Center for Sustainable Engineering has been established to help faculty members accommodate such changes through workshops and new educational materials, including a free access website with peer-reviewed materials.



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Keywords

Sustainability; Education; Green engineering; Sustainable engineering; Workshops

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Cliff Davidson is Professor of Civil and Environmental Engineering, and Engineering and Public Policy, at Carnegie Mellon. He is the Director of the Center for Sustainable Engineering and former President of the American Association for Aerosol Research. He has several decades of experience conducting air quality measurement and modeling research at CMU, and has developed educational materials in Green Engineering.

Chris Hendrickson is the Duquesne Light Company Professor of Engineering, former head of the Department of Civil and Environmental Engineering, and Co-Director of the Green Design Institute. He has several decades of experience conducting research at CMU in life cycle assessment, construction management, infrastructure, and benefit-cost analysis.

Scott Matthews is Associate Professor of Civil and Environmental Engineering, and Engineering and Public Policy at Carnegie Mellon. He is also Director of Research for the Green Design Institute at CMU, and the Co-Director of the Green Practices program at CMU. He has conducted research in life cycle assessment, material flow analysis, environmental implications of e-commerce, and infrastructure sensing, among other topics.

Michael Bridges is a former staff member at the University Center for Social and Urban Research at the University of Pittsburgh, and a former staff member of the Eberly Center for Teaching Excellence at Carnegie Mellon.

David Allen is the Melvin H. Gertz Regents Chair in Chemical Engineering and the Director of the Center for Energy and Environmental Resources at the University of Texas at Austin. He has conducted research in air quality for several decades and was a lead investigator in the Texas Air Quality Study, one of the largest air pollution studies conducted to-date. He has also spearheaded efforts in writing Green Engineering educational materials.

Cynthia Murphy is a Research Associate at the Center for Energy and Environmental Resources at the University of Texas at Austin. She has conducted research there for many years on ways to promote electronics recycling and methods to improve emission inventories for air quality models. Previously, she spent 16 years in the electronics industry and two years in the mining industry.

Braden Allenby is the Lincoln Professor at Arizona State University, and has appointments in Civil and Environmental Engineering, and in Law, at ASU. Until 2004, he was the Environment, Health, and Safety Vice President for AT&T. He had previously served as Director for Energy and Environmental Systems at Lawrence Livermore National Laboratory.

John Crittenden is the Hightower Chair and Georgia Research Alliance Eminent Scholar in the Department of Civil and Environmental Engineering at Georgia Institute of Technology. His research interests are in pollution prevention, physical-chemical treatment processes in air and waste water, and modeling of fixed-bed reactors and absorbers. Dr. Crittenden is a member of the National Academy of Engineering.

Sharon Austin is a staff member with the Chemical Engineering Branch at the Office of Pollution Prevention and Toxics at the U.S. Environmental Protection Agency. She has led several efforts in development of Green Engineering educational material.

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