

ENVIRONMENTAL ENGINEERING

Fundamentals, Sustainability, Design

THIRD EDITION

James R. Mihelcic • Julie Beth Zimmerman



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actions **What is Global Engineering Education For? The Making of International Educators, Part I & II** Gary Downey, Kacey Beddoes, 2022-05-31 Global engineering offers the seductive image of engineers figuring out how to optimize work through collaboration and mobility Its biggest challenge to engineers however is more fundamental and difficult to better understand what they know and value qua engineers and why This volume reports an experimental effort to help sixteen engineering educators produce personal geographies describing what led them to make risky career commitments to international and global engineering education The contents of their diverse trajectories stand out in extending far beyond the narrower image of producing globally competent engineers Their personal geographies repeatedly highlight experiences of incongruence beyond home countries that provoked them to see themselves and understand their knowledge differently The experiences were sufficiently profound to motivate them to design educational experiences that could challenge engineering students in similar ways For nine engineers gaining new international knowledge challenged assumptions that engineering work and life are limited to purely technical practices compelling explicit attention to broader value commitments For five non engineers and two hybrids gaining new international knowledge fueled ambitions to help engineering students better recognize and critically examine the broader value commitments in their work A background chapter examines the historical emergence of international engineering education in the United States and an epilogue explores what it might take to integrate practices of critical self analysis more systematically in the education and training of engineers Two appendices and two online supplements describe the unique research process that generated these personal geographies especially the workshop at the U S National Academy of Engineering in which authors were prohibited from participating in discussions of their manuscripts Table of Contents The Border Crossers Personal Geographies of International and Global Engineering Educators Gary Lee Downey From Diplomacy and Development to Competitiveness and Globalization Historical Perspectives on the Internationalization of Engineering Education Brent Jesiek and Kacey Beddoes Crossing Borders My Journey at WPI Rick Vaz Education of Global Engineers and Global Citizens E Dan Hirleman In Search of Something More My Path Towards International Service Learning in Engineering Education Margaret F Pinnell International Engineering Education The Transition from Engineering Faculty Member to True Believer D Joseph Mook Finding and Educating Self and Others Across Multiple Domains Crossing Cultures Disciplines Research Modalities and Scales Anu Ramaswami If You Don t Go You Don t Know Linda D Phillips A Lifetime of Touches of an Elusive Virtual Elephant Global Engineering Education Lester A Gerhardt Developing Global Awareness in a College of Engineering Alan Parkinson The Right Thing to Do Graduate Education and Research in a Global and Human Context James R Mihelcic Author Biographies What is Global Engineering Education For? The Making of International Educators, Part III Gary Downey, Kacey Beddoes, 2022-06-01 Global engineering offers the seductive image of engineers figuring out how to optimize work through collaboration and mobility Its biggest challenge to engineers however is more fundamental and difficult to

better understand what they know and value qua engineers and why This volume reports an experimental effort to help sixteen engineering educators produce personal geographies describing what led them to make risky career commitments to international and global engineering education The contents of their diverse trajectories stand out in extending far beyond the narrower image of producing globally competent engineers Their personal geographies repeatedly highlight experiences of incongruence beyond home countries that provoked them to see themselves and understand their knowledge differently The experiences were sufficiently profound to motivate them to design educational experiences that could provoke engineering students in similar ways For nine engineers gaining new international knowledge challenged assumptions that engineering work and life are limited to purely technical practices compelling explicit attention to broader value commitments For five non engineers and two hybrids gaining new international knowledge fueled ambitions to help engineering students better recognize and critically examine the broader value commitments in their work A background chapter examines the historical emergence of international engineering education in the United States and an epilogue explores what it might take to integrate practices of critical self analysis more systematically in the education and training of engineers Two appendices and two online supplements describe the unique research process that generated these personal geographies especially the workshop at the U S National Academy of Engineering in which authors were prohibited from participating in discussions of their manuscripts

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Engineering Unesco,2010-01-01 This report reviews engineering s importance to human economic social and cultural development and in addressing the UN Millennium Development Goals Engineering tends to be viewed as a national issue but engineering knowledge companies conferences and journals all demonstrate that it is as international as science The report reviews the role of engineering in development and covers issues including poverty reduction sustainable development climate change mitigation and adaptation It presents the various fields of engineering around the world and is intended to identify issues and challenges facing engineering promote better understanding of engineering and its role and highlight ways of making engineering more attractive to young people especially women Publisher s description

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Sustainable Design Daniel A. Vallero, Chris Brasier, 2008-04-25 Scientific Principles to Guide Sustainable Design Decisions From thermodynamics to fluid dynamics to computational chemistry this book sets forth the scientific principles underlying the need for sustainable design explaining not just the hows of sustainable design and green engineering but also the whys Moreover it provides readers with the scientific principles needed to guide their own sustainable design decisions Throughout the book the authors draw from their experience in architecture civil engineering environmental engineering planning and public policy in order to build an understanding of the interdisciplinary nature of sustainable design Written to enable readers to take a more scientific approach to sustainable design the book offers many practical features including Case studies presenting the authors firsthand accounts of actual green projects Lessons learned from Duke University s Smart House Program that demonstrate the concepts and techniques discussed in the book Exercises that encourage readers to use their newfound knowledge to solve green design problems Figures tables and sidebars illustrating key concepts and summarizing important points For architects designers and engineers this book enables them to not only implement green design methods but also to choose these methods based on science With its many examples case studies and exercises the book is also an ideal textbook for students in civil and environmental engineering construction and architectural engineering

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