#### Contents

# Section I

## **Special Issue**

## Selected Papers from the 2012 Capstone Design Conference

### **Guest Editors**

# Susannah Howe—Smith College, Northampton MA, USA Jay Goldberg—Marquette University, Milwaukee WI, USA Scott Palo—University of Colorado, Boulder CO, USA Peter Rogers—The Ohio State University, Columbus OH, USA

Ahmad Ibrahim	1	Editorial
Susannah Howe, Jay Goldberg, Scott Palo and Peter Rogers	2–5	Guest Editorial
Jay Goldberg, Vikram Cariapa, George Corliss and Kate Kaiser	6–13	Benefits of Industry Involvement in Multidisciplinary Capstone Design Courses
Jimmy L. Trent, Jr. and Robert H. Todd	14–19	Bridging Capstone Design with Industry Needs through Communication, Training and Involvement
John K. Estell and Juliet K. Hurtig	20–30	Adopting Best Corporate Practices for Capstone Courses: A Case Study at Ohio Northern University
Julie A. Reyer, Martin Morris and Scott Post	31–38	Capstone Teams: An Industry Based Model
Judith Shaul Norback, Page F. Rhoad, Susannah Howe and Linda A. Riley	39–47	Student Reflections on Capstone Design: Experiences with Industry-Sponsored Projects
Jennifer Lebeau, Michael Trevisan, Jay McCormack, Steven Beyerlein, Denny Davis, Paul Leiffer, Phillip Thompson, Howard Davis, Susannah Howe, Patricial Brackin, Robert Gerlick and M. Javed Khan48–59 Alumni Perspective on Professional Skills Gained Through Integrated Assessment and Learning		
Nathalie Duval-Couetil, Jessamine Pilcher, Phil Weilerstein and Chad Gotch	60–71	Undergraduate Involvement in Intellectual Property Protection at Universities: Views from Technology Transfer Professionals
Gene Dixon	72–78	Capstone Project Problem Statements: Art or Science?
Beshoy Morkos, Joshua D. Summers and Samantha Thoe	79–90	A Comparative Survey of Domestic and International Experiences in Capstone Design
Charles Pezeshki	91–100	Influencing Performance Development in Student Design Groups through Relational Development
Imran Hyder, Drew Arnold, Javier Calvo-Amodio and John P. Parmigiani	101–111	Using Graduate Assistants as Project Advisers for Externally-Sponsored Capstone Design Projects

## Section II

Contributions in: Systems Design, Creativity, Imagination, First Generation Students, Diversity, Retention, Leadership Styles, Learning Styles, Cross-Cultural Comparisons, Improving Students' Performance, Engineering Mathematics, Examinations, Distance Learning, Computer-Based Assessment, Project-Based Learning, Laboratory Activities, Nanotechnology, Chemical Engineering, LabVIEW

P. Godfrey, R. Deakin Crick and S. Huang	112–127	Systems Thinking, Systems Design and Learning Power in Engineering Education
Hsiu-Ping Yueh, Bernard C. Jiang and Chaoyun Liang	128–135	How Does Human Aggregate Moderate the Effect of Inspiration through Action on the Imagination of Engineering Majors?
Julie P. Martin, Denise R. Simmons and Shirley L. Yu	136–149	Family Roles in Engineering Undergraduates' Academic and Career Choices: Does Parental Educational Attainment Matter?
Walter C. Lee, Holly M. Matusovich and Philip R. Brown	150-165	Measuring Underrepresented Student Perceptions of Inclusion within Engineering Departments and Universities
Luis Manuel Cerdá Suárez and Wilmar Hernández Perdomo	166–178	Social Perspective for Evaluating the Relationship between Leadership Style and Performance of the Professor in the Classroom

Ning Fang and Xiuli Zhao	179–188	Cross-Cultural Comparison of Learning Style Preferences between American and Chinese Undergraduate Engineering Students
V. Kovaichelvan and R. Nandagopal	189–198	Improving the Performance of Engineering Students with Aspiration, Innate Ability through Competency based Education
Desmond Adair and Martin Jaeger	199–209	Making Engineering Mathematics More Relevant Using a Computer Algebra System
Arthur James Swart and Trudy Sutherland	210-217	Student Perspectives of Open Book versus Closed Book Examinations— a Case Study in Satellite Communication
Charles Xie, Zhihui Zhang, Saeid Nourian, Amy Pallant and Edmund Hazzard	218-230	Time Series Analysis Method for Assessing Engineering Design Processes Using a CAD Tool
Weijane Lin, Hsiu-Ping Yueh and Jui-Jen Chou	231–239	Electronic Pet Robots for Mechatronics Engineering Education: A Project-Based Learning Approach
Ming-Der Jean	240–253	Integration of a Project-Based Learning Strategy with Laboratory Activity: A Case Study of a Nanotechnology Exploration Project
Carlos V. Miguel, Luis C. Matos, Fernão D. Magalhães, Luis M. Madeira and Adélio Mendes	254–262	Membrane Ultrafiltration for Oil-from-Water Separation: Multidisciplinary Lab Experiment
Yücel Uğurlu	263–271	The Impact of Blended Learning on LabVIEW Certification Test Scores— A Case Study
	272	Guide for Authors