

Education Division 2020

Held at the 2020 AIChE Annual Meeting

Online
16-20 November 2020

ISBN: 978-1-7138-2299-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2020) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact AIChE
at the address below.

AIChE
120 Wall Street, FL 23
New York, NY 10005-4020

Phone: (800) 242-4363
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

DEVELOPING YOUR MENTORSHIP PROGRAM	1
<i>Rylen O'Meara, Rachel Fetter, Jacob Keating</i>	
LEAPING ONLINE: MAINTAINING TECHNICAL PROFICIENCY AT HOME	2
<i>Nathaniel Torres, Jesus Muñeton</i>	
AICHE MENTORING PROGRAM: YOUR EXPERIENCE IS MINE	3
<i>Zelma Mejía</i>	
DIVERSIFYING TECHNICAL PROJECTS: THE CHEMICAL ENGINEERING INTRODUCTORY PROJECT	4
<i>Pavni Misra, Nolan Origer</i>	
HOW TO RUN A CAREER MEETING: INTERVIEW PREPARATION, RESUME REVIEW, AND LINKEDIN HELP	5
<i>Hannah Boyce, Cameron Young, Kamila Wawer</i>	
(88A) DEVELOPMENT OF AN ELECTROACTIVE PLATFORM FOR DETECTION OF VIRUS FUSION TO HOST MEMBRANES	6
<i>Tiffany Tang, Achilles Savva, Cheyan Xu, Walther Traberg-Christensen, Han-Yuan Liu, Roisin Owens, Susan Daniel</i>	
(88B) ENGINEERING DNA-BASED MATERIALS FOR THE ANALYSIS OF LIVE SINGLE CELLS	7
<i>Sasha Ebrahimi, Devleena Samanta, Ho Fung Cheng, Caroline Kusmierz, Chad A. Mirkin</i>	
(88C) MOLECULAR ENGINEERING OF A COLORIMETRIC NANOGEL SENSOR FOR CLINICAL RADIOTHERAPY AND TRAUMA MONITORING	8
<i>Subhadeep Dutta, Karthik Pushpavanam, Eshwaran Narayanan, Sahil Inamdar, Tomasz Bista, Thaddeus Sokolowski, Eric Boshoven, John Chang, Stephen Sapareto, Kaushal Rege</i>	
(88D) UNIQUE ELECTROCHEMICAL DETECTION OF SEPSIS USING TRIPLEX BIOMARKER DETECTION PANEL WITH IL-6, IL-8 AND IL-10 IN BLOOD PLASMA	9
<i>Ambalika S Tanak, Sriram Muthukumar, Shalini Prasad</i>	
(88E) HARNESSING THE PROTEIN CORONA TOWARDS CARBON NANOTUBE-BASED SENSOR DESIGN	10
<i>Rebecca L. Pinals, Linda Chio, Francis Ledesma, Markita Landry</i>	
(88F) POINT-OF-CARE CANCER BIOMARKER DETECTION SYSTEM INTEGRATING SURFACE ACOUSTIC WAVE STREAMING AND METAL-ENHANCED FLUORESCENCE	11
<i>Yuqi Huang, Shuangming Li, Venkat Bhethanabotla</i>	
(88G) HIGH-THROUGHPUT QUANTIFICATION OF INFLUENZA A VIRUS RNA USING NOVEL DROP-BASED QRT-PCR ANALYSIS	13
<i>Geoffrey K. Zath, Emma K. Loveday, Humberto S. Sanchez, Dimitri A. Bikos, Mallory M. Thomas, Connie B. Chang</i>	
(88H) MICROFLUIDIC PAPER-BASED ANALYTICAL DEVICES USING PLASMA PROCESSES	14
<i>Nikhil Raj, Victor Breedveld, Dennis Hess</i>	

(152A) DETECTION OF ATRAZINE AND ITS METABOLITES USING PHOTONIC MOLECULARLY IMPRINTED POLYMERS	16
<i>Zahra Salahshoor, Khanh-Van Ho, Chung-Ho Lin, Maria M. Fidalgo</i>	
(152B) SIMULTANEOUS DETECTION OF HARMFUL HERBICIDES WITH LATERAL FLOW IMMUNOASSAY CATALYZED BY PALLADIUM@PLATINUM NANOPARTICLES	19
<i>Eunice Y. Kwon, Xiaofan Ruan, Fei Yu, Yuehe Lin, Dan Du, Bernard J. Van Wie</i>	
(152C) PALLADIUM NANOWIRES@RGO@ZIF-8 NANOCOMPOSITE FOR HIGH-PERFORMANCE HYDROGEN SENSORS.....	20
<i>Abhishek Kumar, Mohammad Moein Mohammadi, Jun Liu, Thomas Thundat, Mark T. Swihart</i>	
(152D) ACOUSTIC WAVE SENSOR BASED ON PLASTICIZED POLYMER FILMS FOR DETECTION OF BTEX COMPOUNDS IN AIR	21
<i>Abhijeet Iyer, Scott W. Campbell, Venkat Bhethanabotla</i>	
(152E) ASSESSMENT OF RESIDUAL LIFE OF A GAS FILTER USING CARBON-NANOTUBE GAS SENSORS.....	22
<i>Seung Min Moon, Chang Young Lee</i>	
(152F) INK SYNTHESIS AND SCREEN-PRINTING OF GRAPHENE OXIDE INK FOR PAPER BASED ELECTROCHEMICAL SENSORS.....	23
<i>Letta M. Ntuli, Jean Mulopo, Palesa Diale</i>	
(152G) EFFECT OF SURFACE HETEROGENEITY, HEAT OF ADSORPTION AND SURFACE AREA ON THE CHARACTERISTICS OF PANI-SNO ₂ BASED H ₂ S GAS SENSOR.....	24
<i>Shivam Kumar Gautam, Siddhartha Panda</i>	
(152H) EFFECTS OF ALKANE DIELECTRICS IN CHEMICALLY-SENSITIVE FIELD-EFFECT TRANSISTORS FUNCTIONALIZED WITH METAL-ORGANIC FRAMEWORKS	27
<i>David W. Gardner, Hossain M. Fahad, Carlo Carraro, Ali Javey, Roya Maboudian</i>	
(301A) FIRST PRINCIPLES MODELING OF INTERFACIAL CHARGE TRANSFER AND REDOX CHEMISTRY IN SOLID STATE BATTERIES.....	28
<i>Robert Warburton, Jae Jin Kim, Tim Fister, Jeffrey Greeley</i>	
(301C) MESO-SCALE ARCHITECTURE, ENVIRONMENT AND ACTIVE SITE: EVALUATING CATALYSTS FOR ELECTROCHEMICAL CO ₂ /CO REDUCTION	29
<i>David Raciti</i>	
(301D) HIGHLY EFFICIENT AND STABLE UNITIZED REGENERATIVE FUEL CELLS (URFCS) FOR LONG-TERM ENERGY STORAGE AND CONVERSION	31
<i>Xiong Peng, Zachary Taie, Yagya Regmi, Julie C. Fornaciari, Adam Z. Weber, Nemanja Danilovic</i>	
(301E) ELECTROCHEMICALLY-MEDIATED CARBON DIOXIDE SEPARATION USING REDOX-ACTIVE MOLECULAR SORBENTS AND PROCESS INTENSIFICATION.....	32
<i>Yayuan Liu, T. Alan Hatton</i>	
(301F) APPLICATIONS OF ADVANCED FIBERS FOR NEXT-GENERATION LITHIUM BATTERIES: FROM LIQUID TO SOLID-STATE CELLS.....	33
<i>Jiadeng Zhu</i>	
(301G) TRANSITION METAL CARBIDE ELECTRODES MODIFIED BY HIGH-POWERED IMPULSE MAGNETRON SPUTTERING	34
<i>David Barlaz, Brian Rosen, David Ruzic</i>	

(301H) ZINC ANODE DESIGN FOR HIGH-ENERGY RECHARGEABLE AQUEOUS ZN-AIR BATTERIES	36
<i>Yamin Zhang, Nian Liu</i>	
(345A) THE PYTHON PIVOT – TEACHING CHEMICAL ENGINEERING COMPUTING IN THE WAKE OF COVID-19	38
<i>James P. Abulencia</i>	
(345C) COLLECTIVE REALITIES: A DISCUSSION OF ENCULTURED NORMS IN THE CONTEXT OF IMPROVING LEARNING AND WORKPLACE JUSTICE.....	39
<i>Milo D. Koretsky, Michelle Bothwell, Christine Kelly, Susan Bobbitt Nolen, Devlin Montfort</i>	
(345D) ENGINEERING TEAMWORK IN CHEME CAR: METHODS DEVELOPMENT	40
<i>Declan Mahaffey-Dowd, Shannon Ciston</i>	
(345E) A VIDEO-BASED SELF-STUDY OUTREACH MODELING PROJECT FOR FUTURE CHEMICAL ENGINEERS	42
<i>Matthew Fan, June Shao, Ryan Jin, Gean Hu, Liz Zhang, Zuyi (Jacky) Huang</i>	
(345F) TRANSCEND: TRANSFER SUCCESS CO-DESIGN IN ENGINEERING DISCIPLINES	44
<i>David J. Keffer, Rachel McCord, Travis T. Griffin, Jenny Retherford, Chris Wetteland, Mary S. Kocak, Cheryl Carrico</i>	
(345G) QUALITY IMPROVEMENT IN GRADUATE CHEMICAL ENGINEERING KINETICS	45
<i>John Kuhn, Jing Wan, Christie Nicholas</i>	
(345H) COLORMEPHD: COMMUNICATING RESEARCH TO A BROAD AUDIENCE THROUGH COLORING PAGES	46
<i>Julie Rorrer</i>	
(345I) ENHANCING THE DEPARTMENT OF ENERGY’S INDUSTRIAL ASSESSMENT CENTER EXPERIENCE FOR UNDERGRADUATE STUDENTS THROUGH REAL-WORLD PROBLEM SOLVING, RESEARCH, AND PUBLICATION.....	47
<i>Derek Machalek, Kody M. Powell</i>	
(345K) PLATE SPINNING: A BEGINNERS GUIDE TO EXCELLING IN ACADEMIA AS AN ENGINEER/SCIENTIST	49
<i>Adam Clare, Siddharth V. Patwardhan</i>	
(198A) LEADING AND MANAGING INDUSTRY-ACADEMIA PARTNERSHIPS AND COLLABORATIONS PANEL DISCUSSION.....	50
<i>Aditi Khadilkar</i>	
(69A) REDESIGNING A FIRST YEAR INTRODUCTION TO CHEMICAL ENGINEERING COURSE TO INTEGRATE A LABORATORY COMPONENT	52
<i>Susan M. Stagg-Williams, Andrew D. Yancey, Kevin Chavez, Sayantani Basu, Michael Shao, Jay Patel</i>	
(69B) IT’S ALL BY DESIGN: INCORPORATING DESIGN EARLY IN THE CHEMICAL ENGINEERING CURRICULUM	53
<i>Justin Opatkiewicz</i>	
(69C) INTEGRATING ENTREPRENEURSHIP MINDSET THROUGH MAKERSPACE-BASED DESIGN PROJECT INTO A SECOND-YEAR ENGINEERING CURRICULUM.....	54
<i>Betul Bilgin</i>	

(69D) USING THE RENAISSANCE FOUNDRY MODEL FOR FIRST-YEAR STUDENT ENGAGEMENT THROUGH HIGH IMPACT PRACTICES (HIPS)	55
<i>Stephanie Jorgensen, Andrea Arce-Trigatti</i>	
(69E) SOME REFLECTIONS UPON PROJECT-BASED LEARNING IN A TRADITIONAL FLUID MECHANICS COURSE AT NJIT	56
<i>Ecevit Bilgili</i>	
(69F) COMPARISON OF PROBLEM-SOLVING SKILLS ON TEXTBOOK AND YOUTUBE PROBLEMS ACROSS TWO COHORTS	57
<i>Uchenna Asogwa, T Ryan Duckett, Matthew Liberatore, Gale Mentzer, Amanda P. Malefyt</i>	
(69G) EXPLORATION OF A NON-TRADITIONAL ASSESSMENT METHOD.....	58
<i>Tamara Floyd-Smith</i>	
(78A) LEARNING ASSISTANTS: LEARNING ABOUT LEARNING	59
<i>Milo D. Koretsky, Campbell McColley, Devlin Montfort</i>	
(78B) CORRELATING STUDENT SUCCESS AND ATTEMPTS ON AUTO-GRADED, RANDOMIZED HOMEWORK QUESTIONS FOR MATERIAL AND ENERGY BALANCES	60
<i>Matthew Liberatore, Kayla Chapman</i>	
(78C) CREATING A CONFIDENT AND CURIOUS COHORT: THE EFFECT OF VIDEO-LED INSTRUCTION ON FIRST-YEAR CHEMICAL ENGINEERING STUDENTS PRACTICAL LEARNING.....	61
<i>Andrew Macey, James I. Campbell, Wenqian Chen, Umang V. Shah, Clemens Brechtelsbauer</i>	
(78D) A SOFTWARE FOR LEARNING QUANTITATIVE CRITICAL THINKING BY CHEMICAL ENGINEERING STUDENTS	65
<i>Eldin Wee Chuan Lim</i>	
(78E) MEASURING STUDENT ACADEMIC MOTIVATION TOWARD PROCESS SAFETY DECISION MAKING WITHIN A VIRTUAL DIGITAL ENVIRONMENT	66
<i>Matthew Cooper, Jeffrey Stransky, Landon Bassett, Cheryl A. Bodnar, Daniel Anastasio, Daniel D. Burkey</i>	
(78F) USING VIRTUAL REALITY TO GAIN DEEPER INSIGHTS INTO TRANSPORT PHENOMENA IN PROCESS ENGINEERING.....	67
<i>Gregor D. Wehinger, Steffen Flaischlen</i>	
(78G) BRINGING CHEME-SPORTS, A SAFETY AND OPTIMIZATION COMPETITION, TO THE CHEMICAL ENGINEERING PROFESSION.....	68
<i>Robert G. Bozic, Matthew B. Garvey, Donald C. Glaser</i>	
(194A) THE STRATEGY AND IMPLEMENTATION OF SUSTAINABLE AND GREEN CHEMISTRY EDUCATION IN TAIWAN	69
<i>Pao-Kuei Hsiao, Yi-Kuen Liu, Yu-Chun Wang, Yu-Kai Lin, Yein-Rui Hsieh</i>	
(194B) INTRODUCING SUSTAINABILITY CRITERIA IN THE CHEMICAL ENGINEERING DESIGN PROJECTS: A CASE STUDY OF GREEN AMMONIA	70
<i>Gonzalo Guillén-Gosálbez, Raul Calvo-Serrano, Iasonas Ioannou, Sebastiano C. D'Angelo, Valentina Negri, Ángel Galán-Martín</i>	
(194C) PRODUCT [X] –AN ONGOING EXPERIMENT IN CHEMICAL ENGINEERING SUSTAINABILITY EDUCATION USING PROJECT-BASED LEARNING.....	71
<i>Ma'Moun Al-Rawashdeh, Konstantinos E. Kakosimos, Dhabia Al-Mohannadi</i>	

(194D) HANDS-ON ACTIVITIES FOR INTRODUCING HIGH SCHOOL STUDENTS TO ALTERNATIVE ENERGY AND CLIMATE CHANGE	72
<i>Jennifer Weiser, Daniel Lepek</i>	
(194E) INCORPORATION OF SUSTAINABLE AMMONIA SYNTHESIS PROCESS DESIGN WITH ENHANCED ASSESSMENT METHOD INTO CHEMICAL ENGINEERING SENIOR DESIGN COURSE.....	73
<i>Jia Li</i>	
(194F) TEACHING SUSTAINABILITY AS A COMPLEX SYSTEMS APPROACH	74
<i>Jana M. Weber, Constantin P. Lindenmeyer, Pietro Liò, Alexei A. Lapkin</i>	
(194G) DEVELOPMENT OF MIDDLE SCHOOL STEM CLASSROOM LESSON PLANS AND AFTERSCHOOL PROGRAM ACTIVITIES TO SUPPORT USDA-SPONSORED PROJECT ON ALTERNATIVE CROP BIOECONOMY	76
<i>Jacob Usrey, Rodrigo Rosalez, Catherine E. Brewer</i>	
(372A) ACTIVE MEMBRANES FOR NEURON-INSPIRED IONOTRONIC DEVICES.....	77
<i>Thomas B. H. Schroeder, Varinder S. Takhar, Joanna Aizenberg</i>	
(372B) ELECTROCHEMICAL SWITCHING OF A FLUORESCENT MOLECULAR ROTOR EMBEDDED WITHIN A BISTABLE ROTAXANE.....	78
<i>Yilei Wu</i>	
(372C) GREEN SYNTHESIS OF ZINC SPONGE OPENS SUSTAINABLE BATTERY SUPPLY CHAINS	79
<i>Brandon Hopkins, Christopher Chervin, Megan Sassin, Jeffrey Long, Debra Rolison, Joseph Parker</i>	
(372D) OPTIMIZED MESOSTRUCTURES OF LI-ION BATTERY ELECTRODES PREDICTED FROM PARTICLE-BASED SIMULATIONS.....	80
<i>Ishan Srivastava, Dan S. Bolintineanu, Jeremy B. Lechman, Scott A. Roberts</i>	
(372E) UNDERSTANDING SPATIAL HETEROGENEITIES IN ION TRANSPORT IN COMPOSITE SOLID-ION CONDUCTORS BASED ON NEUTRAL PLASTIC CRYSTAL-POLYMER HYBRIDS	81
<i>Ankit Agrawal, Yierpan Aierken, Meiling Sun, Ethan Crumlin, David Prendergast, Brett Helms</i>	
(372F) MECHANISTIC UNDERSTANDING OF ELECTROCHEMICAL PROCESSES IN ALKALINE ENVIRONMENTS	82
<i>Roberto Schimmenti, Ellen A. Murray, Saurabh Bhandari, Manos Mavrikakis</i>	
(372G) NEW FRONTIERS FOR ELECTROCHEMISTRY IN ADDRESSING CLIMATE CHANGE: CARBON CAPTURE AND STORAGE.....	83
<i>Mohammad (Mim) Rahimi, T. Alan Hatton</i>	
(372H) DATA-DRIVEN MODELING OF ELECTROCHEMICAL SYSTEMS	85
<i>Hongbo Zhao</i>	
(134A) SCALABLE, HANDS-ON, PROBLEM-BASED LEARNING IN UNIT OPERATIONS LAB TO IMPROVE STUDENT PROBLEM-SOLVING SKILLS.....	86
<i>Thomas A. Knotts Iv</i>	

(134B) EXCEL-BASED PROCESS ECONOMICS COMPUTATIONAL TOOLS FOR SENIOR LEVEL PROCESS DESIGN COURSES.....	87
<i>Milos Markovic, Jasmine Villegas, Nisha Patel, Alice Nicole Guzik, Michael Caracotsios, Betul Bilgin</i>	
(134C) STUDENT CONFIDENCE AND METACOGNITION IN A FE REVIEW COURSE IN CHEMICAL ENGINEERING.....	88
<i>Sheima J. Khatib, Roman Taraban, William Lawson</i>	
(134D) A REVIEW OF ALTERNATIVES TO PHYSICAL CHEMICAL ENGINEERING LABORATORIES.....	90
<i>Tracy Carter, David Silverstein, Sarah Wilson</i>	
(134E) CONCEPTTESTS FOR PROCESS CONTROLS COURSES: BY STUDENTS, FOR STUDENTS.....	91
<i>Lucas J. Landherr</i>	
(134F) INITIAL ANALYSIS OF THE EFFECTS OF HOMEWORK WRAPPERS IN A PROBLEM-SOLVING COURSE.....	92
<i>Carl R. F. Lund</i>	
(134G) PROCESS DESIGN VERSUS PRODUCT DESIGN: A COMPARISON OF STUDENT PROBLEM-SOLVING SKILLS ACROSS CAPSTONE DESIGN COURSES.....	94
<i>Eric Burkholder, Carl Wieman</i>	
(188A) ELECTRIC-FIELD ASSISTED MODULATION OF SURFACE THERMOCHEMISTRY	95
<i>Manish Shetty, M. Alexander Ardagh, Yutong Pang, Omar Abdelrahman, Paul Dauenhauer</i>	
(188B) EFFECT OF POTENTIAL AND EXPLICIT AQUEOUS MEDIA ON AMMONIA OXIDATION ON PT(111) USING COMPUTATIONAL MULTI-SCALE MODELING.....	96
<i>Ali Estejab, Rachel B. Getman</i>	
(188C) LITHIUM SULFUR BATTERIES AND GRAPHENE BASED MATERIALS.....	97
<i>Somayeh Zamani</i>	
(188D) ELECTROCHEMICAL PRODUCTION OF AMMONIA VIA DESIGNING NEW CATALYSTS AND PROCESSES	99
<i>Mohammadreza Nazemi</i>	
(188E) HIGH-FIDELITY ELECTROCHEMICAL BATTERY MODELS: REVIEW, ISSUE, AND APPLICATION.....	100
<i>Seongbeom Lee</i>	
(188F) ELECTROSPINNING FOR THE FABRICATION OF ELECTROCHEMICAL SENSORS	101
<i>Kunal Mondal</i>	
(188G) PROBING THE LITHIUM METAL ANODE SURFACE WITH FIRST PRINCIPLES.....	102
<i>Jeffrey S. Lowe, Donald J. Siegel</i>	
(188H) ELECTROCHEMICAL BIOSENSORS FOR IN VIVO NEUROCHEMICAL ANALYSIS.....	103
<i>Bo Wang</i>	
(232A) AN EDUCATIONAL BIOPROCESS SIMULATOR (BIOVL): INTRODUCTION OF DISTURBANCES.....	104
<i>Simoneta Caño De Las Heras, Carina Gargalo, Isuru A. Udugama, Krist V. Gernaey, Ulrich Krühne</i>	

(232B) PERSISTENCE AND PRACTICE OF SPREADSHEET SKILLS USING AN INTERACTIVE TEXTBOOK	105
<i>Matthew Liberatore</i>	
(232C) MACHINE LEARNING FOR FLUID PROPERTY CORRELATIONS: CLASSROOM EXAMPLES WITH MATLAB.....	106
<i>Lisa Joss, Erich A. Müller</i>	
(232D) REINFORCING COMPUTATIONAL THINKING THROUGHOUT CHEMICAL ENGINEERING CURRICULUM WITH MATLAB AND SIMULINK	107
<i>Aycan Hacioglu, Samvith Rao</i>	
(232E) INSTRUCTIONAL VIDEOS AND INTERACTIVE NOTEBOOKS FOR LEARNING CODING CONCEPTS IN CHEMICAL ENGINEERING ANALYSIS.....	108
<i>Matthew Wilhelm, Chenyu Wang, Matthew D. Stuber</i>	
(232F) EXPERIENCE WITH SYMBOLIC ALGEBRA AND SMART COMPUTING IN REACTION ENGINEERING COURSES	109
<i>Satish J. Parulekar</i>	
(271A) FIVE SEMESTERS OF HANDS-ON UNIT OPERATIONS LABORATORY COURSES	110
<i>Taryn Bayles, Michael McMahon</i>	
(271B) DEVELOPING HANDS-ON SKILLS: BUILDING A GAS DELIVERY SYSTEM.....	111
<i>Kristine Horvat</i>	
(271C) MOVING FROM THE TRADITIONAL WAY TO HYBRID APPROACH FOR TEACHING UNIT LABS.....	112
<i>Rupak Dua</i>	
(271D) IMMOBILIZATION OF INVERTASE IN CALCIUM ALGINATE GEL CAPSULES AND DETERMINATION OF BATCH KINETICS.....	116
<i>Marya Cokar, Jacob H. Arredondo, Bailey Covell, Thao Vy Nguyen</i>	
(271E) A WEB-BASED UNIT OPERATIONS LAB FOR ENHANCING DESIGN, CONTROL AND OPTIMIZATION IN CHEMICAL AND BIOCHEMICAL ENGINEERING COURSES	117
<i>Babu Joseph, José Luis Guzmán</i>	
(271F) MEETING UNIT OPERATIONS LABORATORY LEARNING OUTCOMES IN THE ERA OF COVID-19.....	120
<i>Sarah Wilson, Tracy Carter, M. Jane Brennan, Samira M. Azarin, Amy J. Karlsson, Christopher Barr</i>	
(271G) GOT WATER? : A FILTRATION EXPERIMENT FOR THE MATERIAL AND ENERGY BALANCE COURSE	121
<i>Alex Bertuccio, Helen Buettner</i>	
(688A) “SUSTAINABILITY – THE NEED FOR SCALABLE SOLUTIONS & A FRAMEWORK TO MAKE DECISIONS”	122
<i>Narayan Ramesh</i>	
(688B) THE IMPACT OF POLICY INSTRUMENTS ON DEPLOYMENT OF LOW-CARBON HEATING IN THE UK: A WHOLE SYSTEM OPTIMISATION STUDY	123
<i>Jennifer Penman, Sheila Samsatli</i>	
(688C) THE ROLE OF CHEMICAL ENGINEERING IN SUSTAINABLE ENERGY POLICY	124
<i>Quinta Nwanosike Warren</i>	

(688D) REVIEW OF US ENVIRONMENTAL PROTECTION AGENCY GENERAL EXPOSURE SCENARIO MODELING FOR EVALUATING CHEMICAL SAFETY	125
<i>William Barrett, Raymond Smith, David E. Meyer, Gerardo Ruiz-Mercado, Michael A. Gonzalez</i>	
(688F) EFFECTIVELY COMMUNICATING SUSTAINABILITY AND ENGINEERING WITHIN FEDERAL POLICY	126
<i>Ashley M. Pennington</i>	
(190A) ENGINEERING STUDENT MENTAL HEALTH – ANALYSIS OF NATIONAL DATA FROM THE HEALTHY MINDS STUDY	127
<i>Sarah Wilson, Joseph Hammer, Ellen Usher</i>	
(190B) INCORPORATING DIVERSITY EQUALITY & INCLUSION TRAINING INTO FIRST-YEAR CHEMICAL ENGINEERING CURRICULUM.....	128
<i>Anthony Butterfield</i>	
(190C) COMPARING STUDENT PERFORMANCE AND PREPARATION INDICATORS FOR A SUMMER ONLINE THERMODYNAMICS COURSE WITH A FULL TERM FACE-TO-FACE OFFERING	129
<i>David Silverstein, Sarah Wilson</i>	
(190D) HANDS-ON IN THE ONLINE CLASSROOM: TRANSITIONING A HANDS-ON PEDAGOGY TO A VIRTUAL FORMAT	130
<i>Olivia Reynolds, Kitana M. Kaiphanliam, Aminul Islam Khan, Olufunso Oje, Katelyn Dahlke, Jacqueline Burgher Gartner, Prashanta Dutta, David B. Thiessen, Olusola Adesope, Bernard J. Van Wie</i>	
(190E) DESIGN PRINCIPLES FOR INDEPENDENT EXPERIENTIAL LEARNING RESOURCES: A REVIEW OF LITERATURE AND PERSONAL EXPERIENCE.....	131
<i>Pavan Inguva, Umang V. Shah, Clemens Brechtelsbauer</i>	
(190F) MODERNIZING THE CHEMICAL ENGINEERING CURRICULUM VIA A STUDENT-CENTERED FRAMEWORK THAT PROMOTES TECHNICAL, SOFT, AND TECH-SAVVINESS SKILLS: THE CASE OF UNIT OPERATIONS	135
<i>Miguel A. Ballesteros, Juan Sebastián Sánchez, Nicolas Ratkovich, Juan C Cruz, Luis H. Reyes</i>	
(190G) DEVELOPING AND DELIVERING AN UNDERGRADUATE “INTRODUCTION TO RESEARCH METHODS” COURSE FOR HONORS STUDENTS: LESSONS LEARNED	136
<i>Joseph H. Holles</i>	
(190H) TO PRE-REQ OR NOT? STUDENTS’ EXPLANATIONS FOR WHY THEY CHOOSE TO ENROLL (OR NOT) IN CHEMICAL ENGINEERING COURSES	137
<i>Justin Shaffer, Jordan Lopez</i>	
(300B) RAPID TRANSITION TO ONLINE TEACHING: CAPTURING CHEMICAL ENGINEERING FACULTY STRATEGIES, CHALLENGES, AND SUCCESSES FROM SPRING 2020.....	138
<i>Elif E. Miskioglu, Ryan C. Snyder, Kaela Martin</i>	
(499A) STAKEHOLDERS PRESENTATIONS: PRESENTING TO THE GENERAL PUBLIC.....	139
<i>Laura P. Ford, Kerry L. Sublette</i>	
(499B) LEARNING TO TALK THE TALK: DEVELOPMENT OF AN ONLINE CRASH-COURSE IN ENGINEERING COMMUNICATION	140
<i>Sarah Wilson, Renee Kaufmann, Kevin Real</i>	

(499C) COMMUNICATING WITH BOTH ENGINEERS AND NON-ENGINEERS: INCORPORATING MULTI-DISCIPLINARY COMMUNICATION STRATEGIES IN THE UNIT OPERATIONS LABORATORY	141
<i>Stephanie Loveland, Michael Satterwhite</i>	
(499D) REFLECTION ACTIVITIES AS A PATHWAY FOR BUILDING INCLUSIVE TEAM CULTURE (WORK IN PROGRESS).....	142
<i>Jennifer Cole</i>	
(499E) EXPLORING SOCIAL PERSPECTIVES AFFECTING TEAM DYNAMICS AND PERFORMANCE IN CAPSTONE DESIGN	144
<i>Sindia Rivera-Jimenez</i>	
(499G) CAPSTONE DESIGN TEAM DYNAMICS IN CHEMICAL ENGINEERING AT A HISPANIC-SERVING INSTITUTION	145
<i>Matthew Alexander</i>	
(141B) THE CHALLENGE FOR LEADERS TODAY	146
<i>Paulette Clancy</i>	
(448A) MANAGEABLE TEACHING AND SERVICE CHEAT CODES FOR YOUNG FACULTY	147
<i>Anthony Butterfield</i>	
(448B) THE CRAZY LEARNING CURVE OF YOUR NEW TENURE-TRACK JOB	148
<i>Ayse Asatekin</i>	
(153A) THE DEAN’S TEAM IN THE COLLEGE OF ENGINEERING AT THE UNIVERSITY OF AKRON: SUPPORTING ENGINEERING RECRUITING AND OUTREACH	149
<i>Edward A. Evans, Donald P. Visco Jr., Julie Zhao</i>	
(153B) PUTTING STUDENTS FIRST: BUILDING QUALITY ACADEMIC ADVISING FROM THE GROUND UP	150
<i>Whitney Losapio, Mariel Zoni</i>	
(153D) PRE-PROFESSIONAL STUDENT GROUPS AND YOUR DEPARTMENT: A PARTNERSHIP	151
<i>Joseph H. Holles</i>	
(153E) IMPACT OF A COMPUTER PROGRAMMING SUPPORT CENTER ON (CHEMICAL) ENGINEERING STUDENTS’ SUCCESS AND SATISFACTION	152
<i>Jason White, Jiawei Guo</i>	
(153F) INTEGRATION OF PROFESSIONAL DEVELOPMENT PRACTICES IN DOCTORAL AND POSTDOCTORAL TRAINING – APPROACHES FOR SUPPORTING CAREER NAVIGATION IN CHEMICAL ENGINEERING	154
<i>Markita Landry</i>	
(153G) ADVOCACY FOR THE TENURE-TRACK TEACHING PROFESSOR.....	155
<i>Justin Opatkiewicz</i>	
(153H) CREATING AN INCLUSIVE CHEMICAL ENGINEERING COMMUNITY FOR WOMXN THROUGH ALLYSHIP AND ADVOCACY	156
<i>Elizabeth Nance, Beverly Miller, Belinda Garana</i>	
(462A) STUDENT DRIVEN DESIGN PROBLEMS	157
<i>Jonathan Wenzel</i>	

(462B) HANDS-ON BIOCHEMICAL PRODUCTION AND PROCESS DESIGN	158
<i>Jason T. Boock, J. Andrew Jones</i>	
(462C) PROCESS DESIGN AND CRITICAL THINKING.....	159
<i>Taryn Bayles</i>	
(462D) CAPSTONE DESIGN TWITTER POSTER SESSION AS A WAY TO ENGAGE IN DISCUSSIONS AND FEEDBACK ONLINE.....	160
<i>Courtney Pfluger</i>	
(462E) DESIGN IN AND OUT OF CAPSTONE.....	161
<i>Margot A. S. Vigeant, James E. Maneval, Michael J. Prince, Ryan C. Snyder</i>	
(462F) STEAL THIS CURRICULUM-WIDE DESIGN PROJECT: THE HDA PROCESS.....	162
<i>Justin Opatkiewicz</i>	
(462G) CHOOSE YOUR OWN KINETICS ADVENTURE: STUDENT-DESIGNED CASE STUDIES FOR CHEMICAL REACTOR DESIGN PROJECTS	163
<i>Ashlee N. Ford Versypt</i>	
(558B) ACTIVE LEARNING EXERCISES FOR TEACHING REACTOR DESIGN.....	164
<i>Ashlee N. Ford Versypt</i>	

Author Index