#### **BUSINESS ADDRESS:**

Chemical Engineering Education 675 Wolf Ledges Parkway, Suite 2459 Akron, OH 44309-2459

PHONE: 352-682-2622 FAX: 866-CEE-0576 email: cee@che.ufl.edu

#### **EDITOR**

Donald P. Visco, Jr., University of Akron

#### ASSOCIATE EDITOR

Joseph H. Holles, University of Wyoming

# ASSOCIATE EDITOR & LIFELONG LEARNING EDITOR

Lisa G. Bullard, North Carolina State University

## ASSISTANT EDITOR & PROBLEMS EDITOR

David Silverstein, University of Kentucky

## ASSISTANT EDITORS

Allison Godwin, Purdue University

Monica Lamm, Iowa State University

Justin Shaffer, Colorado School of Mines

Victor Ugaz, Texas A&M University

#### ACCESS EDITOR

Carlos Rinaldi, University of Florida

# PREVIOUS EDITOR

Phillip C. Wankat, Purdue University

PUBLICATIONS MANAGER Erin Stevic

## PUBLICATIONS BOARD

## • CHAIR •

Milo Koretsky
Oregon State University

## • VICE CHAIR •

Adrienne Minerick Michigan Technological University

#### • MEMBERS •

Jason Bara (Alabama)

Taryn Bayles (Pittsburgh)

Lorenz Biegler (Carnegie-Mellon)

Cheryl Bodnar (Rowan)

Daniel Burkey (Connecticut)

Matthew Cooper (NC State)

John Falconer (Colorado)

Laura Ford (Tulsa)

Ashlee Ford Versypt (Oklahoma State)

LaRuth McAfee (Delaware)

Polly Piergiovanni (Lafayette)

Stewart Slater (Rowan)

Uttandaraman Sundararaj (Calgary)

# **Chemical Engineering Education**

Volume 54 Number 3 Summer 2020

## ► SPECIAL SECTION: CACHE 50TH ANNIVERSARY

- **110** Introduction to the CACHE 50th Special Section: The Future of Cyber-Assisted Chemical Engineering Education
  - B. Wayne Bequette
- 112 Unit Conversions in the 21st Century: Insights into a Routine yet Critical Scientific and Engineering Task as Measured through User Interactions with a Mobile App

Jason E. Bara, John P. McLemore

- 121 Fostering Motivation for Chemical Engineering Students' Academic Success: An Example from a Sophomore Materials and Energy Balances Course
  - Allison Godwin, Bryan W. Boudouris
- **129** Enhanced Undergraduate Learning through Integration of Theory and Computational Tools

Kirti M. Yenkie

- 137 Apps for Chemical Engineering Education: Off-The-Shelf and Do-It-Yourself Development Options
  - Jason E. Bara, Ashlee N. Ford Versypt, Rachel B. Getman, Chris A. Kieslich, Roman S. Voronov
- 143 Computational Notebooks in Chemical Engineering Curricula
  Fani Boukouvala, Alexander Dowling, Jonathan Verrett,
  Zachary Ulissi, Victor Zavala

## ► CLASSROOM

- **154** The Design and Anatomy of a First-Year Connection Course for Chemical Engineering Students
  - Bahman Ghorashi
- **160** Flipping the Classroom for a Material and Energy Balances Course: Effect on Student Learning Versus Student Perception and Sentiment *Victor K. Lai*

# ► DRAWN TO ENGINEERING

151 Bad Ideas

Lucas Landherr, Yakira Becker

# ► TEACHING TIPS

- **153** Teaching Tips: Remote Presentations for Unit Operations Laboratory *Yanir Maidenberg*
- 171 Teaching Tips: Interactive Self-Study Modules for Chemical Engineering John L. Falconer, Kimberly R. Bourland, Janet deGrazia, Michelle L. Medlin

## **▶** OTHER CONTENTS

172 Call for Papers: Special Issue on Reaction to COVID-19

CHEMICAL ENGINEERING EDUCATION [ISSN 0009-2479 (print); ISSN 2165-6428 (online)] is published quarterly by the Chemical Engineering Division, American Society for Engineering Education. Correspondence regarding editorial matter, circulation, and changes of address should be sent to CEE, 675 Wolf Ledges Parkway, Suite 2459, Akron, OH 44309. Copyright © 2020 by the Chemical Engineering Division, American Society for Engineering Education. The statements and opinions expressed in this periodical are those of the writers and not necessarily those of the ChE Division, ASEE, which body assumes no responsibility for them. Valid defective copies replaced if returned within 90 days of publication. Write for information on subscription costs and for back copy costs and availability. POSTMASTER: Send address changes to Chemical Engineering Education, 675 Wolf Ledges Parkway, Suite 2459, Akron, OH 44309. Periodicals Postage Paid at Gainesville, Florida, and additional post offices (USPS 101900). https://journals.ftvc.org/ceelindex

Vol. 54, No. 3, Summer 2020