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Thanks!

Erin L. Dolan 573–574

This editorial outlines how, and why, *CBE—Life Sciences Education* is becoming more widely read and recognized.

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American Society of Plant Biologists: Position Statement on the Education of Young Children about Plants

E. Kathleen Archer 575–576

FEATURES

WWW. Life Sciences Education

Explain the Brain: Websites to Help Scientists Teach Neuroscience to the General Public

Eric H. Chudler and Kristen Clapper Bergsman 577–583

Increased public awareness of neuroscience often results in requests to neuroscientists to share their knowledge with lay audiences. This *Feature* showcases Internet-based resources to help neuroscientists explain their work to the general public and K–12 audiences.

Current Insights

Recent Research in Science Teaching and Learning

Deborah Allen 584–586

This feature is designed to point *CBE—Life Sciences Education* readers to current articles of interest in life sciences education as well as more general and noteworthy publications in education research.

Meeting Report

NEST 2014: Views from the Trainees—Talking About What Matters in Efforts to Diversify the STEM Workforce

Andrew G. Campbell, Rachel Skvirsky, Henry Wortis, Sheila Thomas, Ichiro Kawachi, and Christine Hohmann 587–592

This paper summarizes the outcomes of a retreat designed to cultivate interactions between trainees at various training levels and provide them opportunities to share their training perspectives and expectations. Retreat outcomes are used to support the development of better science, technology, engineering, and mathematics training practices by informing the trainers’ perspective.

RESEARCH METHODS

Using Small-Scale Randomized Controlled Trials to Evaluate the Efficacy of New Curricular Materials

Dina Drits-Esser, Kristin M. Bass, and Louisa A. Stark 593–601

The authors provide a description of their experience conducting a randomized controlled trial in high school classrooms to test the efficacy of epigenetics curricular materials. This is a case study for science faculty members who wish to employ scientifically rigorous evaluations of educational interventions while limiting their scope and budget.

ESSAYS

Course-Based Undergraduate Research Experiences Can Make Scientific Research More Inclusive

Gita Bangera and Sara E. Brownell 602–606

Course-based undergraduate research experiences (CUREs) may be a more inclusive entry point to scientific research than independent research experiences, and the implementation of CUREs at the introductory level may therefore be a way to improve the diversity of the scientific community.

A Survey of Scholarly Literature Describing the Field of Bioinformatics Education and Bioinformatics Educational Research

Alejandra J. Magana, Manaz Taleyarkhan, Daniela Rivera Alvarado, Michael Kane, John Springer, and Kari Clase 607–623

This article provides an overview of the state of research in bioinformatics education in the years 1998 through 2013. It identifies current curricular approaches for integrating bioinformatics education, concepts and skills being taught, pedagogical approaches and methods of delivery, and educational research and evaluation results.

ARTICLES

A Campus-Wide Study of STEM Courses: New Perspectives on Teaching Practices and Perceptions

Michelle K. Smith, Erin L. Vinson, Jeremy A. Smith, Justin D. Lewin, and MacKenzie R. Stetzer..... 624–635

Teachers observed 51 university-level science, technology, engineering, and mathematics (STEM) courses and collected information on the active-engagement nature of instruction. These results give a comprehensive view of the diversity of STEM instruction and student in-class behavior across the University of Maine. The authors discuss how these results could be used to design targeted professional development.

Addressing Health Disparities in the Undergraduate Curriculum: An Approach to Develop a Knowledgeable Biomedical Workforce

Rocio Benabentos, Payal Ray, and Deepak Kumar 636–640

Disparities in health are a major current public health concern. Efforts to address these disparities must include approaches to engage students in undergraduate education, particularly targeting those in life sciences education and minority-serving institutions. Possible approaches include developing new courses, interdepartmental collaborations, and partnerships.

Undergraduates Achieve Learning Gains in Plant Genetics through Peer Teaching of Secondary Students

H. E. Chrispeels, M. L. Klosterman, J. B. Martin, S. R. Lundy, J. M. Watkins, C. L. Gibson, and G. K. Muday 641–652

This work describes the learning gains of undergraduates who participated in a service-learning program involving teaching genetics to middle and high school students. Results show increases in content knowledge of topics taught by undergraduates, compared with other course content, assessed by both an immediate posttest and a delayed course final exam.

High School Students’ Learning and Perceptions of Phylogenetics of Flowering Plants

Julie R. Bokor, Jacob B. Landis, and Kent J. Crippen..... 653–665

This paper describes the perceptions and learning outcomes of high school students engaged in a 6-h plant phylogenetics module during a summer science, technology, engineering, and mathematics immersion program.

Student Interpretations of Phylogenetic Trees in an Introductory Biology Course

Jonathan Dees, Jennifer L. Momsen, Jarad Niemi, and Lisa Montplaisir 666–676

Phylogenetic trees are essential to understanding evolutionary relatedness, yet undergraduates struggle to interpret these visualizations. This research uses data from students enrolled in a majors introductory biology course to characterize patterns in students’ tree thinking and how students’ reasoning changes over time and in response to instruction.

Practice Makes Pretty Good: Assessment of Primary Literature Reading Abilities across Multiple Large-Enrollment Biology Laboratory Courses

Brian K. Sato, Pavan Kadandale, Wenliang He, Paige M. N. Murata, Yama Latif, and Mark Warschauer 677–686

Incorporation of a module focused on primary literature into three upper-division biology lab courses resulted in biology discipline-independent longitudinal learning gains for enrolled undergraduates. This module is easily transferable and is modeled around the principles used by researchers when approaching a scientific paper.

Students Who Demonstrate Strong Talent and Interest in STEM Are Initially Attracted to STEM through Extracurricular Experiences

Amy VanMeter-Adams, Cara L. Frankenfeld, Jessica Bases, Virginia Espina, and Lance A. Liotta 687–697

Extracurricular experiences are highly influential as the initial influence for students with a potential talent in science, technology, engineering, and mathematics (STEM), while hands-on lab work sustains their interest in STEM. Community-based programs that create awareness about STEM for children and their family members may be key for igniting academic interest in STEM.

The Python Project: A Unique Model for Extending Research Opportunities to Undergraduate Students

Pamela A. Harvey, Christopher Wall, Stephen W. Luckey, Stephen Langer, and Leslie A. Leinwand 698–710

Engagement in scientific research during undergraduate education improves conceptual understanding and retention in science. A laboratory-intensive course was created to offer the opportunity for students to participate in all aspects of research in collaboration with a sponsoring laboratory, providing students with an authentic research experience.

A Central Support System Can Facilitate Implementation and Sustainability of a Classroom-Based Undergraduate Research Experience (CURE) in Genomics

David Lopatto, Charles Hauser, Christopher J. Jones, Don Paetkau, Vidya Chandrasekaran, David Dunbar, Christy MacKinnon, Joyce Stamm, Consuelo Alvarez, Daron Barnard, James E. J. Bedard, April E. Bednarski, Satish Bhalla, John M. Braverman, Martin Burg, Hui-Min Chung, Randall J. DeJong, Justin R. DiAngelo, Chunguang Du, Todd T. Eckdahl, Julia Emerson, Amy Frary, Donald Frohlich, Anya L. Goodman, Yuying Gosser, Shubha Govind, Adam Haberman, Amy T. Hark, Arlene Hoogewerf, Diana Johnson, Lisa Kadlec, Marian Kaehler, S. Catherine Silver Key, Nighat P. Kokan, Olga R. Kopp, Gary A. Kuleck, Jane Lopilato, Juan C. Martinez-Cruzado, Gerard McNeil, Stephanie Mel, Alexis Nagengast, Paul J. Overvoorde, Susan Parrish, Mary L. Preuss, Laura D. Reed, E. Gloria Regisford, Dennis Revie, Srebrenka Robic, Jennifer A. Roecklien-Canfield, Anne G. Rosenwald, Michael R. Rubin, Kenneth Saville, Stephanie Schroeder, Karim A. Sharif, Mary Shaw, Gary Skuse, Christopher D. Smith, Mary Smith, Sheryl T. Smith, Eric P. Spana, Mary Spratt, Aparna Sreenivasan, Jeffrey S. Thompson, Matthew Wawersik, Michael J. Wolyniak, James Youngblom, Leming Zhou, Jeremy Buhler, Elaine Mardis, Wilson Leung, Christopher D. Shaffer, Jennifer Threlfall, and Sarah C. R. Elgin 711–723

There have been numerous calls to engage students in science as science is done. A survey of 90-plus faculty members explores barriers and incentives when developing a research-based genomics course. The results indicate that a central core supporting a national experiment can help overcome local obstacles.

A Comprehensive Faculty, Staff, and Student Training Program Enhances Student Perceptions of a Course-Based Research Experience at a Two-Year Institution

Thomas D. Wolkow, Lisa T. Durrenberger, Michael A. Maynard, Kylie K. Harrall, and Lisa M. Hines 724–737

The authors used a randomized study to evaluate a research experience in equivalent introductory biology courses at a 4-yr and a 2-yr institution. They found that unique barriers exist at 2-yr institutions that preclude student engagement. Students, instructors, and support staff needed a more comprehensive implementation strategy.

CORRECTION

Gender Gaps in Achievement and Participation in Multiple Introductory Biology Classrooms

Sarah L. Eddy, Sara E. Brownell, and Mary Pat Wenderoth 738

On the Cover

The epigenome sits “above” the genome, in the form of molecular tags that help control the activity of individual genes. While the genome is fixed for life and identical in every cell, the epigenome differs dramatically among cell types, and can respond to signals from both within the body and the outside world. This simplified diagram shows DNA (gold) wrapped around histones proteins (blue). Methyl tags (red) on the DNA keep genes switched off. In part, the tags keep segments of DNA wound tightly around histones, making them inaccessible to the cell’s transcription machinery. Other molecular tags (not shown) on histone proteins keep active segments of DNA loosely wound and accessible. In the Research Methods essay section, Drits-Esser, Bass, and Stark describe curriculum materials on epigenetics developed by the Genetic Science Learning Center at the University of Utah and their process of conducting a randomized controlled study in high school classrooms to test the efficacy of these materials. The curriculum is available online through the Genetic Science Learning Center’s website: <http://learn.genetics.utah.edu/content/epigenetics/>. (Image credit: Genetic Science Learning Center)