NSEUS
National Study of Education in Undergraduate Science

Presenters' Biographies: Research Based Undergraduate Science Teaching Conference II

National Conference
May 20-22, 2012
Bryant Conference Center

THE UNIVERSITY OF ALABAMA
FOUNDED 1831

The Conference is funded under the National Science Foundation Grant TPC0554594. The project focuses on an examination of the teaching and learning of undergraduate science in the United States and the subsequent impact on students. Opinions expressed in conference reports and discussions are those of the authors and do not necessarily reflect those of the National Science Foundation.

NSF

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Research Based Undergraduate Science Teaching

National Conference

The Univeresity of Alabama, Tuscaloosa, AL

May 20-22, 2012

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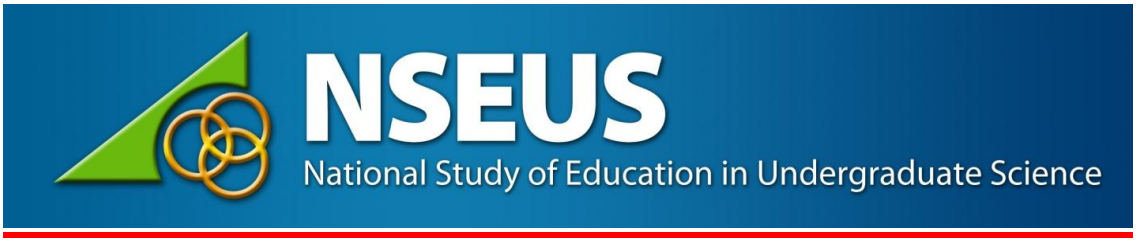

Research Based Undergraduate Science Teaching Conference II

Sunday, May 20, 2012

5:30 – 8:00 PM **Conference Registration**
Reception – Information Conference participant Interaction:
Bryant Conference Center * Room RAST B

Monday May 21, 2012

Strand 1: Implementing and Sustaining Reform in Undergraduate Science Teaching

7:30-8:30 AM **Registration and Full Breakfast:** Bryant Conference Center * Room: RAST A

8:30-8:40 AM **Welcome, Introductions, and Overview of the Day:** Bryant Conference Center * Room: RAST B

- *Dennis W. Sunal, The University of Alabama, Science Education*
- *Cynthia Szymanski Sunal, The University of Alabama, Office of Research on Teaching in the Disciplines*
- *Cheryl L. Mason, San Diego State University, Biology and Science Education*

8:40-9:00 AM **Delphi Study 1:** Bryant Conference Center * Room: RAST B

Donna Turner, The University of Alabama, Deborah McAllister, The University of Tennessee at Chattanooga, and April Nelms, University of North Georgia

9:00-9:30 AM **Keynote Speaker:** Bryant Conference Center * Room: RAST B

Lawrence B. Flick, Dean, College of Education, and Professor, Science and Mathematics Education in Partnership with College of Science, Oregon State University

"Reform or Revolution? Undergraduate Science Education in Diverse Contexts for Learning"

9:30-9:45 AM **Discussion of Keynote Paper:** Bryant Conference Center * Room RAST B

Moderator: Cheryl L. Mason, San Diego State University

9:45-10:00 AM **Break**

10:00–10:30 AM **Panel 1: The Reform Process:** Bryant Conference Center * Room RAST B

"An Ambitious Plan in Undergraduate Science STEM Education"

Barbara Burke, Barbara Hoeling, Michael Page, and Edward Walton, California Polytechnic University – Pomona

10:30-10:45 AM **Discussion of Panel 1 Presentation:** Bryant Conference Center * Room RAST B

Moderator: Dennis W. Sunal, The University of Alabama

10:45-10:55 AM **Break**

10:55-11:25 AM **Panel 2: The Reform Process:** Bryant Conference Center * Room RAST B

"Beginnings to New Horizons"

Paul Adams, Germaine Taggart, Fort Hayes State University and Zdeslav Hrepic, Columbus State University

11:25-11:40 AM **Discussion of Panel 2 Presentation:** Bryant Conference Center * Room RAST B

Moderator: Michael Odell, University of Texas at Tyler

11:40-12:40 PM **Lunch will be provided:** Bryant Conference Center * Room RAST A

Monday May 21, 1:00 – 5:00 pm

Strand 2: Teaching STEM Courses: What Works

NOTE: Concurrent Sessions 1A and 1B with follow-up Discussion, occur 12:40–2:10 PM

12:40-1:55 PM **Concurrent Session 1A: Strategies for Enhancing Learning:** Bryant Conference Center * Room Wilson (2nd Floor)

- **"How do Summer Undergraduate Research Experiences Compare to Other Models?"**

  Omolola Adedokun, Purdue University

- **"Learning Inquiry and Nature of Science through Undergraduate Research: Mentoring Matters**

  Maya Patel, Ithaca College

- **"You Can Learn a Lot about Teaching Undergraduates from Preschoolers"**

  Dana Byrd, Texas A&M University at Kingsville and Gene Byrd, The University of Alabama

1:55-2:10 PM **Discussion of Concurrent Session 1A:** Bryant Conference Center * Room Wilson (2nd Floor)

Moderator: Lloyd Barrow, University of Missouri

12:40-1:55 PM **Concurrent Session 1B: Instructional Practices:** Bryant Conference Center * Room Lackey (2nd Floor)

- **"Cooking From Scratch: Development of Inquiry Based Activities for the General Microbiology Laboratory"**

  Josephine Taylor, Stephen C. Wagner, and Sarah Canterberry, Stephen F. Austin State University

- **"Teaching Undergraduate Physics Through a Research-based Clicker Methodology"**

  Lin Ding, The Ohio State University

- **"Combating 'One and Done': Maximizing the Impact of an Undergraduate Science Course"**

  Peter Holden, University of Massachusetts, Boston

1:55-2:10 PM **Discussion of Concurrent Session 1B:** Bryant Conference Center * Room Lackey (2nd Floor)

Moderator: Mitchell Klett, Northern Michigan University

2:10-2:25 PM **Break**

NOTE: Concurrent Sessions 2A and 2B, with follow-up Discussion, occur 2:25–4:05 PM

2:25-3:50 PM **Concurrent Session 2A: Best Practices in Curriculum:** Bryant Conference Center * Room Wilson (2nd Floor)

- **"Alignment of High School and College STEM Curricula"**

  Michael Odell, University of Texas at Tyler

- **"An Online Undergraduate Astronomy Lab Course"**

  Gene Byrd, The University of Alabama

- **"A Curriculum Experiment in Climate Change Education Using an Integrated Approach of Content Knowledge Instruction and Student-Driven Research, Year 2"**

  Paul Adams, Fort Hayes State University

- **"Bridging Gaps between Research and Education in Biofuel Technologies"**

  Rong Zhang, Auburn University, Frank Armstead, Tuskegee University, Q. Peter He, Tuskegee University, and Jin Wang, Auburn University

3:50-4:05 PM **Discussion of Concurrent Session 2A:** Bryant Conference Center * Room Wilson (2nd Floor)

Moderator: Gerald Krockover, Purdue University

2:25-3:50 PM **Concurrent Session 2B: Key Issues in Course Reform:** Bryant Conference Center * Room Lackey (2nd Floor)

- **"A Research-Based Transformation of Purdue's Modern Mechanics Course"**

  Rebecca Lindell, Jack Doyle, Adam Szewciw, and Andrew Hirsch, Purdue University

- **"Identifying Shifts in Pedagogical Content Knowledge (PCK): Outcomes of a "Scientific Teaching" Course for Biology Graduate Teaching Assistants at a Large Research University"**

  Kathleen Hill, Arizona State University

- **"IMPACT's Role in Improving undergraduate STEM Education at Purdue University'**

  Hosi Karzai and Frank Dooley, Purdue University

- **"Promoting Conceptual Change Through Course Design: Supporting the Physics Content Development of Pre-Service Teachers"**

  Will Stoll, Kadir Demir, and Brett Criswell, Georgia State University

3:50-4:05 PM **Discussion of Concurrent Session 2B:** Bryant Conference Center * Room Lackey (2nd Floor)

Moderator: Sytil Murphy, Shepherd University

4:05-4:20 PM **Break**

4:20-4:40 PM **Delphi Study 2:** Bryant Conference Center * Room RAST B

Donna Turner, The University of Alabama, Deborah McAllister, The University of Tennessee at Chattanooga, and April Nelms, University of North Georgia

4:40-5:00 PM **Wrap-Up:** Bryant Conference Center * Room RAST B

- *Cheryl L. Mason, San Diego State University*
- *Dennis W. Sunal, The University of Alabama*

Tuesday, May 22, 2012

Strand 3: Assessing and Evaluating Student Outcomes in Undergraduate Science Courses

7:30-8:30 AM **Registration and Full Breakfast:** Bryant Conference Center * Room: RAST A

8:30-8:40 AM **Welcome, Introductions, and Overview of the Day:** Bryant Conference Center * Room: RAST B

- *Cynthia Szymanski Sunal, The University of Alabama, Office of Research on Teaching in the Disciplines*
- *Cheryl L. Mason, San Diego State University, Biology and Science Education*

8:40-8:50 AM **Delphi Study Report with Working Groups Established:** Bryant Conference Center * Room: RAST B

Donna Turner, The University of Alabama, Deborah McAllister, The University of Tennessee at Chattanooga, and April Nelms, University of North Georgia

8:50-9:20 AM **Keynote Speaker:** Bryant Conference Center * Room: RAST B

David Hammer, Professor, Departments of Education and Physics and Astronomy, Tufts University

"The Challenges and Possibilities of Meaningful Assessment in Large Lecture Introductory Physics"

9:20-9:30 AM **Discussion of Keynote Paper:** Bryant Conference Center * Room RAST B

Moderator: Christy McKinnon, University of Incarnate Word

9:30-9:40 AM **Break**

9:40-10:10 AM **Paper Presentations:** Bryant Conference Center * Room RAST B

- **"Learning Through Action Research While Teaching Undergraduate Science"**

  Penny Gilmer, Florida State University

- **"Improving Student Outcomes in Organic Chemistry Through Action Research"**

  Gail Horowitz and Laura Rabin, Brook College, City University of New York

10:10-10:20 AM **Discussion of Paper Presentations:** Bryant Conference Center * Room RAST B

Moderator: Corinne Lardy, San Diego State University

Strand 4: Using Research to Evaluate the Success of Reform

10:20-10:50 AM **Keynote Speaker:** Bryant Conference Center * Room: RAST B

John Dantzler, Educational Research, The University of Alabama

"Researching Reform: Designing studies to understand the impact of reform methods in undergraduate science classrooms."

10:50-11:00 AM **Discussion of Keynote Paper:** Bryant Conference Center * Room RAST B

Moderator: Dianne Robinson, Hampton University

11:00-12:15 PM **Symposium: National Reform Study Results:** Bryant Conference Center * Room RAST B

- **"Brief Overview of the NASA/NOVA Faculty Professional Development Program – 1995-2006"**

  Michael Odell, University of Texas at Tyler

- **"National Study of Education in Undergraduate Science – 2006-2012 – What Was Learned"**

  Dennis Sunal, Cynthia Szymanski Sunal, Erika Steele, Donna Turner, The University of Alabama; Cheryl Mason, Corinne

Lardy, San Diego State University; Dean Zollman, Kansas State University; Mojgan Matloob-Haghanikar, Winona State University; and Sytil Murphy, Shepherd College

- **"Investigating the Impact of Professional Development on the Pedagogical Content Knowledge of University Faculty".**

  Donna Turner, The University of Alabama

- **"The Impact of Science Education Reform on Students' Perceptions of the Learning Environment"**
  Erika Steele, The University of Alabama

- **"Students' Reasoning and the Level of Interactivity in Science Content Courses"**

  Dean A. Zollman, Kansas State University, Mojgan Matloob-Haghanikar, Winona State University and Sytil Murphy, Shepherd University

- **"Impact of reformed courses on the science teaching self-efficacy beliefs of preservice and inservice elementary teachers""**

  Corinne Lardy and Cheryl L. Mason, San Diego State University

12:15-12:25 PM **Discussion of Symposium:** Bryant Conference Center * Room: RAST B

Moderator: Emmett Wright, Kansas State University

12:25-1:30 PM **Lunch will be provided:** Bryant Conference Center * Room RAST A

Tuesday May 22, 1:30 – 5:00 pm

Strand 5: Developing a Research Agenda and Action Plan

1:30-1:40 PM **Overview of Strand 5 Activities:** Bryant Conference Center * Room RAST B

The afternoon will focus on developing a research agenda in a collaborative group. The outcome will be the identification of groups of higher education faculty whose intent is to develop and seek funding regarding research on reform of undergraduate entry-level science courses.

- *Dennis W. Sunal, The University of Alabama*
- *Cheryl L. Mason, San Diego State University*

1:40-2:40 **Working Groups Meet – Develop Elements of a Research Agenda:** Bryant Conference Center * Rooms RAST B, Wilson, Lackey, RAST A

NOTE: Each Working Group will have a Facilitator who has expressed interest in the area with which the group is working

2:40-3:00 PM **Initial Whole Group Sharing by Workings Groups of Research Agenda and Action Plan:** Bryant Conference Center * Room RAST B

Moderator: Cheryl L. Mason, San Diego State University

3:00-3:15 PM **Break**

3:15-4:30 PM **Working Groups Meet – Develop Action Plans for Your Working Group:** Bryant Conference Center * Rooms RAST B, Wilson, Lackey, RAST A

4:30-5:00 PM **Wrap Up Discussion and Closing Comments:** Bryant Conference Center * Room RAST B

Moderators: Dennis W. Sunal, Cynthia Szymanski Sunal, University of Alabama, Cheryl L. Mason, San Diego State University

6:30-8:30 PM Wrap-Up Dinner: Hotel Capstone

Information regarding the conference is available on the NSEUS website, http://nseus.org

Conference committee co-chairs: Dennis W. Sunal, The University of Alabama, dwsunal@bamaed.ua.edu; Cynthia Szymanski Sunal, The University of Alabama, cvsunal@bamaed.ua.edu; Cheryl L. Mason, San Diego State University, cmason@mail.adsu.edu; and Dean A. Zollman, Kansas State University, dzollman@ksu.edu

The Conference is funded under the National Science Foundation Grant TPC0554594. The project focuses on an examination of the teaching and learning of undergraduate science in the United States and the subsequent impact on students. Opinions expressed in Conference reports and discussions are those of the authors and do not necessarily reflect those of the National Science Foundation.

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Sytil Murphy, Physics, Shepherd University
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Donna Turner, Science Education, The University of Alabama
John Dantzler, Consultant, Education Research, The University of Alabama

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Sandra Ray, Recent member, Alabama State Board of Education

Research Based Undergraduate Science Teaching Conference II Presenters' Biographies

Research Based Undergraduate Science Teaching, a national conference on the best practices in teaching undergraduate science and their impact on student learning outcomes, was held May 20-22, 2012 at the University of Alabama's Bryant Conference Center. The conference was sponsored by the National Study of Education in Undergraduate Science (NSEUS) a project funded by the National Science Foundation and The University of Alabama Office of Research on Teaching in the Disciplines.

Keynote speakers included Lawrence B. Flick, Dean, College of Education, and Professor, Science and Mathematics Education in Parternership with College Science, Oregon State University; David Hammer, Professor, Department of Education and Physics and Astronomy, Tufts University; and John Dantzler, Educational Research, The Univerisity of Alabama.

Highlighted in the conference were the results of the five year NSEUS national study investigating undergraduate science classrooms. The goal of the National Study of Education in Undergraduate Science (NSEUS) project was to examine the impact of reformed undergraduate entry-level science courses that differ from traditional courses. Extensive site visits with couses and students at 20 colleges and universities as well as over 90 graduates of the courses now serving as in-service teachers in K-12 schools were conducted by a team of investigators from the University of Alabama, Kansas State University, and San Diego State University.

Conference II research presentations included over 60 researchers from universities and colleges from 25 states and participation in discussion and work groups by all conference attendees from 40 universities, colleges, and agencies.

To access a Conference II agenda and archived resources with speaker videos, papers, and PowerPoints go to the Conference II section on the NSEUS web site at **http://nseus.org**

Dennis Sunal, Donna Turner, and Cynthia Sunal, University of Alabama; Dean Zollman, Kansas State University; and Cheryl Mason, San Diego State University conference committee co-chairs.

For more information, contact Sunal at dwsunal@bama.ua.edu.

Presenters' Biographies

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Research Based Undergraduate Science Teaching Conference II

Authors' Biographies

1. Paul Adams
Fort Hays State University

Paul Adams is the Anschutz Professor of Education and Professor of Physics at Fort Hays State University, Hays, KS. He obtained a BS in physics and mathematics at Heidelberg College, Tiffin, OH, MS in physics at Washington State University, and PhD in science education at Purdue University. He teaches courses in education, geosciences, and physics. His primary research interest is in teacher professional development and education and public outreach in science.

2. Omolola Adedokun
Purdue University

Omolola Adedokun is an Assessment Specialist for Purdue University's Discovery Learning Research Center (DLRC) where she coordinates and conducts research and evaluation studies to examine the effectiveness of STEM education programs. Omolola's expertise is in quantitative and qualitative methods of educational research and evaluation. Her research and evaluation interests include the impacts of program dynamics and structures on the outcomes of undergraduate research experiences, and the processes through which the outcomes are achieved. Prior to joining the DLRC in 2009, Omolola completed her postdoctoral training in Life Science Education in the Department of Youth Development and Agricultural Education at Purdue University where she conducted the evaluation of a youth science program. Omolola received her doctorate in Education from Purdue University. She also holds M.S. degrees in Sociology and Agricultural Economics, a graduate diploma in Survey Research and a B.Sc. degree in Agricultural Economics.

3. Frank Armstead III
Tuskegee University

Frank Armstead is a senior undergraduate student majoring in chemical engineering (with a specification in biochemical engineering) at Tuskegee University. He is currently conducting research in Dr. He's group for improving undergraduate chemical engineering renewable energy education.

4. Donalee Attardo
Purdue University

Donalee Attardo is the Director of Instructional Technologies at Purdue (ITaP). The ITaP is responsible for providing online student connection, digital teaching and learning software, security, and business hardware for Purdue University. Donalee Attardo also serves as a member of the IMPACT Steering Committee. She has PhD and MA in Linguistics from Purdue and BA in English Literature and History from Hanover College.

5. Lloyd H. Barrow
University of Missouri

Lloyd H. Barrow is Professor of science education at the University of Missouri and Director of Graduate Studies for the Department of Learning, Teaching and Curriculum. His teaching responsibility is primarily elementary science methods. His current research is on research institutional productivity and employment in higher education.

6. Ann Bessenbacher
Purdue University

Ann Bessenbacher is Project Coordinator for the Discovery Learning Research Center at Purdue University. She is also the database administrator and curator for all of the assessment data at the center and the technology steward for STEMEdhub.org. She previously worked as a data analyst with Space Management and Academic Scheduling here at Purdue University. Before that Ann served as the Data Operations Manager at the National Snow and Ice Data Center in Boulder, Colorado. She works on the communities of practice for two different websites built on Purdue's Hubzero technology. She has fifteen years of experience in data management/analysis in both scientific and administrative areas. She also has previous experience in presenting and assisting with the development of educational programs for the department of Foods and Nutrition at Purdue University. She holds bachelor degrees in both Mathematics/Computer Science and Industrial Management from Purdue University.

7. Wilella Burgess
Purdue University

Wilella D. Burgess is the Managing Director of Purdue University's Discovery Learning Research Center. She holds degrees in Biology, Earth Sciences, and Ecology from the Pennsylvania State University and has spent the past 20 years developing and analyzing the effectiveness of education programs reaching audiences including K-16 students and teachers, graduate students, professionals, and the general public through a variety of formal and informal venues.

8. Barbara A. Burke
California State Polytechnic University, Pomona

Barbara A. Burke is Professor of chemistry and Director of Science Educational Enhancement Services (SEES) in the College of Science, California State Polytechnic University, Pomona. Her professional career encompasses teacher education (elementary & middle school), curriculum development, equity issues, and communication of science to the public. She developed/runs various programs for students traditionally underrepresented in STEM and is editor of an online column for the Journal of Chemical Education that features women/minority chemists. She's received awards for teaching, advising, and community service, including the NSF 2004 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. She can be contacted at baburke@csupomona.edu.

9. Dana Byrd
Texas A&M University, Kingsville

Dana Byrds holds a B. A., Psychology, New College the Honors College of Florida, (1997); an M.S. (1999) a Ph.D, Psychology (2004), Univ. of Florida; was a Postdoc Columbia Medical Univ. (2004-2006); was a Research Affiliate and Institutional Review Board, Univ. Florida (2006-2011); and is on the Faculty of Texas A&M Univ. at Kingsville (2011-present). Dr. Byrd's general interest is understanding cognitive development and neurological changes that underlie both age and disorder differences in cognition. She has explored life-span development of anticipation, preparation and planning by utilizing behavior and other psychophysiological measures including electrical "brain wave" potential, functional MRI as well as language. ADHD-diagnosed children and adults were studied. Dr. Byrd studied neurological function and dysfunction in the neural circuitry during eyeblink conditioning in newborns. She is interested in the improvement of undergraduate teaching via the application of neurological knowledge. Dr. Byrd has published a variety of articles on this research in respected refereed research journals.

10. Gene Byrd
University of Texas, Austin

Gene Byrd hols a B.S., Physics at Texas A&M Univ. (1968) ; PhD in Astronomy from the Univ. of Texas Austin (1974); and is on the Univ. of Alabama faculty). He has published on in-class response pads in teaching astronomy, simple astronomy lab equipment and a self-paced course text. He studies the dynamics of disk galaxies *e.g*. the unusual galaxy NGC4622, whose inner

and outer spiral arms wind in opposite directions. He and collaborators discovered effects of dark energy in our Local Group within several million light years. He was Chair of the American Astronomical Society's Division on Dynamical Astronomy. He edited *Order and Chaos in Stellar and Dynamical Systems* and co-authored graduate texts *Cosmology: Foundations and Frontiers*, *Paths to Dark Energy: Theory and Observation* plus a popular book: *The Evolving Universe and the Quest for Life*.

11. John Campbell
Purdue University

John Campbell is the Associate Vice President of Academic Technologies, ITaP. As Associate Vice President of Academic Technologies, he supervises team of 60 people at ITaP's research-computing arm at the Rosen Center for Advanced Computing. He also serves IMPACT as a member of the Steering Committee. Campbell has a PhD in Higher-Education Administration and a MA in Educational Computing and Instructional Design and a BA in Mathematics and Science Education.

12. Sarah Canterberry
Stephen F. Austin State University

Sarah Canterberry in 2001, earned her Bachelor of Science in Animal Science and completed a Ph.D. in Genetics in 2006, both at Texas A&M University. From 2006 to 2008 she was a Postdoctoral Research Scientist in the Department of Veterinary Physiology and Pharmacology at Texas A&M. In this position she worked with both graduate and undergraduate students on research projects and was responsible for training these students to conduct a variety of laboratory techniques. In 2008 she became an Assistant Professor at Stephen F. Austin State University, where her primary role is that of a lecture professor. She currently teaches Principles of Cell and Molecular Biology (BIO130), Senior Seminar (BIO470), Molecular Biology (BIO431/532), and the lecture components of two non-majors courses: Concepts of Biology (BIO121) and Human Biology (BIO123). In her current position she has the opportunity to direct graduate and undergraduate students on research projects in her laboratory.

13. Amy Childress
Purdue University

Amy Childress is a Project Coordinator in the Discovery Learning Research Center (DLRC) in Purdue University's Discovery Park. She is currently a doctoral candidate in Educational Leadership and Cultural Foundations in the Department of Educational Studies at Purdue University. She received her MBA from the Krannert Graduate School of Management at Purdue and her B.S. in Biology and B.A. in History from Purdue. Ms. Childress coordinates a number of student programs, including the NIH-funded Interdisciplinary Cancer Prevention Research Internship Program (CPIP). She recently served as program coordinator for the NSF-funded Indiana Interdisciplinary GK-12 Program.

14. John Dantzler
University of Alabama

John Dantzler is an Assistant Professor in The University of Alabama's Department of Educational Studies in Psychology, Research Methods and Counseling in the College of Education. He currently teaches educational research methods courses for the University, and has worked as a consultant with the NSEUS project. Prior to his work in higher education, Dantzler was the owner of a program evaluation consulting firm. His fifteen years of work with this firm consisted of designing research and evaluation surrounding federally funded programs in engineering education, K-12 education, mental health, low income housing, substance abuse prevention, criminal justice, HIV/AIDS treatment and prevention, and public health. Currently, his research interests are in the areas of psychometric development, graduate student identity as researchers, and count-based data analysis. Dantzler has a Ph.D. in Educational Research with an emphasis in psychometrics and program evaluation.

15. Kadir Demir
Georgia State University

Kadir Demir is an Assistant Professor of science education in the Department of Middle/Secondary Education & Instructional Technology Department at Georgia State University. Dr. Demir holds a bachelor's degree in Biology Teaching, from Gazi University-Turkey, and two master's degrees, one in Science Education and one in Educational Technology, and a Ph.D. in Science Education from University of Missouri-Columbia. He teaches undergraduate and graduate classes in science education. His current research foci include reform-based practices of college science faculty and pre/in-service secondary science teachers and science education in urban settings.

16. Lin Ding
Ohio State University

Lin Ding is an Assistant Professor of science education in the School of the Teaching and Learning at the Ohio State University. His research work focuses on investigating and improving student conceptual understanding, problem solving and learning attitudes in the physics domain. Previously a post-doctoral researcher in the Physics Department at OSU, Ding has led a research group in developing an innovative clicker methodology to effectively promote interactive learning environment in physics classroom. Ding also specializes in development of assessment instruments and quantitative research methods. He has published over a dozen peer-reviewed journal articles, presented many conference papers, and organized a number of workshops at national and international symposiums.

17. Tomalee Doan
Purdue University

Tomalee Doan is an Associate Professor of Library Science and Division Head of Humanities Social Sciences Education, Hicks Undergraduate and Parrish Libraries. As Division Head, she works in planning, operations and the steering committee for her division and is a member of the

IMPACT Steering Committee. She has a MA in Library Science from Wayne State University and a BA in Psychology/Sociology from Indiana University.

18. Frank Dooley
Purdue University

Frank Dooley is the Provost Fellow and Professor of Agriculture Economics. As Provost Fellow, his primary responsibility is to work with the Department of Agriculture Economics on all facets of the undergraduate curriculum. He also participates in IMPACT as a member of the Steering Committee. He has a PhD from Washington State University, a JD from the University of North Dakota, and BS from St. John's University.

19. John Doyle
Purdue University

John Doyle is a graduate student, Department of Physics, Purdue University. A member of the PER@P team redesigning the Physics 172 course, Doyle's focus is the redesign of the online homework component of the course. He received his BS in Physics from Purdue University. His future goal is to become a professor of physics.

20. Lawrence B. Flick
Oregon State University

Lawrence B. Flick is Dean, College of Education, Oregon State University and Professor, Science and Mathematics Education in Partnership with College of Science, Oregon State University. Larry holds a B.S. in electrical engineering from Purdue University, an M.A.T. from Northwestern and a Ph.D. in Science Education from Indiana University. He holds a Professorship of Science Education in the College of Science. He is currently dean of the College of Education at Oregon State University. Dr. Flick has served as president of Association for the Education of Teachers in Science and served on the editorial boards of *Journal for Research in Science Teaching*, the *Journal for Science Teacher Education*, and a co-editor editor for the journal *School Science and Mathematics*. Dr. Flick has received competitive funding from the National Science Foundation and US Department of Education through the Oregon ESEA Title IIB Math/Science Partnership. He has received funding from the Department of Energy and Westinghouse Corporation. He has taught elementary and middle school science for 13 years and spent 26 years in science teacher education.

21. Penny J. Gilmer
Florida State University

Penny Gilmer received her PhD in Biochemistry from University of California-Berkeley (1972), did postdoctoral research in biophysical chemistry at Stanford University, and taught and conducted both biochemistry and science education research at Florida State University for 33 years. She also earned a doctorate in science education from Curtin University (2004). She retired two years ago, is active as PI on a collaborative NSF ADVANCE-PAID grant, and is senior personnel on an Institute of Education Sciences grant from the US Department of

Education. Gilmer is the author of one book: *Transforming Undergraduate Biochemistry Teaching Using Collaborative Learning and Technology: Ready, Set, Action Research!* (2010), and co-editor of two books: *Transforming Undergraduate Science Teaching: Social Constructivist Perspectives (*2002), and *Celebrating the 100th Anniversary of Marie Sklodowska Curie's Nobel Prize in Chemistry* (2011). Currently, she is editing another book, *Alliances for Advancing Academic Women: Guidelines for Collaboration in Chemistry, Engineering and Beyond*.

22. David Hammer
Tufts University

David Hammer's research has focused on the learning and teaching of science (mainly physics) from elementary school through university, with particular emphases on students' intuitive epistemologies, how instructors interpret and respond to student thinking, and resource-based models of knowledge and reasoning. From 1998-2010, he held a joint position in Physics and Curriculum and Instruction at the University of Maryland, College Park; he is now Professor of Education and Physics, and Co-Director of the Center for Engineering Education and Outreach, at Tufts University.

23. Mark Haugan
Purdue University

Mark Haugan is Associate Professor in the Department of Physics, Purdue University. His research focuses on Conceptual and Empirical Foundations of Relativity and Gravitation Physics and Physics Education Research and Development. As part of the Physics 172 redesign team, he is focusing on developing the series of clicker questions to probe student understanding. Haugan implemented the current Matter and Interaction curriculum in 2001. He received his PhD in Physics from Stanford University and his BS in Applied Mathematics and Theoretical Physics from McMaster University.

24. Qinghua (Peter) He
Tuskegee University

Qinghua He received his BS degree in chemical engineering from Tsinghua University, Beijing, China, in 1996 and MS and PhD degrees in chemical engineering in 2002 and 2005 from the University of Texas, Austin. He is currently Associate Professor in the Department of Chemical Engineering at Tuskegee University. His research interests are in the following areas: process modeling, monitoring, optimization and control; renewable energy; biostatistics and cancer informatics.

25. Kathleen Hill
Arizona State University

Kathleen Hill became a teaching assistant in 2011 for the School of Life Sciences (SoLS) at Arizona State University following five years of secondary science teaching. As a science education doctoral student in the Mary Lou Fulton Teacher's College, her area of research

includes biology faculty and graduate TA science knowledge for teaching. Mrs. Hill has been working with SoLS faculty and graduate TAs to support improving undergraduate science teaching for biology majors and non-majors. She has also works to support early career secondary science teachers through feedback from classroom observations and discussions to promote effective instructional decisions. Prior to embarking on a career in science education, Mrs. Hill earned an M.S. in environmental pollution control from Pennsylvania State University and a B.A. in geological science from Lehigh University. She then worked as a geologist in the environmental consulting industry for over ten years in Phoenix, Arizona.

26. Andrew Hirsch
Purdue University

Andrew Hirsch is a Professor of Physics at Purdue University specializing in experimental nuclear physics. Hirsch spearheaded the redesign of Phys 172: Modern Physics. Former department head, he helped spearhead to adoption of the Matter and Interaction text and the original creation of Phys 172. He is currently focusing on lecture redesign, implementation of Just-In-Time Teaching and designing the pre-lecture tutorials. He received his PhD and BS in Physics from Massachusetts Institute of Technology.

27. Peter Holden
University of Massachusetts, Boston

Peter Holden received his doctorate in geology (planetary) from Rensselaer Polytechnic Institute, where he conducted research on a technique for detection of pre-biotic compounds in the solar system. There, he worked on NASA and NSF sponsored projects and collaborated with major oil company research centers. Several years ago, he turned his attention to education, first designing and teaching a math program for gifted students at a private school and later teaching in the math and science program at Wheelock College. He leveraged funding sources to create the Math Science Education Initiative at Wheelock, which supported science education related projects at the college including teacher professional development, educational technology infrastructure and creation of a science education resource library. His course, Science Inquiry and the Earth, was selected for examination as part of the NSEUS national study of the impact of reform methods on undergraduate science teaching. Peter is currently formalizing his background in education through the graduate program in Instructional Design at University of Massachusetts, Boston. There, he is collaborating with a major biotechnology research laboratory to develop eLearning solutions.

28. Gail Horowitz
Brooklyn College of the City University of New York

Gail Horowitz has spent the past two decades teaching chemistry at the undergraduate level. She is currently a Lecturer of Organic Chemistry at Brooklyn College of the City University of New York. She holds a Masters degree in Organic Chemistry and a Ph.D. in Science Education and utilizes action research as a way of combining her interests in research and teaching. Since joining Brooklyn College, Gail has focused her research efforts on determining strategies and

methods to best help under-represented students achieve success in Organic Chemistry and other introductory science courses.

29. Zdeslav Hrepic
Columbus State University, Georgia

Zdeslav Hrepic is Associate Professor of Physics at Columbus State University (GA). He obtained a BA in physics and Polytechnic teaching from University of Split, Croatia and MS and PhD in physics education from Kansas State University. He has been teaching a broad range of physics, physical science and science education courses. His primary pedagogical and research interests are students' mental model building and technology enhanced active learning environments.

30. Max Kagan
Purdue University

Max Kagan is a student researcher, Department of Physics, Purdue University. A member of the PER@P team that is focusing on redesigning the Physics 172 course. Specifically, he is working with Jordan Steckloff on the redesign of the laboratory component of the course. He received his BS from Purdue University. His current goal is to become a commissioned officer in the US Navy.

31. Hosi Karzai
Purdue University

Hosi Karzai joined Purdue University in July 2011 as Project Director for Instruction Matters: Purdue Academic Course Transformation (IMPACT) program within the Center for Instructional Excellence (CIE). IMPACT is a campus-wide program initiated in 2010 by the Office of the Provost in the redesign of classes and creation of active learning spaces. Its aim is to engage students more fully in their learning, thereby improving retention and completion in classes that serve students across the entire campus. In this position, she works closely with (CIE), Office of Instructional Technology at Purdue (ITAP), steering committee members, Provost faculty fellow, Support staff and over 59 IMPACT faculty fellows. She also implemented communication and collaboration strategies for the program. Hosi came to Purdue after over 20 years of versatile Management Information System experience in Technology Management where she managed e-commerce projects for various companies.

32. Lisa Kirkham
Purdue University

Lisa Kirham has over twenty years of experience in K-12 education as a teacher and Principal. As a Project Coordinator in the Discovery Learning Research Center (DLRC) in Purdue's Discovery Park, she works with faculty and staff to coordinate and manage projects. She provides expertise in K-12 education and interfaces with K-12 educational institutions throughout the state. Currently, she is the Project Coordinator for the following projects: *Discovery Park Undergraduate Research Internships (DURI)* - Undergraduate students are

given the opportunity to work in interdisciplinary research settings on cutting edge research projects through Purdue's Discovery Park. *NSF - Innovative Institutional Integrations* – "Research Goes to School" is a program designed to integrate currently funded NSF projects at Purdue, providing synergistic outcomes to the projects involved. This project connects Woodrow Wilson Fellows, and in-service teachers with the advanced research of Purdue's Center for Direct Catalytic Conversion of Biomass to Biofuels (C3Bio).

33. Mitchell Klett
Northern Michigan University

Mitchell Klett earned a Bachelor's degree in Geoscience and Master's in Science Curriculum from the University of Texas at Dallas He began his teaching career in Texas at A. C. New Middle School as part of the Mesquite Independent School District where he taught courses in English, Earth Science and Language Arts. He attended the University of Idaho and graduated with an earned doctorate in curriculum and instruction with an emphasis on science education and educational technology. After teaching in courses in elementary and secondary science and technology education at Roosevelt University in Chicago, he took a position as a consultant and researcher for the Lewis and Clark Rediscovery project Technology Innovation Challenge (TIC) grant through the Potlatch School district and the University of Idaho's College of Education. His experience in science teaching includes; Laboratories and Demonstrations in Science, Models in Science Teaching, Methods and Materials in Science Teaching, Earth Science, and Integrating Technology in Science Teaching. His support for the university includes the development of an assessment system to evaluate the Liberal Studies Program. Mitchell Klett was promoted at Northern Michigan University's School of Education to the rank of Professor in 2010. He is the principal investigator of the Earth System Science Education Alliance grant empowering change in earth science education at the University level. Mitchell is currently on sabbatical studying the integration of touch technology in teaching.

34. Gerald H. Krockover
Purdue University

Gerald Krockover is Professor Emeritus of Curriculum and Instruction and Earth and Atmospheric Science Education at Purdue University, West Lafayette IN. His BA, MA and PhD degrees are all from The University of Iowa. Prior to joining Purdue University, he taught middle and high school science in Iowa. He is a fellow of the American Association for the Advancement of Science and the Iowa Academy of Science, an inaugural member of the Purdue University Book of Great Teachers, and a charter member of the Purdue University Teaching Academy. He has published more than 124 refereed manuscripts, ten edited books, and seven textbook series for K-6 science. He has received 32 outstanding teaching awards, chaired 14 doctoral committees and more than 300 Master's committees. He has received more than 40 external grants totaling nearly $7 million and serves as a consultant for numerous school districts and informal education centers throughout the US.

34. Corinne Lardy
San Diego State University

Corinne Lardy is currently a lecturer in the Biology department and an associate member of the Center for Research in Mathematics and Science Education (CRMSE) at San Diego State University. She recently graduated from San Diego State University and the University of California, San Diego with her Ph.D. in Mathematics and Science Education. During her doctoral program, Corinne served as the Western Region Graduate Research Associate for the NSEUS project. Before earning her doctoral degree, Corinne taught middle school and high school earth science, chemistry, and biology, and earned her MS in Biology from San Jose State University in San Jose, CA.

35. Mickey Latour
Purdue University

Mickey Latour is the Professor of Animal Sciences and Associate Dean of Distance Learning. As Dean he manages Extended Campus, Purdue's online course initiative and is a member of the Steering Committee. He performed his Post-Doctoral Training as National Institutes of Health Fellow at Washington University's School of Medicine. He also has a PhD and MS from Mississippi State University, a BS from Southern Louisiana.

36. Chantal Levesque-Bristol
Purdue University

Chantal Levesque-Bristol is the Director of Center of Instructional Excellence (CIE). CIE is an information hub containing teaching tools for all aspects of instruction on Purdue's Campus. Levesque-Bristol is a member of the IMPACT Steering Committee. She has a PhD in Social Psychology/Quantitative Psychology from University of Ottawa and BA in Psychology from University of Ottawa.

37. Rebecca Lindell
Purdue University

Rebecca Lindell is Visiting Scholar in the Department of Physics, Purdue University. With over 15 yrs experience in the field of Physics Education Research (PER), Rebecca brings to Purdue expertise for assessing college students understanding of physics and astronomy, specifically in the area of concept inventory development and critique. As part of her dissertation, she created the Lunar Phases Concept Inventory (LPCI), which was used as model concept inventory in the development of other astronomy concept inventories. In addition to her research efforts, Rebecca is an award winning curriculum developer and has received national recognition for her redesign of her introductory astronomy course. She has redesigned or assisted in the redesign of numerous physics courses at every level. Based on her expertise, Professor Andrew Hirsch supported her joining the Purdue University Department of Physics to assist with the redesign of Phys 172: Modern Mechanics.

38. Christy A. MacKinnon
University of Incarnate Word, San Antonio, TX

Christy MacKinnon joined the Biology Department at the University of Incarnate Word, San Antonio, TX, in 1991. She currently holds the Sister Joseph Marie Armer Endowed Chair. Christy earned her B.S. in Biology from the University of Michigan-Flint, and a M.S. in Plant Biology from Michigan State University, where she also completed teacher certification in secondary science. She completed a Ph.D. in Plant Biology from Colorado State University. Dr. MacKinnon's scholarly interests have focused on the professional development of in-service science teachers and college faculty. This research has been conducted in collaboration with Dr. Dennis Sunal, Department of Education, and University of Alabama. She was a NASA Project NOVA Research Fellow from 2001-2006 and a NSEUS Fellow from 2008-2012. Christy was the primary developer of the MA degree in Multidisciplinary Studies, School of Mathematics, Science and Engineering, UIW. This unique program integrates reform-based science teaching methods with standards based content. Her most recent research involves gene annotation of Drosophila genes, which she conducts with her undergraduate students.

39. Cheryl L. Mason
San Diego State University

Cheryl Mason is Professor Emerita of Science Education and Biological Sciences at San Diego State University. She received her Ph.D. in Science Education and Educational Computing from Purdue University, and her bachelor and masters degrees in Biological Sciences from Indiana University. Cheryl's teaching experiences include undergraduate and graduate courses in biological sciences, science teaching and learning, and interfacing technology in the science classroom. In addition, she has 12 years of teaching science at the precollege level. Supporting her research, She has received extramural grants that have totaled almost $5,000,000. She has scholarly publications in numerous journals and several books, and has made presentations to various audiences over the past 40+ years. She is an active member and leader of international professional organizations such as ASTE, NARST, and NSTA, in addition to serving as a Program Director for NSF. Highlights of her career are that she received the Association for Science Teacher Education *Outstanding Science Teacher Educator Award*, the *Perham Indiana Women of Distinction Award*, the first *National Space Educator Award* from the Smithsonian Institute's National Space Club, the first *Presidential Award for Excellence in Science and Mathematics Teaching* and the *Outstanding Biology Teacher Award* from the National Association of Biology Teachers. Overall, Mason's research focus is on the relationship of cognitive, including visual/spatial thinking skills, and attitudinal factors concerning successful science teaching and learning. She is especially concerned with helping girls and persons of color succeed in the science classroom and scientific community.

40. Mojgan Matloob-Haghanikar
Winnona State University

Mojgan Haghanikar received her B.sc. in solid state physics from National University of Iran (Shahid Beheshti). After graduation, she worked for several commercial companies who were

conducting development projects such as telecommunications, solar cells, laser and holography. She also taught introductory physics labs in local universities. In these years, she was involved in establishing science museums, informal methods of teaching and curriculum development. Mojgan contributed to the construction of science museums in Iran and at that point began several projects in physics education research. In 2002, she received a CHEVENING scholarship for completing Master's degree research in United Kingdom. She conducted research in astronomy education at the University of Glasgow Scotland. She completed a Master's in physics education in 2007 and her doctoral degree in the Physics Department at Kansas State University in 2012.

41. Deborah McAllister
University of Tennessee at Chattanooga

Deborah McAllister is a Professor of Education, at The University of Tennessee at Chattanooga, with responsibilities in mathematics education, science education, educational technology, and action research. She taught at the high school level for 13 years, and has taught at the university level for 20 years. In July, she will begin a 2-year term as Faculty Senate President. Educational background: B.S., Zoology, Massachusetts; M.S.Ed., Educational Psychology and Research, Kansas; Ed.D., Curriculum and Instruction, Kansas.

42. Sytil Murphy
Shepherd University

Sytil Murphy just completed her first year as an assistant professor of physics at Shepherd University. Her research is in the area of physics education research. Current projects involve investigating students' perceptions of physics concepts as shown in video taken by the students and other media along with accompanying write-ups.

43. Michael R.L. Odell
University of Texas at Tyler

Michael Odell is the Associate Vice President for Sponsored Research and the Director of Federal Relations at the University of Texas at Tyler. He also holds the endowed Sam and Celia Roosth Chair in Education at the University of Texas-Tyler He is a Professor of STEM Education and holds a joint appointment in the College of Education and Psychology and the College of Engineering and Computer Science. He also serves as the Executive Director of the Ingenuity Center, one of seven Texas Education Agency funded STEM Centers. Michael began his career in education as an Earth Science teacher in Irving, Texas (1984-1990). He received his B.A. in Geoscience (1984) and M.A.T. in Science Education (1989) from the University of Texas at Dallas. He went on to earn his Ph.D. in Curriculum and Instruction/Science Education (1993) from Indiana University. He is best known for his work with the NASA Opportunities for Visionary Academics (NOVA), the National Space Grant College and Fellowship program, Texas Project Lead the Way (PLTW), and Texas STEM Center Coalition. He has served as a National Space Grant Fellow at NASA Headquarters in Washington, D.C. (1995-97) and as a Faculty Fellow at NASA Kennedy Space Center (2003) in Florida. He is currently the President

of the National Alliance of State Science and Mathematics Coalitions (NASSMC). Dr. Odell is currently Principal Investigator on over a dozen externally funded projects.

44. Loran Carleton Parker
Discovery Learning Center

Loran Parker is the Assessment Specialist at the Discovery Learning Research Center (DLRC). Her specialties include qualitative research and evaluation methods and educational research and evaluation of informal learning contexts. In her work at DLRC, she oversees the evaluation of several projects focusing on K-12, secondary and informal STEM education. Loran joined the center's evaluation and assessment team in 2009 after completing her doctorate in Science Education at Purdue University. During her graduate studies, Loran was the Assessment Director for two programs focused on science teacher education; for her dissertation work she studied the dynamics of family learning during visits to a zoo. Loran also holds an M.S.Ed. degree in Science Education and a B.S. degree in Atmospheric Chemistry from Purdue University.

45. Maya Patel
Ithaca College

Maya Patel received her BS in Biology from Mount Holyoke College in 1993, and MS in Entomology from the University of Illinois at Urbana Champaign in 1996. She then taught introductory biology at Georgetown University for several years. Maya continues to serve as instructor and Science Chair for Georgetown's Myer's Institute for College Preparation for inner-city youth. Maya's experiences in large-enrollment, gateway-science courses, and as a mentor for students of color, helped to revise her views of teaching and learning science in higher education. In 2006 Maya entered the PhD program in Education at Cornell University, where she investigated student learning through undergraduate research. At Cornell she also participated in several undergraduate- and graduate-level science education program evaluations and K-12 teacher professional development. Maya is currently an Assistant Professor of Biology at Ithaca College where she continues her efforts to bring student-centered and inquiry-based pedagogies to her large-enrollment and non-majors courses.

46. Laura A. Rabin
Brooklyn College of the City University of New York

Laura Rabin is a neuropsychologist by training and an Associate Professor of Psychology at Brooklyn College of the City University of New York. Laura's research is supported by the NIH/NIA and is focused on identifying the cognitive and neurophysiological changes associated with preclinical stages of dementia. She is also deeply committed to educational endeavors. With grant support from the American Psychological Foundation, she previously implemented a program that enabled underrepresented high school students to immerse themselves in the field of psychology through coursework, research, and fieldwork. She currently serves as PI on an NSF Neuroscience Research Experiences for Undergraduates (REU) Site grant, which immerses diverse students in innovative neuroscience research at Brooklyn College.

47. Jordan Steckloff
Purdue University

Jordan Steckloff is a graduate student, Department of Physics, Purdue University. He is a member of the PER@P team redesigning the Physics 172 course, Steckloff is working in conjunction with Max Kagan on the redesign of the laboratory component of the course. He received his BS in Physics from the University of Michigan. Currently, he is pursuing his PhD specializing in planetary science.

48. Erika Steele
Univesity of Alabama

Erika Steele received her Master's degree in Biology in 2008. She is currently completing her PhD in Biology Science Education at the University of Alabama. She will receive her PhD in December of 2012. Her dissertation examines the impact of undergraduate course reform on students' perceptions of the learning environment. Her research interest includes how university instructors' beliefs about pedagogy and its impact on the classroom learning environment as well as the impact of undergraduate students' perception of the learning environment has on their learning.

49. Will Stoll
Georgia State University

Will Stoll is a Ph.D. student at Georgia State University in the MSIT Teaching and Learning Program focusing on science education specifically reformed physics education. Concurrently, he is a high school physics teacher at Norcross High, a large diverse high school in the Atlanta metropolitan area, where he has taught IB and AP physics for the last eight years.

50. Cynthia Szymanski Sunal
University of Alabama

Cynthia Szymanski Sunal is a Professor of Curriculum and Instruction at The University of Alabama and Director of the Office of Research on Teaching in the Disciplines. She primarily works with elementary and middle school teachers. Among her publications are numerous books, journal articles, and monographs. She is Executive Editor of two journals and publishes a research series. She has been involved in several funded projects from the National Science Foundation, the Department of Energy, and other agencies.

51. Dennis W. Sunal
University of Alabama

Dennis Sunal holds a Ph.D. in science education, MA in Interdisciplinary Science, and a BS in Physics all from the University of Michigan. He currently is a Professor of Science Education at the University of Alabama. His university teaching experiences include undergraduate and graduate courses in physics, engineering, curriculum and instruction, and science education. He holds both Secondary, 6 -12, and Elementary K-6 teacher certification and has taught extensively on both levels. His research interests are

in undergraduate science, pre-service teacher education, conceptual change in teachers and faculty, and web course design. He has been project director and co-director in numerous grants (e.g. NSF, NASA, Department of Education, USIA, and U.S. Department of Energy). Dennis has published numerous articles and chapters in refereed journals and books. Recent research presentations have been at the annual meetings of NARST, ASTE, NSTA, SCST, AACTE, and AERA. His published books include *Teaching Elementary and Middle School Science; Integrating Academic Units in the Elementary School Curriculum; Reform in Undergraduate Science Teaching for the 21st Century; and The Impact of State and National Standards on K-12 Science Teaching, and The Impact of the Laboratory and Technology on Learning and Teaching Science K-16*.

52. Adam Szewciw
Purdue University

Adam Szewciw is an undergraduate student, Department of Physics, Purdue University. A member of the PER@P team redesigning the Physics 172 course, he is working on gathering student feedback of the course and developing the pre-lecture tutorials. He expects to graduate in 2014.

53. Germaine L. Taggart
Fort Hays State Univeristy

Germaine Taggard is Professor and Chair of the Department of Teacher Education at Fort Hays State University in Hays, KS. She obtained a BS and MS in elementary teaching from Pittsburg State University in Pittsburg KS, an Ed.S. from Fort Hays State University in Educational Administration, and an Ed.D. from Kansas State University in Educational Administration with an emphasis in curriculum. She has been teaching a broad range of methods and internships, curriculum and assessment, student teaching, science education, and alternative certification coursework. Her interests are in the area of meaningful, virtual field experiences, curriculum and assessment, and alternative certification.

54. Josephine Taylor
Stephen F. Austin University

Josephine Taylor is a Professor of Biology at Stephen F. Austin State University and has taught non-majors biology, mycology, plant pathology, and electron microscopy for over 19 years. She earned a Bachelors Degree in Agriculture from Stephen F. Austin State University and a Doctorate Degree in Plant Pathology from the University of Georgia. My research involves the use of microscopic techniques to investigate fungal diseases of plants, with particular emphasis on mechanisms of disease resistance. She enjoys outdoor activities, pets, and volunteer work. I am married with one step-daughter and four step-grandchildren.

55. Dorothy Teegarden
Purdue University

Dorothy Teegarden is a Professor and Associate Head for Research in the Department of Nutrition Science at Purdue University. She received her doctorate in Human Nutrition and

Nutritional Biology from the University of Chicago. Dorothy completed a postdoctoral fellowship in biochemistry with Dr. Claudia Kent and another with Dr. Connie Weaver in Nutrition Science at Purdue. She is the Director of the Purdue Cancer Prevention Internship Program which is focused on preparing undergraduate students for graduate education and graduate students for careers in cancer prevention. She is also the Director for the Cancer Prevention Program of the Purdue Oncological Sciences Center. She has over 60 peer reviewed publications. She currently is a Purdue University Faculty Scholar and her research has been continuously funded since starting as faculty at Purdue in 1994. A primary research focus for her laboratory is the effect of vitamin D in preventing breast cancer.

56. Donna P. Turner
University of Alabama

Donna Turner graduated from the University of Alabama with a Doctor of Philosophy Degree in Secondary Science Education in December 2011. She received her Master's Degree in Biology Education from Alabama A&M University and her AA certification from the University of Alabama in Birmingham. She has 15 years teaching experience with the Birmingham City School System. She currently works as a Post Doctoral Research Fellow for the National Study of Education in Undergraduate Science for the University of Alabama. Her research focus is science education reform and the Pedagogical Content Knowledge of undergraduate faculty and inservice elementary teachers.

57. Stephen Wagner
Stephen F. Austin State University

Stephen Wagner is a Professor of Biology at Stephen F. Austin State University and has taught non-majors biology, cell biology, microbiology, and space biology for over 15 years. He earned a Bachelors Degree in Environmental Biology from Heidelberg College, a Masters Degree in Microbiology from North Carolina State University, a Doctorate Degree in Soil Microbiology from Clemson University. His research focuses on biology education and microbial ecology. Most recently he has directed projects funded by NASA and the U.S. Dept. of Education to train pre-service and in-service teachers to use inquiry-based approaches to teach science. He enjoys gardening, walking his dogs Gracie and Charlie Brown, home improvement, cheering on my school and Cleveland, Ohio teams, and doing volunteer work. In December, with wife Lynn, he will celebrate his 28th wedding anniversary. He has two children, Melissa and Michael, one daughter-in-law, Katie and one son-in-law, Matthew.

58. Jin Wang
Auburn University

Jin Wang obtained her BS degree from Tsinghua University, and PhD degree from the University of Texas at Austin in 1994 and 2004 respectively, both in Chemical Engineering. From 2002 to 2006 she was a process development engineer and later a senior process development engineer at Advanced Micro Devices, Inc. She is Associate Professor in the Department of Chemical Engineering at Auburn University. Her research interests include

process modeling, monitoring and control, system identification, control performance monitoring, and systems biology. She holds 13 U.S. patents.

60. Gabriela Weaver
Purdue University

Gabriela Weaver is a Professor of Chemical Education and Physical Chemistry. She is in charge of the Purdue Discovery Learning Research Center which works with the IMPACT program to revolution learning in the STEM disciplines and is a member of the IMPACT Steering Committee. She has a PhD in Chemical Physics from the University of Colorado at Boulder and a BS in Chemistry from California Institute of Technology.

61. Cliff Weil
Purdue University

Cliff Weil is a Professor of Agronomy. Weil is a member of the IMPACT Steering Committee and was a member of the 1st Cohort, adopting IMPACT to his Agronomy classes. He has a PhD from Cornell University and a BS from University of California-Davis.

62. Dale Whittaker
Purdue University

Dale Whittaker is the Vice Provost for Undergraduate Academic Affairs. He is responsible for forming the Steering Committee and overseeing the IMPACT program as a whole. Dale has a PhD and MS in Agricultural Engineering from Purdue University and a BS from Agricultural Engineering from Texas A&M University.

63. Rong Zhang
Auburn University

Rong Zhang received her B.Med. degree in Clinical Psychology from Anhui University of Traditional Chinese Medicine, China in 2007 and her M.Med. degree in Psychiatry and Mental Health from Zhejiang University, China in 2010. Currently, she is working toward her M.Sc. degree in Statistics at Auburn University. She has been a research assistant in Dr. Jin Wang's group since January 2012. Her responsibilities include literature search, data collection and creation of animated video clips for various biofuel processes.