FIE 2011
ERM Business Meeting
Thursday, October 13, 2011
1:30-3:00pm
Holiday Inn Salon B
Moderator(s): Maura Borrego, Virginia Tech/National Science Foundation

Agenda

Call to order Maura Borrego, ERM Chair called the meeting to order at 2:30 PM and asked for introductions of those present.

Introductions

Bailey	Reid	Univ. of Virginia	rrbailey@virgina.edu
Bates	Rebecca	Minnesota State Univ., Mank.	bates@mnsu.edu
Benson	Lisa	Clemson	lbenson@clemson.edu
Besterfield-Sacre	Mary	Pittsburgh	mbsacre@.pitt.edu
Borrego	Maura	Virginia Tech	mborrego@vt.edu
Brown	Shane	Washington State Univ.	shanebrown@wsu.edu
Budny	Dan	Univ. of Pittsburgh	budny@pitt.edu
Cady	Elizabeth	Nat. Acad. Of Engr	ecady@nae.edu
Carberry	Adam	Tufts University	adam.carberry@asu.edu
Cass	Cheryl	North Carolina State University	cheryl_cass@ncsu.edu
Cutler	Stephanie	Virginia Tech	cutlersl@vt.edu
Douglas	Elliot	Univ. of Florida	edoug@mse.ufl.edu
Eschenbach	Elizabeth	Humboldt State Univ	beth.eschenbach@humboldt.edu
Froyd	Jeff	Texas A&M	froyd@tamu.edu
Herman	Geoffrey	Univ of Illinois Urbana-Champaign	glherman@illinois.edu
Heywood	John	Trinity College - Dublin	heywoodj@eircom.net
Holmes	Archie	UVA	archieholmes@virginia.edu
Hughes	Joseph	Georgia Tech	joe.hughes@ece.gatech.edu
Imbrie	P.K.	Purdue University	imbrie@purdue.edu
Korte	Russ	University of Illinois@uc	korte@illinois.edu
Kotys-Schwartz	Daria	University of Colorado	daria.kotys@colorado.edu
Krause	Steve	Arizona State University	skrause@asu.edu

Lord	Susan	U. of San Diego	slord@sandiego.edu
Lawanto	Oenardi	Utah State University	olawanto@usu.edu
Madhavan	Krishna	Purdue University	cm@purdue.edu
Martin	Julie	Clemson	jtrenor@clemson.edu
McKenna	Ann	Arizona State University	annmckenna01@gmail.com
Morgan	Jim	Texas A&M	jim-morgan@tamu.edu
Orr	Marisa	Purdue Univ.	mkorr@alumni.clemson.edu
Pembridge	James	Virginia Tech	jpembrid@vt.edu
Purzer	Senay	Purdue Univ.	spurzer@purdue.edu
Reed-Rhoads	Teri	Purdue University	trhoads@purdue.edu
Richards	Larry	University of Virginia	lgr@virginia.edu
Schertz	Brian	University of Illinois@uc	schertz2@illinois.edu
St. Omer	Ingrid	Univ. of Kentucky	istomer@engr.uky.edu
Thomas	Lauren	Virginia Tech	laurendt@vt.edu
Verleger	Matthew	Utah State University	matthew.verleger@usu.edu

Officer reports

1. Chair – Maura Borrego
   None at this time.

2. Secretary/Treasurer – Daria Kotys-Schwartz
   Treasurer report as of June 30, 2010 shows $0.00 in the operating account and $96,542 in the Bass account. Historical comparisons are as follows: Treasurer report as of June 30, 2009 in the operating account was $0.00 as of 6/30/09, $1330.00 as of 7/28/08, and $67.25 as of 7/31/07. In the Bass Account, there was $113,103.36 as of 6/30/2010, $132,001.76 as of 6/30/09, $94,315.59 as of 7/28/08, and $97,845.26 as of 7/31/07.

3. Vice-Chair for FIE 2011 (Rapid City, SD, Oct. 12-15, 2011) Programs – Jim Morgan
   Some conference cancellations, not as many as feared. Started with 700 abstracts. The conference resulted in 420 papers, and just over 520 people attending the conference. ERM will make money this year. Paper count: WIP ~ 40%, Full Papers ~ 60%.

4. Vice-Chair for ASEE 2012 (San Antonio, TX, June 17-20, 2012) Programs – Richard Layton
   Overview
   Preparations for the 2012 meeting are going well. Monolith has been working satisfactorily and Wayne Davis and the Monolith developers have been responsive to questions and suggestions. Reminder: all deadlines for ASEE 2012 can be found at http://www.asee.org/conferences-and-events/conferences/annual-conference/2012/program-schedule/call-for-papers

Abstracts and papers
179 abstracts have been submitted to the ERM division, down a bit from 219 last year. Reviewers will be assigned in the coming week. Expect another invitation-to-review from me soon. Each abstract will receive three peer reviews. No individual reviewer will have to review more than five abstracts.

Richard repeats the sage advice of his predecessor: "If everyone who writes a paper for the annual meeting proceedings also volunteers to review papers, the number of reviews assigned to each individual would be nice and low."

Workshops and special sessions
Richard received 7 proposals for workshops and special sessions. These were reviewed by ERM officers according to a process and a rubric emailed to the ERM membership at large. We have accepted, for further review:
   • 1 special session proposal
   • 3 workshops proposals

Meetings and social events
ERM meetings and social events for the 2012 ASEE meeting are in early stages of planning. Richard has submitted requests for the usual slate of meetings & social events. For 2012, there are some changes, as follows.

> Mon 12:30 pm Business Meeting & Lunch (historically held on Tuesday)
> Mon 7 pm For-um & Agin-um
> Tue 7 am Breakfast with Champions (historically held on Monday)
> Tue 6:30 pm Brouhaha
> Wed 10:30 Distinguished Lecturer

Discussion:
1. The former Tuesday lunch slot has been pre-empted by ASEE for a new Exhibit Hall Lunch. Therefore, Richard scheduled the business meeting for 12:30 on Monday, thinking that Wednesday might be inconvenient for folks with an early departure. The venue is charging $50 per person for lunch. Richard has set up a ticket price of $30 with ERM subsidizing the balance. Richard estimates 80 attendees with food for 50 ticket buyers. Does anyone want to modify any of these conditions?
2. For-um & Agin-um was not held last year to make room for a social event. The For-um can be brought back this year and Richard has scheduled it for Monday evening. A volunteer is needed to arrange the topic & pro-con speakers. Keep it? Cancel it?
    ERM answer: Keep it – work with the New Engineering Educator and Student Divisions.
3. Richard scheduled the Breakfast with Champions for Tuesday morning because he moved the business meeting to Monday, trying to spread these events out a little bit. The venue is charging $30 per person for breakfast. Richard has set up a ticket price of $15 with ERM subsidizing the balance. Richard estimates 30 attendees with food for 30 ticket buyers. Does anyone want to modify any of these conditions? A volunteer is needed to arrange the topic and facilitate the discussions.
4. Elliott Douglas will report on the Brouhaha. Richard has scheduled a maximum head count of 140, a $45 ticket price, with ERM picking up the balance, 6:30-9:30 pm. In Vancouver last summer, we opened the bar at 6:30, dinner started at about 7:15, a break at 8:15 for the awards, etc, and the DJ stayed until 10 pm. Richard encourages ERM to reserve the venue from 6:30-10pm.

The ERM Brouhaha at the ASEE Annual Meeting in San Antonio will be held on June 19, 2012, 7-10 PM, at The Pavilion (photo can be found in the Addendum), which is located adjacent to the Hilton Hotel next to the Convention Center. The Pavilion was built in the late 1800s and now serves as an event venue. It has two stories with an outdoor balcony on the second floor.

The menu for the Brouhaha includes a fajita station that will have both beef and vegetable fajitas, a brisket station, a vegetable, cheese and fruit station, and a dessert station. Two drink tickets per guest are also included, and choices include mixed drinks, margaritas, mojitos, beer, wine, and soda. Entertainment will be provided by a mariachi band, and there will also be a DJ providing music after the meal. Total cost is based on 150 guests is approximately $9800.

5. The annual picnic is replaced this year with a new "Division Mixer" on Sunday afternoon. All Divisions are invited (but not required) to feature tables staffed by the Division to "showcase and promote themselves to attendees". Light appetizers and complementary soft drinks are provided by ASEE. This event is followed by a welcome reception with an open bar. Does ERM want to set up a table at this mixer? If so, we'll need a volunteers to create it, set it up, and staff it.
   ERM Answer: Ask Kevin Curry to staff it – take the FIE 2012 booth. Don't do it.

Distinguished lecturer
Many thanks to KC Dee for recruiting our distinguished lecturer, Dr. Charles Henderson.

Dr. Henderson is an Associate Professor at Western Michigan University (WMU), with a joint appointment between the Physics Department and the WMU Mallinson Institute for Science Education. Much of his research activity is focused on understanding and improving the slow incorporation of research-based instructional reforms into college-level STEM courses. Research projects have attacked this problem from several directions: in-depth studies of faculty attempting to change their instruction, surveys and interviews with faculty related to their interaction with research-based instructional strategies, and an interdisciplinary literature review of change strategies in higher education.

Dr. Henderson's work has been supported by several National Science Foundation grants and has resulted in a number of publications (see http://homepages.wmich.edu/~chenders/ for details). In spring 2010, Henderson was a Fulbright Scholar with the Finnish Institute for Educational Research at the University of Jyväskylä, Finland. He is currently the Physics Education Research Editor for the American Journal of Physics and a member of the National Research Council Committee on Undergraduate Physics Education Research and Implementation.

His talk is entitled : The Challenges of Spreading and Sustaining Research-Based Instruction in Undergraduate STEM Charles Henderson, Western Michigan University

Abstract: There have been many calls for the reform of introductory Science, Technology, Engineering and Mathematics (STEM) courses. These calls have resulted in a cadre of researchers who study the teaching and learning of undergraduate STEM and have developed instructional methods that improve student learning. There currently exists a substantial gap between research-based knowledge of 'best practice' instructional methods and the teaching practices of typical STEM faculty. This talk will connect data about the spread of research-based

instructional strategies in college-level STEM to ideas from the change literature. Recommendations will be made for how to decrease the knowledge-practice gap.

5. Vice-Chair for FIE 2012 (Seattle, WA, Oct. 2012) Programs – Archie Holmes and Reid Bailey
   No report at this time.

6. Vice-Chair for ASEE 2013 (Atlanta, GA, June 23-26, 2010) Programs – Elliot Douglas
   No report at this time.

7. Vice-Chair for FIE 2013 (Oklahoma City, OK, October 2013) Programs – Teri Reed-Rhoads
   Jim was asked to hold off, planning is beginning – hotel and venue.

8. Vice-Chair for Publications – Dan Budny
   Changes in the next year for publications. This is Jim's last year being involved in the proceedings (currently the proceedings chair). Dan will be shutting down the clearinghouse site. GoDaddy.com is hosting the site – Dan pays a monthly fee. ERM is on the clearinghouse site. So the ERM website is about going away. Maura will talk to ASEE to have them host the ERM site. We have until the end of December to transfer the ERM website from Dan. Can buy a domain name for ERM.org – will cost couple hundred dollars.

Committee reports

1. Apprentice Faculty Grant (AFG) Committee (to be presented at Brouhaha) – Holly Matusovich
   No report at this time.

2. Brochure / Newsletter Editor – Glen Livesay (brochure and bookmark available at NETI)
   No report at this time.

3. Distinguished Service Award Committee (to be presented at FIE 2012) – Maura Borrego
   For FIE 2011 – Jennifer Karlin. Will be presented at the banquet on Friday night. ERM will be awarding the Distinguished Service Award at ASEE starting ASEE 2012.

4. Benjamin Dasher Award Committee (to be presented at FIE 2011) – Susan Donohue / Jenefer Husman
   The 2010 Benjamin Dasher Award recipient is Jeffrey L. Newcomer, Western Washington University, "Inconsistencies in Students' Approaches to Solving Problems in Engineering Statics."

   Honorable mention are:

   Brook Sattler, Deborah Kilgore, and Jennifer Turns, University of Washington, ""I Have Never Spent Time to Think About What I Have Gained From My Projects": Linking Portfolio Development and Life-Long Learning."

   Jacquelyn Kelly, Stephen Krause, and Dale Baker, Arizona State University, "A Pre-Post Topic Assessment Tool for Uncovering Misconceptions and Assessing Their Repair and Conceptual Change."

Jenefer Husman will be replacing Susan Donohue after FIE 2011.

5. Helen Plants Award Committee (to be presented at FIE 2011) – Monica Cardella / Matthew Verleger
For the Helen Plants Award Committee, we are happy to announce that the winner from 2010 is Session T3B: Special Session - A War of Words: Using Sticky Language to Effect Change in Engineering Education. The presenters were Mark H. Somerville, David E. Goldberg, Sherra E. Kerns, and Russell Korte.

For 2011 (this conference) Matthew Verleger is taking Monica Cardella's place as the ERM representative on the Helen Plants Award committee, as she will be one of the presenters for a special session. Matthew will be collecting feedback forms related to the Plants Award. There are six qualified session this year.

6. Best ERM Paper Award for the 2012 ASEE Conference – Senay Purzer
Need volunteers. March time frame for ERM Best Paper reviews. Senay will send out solicitation for reviewers through the ERM email list.

7. Nominating Committee – Julie Martin
Julie Martin has replaced Richard Layton. Ramping up for 2012 elections. Julie would like to use online voting instead of voting via email. Julie will discuss voting with the outgoing Nominating Committee chair.

Additional reports

1. FIE Steering Committee –Beth Eschenbach, Cindy Finelli, Jim Morgan
Looking for people to volunteer for FIE 2015. Also looking for locations for FIE 2015 and beyond. Who is taking over publications? It is unknown – no contracts have been signed.

2. National Effective Teaching Institute (NETI) – Rich Felder

Full 2011 NETI report can be found in the addendum.

Mike, Rebecca, and Rich have been working with Norman Fortenberry on an expansion of the program. They are talking about:

- A second offering of the NETI starting in January 2013, since in the last couple of years they have had to turn away a significant number of applicants to the June offering. All they know for sure about it now is that it will be essentially the same as the June offering and it will be in a warm climate.

- An advanced NETI for alumni of the original one and others who don't need an introductory teaching workshop. The plan is to give it around the dates of FIE in the hope of attracting more attendees to both events, starting in 2012. They haven't firmed up the content, but it will concentrate on instructional methods such as cooperative and problem-based learning, and may also get into the scholarship of teaching and learning. If they do the latter, they will try to do it in a way that complements and doesn't compete with the Smith-Streveler workshop.

- A series of regional teaching workshops to be conducted by Mike Prince.

3. New Faculty Fellows – Krishna Madhavan

There were 12 applicants and 9 fellows. There was an issue with the support mechanism – CASEE is no longer support the New Faculty Fellows. ERM will cover the 9 Faculty Fellows for 2011. The cost is $1000 each. Is this an ERM award or an FIE award? If it is an FIE award – then others societies should contribute. Sloan Foundation was the original $ for New Faculty Fellow. Always had other outside money. Sloan , NSF, FIE sponsoring socieiteis (pg. 19 of program). Needs to be pursued through the steering committee.

Motion to pass the meeting minutes from ASEE 2011 Business meeting.

Old Business

- Monolith testing / Membership – Matthew Verleger / Matt Ohland
  No report since ASEE. Matt Verleger will be contacting ASEE HQ for the trajectory of the system and will prepare a report for ASEE 2012.

- Inter-divisional cooperation – Shane Brown
  Two activities related to IDC:

  The first is the proposed changes that will go to the board, including PIC alignment, and the second is Shane's upcoming efforts to solicit input on IDC activities and work on implementing some of the recommendations.

  Let members know they will be hearing from Shane in the next couple weeks soliciting input on IDC activities?

- Special session at FIE 2011, "Philosophy and its Bearing on Engineering Education" - John Heywood, Trevor Harding, Russell Korte, and Bill Grimson
  The special session had an external evaluation report, since there was NSF support for the session. There were some complaints from the participants that the session organizers lacked diversity. Outcomes = background paper. Website for the workshop material is being set up with Cleerhub (recordings of the sessions).

- Discussion and Voting on Bylaws Updates – Maura Borrego
  - Bylaws require a vote at the ASEE Business meeting. Could we look at an electronic vote – to expedite certain topics? Concerns from some ERM members – electronic vote does not allow for discussion.
  - Pg. section 2.4
  - Page 4 advice (use a footnote for a definition of 'instant runoff')
  - Parts for Vice Chair's for (section 2.3) – clause, cannot be appointed more than 2 years in advance of the conference. Why? The executive board had an issue with appointing out further than 2 years. Amend to say…the chair cannot be appointed until the location had been announced/selected. The General Chair may have someone in mind. For FIE – when the location is approved by the Steering Committee. Same for ASEE?

- Award in the name of Kamyar Haghighi – PK Imbrie

  Several suggestions – AFG in his name, the distinguished lecture in his name. May not have $ to support the AFG indefinitely. Looking at having an endowed position. Slowly build up an endowment when building the awards. An award at the ASEE level – if it is $1000 ($15,000 for endowment), $2,000 ($30,000 for endowment). Award at the National Academy - $2 million for a Medal, could start with an amount and find donors.

New business

- PIC chairs request to form a committee to redesign ASEE conference evals – call for volunteers and ideas.

  Redesign the evaluation. The different options for evaluations – electronic means. What do we do with them? ASEE did send results to session chairs last year. Are they doing counts? Timeframe….by June?

- Fellow Nominations – Ann McKenna

  No report at this time.

- Breakfast with Champions – Euan Lindsay

  Considering finding a theme that will excite deep interest rather than broad interest. Euan figures it is better to have a slightly smaller event with people who are passionate, rather than having a topic so broad that everyone could be interested but nobody really is.

- Pins and new initiatives – Doug Schmucker

  1" square, stainless steel, with ERM logo: $3.50 per pin; 100 min order; plus s/h; $45 art charge unless we can put the logo into vector format; 10 to 14 business days; p.o. preferred; invoice perhaps possible (Midwest Trophy; same folks that do the BCS trophies, and other major sports trophies). We can do something other than stainless that would cost slightly less, but count on about $3/pin.

  Similar quote from a random on-line manufacturer; slightly less at $3.25 per pin plus artwork; quality of pin would less and pin would be smaller.

  Several remaining questions:
  - Are you still wanting "emeritus" on the pin? If so, we'd be stuck for ordering 100 of them. Do you want that many?
  - Preferred size and color (stainless/silver or brass/gold)
  - Are you satisfied with ERM logo or do you want something else?

  Need answers to those questions and we can then move forward with final logistics

  Other Special Projects
  - As yet not identified.
  - Now that the Engr. Educ. field is taking off, a lot of "big" research dollars are being directed to those folks. The potential is that people outside of that community may become disadvantaged yet are many of the people that ERM has successfully engaged in the past.
  - Has anybody thought about outreach to all those folks who teach (only) at those schools without resources for support or other engagement in the scholarship of teaching and learning?

- Is anybody talking about ways to ensure that ERM can continue to engage both those who are interested in the scholarship of research and those who are engaged in the scholarship of application (of best education practices), i.e., the teachers?

ASEE 2013 Program Chair Report
Elliot P. Douglas

The ERM Brouhaha at the ASEE Annual Meeting in San Antonio will be held on June 19, 2012, 7-10 PM, at The Pavilion, which is located adjacent to the Hilton Hotel next to the Convention Center. The Pavilion was built in the late 1800s and now serves as an event venue. It has two stories with an outdoor balcony on the second floor.

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Final Report

2011 NATIONAL EFFECTIVE TEACHING INSTITUTE

Rebecca Brent, Co-Director
President, Education Designs, Inc.

Richard M. Felder, Co-Director
Hoechst Celanese Professor Emeritus of Chemical Engineering
North Carolina State University

Michael J. Prince, Co-Director
Professor of Chemical Engineering
Bucknell University

Susan Lord, NETI Fellow
Professor and Coordinator of Electrical Engineering
University of San Diego

Vancouver, BC, Canada
June 23–25, 2011

The 21ˢᵗ annual National Effective Teaching Institute took place at the Vancouver Convention Center in Vancouver, British Columbia, Canada, on June 23–25, 2011. The facilitators were Rebecca Brent (President, Education Designs, Inc., Cary, North Carolina), Richard Felder (North Carolina State University), Michael Prince (Bucknell University), and NETI Fellow Susan Lord (University of San Diego). Several brief presentations were also given by NETI co-founder and co-director emeritus James Stice (University of Texas at Austin), and staff support was provided by Mas Tadesse and Na'ilah Metwally (ASEE). The participants were 52 professors from 35 different schools (Appendix A). Of the 47 participants who submitted evaluations, 5 had taught less than a year, 32 had between one and five years teaching experience, 6 had five to ten years, and 4 had more than ten years. The NETI has now reached a total of 1099 professors from 223 different schools (Appendix B).

The workshop covered learning and teaching styles; course planning and instructional objectives; assessment of learning; effective lecturing; active learning and inductive teaching and learning; teaching to promote conceptual understanding; gender issues in engineering education; and student problems and problem students. Parallel breakout sessions were held on the second afternoon. One of them, led by Lord and Brent, dealt with the challenges and problems typically faced by new faculty members and proven strategies for overcoming them. The other session for more experienced faculty members was led by Felder and Prince and dealt with improving the climate for engineering education on local campuses. Photos of the workshop are shown at http://www.ncsu.edu/felder-public/NETI/2011_NETI.html.

In their final evaluations, the responding participants gave the workshop 38 "Excellent" ratings, 8 "Good," 1 "Average," and no "Fair" or "Poor" ratings. In their observations of what they liked, participants mentioned the practical, engineering-relevant content (20), enthusiasm, expertise, experience, and approachability of the presenters (9), the active presentation style (8) and the material on active learning (6), meeting and interacting with colleagues (4), the final course planning exercise (4), notebook and references (4), the presenters practicing what they preached (2), the food (2), the crisis clinic (2), the material on learning styles (2), and "everything" (2). When asked what could be improved, four said to spend less time on gender issues, three would have liked more activities, a shorter workshop, and a closer match between the slides and the notebook, two would have liked an expanded discussion of minority issues, an electronic copy of the notebook, more chance to work on their own courses, and more crisis clinics. Twenty of the respondents indicated that they expected to be involved in the presentation of teaching workshops on their own campuses, with several others indicating that they might do so. In the 21 years that the workshop has been given, it has received 767 overall ratings of "Excellent," 211 "Good," 8 "Average," 1 "Fair," and no "Poor" ratings.

The 2012 NETI will take place in San Antonio, TX, on June 7–9, 2012. An announcement along with general information about the NETI can be found on Dr. Felder's website at http://www.ncsu.edu/felder-public/NETI.html. The NETI co-directors have already begun plans for changes in future offerings starting in 2012, of which the most dramatic is that the final course planning exercise will be modified to permit individual participants to workshop their own courses and periodically exchange feedback with one another.

This year registrations for the NETI came in at a much faster rate than ever before and the workshop was full before the end of February (in the past it rarely filled before April). A total

of 23 applicants had to be turned away, and the number would have been larger if numerous potential applicants had not been told that there were no more vacancies. The co-directors have begun preliminary planning with ASEE Executive Director Norman Fortenberry regarding the presentation of a second annual National Effective Teaching Institute. Also being planned is a new Advanced NETI that would focus on intensive learner-centered instructional methods such as cooperative and problem-based learning as well as engineering faculty development.

In 2008, Rebecca Brent and Richard Felder surveyed all of the NETI alumni for whom email addresses could be found regarding the impact of the workshop on their teaching practices, attitudes toward teaching and learning, student ratings, and engagement in educational scholarship and instructional development. The survey was sent to 607 alumni and valid responses were obtained from 319 of them for a 53% response rate. A full report of the survey results presented at the 2009 Annual ASEE Conference can be found at *http://www.ncsu.edu/felder-public/Papers/NETIpaper.pdf*. A paper summarizing the results and discussing their implications for design and assessment of faculty development in engineering and the sciences was published as *J. Engr. Education, 99*(2), 121–134 (2010), and can be found at *http://www.ncsu.edu/felder-public/Papers/NETIpaper(JEE).pdf*.

2011 NATIONAL EFFECTIVE TEACHING INSTITUTE
PRESENTERS AND PARTICIPANTS

Presenters

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Participants

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APPENDIX B
PARTICIPANTS' INSTITUTIONS — 1991-2011

1.   Air Force Institute of Technology (1)
2.   Ajou University-Korea (2)
3.   Arizona State University (5)
4.   Auburn University (1)
5.   Baylor University (2)
6.   Binghamton University (4)
7.   Boise State University (8)
8.   Brigham Young University (1)
9.   Bucknell University (16)
10. California State University-Los Angeles (4)
11. Calvin College (1)
12. Case Western Reserve University (5)
13. Central Connecticut State University (2)
14. Clarkson University (1)
15. Clemson University (26)
16. Cleveland State University (2)
17. Colorado School of Mines (3)
18. Colorado State University (2)
19. Cornell University (13)
20. Cuyahoga Community College (1)
21. Dartmouth College (4)
22. DeVry Institute of Technology–Addison (1)
23. DeVry Institute of Technology–Columbus (1)
24. Duke University (3)
25. Ecole Polytechnique de Montreal (9)
26. Ecole de Technologie Superieure (Montreal) (1)
27. Elizabethtown College (PA) (2)
28. Embry-Riddle Aeronautical University (4)
29. Florida Gulf Coast University (2)
30. Florida Institute of Technology (1)
31. Florida International University (3)
32. Franklin University (1)
33. Gaston College (1)
34. George Fox University (1)
35. Georgia Institute of Technology (10)
36. George Washington University (2)
37. Gonzaga University (3)
38. Grand Valley State University (4)
39. Howard University (3)
40. Humboldt State University (1)
41. Illinois Institute of Technology (4)
42. Indiana University–Purdue University at Indianapolis (17)
43. Iowa State University (11)
44. ITESM-CEM (Mexico) (1)
45. Johns Hopkins University (1)
46. Kansas State University (10)
47. Kettering University (14)

48. Kuwait University (1)
49. Lafayette College (2)
50. Lake Superior State University (2)
51. Lamar University (2)
52. Lawrence Technological University (1)
53. Lehigh University (6)
54. Louisiana State University (1)
55. Louisiana Tech University (7)
56. Loyola Marymount University (4)
57. Manhattan College (3)
58. Marquette University (2)
59. Massachusetts Institute of Technology (1)
60. Mercer University (3)
61. Metropolitan State College of Denver (1)
62. Miami University (Ohio) (4)
63. Michigan State University (19)
64. Michigan Technological University (10)
65. Milwaukee School of Engineering (11)
66. Mississippi State University (13)
67. Missouri University of Science and Technology (36)
68. Montana State University (5)
69. New Jersey Institute of Technology (3)
70. New Mexico Institute of Mining and Technology (3)
71. North Carolina A&T State University (8)
72. North Carolina State University (2)
73. North Dakota State University (6)
74. Northeastern University (6)
75. Northern Alberta Institute of Technology (2)
76. Northern Arizona University (2)
77. Northern Illinois University (3)
78. Northwestern University (2)
79. Ohio Northern University (3)
80. Ohio State University (4)
81. Ohio University (11)
82. Oklahoma Christian University (2)
83. Oklahoma State University (4)
84. Old Dominion University (1)
85. Olivet Nazarene University (1)
86. Oregon State University (1)
87. Penn State University (3)
88. Penn State University – Altoona (1)
89. Penn State University – Erie (1)
90. Polytechnic Institute of New York (2)
91. Portland State University (1)
92. Prairie View A&M University (1)
93. Purdue University (23)
94. Purdue University-Calumet (1)
95. Purdue University-Columbus (1)
96. Queens University (1)
97. Rensselaer Polytechnic Institute (2)
98. Rice University (4)

99. Rochester Institute of Technology (14)
100. Rose-Hulman Institute of Technology (10)
101. Rowan University (16)
102. Royal Military College of Canada (2)
103. Ryerson Polytechnic University (2)
104. Saginaw Valley State University (2)
105. San Jose State University (1)
106. Santa Clara University (4)
107. Seattle University (2)
108. South Dakota State University (17)
109. Southern College of Technology (1)
110. Southern Illinois University (9)
111. Southern Illinois University – Edwardsville (1)
112. Stanford University (1)
113. Stevens Institute of Technology (2)
114. St. Louis University (1)
115. SUNY-Binghamton (3)
116. SUNY-Buffalo (7)
117. Texas A&M University (11)
118. Texas A&M University – Qatar (3)
119. Texas Tech University (3)
120. The Citadel (2)
121. Trinity University (2)
122. Trine University (12)
123. Tufts University (1)
124. Tulane University (5)
125. Tuskegee University (2)
126. Universidad de Las Americas – Puebla (Mexico) (2)
127. Universidad del Turabo (Mexico) (1)
128. University del Valle (Colombia) (1)
129. University of Akron (15)
130. University of Alabama (7)
131. University of Alberta (10)
132. University of Ancona (Italy) (1)
133. University of Arizona (15)
134. University of Arkansas (5)
135. University of Calgary (3)
136. University of California-Berkeley (8)
137. University of California-Los Angeles (3)
138. University of Colorado (3)
139. University of Colorado at Denver (1)
140. University of Connecticut (6)
141. University of Dayton (2)
142. University of Delaware (2)
143. University of Denver (1)
144. University of Detroit–Mercy (1)
145. University of Evansville (1)
146. University of Florida (16)
147. University of Georgia (5)
148. University of Hartford (1)
149. University of Hawaii (3)

150. University of Houston (2)
151. University of Illinois (5)
152. University of Iowa (1)
153. University of Kansas (13)
154. University of Kentucky (3)
155. University of Louisville (8)
156. University of Maine (7)
157. University of Manitoba (1)
158. University of Massachusetts-Dartmouth (1)
159. University of Memphis (5)
160. University of Michigan (15)
161. University of Michigan – Dearborn (1)
162. University of Minho (Portugal) (1)
163. University of Missouri-Columbia (1)
164. University of Nebraska (5)
165. University of Nevada-Reno (1)
166. University of New Hampshire (1)
167. University of New Haven (2)
168. University of New Mexico (5)
169. University of North Carolina at Charlotte (9)
170. University of North Dakota (3)
171. University of Notre Dame (12)
172. University of Oklahoma (4)
173. University of the Pacific (5)
174. University of Pittsburgh (3)
175. University of Pittsburgh at Johnstown (1)
176. University of Portland (2)
177. University of Puerto Rico (1)
178. University of Rochester (1)
179. University of San Diego (5)
180. University of Saskatchewan (2)
181. Université de Sherbrooke (1)
182. University of South Carolina (6)
183. University of Southern California (1)
184. University of Southern Colorado (2)
185. University of South Florida (4)
186. University of Tennessee-Knoxville (5)
187. University of Tennessee-Martin (9)
188. University of Texas-Arlington (1)
189. University of Texas-Austin (23)
190. University of Texas-El Paso (2)
191. University of Texas-Tyler (4)
192. University of Toledo (7)
193. University of Toronto (3)
194. University of Vermont (1)
195. University of Washington (20)
196. University of Waterloo (5)
197. University of Wisconsin (2)
198. University of Wisconsin–Platteville (5)
199. University of Wyoming (4)
200. U.S. Air Force Academy (18)

201. U.S. Military Academy (4)
202. U.S. Naval Academy (1)
203. Utah State University (5)
204. Valparaiso University (15)
205. Vanderbilt University (2)
206. Villanova University (2)
207. Virginia Military Institute (2)
208. Virginia Polytechnic Institute (23)
209. Washington State University (9)
210. Wayne State University (9)
211. Webb Institute (2)
212. Western Kentucky University (3)
213. Western Michigan University (1)
214. Western Washington University (2)
215. West Virginia Institute of Technology (2)
216. West Virginia University (12)
217. Wichita State University (28)
218. Widener University (1)
219. Wilkes University (2)
220. Winona State University (2)
221. Worcester Polytechnic Institute (3)
222. Wright State University (9)
223. Youngstown State University (1)