

William Jerome Leonard

Department of Electrical and Computer Engineering
University of Massachusetts Amherst
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Birth Date: 24 June 1958

Educational Background

1982	University of Massachusetts, Amherst	B.S. (Physics)
1988	University of Massachusetts, Amherst	Ph.D. (Physics)

Dissertation title: *Baryon wave functions and properties in a quark-meson coupling model*

Professional Employment

Univ. of Mass. Senior Lecturer I / Undergrad. Program Director	Sept. 2015 – present
Univ. of Mass. Senior Lecturer I	Sept. 2014 – Sept. 2015
Univ. of Mass. Lecturer	Aug. 2010 – Aug. 2014
Univ. of NC at Greensboro Associate Professor	Aug. 2009 – July 2010
Univ. of Mass. Research Associate Professor	Sept. 2002 – Jun. 2009
Univ. of Mass. Research Assistant Professor	Sept. 1995 – Sept. 2002
Univ. of Mass. Senior Research Assoc. / Lecturer A	Sept. 1993 – Aug. 1995
Univ. of Mass. Senior Research Associate	Sept. 1990 – Aug. 1993
Univ. of Mass. Research Associate	Sept. 1988 – Aug. 1990

Research Interests

- Rate of learning models
- Mastering Circuit Analysis
- Assessing Assessment
- Representations in Instruction and Problem Solving
- Using Analysis Activities to Bridge Conceptual Understanding and Problem Solving
- In-service Teacher Development
- Formative Assessment / Assessing for Understanding

Professional Service

2008, 2015; Manuscript referee, The Physics Teacher
2008; Manuscript referee, Frontiers in Education Proceedings
2001-2003; Associate Editor, Journal of Computing in Higher Education
2002; Manuscript referee, Physics Education Research Conference
1997-2002; Manuscript referee, Journal of Computing in Higher Education
1997; Proposal reviewer, National Science Foundation
1993, 1994, 1997, 2014; Manuscript referee, American Journal of Physics

Awards and Nominations

- 2015 (Spring); UMass Distinguished Teaching Award (non-tenure track faculty)
- 2012 (Spring); nominated, UMass Honors Teaching Excellence Award
- 2009 (Fall); IEEE / ASEE Frontiers in Education Conference Benjamin J. Dasher Award,
for the best paper at FIE 2008 (*Mastering Circuit Analysis: An innovative approach to a
foundational sequence*, with C.V. Hollot and W.J. Gerace)
- 2009; MERLOT Award for Exemplary Online Learning Resources
(*Assessing-to-Learn Physics*, with Ian Beatty and Robert Dufresne)
- 2009 (Spring); UMass College of Engineering Outstanding Teacher Award
- 2008, 2013 (Spring); finalist, UMass Distinguished Teaching Award
- 2006–09, 2011–17 (Spring); IEEE Student Branch Outstanding Faculty (UMass ECE)
- 2002–03, 2006–08, 2010–14 (Fall); nominated, UMass Distinguished Teaching Award
- 1995 (Spring); UMass Distinguished Teaching Award (graduate student category)

Teaching Experience

Electrical and Computer Engineering (UMass)

Fall 2011; ECE 197ME, Methods of Engineering

Summer 2007–12, 2014–17; ECE 296S, Mastering Circuit Analysis II

Winter 2006–09, 2011–13, 2015–17, Summer 2015; ECE 296A, Mastering Circuit Analysis I

Spring 2005–09, 2011–17, Summer 2009–17; ECE 212, Circuit Analysis II

Fall 2004–08, 2010–17, Winter 2009, 2011–17, Summer 2013–17; ECE 211, Circuit Analysis I

Physics (UNCG)

Spring 2010; PHY 323, Mechanics

Fall 2009, Spring 2010; PHY 205L, Conceptual Physics Lab

Fall 2009; PHY 101, Methods, Skills, and Strategies for Physics

Multidisciplinary (UMass)

Spring 2007–09; NSM 597C, Technology-Enhanced Formative Assessment for
Middle and High School Science and Math Teachers II

Winter 2007; EDUC 692CC, Technology-Enhanced Formative Assessment for
Middle and High School Science and Math Teachers I

Fall 1989; NSM 190A, Forming a Scientific Perspective of the World

Physics (UMass)

Spring 2002, 2003; PHYS 151, General Physics I

Fall 2001; PHYS 152, General Physics II

Fall 1998; PHYS 119/597T, Motion, Interactions, and Conservation Laws:
An Active-Learning Approach to Physics

Spring 1993–94; PHYS 182, Physics II (Discussion instructor)

Fall 1992–93; PHYS 181, Physics I (Discussion instructor)

Spring 1990–91; PHYS 162, General Physics II (Discussion instructor)

Fall 1990–91; PHYS 161, General Physics I (Discussion instructor)

A. Publications

34. W.J. Leonard, J.C. Kelly, & W.J. Gerace. *Work in Progress – Implementation and Research of Mastery Learning at an HBCU*. In D. Budny [Ed.], **Proceedings of the 40th Annual ASEE/IEEE Frontiers in Education Conference** (pp. T1A:1–2). Piscataway, NJ: IEEE (2010).
33. W.J. Leonard & W.J. Gerace. *Work in Progress – Application of Mastery Learning in an Introductory Mathematical Physics Course*. In D. Budny [Ed.], **Proceedings of the 40th Annual ASEE/IEEE Frontiers in Education Conference** (pp. F4G:1–2). Piscataway, NJ: IEEE (2010).
32. I.D. Beatty, A. Feldman, W.J. Leonard, W.J. Gerace, K. St. Cyr, H. Lee, & R. Harris. *Teacher Learning of Technology-Enhanced Formative Assessment*. Conference paper accompanying a special symposium presented at the 2008 Annual International Conference of the US National Association for Research in Science Teaching (NARST), Baltimore, MD, April 1, 2008.
31. W.J. Leonard, W.J. Gerace, & C.V. Hollot. *Work In Progress – Implications of the Mastery approach for rates of learning and assessment*. In D. Budny [Ed.], **Proceedings of the 38th Annual ASEE/IEEE Frontiers in Education Conference** (pp. S4A:3–4). Piscataway, NJ: IEEE (2008).
30. W.J. Leonard, C.V. Hollot, & W.J. Gerace. *Mastering Circuit Analysis: An innovative approach to a foundational sequence*. In D. Budny [Ed.], **Proceedings of the 38th Annual ASEE/IEEE Frontiers in Education Conference** (pp. F2H:3–8). Piscataway, NJ: IEEE (2008).
29. I.D. Beatty, W.J. Gerace, A.P. Feldman, & W.J. Leonard. *Technology-Enhanced Formative Assessment: An innovative approach to student-centered science teaching*. Submitted for review to the **2008 ASTE International Conference**, St. Louis, MO (January 2008).
28. B. Leonard. *Minds•On Physics: Redefining physics instruction*. In L. Woolf [Ed.], **American Physical Society Forum on Education Summer 2007 Newsletter** (pp. 24–25). College Park, MD: APS (2007).
27. I.D. Beatty, W.J. Gerace, W.J. Leonard, & R.J. Dufresne. *Designing effective classroom response system questions*. **American Journal of Physics** **74** (1), 31–39 (2006).
26. I.D. Beatty, W.J. Leonard, W.J. Gerace, & R.J. Dufresne. *Teaching science (well) with an audience response system*. In D.A. Banks [Ed.], **Audience Response Systems in Higher Education: Applications and Cases** (pp. 96–115). Hershey, PA: Idea Group (2006).
25. T.C. Thaden-Koch, J.P. Mestre, R.J. Dufresne, W.J. Gerace & W.J. Leonard. *When Transfer Fails: Effect of knowledge, expectations, and observations on transfer in physics*. In J.P. Mestre [Ed.], **Transfer of Learning: Research and Perspectives** (pp. 155–215). Greenwich, CT: Information Age Publishing (2005).
24. T.C. Thaden-Koch, W.J. Gerace, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *A coordination class analysis of judgments about animated motion*. M. Wittmann & R. Scherr (Eds.), **Proceedings of the 2003 Physics Education Research Conference**. Orono, ME: University of Maine (2003).
23. T.C. Koch, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *Student reasoning about an animated physics demonstration: Race results versus realistic rolling*. National Association of Research in Science Teaching 2002 Online Conference Proceedings (2002).

A. Publications (continued)

22. W.J. Leonard, W.J. Gerace & R.J. Dufresne. *Resolución de Problemas Basada en el Análisis. Hacer del análisis y del razonamiento el foco de la enseñanza de la física [Analysis-Based Problem Solving: Making analysis and reasoning the focus of physics instruction]*. **Enseñanza de las Ciencias [Science Teaching]** **20**(3, November): 387–400 (2002).
21. R.J. Dufresne, W.J. Leonard & W.J. Gerace. *Making sense of students' answers to multiple-choice questions*. **The Physics Teacher** **40** (3, March): 174–180 (2002).
20. W.J. Leonard, W.J. Gerace & R.J. Dufresne. *Questions First (Q1st): The challenges, benefits, drawbacks, and results of asking students questions prior to formal instruction*. In S. Franklin, J. Marx & K. Cummings (Eds.), **Proceedings of the 2001 Physics Education Research Conference** (pp. 41–44). Rochester, NY: PERC Publishing (2001).
19. W.J. Leonard. *Dragging a box: The representation of constraints and the constraint of representations*. **The Physics Teacher** **39** (7, October): 412–414 (2001).
18. W.J. Leonard. *Reader Reflections: Problem 12, May 2000*. **The Mathematics Teacher** **94** (3, March): 234, 236 (2001).
17. R.J. Dufresne, W.J. Gerace & W.J. Leonard. *Springbok: The physics of jumping*. **The Physics Teacher** **39**(2, February): 109–115 (2001).
16. W.J. Leonard. *Reader Reflections: Problem 3, May 1999*. **The Mathematics Teacher** **93**(2): 140 (February 2000).
15. B. Leonard. *The difficulty of interpreting simple motion graphs*. **The Physics Teacher** **38**(2): 68–69 (February 2000).
14. W.J. Leonard. *Geometric scaling and the volume of a pyramid*. **New England Mathematics Journal** **30**(1): 36–50 (November 1997).
13. J.P. Mestre, W.J. Gerace, R.J. Dufresne & W.J. Leonard. *Promoting active learning in large classes using a classroom communication system*. In E.F. Redish & J.S. Rigden (Eds.), **The Changing Role of Physics Departments in Modern Universities: Proceedings of the International Conference on Undergraduate Physics Education / Part Two: Sample Classes** (pp. 1019–1036). Woodbury, NY: AIP (1997).
12. L. Wenk, R. Dufresne, W. Gerace, W. Leonard & J. Mestre. *Technology-assisted active learning in large lectures*. In A.P. McNeal and C. D'Avanzo (Eds.), **Student-active science: Models of innovation in college science teaching** (pp. 431–451). Orlando, FL: Saunders College Publishing (1997).
11. R.J. Dufresne, W.J. Gerace & W.J. Leonard. *Solving physics problems with multiple representations*. **The Physics Teacher** **35**(5): 270–275 (May 1997).
10. W.J. Leonard. *Dangers of automated data analysis*. **The Physics Teacher** **35**(4): 220–222 (April 1997).
9. W.J. Leonard. *The dynamics of group effort (insert)*. **The Physics Teacher** **34**(9): 571 (December 1996).
8. W.J. Leonard, R.J. Dufresne & J.P. Mestre. *Using qualitative problem-solving strategies to highlight the role of conceptual knowledge in solving problems*. **American Journal of Physics** **64**(12): 1495–1503 (December 1996).

A. Publications (continued)

7. W.J. Leonard & W.J. Gerace. *The power of simple reasoning*. **The Physics Teacher** **34**(5): 280–283 (May 1996).
6. R.J. Dufresne, W.J. Gerace, W.J. Leonard, J.P. Mestre & L. Wenk. *Classtalk: A classroom communication system for active learning*. **Journal of Computing in Higher Education** **7**(2): 3–47 (Spring 1996).
5. R.J. Dufresne, W.J. Leonard & W.J. Gerace. *Summary of the workshop: ‘Research-based materials for developing a conceptual approach to problem solving in science.’* In D. Grayson (Ed.), **Proceedings of the Workshop on Research in Science and Mathematics Education** (pp. 93–117). Pietermaritzburg, ZA: Teeanem Printers (1992).
4. W.J. Leonard & W.J. Gerace. *Reply to ‘Comment on “Quark–meson coupling model for baryon wave functions and properties.”’* **Phys. Rev. D** **43**(1): 291–292 (1 January 1991).
3. W.J. Leonard & W.J. Gerace. *Quark–meson coupling model for baryon wave functions and properties*. **Phys. Rev. D** **41**(3): 924–936 (1 February 1990).
2. W.J. Leonard. *Baryon wave functions and properties in a quark–meson coupling model*. Univ. of Mass. Ph.D. thesis (September 1988). 165pp.
1. W.J. Gerace, W.J. Leonard & D.A. Sparrow. *Importance of quadrupole coupling for low energy pion charge exchange reactions*. **Phys. Rev. C** **34**(1): 353–356 (July 1986).

B. Books

12. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Teacher's Guide to accompany Minds•On Physics: Advanced Topics in Mechanics.** Dubuque, IA: Kendall/Hunt Publishing. xxxiv+414pp. (2003)
11. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Teacher's Guide to accompany Minds•On Physics: Complex Systems.** Dubuque, IA: Kendall/Hunt Publishing. xxxviii+410pp. (2002).
10. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Minds•On Physics: Complex Systems / Activities & Reader.** Dubuque, IA: Kendall/Hunt Publishing. xxvi+226pp. (2000).
9. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Teacher's Guide to accompany Minds•On Physics: Fundamental Forces & Fields.** Dubuque, IA: Kendall/Hunt Publishing. xxviii+430pp. (1999).
8. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Minds•On Physics: Fundamental Forces & Fields / Activities & Reader.** Dubuque, IA: Kendall/Hunt Publishing. xxiv+183pp. (1999).
7. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Minds•On Physics: Advanced Topics in Mechanics / Activities & Reader.** Dubuque, IA: Kendall/Hunt Publishing. xxiv+149pp. (1999).
6. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Teacher's Guide to accompany Minds•On Physics: Conservation Laws & Concept-Based Problem Solving.** Dubuque, IA: Kendall/Hunt Publishing. xxii+358pp. (1998).
5. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Minds•On Physics: Conservation Laws & Concept-Based Problem Solving / Activities & Reader.** Dubuque, IA: Kendall/Hunt Publishing. xx+204pp. (1998).
4. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Teacher's Guide to accompany Minds•On Physics: Interactions.** Dubuque, IA: Kendall/Hunt Publishing. xxii+350pp. (1998).
3. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Minds•On Physics: Interactions / Activities & Reader.** Dubuque, IA: Kendall/Hunt Publishing. xviii+206pp. (1998).
2. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Teacher's Guide to accompany Minds•On Physics: Motion.** Dubuque, IA: Kendall/Hunt Publishing. xxviii+326pp. (1998).
1. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. **Minds•On Physics: Motion / Activities & Reader.** Dubuque, IA: Kendall/Hunt Publishing. xx+172pp. (1998).

C. Work in Progress

16. W.J. Leonard. *Mastery learning: Helping students build foundational knowledge in college courses.*
15. W.J. Leonard, R.J. Dufresne & W.J. Gerace. *ASK•IT: Assessing Student Knowledge with Instructional Technology.* **Journal of Computing in Higher Education** (in preparation).
14. W.J. Leonard, W.J. Gerace & R.J. Dufresne. *Students' self-assessment of physics knowledge: Why don't they know what they don't know?* **American Journal of Physics** (in preparation).
13. T.C. Koch, R.J. Dufresne, W.J. Leonard & J.P. Mestre. *The context dependence of students' use of physics knowledge.* **Physics Education Research** [Supplement to the **American Journal of Physics**] (in preparation).
12. W.J. Leonard. *Distinguishing force and torque.* **The Physics Teacher** (submitted February 2001).
11. W.J. Gerace, R.J. Dufresne & W.J. Leonard. *Concept-Based Problem Solving: Aligning desirable habits of mind with beneficial cognitive goals.* In D. Chirnside (Ed.), **Neat Zippy Ideas in Physics**. Christchurch, New Zealand: NZIP Education Committee (accepted).
10. W.J. Gerace, R.J. Dufresne, W.J. Leonard & J.P. Mestre. *Minds•On Physics: Materials for developing concept-based problem-solving skills in physics.* In D. Chirnside (Ed.), **Neat Zippy Ideas in Physics**. Christchurch, New Zealand: NZIP Education Committee (accepted).
9. W.J. Leonard. *Every Decision Counts (EDC): A multiple-choice format for improving student attitudes and increasing the precision of assessments.* (work in progress).
8. W.J. Leonard. *Making a case for conceptual rigor.* (work in progress).
7. R.J. Dufresne & W.J. Leonard. *Understanding two-dimensional field line diagrams of three-dimensional fields.* (work in progress).
6. R.J. Dufresne & W.J. Leonard. *Understanding the work done by friction.* (in preparation).
5. P.M. Vishton & W.J. Leonard. *Judgments of natural and anomalous trajectories for balls rolling along tracks: A comparison of experts and novices.* (work in progress).
4. W.J. Leonard. *Metaphorical Reasoning: Using extended metaphors to develop new insights into teaching and learning.* (work in progress).
3. W.J. Leonard. *Teaching simultaneity in special relativity.* (work in progress).
2. W.J. Gerace, R.J. Dufresne & W.J. Leonard. *Uncovering students' ideas about acceleration.* (in preparation).
1. W.J. Gerace & W.J. Leonard. *Using analysis activities to bridge the gap between conceptual understanding and problem-solving ability.* (in preparation).

D. Technical Reports

15. R.J. Dufresne, W.J. Gerace & W.J. Leonard. *Assessing-To-Learn (A2L): Reflective Formative Assessment Using a Classroom Communication System*. Invited workshop paper available online at <http://stemtec.org/pathways/Proceedings/Papers/Dufres-p.pdf>; also available on a CD-ROM assembled by STEMTEC. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-2002#05-APR#1-15pp. (2002).
14. W.J. Leonard, W.J. Gerace & R.J. Dufresne. *Analysis-Based Problem Solving: Making analysis and reasoning the focus of physics instruction*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-2001#12-AUG#3-v.2-23pp. (2001).
13. R.J. Dufresne, W.J. Gerace, J.P. Mestre & W.J. Leonard. *ASK•IT / A2L: Assessing Student Knowledge with Instructional Technology*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-2000#09-SEP#1-28pp. (2000).
12. W.J. Gerace, R.J. Dufresne, W.J. Leonard & J.P. Mestre. *Minds-On Physics: Materials for developing concept-based problem-solving skills in physics*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-2000#08-AUG#1-v.10-8pp (2000).
11. W.J. Leonard, W.J. Gerace & R.J. Dufresne. *Concept-Based Problem Solving: Making concepts the language of physics*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1999#12-NOV#3-18pp (1999).
10. W.J. Gerace, R.J. Dufresne & W.J. Leonard. *Using technology to implement active learning in large classes*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1999#11-NOV#2-22pp (1999).
9. W.J. Leonard & W.J. Gerace. *A demonstration of kinematics principles*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1999#07-JUL#2-v.2-10pp (1996).
8. N.R. Greene & W.J. Leonard. *Theory can be misleading: Balls on tracks revisited (again)*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1998#01-JAN#1-v.2-4pp (1998).
7. W.J. Gerace & W.J. Leonard. *Promoting active learning with a classroom communication system*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1997#18-NOV#3-4pp (1997).
6. W.J. Gerace, R.J. Dufresne & W.J. Leonard. *A framework for the storage of knowledge and its implications for problem solving*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1997#01-MAY#1-19pp (1997).
5. W.J. Leonard & W.J. Gerace. *Students' reflections on an introductory physics course*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1994#13-AUG#3-6pp (1994).
4. W.J. Leonard & W.J. Gerace. *Exams as a learning experience for students and teachers*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1994#12-AUG#2-12pp (1994).
3. W.J. Leonard, R.J. Dufresne & J.P. Mestre. *Writing strategies to develop conceptual understanding of physics*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1994#10-MAY#1-v.2-19pp (1994).

D. Technical Reports (continued)

2. W.J. Leonard, W.J. Gerace, R.J. Dufresne & J.P. Mestre. *Concept-based problem solving in physics*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1994#08-APR#1-v.2-16pp (1994).
1. W.J. Leonard, R.J. Dufresne & W.J. Gerace. *A constructivist lesson outline*. University of Massachusetts Physics Education Research Group Tech. Rep. PERG-1994#02-JAN#2-14pp (1994).

E. Abstracts

32. K. St. Cyr, I.D. Beatty, A. Feldman, W.J. Gerace, & W.J. Leonard. *Teacher change facilitated by sustained school situated professional development: Exemplar learning of Technology Enhanced Formative Assessment (TEFA)*. Paper presented at the **2009 Association for Science Teacher Education (ASTE) International Conference**, Hartford, CT, Jan. 8–10, 2009.
31. I.D. Beatty, A. Feldman, W.J. Leonard, W.J. Gerace, K. St. Cyr, H. Lee, & R. Harris. *Teacher Learning of Technology-Enhanced Formative Assessment*. Special symposium presented at the **2008 Annual International Conference of the US National Association for Research in Science Teaching (NARST)**, Baltimore, MD, March 30–April 2, 2008. (Presented by I.D. Beatty.)
30. A.P. Feldman, I.D. Beatty, W.J. Leonard, & W.J. Gerace. *Technology-Enhanced Formative Assessment: An innovative approach to the teaching and learning of science*. **2008 AERA Annual Meeting**, New York, NY, March 24–28, 2008. (Presented by A. Feldman.)
29. I.D. Beatty, W.J. Gerace, A.P. Feldman, & W.J. Leonard. *Technology-Enhanced Formative Assessment: An innovative approach to student-centered science teaching*. **2008 ASTE International Conference**, St. Louis, MO, January 10–12, 2008. (Presented by A. Feldman.)
28. I.D. Beatty, W.J. Gerace & W.J. Leonard. *Illuminating Teacher Learning of Technology-Enhanced Formative Assessment*. **AAPT Announcer**, **36**, #2 (Summer), Contributed Paper, p. 133 (2006). Presented at the Contributed Session on Classroom Response Systems, Part I, for the Summer Meeting of the American Association of Physics Teachers, Syracuse NY, July 22–26, 2006. (Presented by I. Beatty.)
27. I.D. Beatty, W.J. Gerace & W.J. Leonard. *Designing effective questions for classroom response system teaching*. **AAPT Announcer**, **34**, #4 (Winter), Contributed Paper BL05, p. 84 (2004). Presented at the Contributed Session on Classroom Response Systems, Part I, for the Winter Meeting of the American Association of Physics Teachers, Albuquerque, NM, January 8–12, 2005. (Presented by I. Beatty.)
26. I. Beatty, W.J. Leonard, R.J. Dufresne, & W.J. Gerace. *Bridging conceptual understanding to problem solving through qualitative analysis activities*. **AAPT Announcer**, **34**, #2 (Summer), Invited Paper DG03, p. 142 (2004). Presented at the Invited Session on Bridging Conceptual Understanding and Problem Solving, for the Summer Meeting of the American Association of Physics Teachers, Sacramento, CA, July 31–August 4, 2004. (Presented by I. Beatty.)
25. T.C. Koch, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *Student reasoning about an animated physics demonstration: Race results versus realistic rolling*. National Association of Research in Science Teaching 2002 National Conference. New Orleans, LA, April 7–10, 2002. (Presented by T. Koch.)
24. T.C. Koch, J.P. Mestre, W.J. Leonard & R.J. Dufresne. *Student Reasoning: Race results vs. realistic rolling*. **AAPT Announcer**, **30**, #4 (Winter), Contributed Paper EG06, p. 119 (2000). Presented at the Contributed Session on PER Assessment, Part I, for the Joint Winter Meeting of the American Association of Physics Teachers and the American Astronomical Society, San Diego, CA, January 6–11, 2001. (Presented by T. Koch.)
23. R.J. Dufresne, W.J. Gerace, J.P. Mestre & W.J. Leonard. *Assessing to Learn (A2L): Research on teacher implementation of continuous formative assessment*. **AAPT Announcer**, **30**, #4 (Winter), Contributed Paper EG03, p. 119 (2000). Presented at the Contributed Session on PER Assessment, Part I, for the Joint Winter Meeting of the American Association of Physics Teachers and the American Astronomical Society, San Diego, CA, January 6–11, 2001. (Presented by R. Dufresne.)

E. Abstracts (continued)

22. J.P. Mestre, R.J. Dufresne, W.J. Gerace & W.J. Leonard. *The multidimensionality of assessing for understanding*. **AAPT Announcer**, **30**, #4 (Winter), Contributed Paper EG01, p. 118 (2000). Presented at the Contributed Session on PER Assessment, Part I, for the Joint Winter Meeting of the American Association of Physics Teachers and the American Astronomical Society, San Diego, CA, January 6–11, 2001. (Presented by J. Mestre.)
21. J.P. Mestre, R.J. Dufresne, W.J. Gerace & W.J. Leonard. *Assessing to Learn: Formative assessment materials for high school physics*. Poster presented at the Physics Education Research Conference, Guelph, Ontario, CANADA, August 2–3, 2000. (Presented by J. Mestre.)
20. T.C. Koch, J.P. Mestre, W.J. Leonard & R.J. Dufresne. *Animation and Video vs. Paper: Does representation affect students' predictions?* **AAPT Announcer**, **30**, #2 (Summer), Contributed Paper AB08, p. 75 (2000). Presented at the Contributed Session on Simulations and Computation, for the Summer Meeting of the American Association of Physics Teachers, University of Guelph, Guelph, Ontario, CANADA, July 29–Aug 2, 2000. (Presentation canceled.)
19. W.J. Leonard, W.J. Gerace, J.P. Mestre & R.J. Dufresne. *Multiple-Choice Questions: Searching for some answers*. **AAPT Announcer**, **29**, #4 (December), Contributed Paper FB2, p. 99 (1999). Presented at the Contributed Session on PER: Basic Research and Tool Analysis, for the Winter Meeting of the American Association of Physics Teachers, Kissimmee, FL, January 15–19, 2000. (Presented by R. Dufresne.)
18. W.J. Gerace, J.P. Mestre, W.J. Leonard & R.J. Dufresne. *Assessing to Learn (A2L): Formative assessment for high-school physics*. **AAPT Announcer**, **29**, #4 (December), Contributed Paper DF1, p. 88 (1999). Presented at the Contributed Session on PER: Assessing Methods of Instruction, for the Winter Meeting of the American Association of Physics Teachers, Kissimmee, FL, January 15–19, 2000. (Presented by R. Dufresne.)
17. R.J. Dufresne, W.J. Gerace, W.J. Leonard & J.P. Mestre. *Physics Analysis Workbench (PAW): Incorporating conceptual analysis into physics electronic homework*. **AAPT Announcer**, **29**, #4 (December), Contributed Paper AG2, p. 58 (1999). Presented at the Contributed Session on PER: Assessing Technological Tools, for the Winter Meeting of the American Association of Physics Teachers, Kissimmee, FL, January 15–19, 2000. (Presented by R. Dufresne.)
16. M. Oliphant, W. Leonard, W. Gerace, R. Dufresne & J. Mestre. *MINDS-ON PHYSICS: Curriculum materials for developing concept-based problem-solving skills in physics*. Two presentations at the AEL/RBS Curriculum Showcase Conference on Standards-Based Mathematics & Science Programs, Washington, DC, July 25–27, 1999. (Presented by M. Oliphant.)
15. M. Oliphant, W. Leonard, W. Gerace, R. Dufresne & J. Mestre. *MINDS-ON PHYSICS: Curriculum materials for developing concept-based problem-solving skills in physics*. Two presentations at the Mid-Atlantic Curriculum Showcase Conference, Harrisburg, PA, July 26–28, 1998. (Presented by M. Oliphant.)
14. W.J. Gerace & W.J. Leonard. *Promoting active learning with a classroom communication system*. Abstract printed in the conference program for the 10th Teachers Teaching with Technology International Conference, Nashville, TN, March 13–15, 1998. (Presentation canceled.)

E. Abstracts (continued)

13. W. Gerace, J. Mestre, R. Dufresne & W. Leonard. *Active learning using Classtalk*. Presented at the Concurrent Session on Active Learning with Technology, for the Innovations in Instructional Technology Conference, sponsored by the UMass-Amherst Center for Teaching, Amherst, MA, January 22, 1998. (Presented by R. Dufresne.)
12. J. Mestre, R. Dufresne, W. Gerace & W. Leonard. *Pedagogical strategies for active learning in large introductory classes using the Classtalk classroom communication system*. **AAPT Announcer**, **27**, #4 (December), Invited Paper BD2, p. 90 (1997). Presented at the Invited Session on Pedagogical Techniques for Classroom Communication Systems, for the Winter Meeting of the American Association of Physics Teachers, New Orleans, LA, January 3-8, 1998. (Presented by J. Mestre.)
11. R.J. Dufresne, W.J. Gerace, W.J. Leonard & J.P. Mestre. *Transforming passive lecture courses into active learning environments with a classroom communication system*. Presented at the Concurrent Session on Active Learning, for the UMass Instructional Technology Conference '97 Teaching, Learning and Technology: Building Synergy, Boxborough, MA, April 17, 1997. (Presented by J. Mestre.)
10. J. Mestre, W. Gerace, R. Dufresne & W. Leonard. *Turning passive lectures into interactive learning environments with a classroom communication system*. **Bulletin of the American Physical Society**, **40**, #2 (April), Invited Paper A3-1, p. 917 (1995). Presented at the Invited Session on Enhancing Physics Learning via Research: Technology-Induced Interaction in Lecture Settings, for the Joint April Meeting of the American Physical Society and the American Association of Physics Teachers, Washington, DC, April 17-21, 1995. (Presented by J. Mestre.)
9. J. Mestre, R. Dufresne, W. Gerace & W. Leonard. *Probing conceptual understanding through the posing of problems*. **AAPT Announcer**, **24**, #4 (December), Invited Paper ED4, p. 76 (December 1994). Presented at the Winter Meeting of the American Association of Physics Teachers, Orlando, FL, January 14-19, 1995. (Presented by J. Mestre.)
8. J. Mestre, W. Gerace, R. Dufresne & W. Leonard. *Turning passive lectures into interactive learning environments with a classroom communication system*. **AAPT Announcer**, **24**, #4 (December), Invited Paper CC1, p. 63 (December 1994). Presented at the Winter Meeting of the American Association of Physics Teachers, Orlando, FL, January 14-19, 1995. (Presented by J. Mestre.)
7. W. Gerace, R. Dufresne, W. Leonard & J. Mestre. *MINDS-ON PHYSICS: An integrated curriculum for developing concept-based problem-solving skills*. **AAPT Announcer**, **24**, #2 (July), Contributed Paper FD7, p. 102 (July 1994). Presented at the Summer Meeting of the American Association of Physics Teachers, University of Notre Dame, Notre Dame, IN, August 8-13, 1994. (Presented by W. Gerace.)
6. R. Dufresne, W. Gerace, W. Leonard & J. Mestre. *Using 'Extended Scenario' to enhance learning during interactive lectures*. **AAPT Announcer**, **24**, #2 (July), Contributed Paper BC2, p. 60 (July 1994). Presented at the Summer Meeting of the American Association of Physics Teachers, University of Notre Dame, Notre Dame, IN, August 8-13, 1994. (Presented by W. Gerace.)
5. R. Dufresne, W. Gerace, W. Leonard & J. Mestre. *CONPSEP: A concept-based problem-solving environment for introductory physics*. **AAPT Announcer**, **22**, #4 (December), Contributed Paper FH3, p. 83 (December 1992). Presented at the Winter Meeting of the American Association of Physics Teachers, New Orleans, LA, January 3-7, 1993. (Presented by R. Dufresne.)

E. Abstracts (continued)

4. R. Dufresne, W. Gerace, W. Leonard & J. Mestre. *The long-term effects of teaching undergraduates to construct concept-based problem-solving strategies.* **AAPT Announcer** (Supplement to the June 1992 issue) (August 1992). Contributed Paper presented at the Summer Meeting of the American Association of Physics Teachers, University of Maine, Orono, ME, August 10–15, 1992. (Presented by R. Dufresne.)
3. R. Dufresne, W. Gerace, W. Leonard & J. Mestre. *The value of teaching undergraduates to construct concept-based problem-solving strategies.* **AAPT Announcer**, **21**, #4 (December), Contributed Paper GA2, p. 78 (December 1991). Presented at the Joint Winter Meeting of the American Association of Physics Teachers and the American Physical Society, Orlando, FL, January 4–9, 1992. (Presented by R. Dufresne.)
2. R. Dufresne, W. Gerace, J. Mestre & W. Leonard. *Developing students' conceptual understanding of mechanics.* **AAPT Announcer**, **20**, #4 (December), Contributed Paper BA2, p. 48 (December 1990). Presented at the Annual Meeting of the American Association of Physics Teachers, San Antonio, TX, January 19–23, 1991. (Presented by J. Mestre.)
1. J.S. Touger, W.J. Gerace, J.P. Mestre & W.J. Leonard. *Nurturing the shift from formula-centered to hierarchically organized knowledge of physics.* **AAPT Announcer**, **16**, #4 (December), p. 74 (December 1986). Presented at the Annual Meeting of the American Association of Physics Teachers, San Francisco, CA, January 28–31, 1987. (Presented by J. Touger.)

F. Presentations

70. B. Leonard. *Faculty Chat*. Invited discussion for the College of Engineering Peer Mentoring Program. Leach Hall, University of Massachusetts, Amherst, MA, October 12, 2017.
69. B. Leonard. *Faculty Chat*. Invited discussion for the College of Engineering Peer Mentoring Program. Van Meter Hall, University of Massachusetts, Amherst, MA, March 8, 2017.
68. B. Leonard. *Faculty Chat*. Invited discussion for the College of Engineering Peer Mentoring Program. Dickinson Hall, University of Massachusetts, Amherst, MA, March 22, 2016.
67. B. Leonard. *Are you afraid of failure?* Invited discussion for the College of Engineering Peer Mentoring Program. Leach Hall, University of Massachusetts, Amherst, MA, October 24, 2015.
66. B. Leonard. *Embracing Error: Mastery Learning in Circuit Analysis*. Invited presentation. Northeast Regional Electrical and Computer Engineering Department Heads Meeting, University of Massachusetts, Amherst, MA, October 18, 2014.
65. B. Leonard. *Every Decision Counts (for Better Assessment): Redesigning multiple-choice assessments*. Invited presentation. Department of Electrical and Computer Engineering Faculty Retreat, Mount Holyoke College, South Hadley, MA, January 16, 2014.
64. B. Leonard. *Pirate parties, GPS devices, and elevators: Bringing the everyday into every classroom*. Invited presentation. Teaching Arts Lunch, Smith College, Northampton, MA, September 13, 2013.
63. B. Leonard. *MOOCs: My predictions*. Invited presentation. Department of Electrical and Computer Engineering Faculty Retreat, Mount Holyoke College, South Hadley, MA, January 17, 2013.
62. B. Leonard. *Work In Progress – Application of Mastery Learning in an Introductory Mathematical Physics Course*. **40th Annual ASEE/IEEE Frontiers in Education Conference**, Washington, DC, October 29, 2010.
61. B. Leonard. *Work In Progress – Implementation and Research of Mastery Learning at an HBCU*. **40th Annual ASEE/IEEE Frontiers in Education Conference**, Washington, DC, October 28, 2010.
60. B. Leonard. *Work In Progress – Implications of the Mastery approach for rates of learning and assessment*. **38th Annual ASEE/IEEE Frontiers in Education Conference**, Saratoga Springs, NY, October 25, 2008.
59. B. Leonard. *Mastering Circuit Analysis: An innovative approach to a foundational sequence*. **38th Annual ASEE/IEEE Frontiers in Education Conference**, Saratoga Springs, NY, October 24, 2008.
58. B. Leonard. *Instructional Innovations: Four ways to change the classroom dynamic*. Invited presentation. **Summer Institute on Student Engagement**, Berkshire Community College, Pittsfield, MA, May 29, 2008.
57. B. Leonard. *Mastering Circuit Analysis: A laboratory for student learning in an engineering course*. Invited presentation. College of Engineering, Cornell University, Ithaca, NY, May 15, 2008.
56. B. Leonard. *Alternative Assessments: Windows into student learning in technical courses*. Invited presentation. Department of Physics, University of North Carolina Greensboro, Greensboro, NC, April 24, 2008.

F. Presentations (continued)

55. R. Dufresne, B. Gerace, B. Leonard, J. Mestre, & I. Beatty. *Assessing-to-Learn Physics (A2L)*. Invited poster presented at the **2007 Discovery Research K-12 PI Conference**, Crystal City, VA, September 9–11, 2007.
54. B. Leonard, I. Beatty, B. Gerace, & A. Feldman. *Teacher learning of technology-enhanced formative assessment (TLT)*. Invited poster presented at the **2007 Discovery Research K-12 PI Conference**, Crystal City, VA, September 9–11, 2007.
53. B. Leonard, I. Beatty, B. Gerace, & A. Feldman. *Teacher learning of technology-enhanced formative assessment*. Invited poster presented at the **2006 Teacher Professional Continuum PI Conference**, Reston, VA, May 7–9, 2006.
52. B. Leonard & B. Gerace. *Classroom Response Systems: A lecture and a demonstration*. Invited interactive presentation, Department of Physics, College of the Holy Cross, Worcester, MA, July 19, 2005.
51. B. Leonard. *Misunderstandings, Deliberate Deceptions, and Unacceptable Truths: A context for understanding communication and assessment in the science and math classroom*. Invited keynote at the **Tenth Annual Colloquium on Research in Mathematics and Science Education**. University of Massachusetts, Lowell, MA, April 7, 2005.
50. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive presentation for the Fairfax County (VA) Public Schools, Marshall High School, Falls Church, VA, July 12, 2004.
49. B. Leonard, B. Dufresne, B. Gerace, & J. Mestre. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited poster presented at the **2004 NSF (National Science Foundation) K-12 Math, Science, and Technology Curriculum Developers Conference**, Arlington, VA, May 9–12, 2004.
48. B. Leonard. *Misunderstandings, Deliberate Deceptions, and Unacceptable Truths: A context for understanding communication and assessment in the science classroom*. Invited interactive seminar, Department of Physics, James Madison University, Harrisonburg, VA, February 10, 2004.
47. B. Leonard. *Misunderstandings, Deliberate Deceptions, and Unacceptable Truths: A context for understanding communication and assessment in the science classroom*. Invited interactive colloquium, Physics Department, Purdue University, West Lafayette, IN, January 29, 2004.
46. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive presentations (2) for the Chicago Public Schools Math and Science Initiative **High School Math and Science Curriculum Materials Showcase**, Museum of Science and Industry, Chicago, IL, January 15–16, 2004.
45. B. Leonard. *Mental Models: How prior knowledge, perceptions, language, and representations impact the learning of science*. Invited interactive presentation for the Watershed–Integrated Sciences Partnership (WISP) project, UMass-Boston, Boston, MA, November 15, 2003.
44. B. Leonard, B. Dufresne, B. Gerace & J. Mestre. *Researching the Role of Qualitative Analysis: ROLE-0106771*. Invited poster presented at the **2003 National Science Foundation REC (Research, Evaluation, and Communication) Division PI Meeting**, Crystal City, VA, October 27–28, 2003.

F. Presentations (continued)

43. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive presentation for the West Ottawa School District, Holland, MI, July 15, 2003.
42. B. Leonard, B. Dufresne, B. Gerace, and J. Mestre. *Minds-On Physics: Curriculum materials for active learning and thoughtful engagement*. Poster presented at the **National Science Foundation K-12 Math, Science Curriculum and Implementation Conference**, Arlington, VA, January 26–29, 2003.
41. W.J. Leonard, J. Dick & A. Marquis. *Every Decision Counts (EDC): Improving student attitudes on multiple-choice assessments while gathering more precise feedback about student reasoning and problem solving*. Seminar for the Scientific Reasoning Research Institute at the University of Massachusetts, Amherst, MA, December 5, 2002.
40. W.J. Leonard. *Clever deceptions, silly misunderstandings, and unacceptable truths: Thoughts on politics, relationships, communication, and education*. Invited colloquium for the Physics Department at Worcester Polytechnic Institute, Worcester, MA, October 7, 2002.
39. W.J. Leonard. *Resisting the Lure: Using new technologies to motivate rather than seduce*. Invited presentation and panel discussion for the Worcester State College Center for Teaching and Learning conference, **Beyond the Use of Technology for Technology's Sake: Developing a Pedagogy and Philosophy for Today's Learning Environment**, Worcester, MA, October 2, 2002.
38. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive presentations (3) at the (Pittsburgh Area) Math and Science Collaborative's **High School Science Curriculum Showcase**, Pittsburgh, PA, May 15, 2002.
37. W.J. Leonard. *Changing the Way We Teach*. Invited presentation and panel discussion for the Five College conference, **Transforming Practice with Technology**, University of Massachusetts, Amherst, MA, March 1, 2002.
36. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive presentation at the New Jersey State Systemic Initiative's **Mathematics and Science Curriculum Showcase**, Somerset, NJ, December 4, 2001.
35. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive video-conference presentation at the K-12 Science Curriculum Dissemination Center's **Showcase of Research-Based Science Materials**, Amherst, MA-Sioux Falls, SD, October 10, 2001.
34. W.J. Leonard, W.J. Gerace & R.J. Dufresne. *Questions First (Q1ST): The challenges, benefits, drawbacks, and results of asking students questions prior to formal instruction*. **AAPT Announcer**, **31**, #2 (Summer), Invited Paper FF02, p. 137 (2001). Presented at the Invited Session on Studying Student Learning Through Classroom Behaviors, Rochester, NY, July 21–25, 2001.
33. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Invited interactive presentation at **Windows on the New Century**, the 33rd Annual Meeting of the Massachusetts Association of Science Supervisors, Worcester, MA, May 4, 2001.
32. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement*. Two [2] invited interactive presentations at the **Science Curriculum Materials Review Conference**, sponsored by the Georgia Science Supervisors Association and the Georgia Science Teachers Association, Fayetteville, GA, April 24, 2001.

F. Presentations (continued)

31. W.J. Leonard. *Goofs and Gaffs: Honest mistakes or deliberate deceptions?* Invited seminar for the Scientific Reasoning Research Institute, University of Massachusetts, Amherst, MA, April 12, 2001.
30. B. Leonard. *Minds•On Physics: Curriculum materials for active learning and thoughtful engagement.* Invited interactive presentation at **2001: A Science Odyssey**, the Annual Meeting of the Georgia Science Teachers Association, Macon, GA, February 10, 2001.
29. B. Leonard. *Minds•On Physics: Curriculum materials for developing concept-based problem-solving skills in physics.* Invited interactive presentation for the Grand Rapids Public School District, Grand Rapids, MI, February 6, 2001.
28. W.J. Leonard, W.J. Gerace, R.J. Dufresne & J.P. Mestre. *Minds•On Physics: Materials for developing concept-based problem-solving skills.* Invited Poster Session at the Annual NSF K-12 Math, Science Implementation Project Conference, Arlington, VA, February 1-4, 2001.
27. W.J. Leonard. *Minds•On Physics: Materials for developing concept-based problem-solving skills.* Invited interactive presentation at **the 32nd Annual Meeting of the Massachusetts Association of Science Supervisors**, Marlborough, MA, May 3, 2000.
26. W.J. Leonard. *Minds•On Physics: Materials for developing concept-based problem-solving skills.* Invited interactive presentation at **Considering New Science Curricula**, Phoenix, AZ, February 17, 2000.
25. W.J. Leonard, R.J. Dufresne, W.J. Gerace & J.P. Mestre. *Minds•On Physics: Materials for developing concept-based problem-solving skills.* Poster Session at the National Science Foundation Conference for Developers of Comprehensive K-12 Math and Science Curriculum Programs, Alexandria, VA, February 3-6, 2000.
24. W. Gerace & W. Leonard. *Teaching vs. Learning: Changing perspectives.* Invited interactive seminar, Department of Physics, University of Natal, Durban, South Africa, August 18, 1999.
23. W. Gerace & W. Leonard. *Teachers modeling pupils; pupils modeling the world.* Interactive seminar, Center for the Advancement of Science and Mathematics Education, Durban, South Africa, August 18, 1999.
22. W. Gerace & W. Leonard. *Teaching vs. Learning: Changing perspectives.* Invited interactive seminar, Potchefstroom University, Potchefstroom, South Africa, August 11, 1999.
21. W. Gerace & W. Leonard. *Science education in community schools.* Invited interactive presentation at the **Community Education Conference**, Rand Afrikaans University, Johannesburg, South Africa, August 7, 1999.
20. W. Leonard & D. Lee. *Exploring Ideas About Fluids.* Interactive presentation and demonstration, sponsored by Kendall/Hunt Publishing Company, at the National Science Teachers Association National Convention, Boston, MA, March 27, 1999.
19. C. Camp, C. Emery, W. Gerace & W. Leonard. *Aligning perspectives and expectation for physical science curricula in high school and college.* Invited Panel Presentation and Discussion at **The New High School Graduate: What colleges can expect**, Milford, MA, December 4, 1998.
18. W. Leonard & W. Gerace. *Multiple-Choice Questions: What do students' answers really mean?* Interactive Seminar presented at the Invited Session on Issues in Undergraduate Education, for the 1998 Fall Meeting of the New England Section of the American Physical Society, Department of Physics, University of New Hampshire, Durham, NH, October 23, 1998.

F. Presentations (continued)

17. W. Gerace & W. Leonard. *Teaching vs. Learning: Changing perspectives*. Interactive Seminar for Science Faculty, Mount Holyoke College, South Hadley, MA, December 17, 1997.
16. W. Gerace & W. Leonard. *Teaching vs. Learning: Changing perspectives*. Physics Department Colloquium, University of New Hampshire, Durham, NH, November 10, 1997.
15. W. Gerace, W. Leonard, R. Dufresne, J. Mestre & A. Feldman. *Minds-On Physics: Materials for Developing Concept-based Problem-Solving Skills*. **AAPT Announcer**, **27**, #2 (July), Invited Paper BC1, p. 85 (July 1997). Presented at the Invited and Contributed Session on Applications of Physics Education Research to Curriculum Development, for the Summer Meeting of the American Association of Physics Teachers, University of Denver, Denver, CO, August 11-16, 1997.
14. W.J. Leonard. *Using an alternative representation to develop insights about common situations*. Physics Department Colloquium, Amherst College, Amherst, MA, February 27, 1997.
13. W. Gerace & W. Leonard. *Alternative views of science education*. Interactive seminar given for in-service secondary school physical science teachers, University of Potchefstroom, Potchefstroom, South Africa, January 13, 1997.
12. W. Gerace & W. Leonard. *Learning vs. teaching: Changing perspectives*. Interactive seminar given at the request of the Physics Faculty of the University of Natal, Durban, South Africa, December 6, 1996.
11. W.J. Leonard. *The use of an alternative representation to develop new physical intuitions about common situations*. Interactive seminar given to the Physics Faculty of the University of Natal-Durban, Durban, South Africa, November 12, 1996.
10. W. Gerace & W. Leonard. *Learning vs. teaching: Changing perspectives*. Interactive seminar given for the Physics Faculty of the University of South Africa, Pretoria, South Africa, October 30, 1996.
9. W. Gerace & W. Leonard. *A brief introduction to physics education research*. Interactive seminar given to the Physics Faculty of the University of Durban-Westville, Westville, South Africa, September 20, 1996.
8. W.J. Leonard. *Classroom implementation of MOPs activities*. Given at the Minds-On Physics Workshop, Mt. Holyoke College, South Hadley, MA, July 31-August 4, 1995.
7. W.J. Leonard. *Working, learning, and communicating in collaborative groups*. Given at the Minds-On Physics Workshop, Mt. Holyoke College, South Hadley, MA, July 31-August 4, 1995.
6. W. Leonard, R. Dufresne, W. Gerace & J. Mestre. *Assessment as a learning experience for students and teachers*. **AAPT Announcer**, **24**, #2 (July), Contributed Paper AH6, p. 56 (July 1994). Presented at the Summer Meeting of the American Association of Physics Teachers, University of Notre Dame, Notre Dame, IN, August 8-13, 1994.
5. W. Leonard, R. Dufresne, W. Gerace & J. Mestre. *Students' reflections on an introductory physics course*. **AAPT Announcer**, **24**, #2 (July), Contributed Paper AH5, p. 56 (July 1994). Presented at the Summer Meeting of the American Association of Physics Teachers, University of Notre Dame, Notre Dame, IN, August 8-13, 1994.
4. W.J. Leonard. *Implications of constructivism for science education*. Invited talk presented at the Annual Statewide Conference and Dissemination of Exemplary Mathematics and Science Programs for Minorities, Clark Atlanta University, Atlanta, GA, November 5, 1993.

F. Presentations (continued)

3. W.J. Leonard. *Demonstrations of physics principles for elementary-school students using common household items.* Invited talk presented to the Primary Science Project, University of Natal-Durban, Durban, South Africa, July 16, 1993.
2. G. Driscoll, W. Leonard, R. Dufresne, W. Gerace & J. Mestre. *Thinking patterns exhibited by students engaged in concept-based problem-solving activities in kinematics.* **AAPT Announcer** (Supplement to the June 1992 issue) (Aug 1992). Contributed paper presented at the Summer Meeting of the American Association of Physics Teachers, University of Maine, Orono, ME, August 10-15, 1992.
1. W. Leonard, R. Dufresne, W. Gerace & J. Mestre. *Encouraging conceptual development through problem-solving activities among high school students.* **AAPT Announcer**, **21**, #4 (December), Contributed Paper GA3, p. 78 (December 1991). Presented at the Joint Winter Meeting of the American Association of Physics Teachers and the American Physical Society, Orlando, FL, January 4-9, 1992.

G. Workshops / Mini-Courses

56. B. Leonard. *Test-taking strategies for engineers*. Invited workshop for the Society of Hispanic Professional Engineers (SHPE), University of Massachusetts, Amherst, MA, February 9, 2016.
55. B. Leonard. *Test-taking strategies for engineers*. Invited workshop for the Society of Hispanic Professional Engineers (SHPE), University of Massachusetts, Amherst, MA, February 23, 2015.
54. W.J. Leonard & D. Meredith. *Developing questions to stimulate classroom discussion (in the context of formative assessment)*. Workshop given at the **NHSTA/Keene State College K-12 Science Education Conference**, Keene State College, Keene, NH, March 12, 2012.
53. W.J. Leonard & D. Meredith. *Technology-Enhanced Formative Assessment (TEFA): Providing classroom management tools to make student engagement more effective*. Workshop given at the **NHSTA/Keene State College K-12 Science Education Conference**, Keene State College, Keene, NH, March 12, 2012.
52. I.D. Beatty, W.J. Gerace, W. J. Leonard, & A. Feldman. *Technology-enhanced formative assessment (TEFA) with a classroom response system*. Workshop given at the **Inaugural Conference on Classroom Response Systems: Innovations and Best Practices**, Delphi Center for Teaching and Learning, University of Louisville, KY, Nov. 15, 2008. (Presented by I.D. Beatty.)
51. I. Beatty & B. Leonard. *Technology-Enhanced Formative Assessment Summer Implementation Workshop*. Workshop for Westfield Public Schools, Westfield, MA, August 19–22, 2008.
50. B. Leonard. *Collaborative Learning*. Invited workshop for the **Summer Institute on Student Engagement**, Berkshire Community College, Pittsfield, MA, May 29, 2008.
49. I. Beatty, B. Leonard, & B. Gerace. *Technology-Enhanced Formative Assessment Summer Implementation Workshop*. Workshop for Northampton High School, Northampton, MA, August 14–17, 2007.
48. B. Leonard, B. Gerace, A. Feldman & I. Beatty. *Technology-Enhanced Formative Assessment Summer Implementation Workshop*. Workshop for Frontier Regional School, South Deerfield, MA, August 1–3, 2006.
47. B. Leonard & A. Kropf. *Minds-On Physics Implementation Workshop*. Invited workshop for the Fairfax County (VA) Public Schools, Falls Church High School, Falls Church, VA, January 31, 2005.
46. W.J. Gerace & W.J. Leonard. *Minds-On Physics*. Course given for middle and high school science teachers for the Springfield Public Schools MMSP (Massachusetts Math–Science Partnership) program in association with the Five College/Public School Partnership and Holyoke Public Schools, Springfield, MA and Northampton, MA, May 22 and June 24–July 2, 2004.
45. W.J. Gerace & W.J. Leonard. *Strategic Tutoring in Science*. Five-day workshop given for the Quantitative Skills Center/Summer Science Program, Amherst College, Amherst, MA, July 30–Aug 13, 2002.
44. R.J. Dufresne, W.J. Gerace & W.J. Leonard. *Assessing-To-Learn (A2L): Reflective Formative Assessment Using a Classroom Communication System*. Workshop presented at **PATHWAYS TO CHANGE: An International Conference on Transforming Math and Science Education in the K-16 Continuum**, Arlington, VA, April 21, 2002.
- 42,43. W.J. Leonard & W.J. Gerace. *FUN-da-MENTAL Physics: Amusing musings*. Invited mini-courses (2) given for the **Teachers As Scholars** program of the Five College/Public School Partnership, April 6 & 27, 2001.

G. Workshops / Mini-Courses (continued)

- 39-41. W.J. Leonard & W.J. Gerace. *FUN·damental Physics*. Invited workshops (3) given for the Chicopee Public Schools, Chicopee, MA, April 4 & 11, May 2, 2001.
38. W.J. Gerace, W.J. Leonard & R.J. Dufresne. *Learning vs. Teaching: Changing Perspectives in Science Instruction*. Workshop presented for the Institutional Research and Academic Development Awards Program Workshop, Tucson, AZ, October 27-28, 2000.
- 36,37. W. Gerace & W. Leonard. *FUN·damental Physics: Amusing musings*. Invited mini-courses (2) given for the **Teachers As Scholars** program of the Five College/Public School Partnership, University of Massachusetts, Amherst, MA, March 28 & April 6, 2000.
- 33-35. W. Gerace & W. Leonard. *Developing Effective Classroom Practices. Session 1: Promoting higher order thinking skills / Session 2: Assessment in the service of instruction / Session 3: Emphasizing structuring and communication*. Invited workshops (3) given for the Springfield Public Schools, Springfield High School of Science & Technology, Springfield, MA, December 6, 1999; January 28, March 6, 2000.
- 30-32. W. Gerace & W. Leonard. *Promoting higher order thinking skills / Assessment in the service of instruction / Relating communication and learning skills*. Invited workshops (3) given for the Chicopee Public Schools, Chicopee, MA, October 25, November 1 & 8, 1999.
29. W. Gerace & W. Leonard. *Active Learning: How to engage students, increase motivation, and encourage learning*. Invited mini-workshop given for the elementary and middle school teachers at St. Vincent de Paul School, Long Hill Township, NJ, March 25, 1999.
- 27,28. W. Gerace, W. Leonard, R. Dufresne & J. Mestre. *Collaborative groups & Creating a course for pre-service elementary and middle school teachers*. Two workshops given for STEMTEC/Cycle II (Science, Technology, Engineering and Mathematics Teacher Education Collaborative), University of Massachusetts, Amherst, MA, January 17-18, 1998.
26. W. Gerace, J. Mestre, R. Dufresne & W. Leonard. *Effective teaching strategies using Classtalk*. Follow-up workshop given for the University of Massachusetts (all disciplines) at the request of the College of Natural Sciences & Mathematics and the UMass Center for Teaching, Amherst, MA, April 7, 1997.
25. W. Gerace, J. Mestre, R. Dufresne & W. Leonard. *Active learning using Classtalk – A campus-wide workshop*. Workshop given for the University of Massachusetts (all disciplines) at the request of the College of Natural Sciences & Mathematics and the UMass Center for Teaching, Amherst, MA, March 3, 1997.
24. W. Gerace, W. Leonard & D. Brookes. *Concept-based problem solving in physics*. Workshop given for the physical science subject advisors of KwaZulu-Natal (ZA) province, Durban Teachers Centre, Sydenham (Durban), South Africa, November 7, 1996.
23. W. Leonard & W. Gerace. *Teaching scientific methods using common, household items*. Workshop given to teachers from standard 2-10 (grades 4-12), at the request of Prof. Elizabeth Henning (Rand-Afrikaans University Department of Curriculum Studies), Voice of the Children Education Centre, Orange Farm, South Africa, October 31, 1996.
22. W. Leonard, W. Gerace, D. Lee & I. Beatty. *Teaching scientific methods using common, household items*. Mini-workshop given to teachers from grade 1 to standard 6 (grade 8), The Foundation School, Melville (Johannesburg), South Africa, October 29, 1996.

G. Workshops / Mini-Courses (continued)

- 20,21. W. Leonard & W. Gerace. *How can Elementary and Middle School Teachers incorporate more physics into their science curriculum?* Two workshops given at the request of the Chattanooga Public Schools, Chattanooga, TN, April 15 & 17, 1996.
19. W. Gerace, J. Mestre, R. Dufresne & W. Leonard. *Minds-On Physics*. One-week workshop given at Mt. Holyoke College, South Hadley, MA, July 31–August 4, 1995.
18. W. Gerace & W. Leonard. *MINDS-ON PHYSICS: An integrated curriculum for developing concept-based problem-solving skills in physics*. Workshop given at Chattanooga Phoenix III High School, Chattanooga, TN, December 10, 1994.
17. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Workshop given at the request of the Chattanooga Public Schools, Chattanooga, TN, August 8, 1994.
16. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Workshop given at the Annual Statewide Conference and Dissemination of Exemplary Mathematics and Science Programs for Minorities, Atlanta, GA, November 5, 1993.
15. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Workshop given at the University of Durban–Westville, Durban, South Africa, July 28, 1993.
14. W. Leonard & W. Gerace. *Developing curriculum materials for promoting conceptual understanding*. Workshop given at the University of Natal–Pietermaritzburg, Pietermaritzburg, South Africa, July 27, 1993.
13. W. Leonard & W. Gerace. *Developing curriculum materials for promoting conceptual understanding*. Workshop given at the School of Science Education, University of the Witwatersrand, Johannesburg, South Africa, July 22, 1993.
12. W. Leonard & W. Gerace. *Developing perspectives for research in science and mathematics education*. Workshop given at a meeting of Black Researchers, sponsored by the South African Association for Research in Mathematics and Science Education, Mmabatho, Bophuthatswana, July 19–20, 1993.
11. W. Leonard & W. Gerace. *A constructivist view of science education*. Workshop given for the Center for the Advancement of Science and Mathematics Education, University of Natal–Durban, Durban, South Africa, July 15, 1993.
10. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Workshop given at the Winter Meeting of the South African Association of Teachers of Physical Science, held at the University of the Orange Free State, Bloemfontein, South Africa, July 4–9, 1993.
- 8,9. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Workshops (2) given for the Physics Department of the University of South Carolina, Columbia, SC, April 30 and May 1, 1993.
7. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Given at Allen J. Ellender Memorial High School by request of the Southeastern Louisiana Area Health Education Center, Houma, LA, January 8, 1993.

G. Workshops / Mini-Courses (continued)

6. W. Gerace & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Given at Sarah T. Reed High School, New Orleans, LA, January 7, 1993.
5. W. Gerace, R. Dufresne & W. Leonard. *An approach to promoting conceptual understanding of physics through problem-solving activities*. Given at Slidell High School by request of the Southeastern Louisiana Area Health Education Center, Slidell, LA, January 5, 1993.
4. W. Gerace, R. Dufresne, W. Leonard & J. Mestre. *An approach to promoting conceptual understanding of physics through problem-solving activities*. **AAPT Announcer**, **22**, #4 (December), Workshop W23, p. 34 (December 1992). Given at the Winter Meeting of the American Association of Physics Teachers, New Orleans, LA, January 3–7, 1993.
3. R.J. Dufresne, W.J. Gerace & W.J. Leonard. *Research-based materials for developing a conceptual approach to problem solving in science*. Given at the Workshop on Research in Science and Mathematics Education, Winterton, South Africa, January 20–24, 1992.
2. W.J. Gerace, R.J. Dufresne & W.J. Leonard. *Promoting concept-based problem-solving skills in physics*. Given at the request of the University of the Witwatersrand, Johannesburg, South Africa, January 14, 1992.
1. J. Mestre, R. Dufresne, W. Gerace & W. Leonard. *Activities for promoting conceptual understanding and problem-solving skills in mechanics*. **AAPT Announcer**, **21**, #4 (December), Workshop W27, p. 34 (December 1991). Given at the Joint Winter Meeting of the American Association of Physics Teachers and the American Physical Society, Orlando, FL, January 4–9, 1992.

H. Science Outreach Events

- 94,95. Fort River Elementary School. *Bring Your Brain! Demonstrations of Weight*. Two interactive science demonstrations for kindergarten children, Amherst, MA, June 18, 2014.
93. Spring Street School. *What is Real, and What is Pretend?* Interactive science demonstrations for preschool children, Amherst, MA, January 14, 2013.
92. Spring Street School. *What is Real, and What is Pretend?* Interactive science demonstrations for preschool children, Amherst, MA, January 11, 2012.
91. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, May 30, 2009.
90. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, May 31, 2008.
89. Northampton High School. *Batteries and Bulbs*, given for 11th and 12th graders in AP Physics, Northampton, MA, May 28, 2008.
88. Fort River School. *Bring Your Brain: Favorites*, given for first-graders at Fort River School, Amherst, MA, May 2, 2008.
87. Fort River School. *Bring Your Brain: Resonance in air and bouncing balls*, given for first-graders, Amherst, MA, April 4, 2008.
86. Fort River School. *Bring Your Brain: Properties of air pressure*, given for first-graders, Amherst, MA, February 29, 2008.
85. Frontier Regional School. *The Chart of the Nuclides and Energy-Mass Equivalence*, given for high school students in AP Chemistry, South Deerfield, MA, February 27, 2008.
84. Fort River School. *Bring Your Brain: Invisible forces*, given for first-graders, Amherst, MA, January 11, 2008.
83. Fort River School. *Bring Your Brain: Does air have weight?*, given for first-graders, Amherst, MA, December 7, 2007.
82. Fort River School. *Bring Your Brain: Units of measure*, given for first-graders, Amherst, MA, November 16, 2007.
81. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, June 2, 2007.
80. Fort River School. *Bring Your Brain: Favorites*, given for kindergarten children at Fort River School, Amherst, MA, May 23, 2007.
79. Fort River School. *Bring Your Brain: Balance and Weight Distribution*, given for kindergarten children at Fort River School, Amherst, MA, April 25, 2007.
78. Fort River School. *Bring Your Brain: Balance and Spinning*, given for kindergarten children at Fort River School, Amherst, MA, March 28, 2007.

H. Science Outreach Events (continued)

77. Fort River School. *Bring Your Brain: Does air have weight? and other properties of air*, given for kindergarten children at Fort River School, Amherst, MA, February 28, 2007.
76. Fort River School. *Science Experiments: Mass, Weight, and Volume*, given for kindergarten children at Fort River School, Amherst, MA, January 17, 2007.
75. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, June 3, 2006.
74. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, May 29, 2004.
73. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, May 31, 2003.
72. Amherst College Mini-Camp. *Bring Your Brain! Science Experiments*, given for children of Amherst College Alums during Reunion Week, Amherst College, Amherst, MA, June 1, 2002.
71. Immanuel Lutheran Church Hall. Demonstrations of physics principles using common, household items, given to members of the Brownies and Junior Girl Scouts, Amherst, MA, November 6, 2001.
- 68-70. Naauwpoort School (with I. Beatty, W. Gerace & D. Lee). Three sets of demonstrations of physics principles using common, household items, given to pupils in standards 7-10 (grades 9-12), Rustenburg, South Africa, August 20, 1999.
- 64-67. Anchor Village, St. Philomena's Children's Home (with I. Beatty, W. Gerace & D. Lee). Four sets of demonstrations of physics principles using common, household items, given to children of ages 3-18, Sydenham (Durban), South Africa, August 16-17, 1999.
- 58-63. Selser Memorial School. *Bring Your Brain! Demonstrations of science principles using common, household items*. Six sets of demonstrations given for approximately 150 grade 5 students, Chicopee, MA, April 13, 1999.
- 50-57. St. Vincent de Paul School (with W. Gerace). *Bring Your Brain: Demonstrations of physics principles using common, household items*. Eight sets of demonstrations given for approximately 200 students in grades 1-8, Long Hill Township, NJ, March 25, 1999.
49. University of Massachusetts. *Bring Your Brain II: More demonstrations of physics using common, household items*. Demonstration given at the request of the UMass Department of Physics & Astronomy to celebrate Bring Our Daughters to Work Day, Amherst, MA, April 23, 1998.
48. Amherst Regional High School. One set of demonstrations of physics using common, household items, given to one section of Advanced Physics, Amherst, MA, May 15, 1997.
- 46,47. University of Massachusetts (with W. Gerace). *Bring Your Brain! Demonstrations of physics using common, household items*. Two sets of demonstrations given at the request of the UMass Department of Physics & Astronomy to celebrate Bring Our Daughters to Work Day, Amherst, MA, April 24, 1997.
- 44,45. St. Mary's School for Girls (with I. Beatty & W. Gerace). Two sets of demonstrations of physics principles using common, household items, given for standard six (grade eight) pupils, at the request of Mr. Barry Williams (HOD), Kloof, South Africa, November 29, 1996.

H. Science Outreach Events (continued)

43. Northcrest Primary School (with I. Beatty & W. Gerace). One set of demonstrations of physics principles using common, household items, given for standard five (grade seven) pupils at the request of Ms. Busi Alant, Park Hill (Durban), South Africa, November 29, 1996.
- 40-42. Anchor Village, St. Philomena's Children's Home (with I. Beatty, W. Gerace & D. Lee). Three sets of demonstrations of physics principles using common, household items, given to children of ages 3-18, Sydenham (Durban), South Africa, November 4-6, 1996.
- 33-39. The Foundation School (with I. Beatty, W. Gerace & D. Lee). Seven sets of demonstrations of physics principles using common, household items. Given to pupils in standards 3-6 (grades 5-8) at the request of Prof. Elizabeth Henning of Rand-Afrikaans University Department of Curriculum Studies, Melville (Johannesburg), South Africa, October 28-29, 1996.
32. Sunderland Congregational Church Chapel. *Mr. Science!* Demonstrations of physical principles using common, household items, for children of ages 3-13, Sunderland, MA, July 15, 1996.
- 16-31. Chattanooga Public Schools (with W.J. Gerace). 16 sets of demonstrations of physics principles using common, household items, given to over 500 high school students, at the request of the Chattanooga Public School System, Chattanooga, TN, April 16-18, 1996.
15. Millis High School. "What should we be teaching students in high school science classes, and how should we teach it?" Panel Discussion for the Millis HS Science Club and the Massachusetts Association of Science Supervisors (Metro West Region), Millis, MA, October 3, 1994.
14. Smith Academy. Demonstration and discussion of scientific principles using common, household items, for combined 8th grade physical science classes, Hatfield, MA, June 7, 1994.
- 6-13. Sunderland Elementary School. Eight sets of demonstrations of scientific principles using common, household items, for approximately 180 students in pre-school (ages 3 & 4) and in grades K-6, Sunderland, MA, April 12 & May 10, 1994.
- 4,5. Four Corners Elementary School. *Bring Your Brain!* Two sets of demonstrations of scientific principles using common, household items, for approximately 80 students in grades 3-5, Greenfield, MA, May 7, 1993.
- 2,3. Four Corners Elementary School. *Mr. Physics!* Two sets of demonstrations of scientific principles, for approximately 80 students in grades 3-5, Greenfield, MA, May 15, 1992.
1. Sunderland Town Hall. Demonstration of science principles, for about 30 children of ages 4-14, Sunderland, MA, August 2, 1991.

I. Grant Support

9. P.L. Sturdevant Rees, D.M. Ford, S.F. Brena, W. Fan, W.J. Leonard, & J.L. Marquard. *Overcoming Barriers for Transfer Students in the Engineering Pipeline*. National Science Foundation grant DUE-1458225 (S-STEM). 2015–2019. Funding Level: \$632,369.
8. W. Leonard, W. Gerace, I. Beatty, & A. Feldman. *Teacher Learning of Technology-Enhanced Formative Assessment*. National Science Foundation grant DRL-0456124 (TPC). 2005–2010. Funding Level: \$2,500,000.
7. W. Gerace, R. Dufresne, W. Leonard & J. Mestre. *Researching the Role of Qualitative Analysis*. National Science Foundation grant REC-0106771 (ROLE). 2001–2004. Funding Level: \$864,375.
6. W. Gerace, R. Dufresne, & W. Leonard (Faculty Associate). *Physics Analysis Workbench: A web-based computer environment for developing analytic reasoning and thinking skills*. National Science Foundation grant DUE-9950323. 1999–2001. Funding Level: \$150,000.
5. W. Gerace, J. Mestre, R. Dufresne & W. Leonard. *Assessing-to-Learn-Physics: An assessment-based teaching and learning curriculum for use with the Classtalk classroom communication system*. National Science Foundation ESI-9730438. 1998–2002. Funding Level: \$1,002,162.
4. W.J Gerace, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *MINDS-ON PHYSICS: An integrated curriculum for promoting concept-based problem solving in physics*. Supplement to National Science Foundation grant ESI-9255713. 1993–1997. Funding Level: \$91,368.
3. W.J Gerace, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *TTECCS: Transforming Technical Education with a Classroom Communication System*. National Science Foundation grant DUE-9453881. 1994–1997. Funding Level: \$772,784.
2. W.J Gerace, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *MINDS-ON PHYSICS: An integrated curriculum for promoting concept-based problem solving in physics*. National Science Foundation grant ESI-9255713. 1993–1996. Funding Level: \$899,111.
1. W.J Gerace, J.P. Mestre, R.J. Dufresne & W.J. Leonard. *A computer environment to encourage a conceptual approach to problem analysis*. National Science Foundation grant UCC-9155859. 1992–1993. Funding Level: \$110,000.

J. Recent Grant Proposals

2. W.J. Leonard, J.C. Kelly, & W.J. Gerace. *Improving preparation and success of minority engineering students through Mastery Learning*. Submitted to NSF, May 2010. Proposal: DUE-1044803. Funding Requested: \$199,117. (declined).
1. W.J. Leonard & W.J. Gerace. *Emerging Research-Pathways - Implications of Mastery Learning for retention and preparation of minority engineering students*. Submitted to NSF, November 2009. Proposal: DRL-1008328. Funding Requested: \$249,986. (declined).