References

[1] D. Hestenes, M. Wells, and G. Swackhamer, "Force Concept Inventory," *Phys. Teach.* **30**, 141 (1992).
[2] R. Beichner, "Testing Student Interpretation of Kinematics Graphs," *Am. J. Phys.* **62**, 750 (1994); R. K. Thornton and D. R. Sokoloff, "Assessing Student Learning of Newton's Laws: The Force and Motion Conceptual Evaluation and the Evaluation of Active Learning Laboratory and Lecture Curricula," *Am. J. Phys.* **66**, 338 (1998); Paula Vetter Engelhardt and Robert J. Beichner, "Students' Understanding of Direct Current Resistive Electrical Circuits," *Am. J. Phys.* **72**, 98 (2004); D. P. Maloney, T. L. O'Kuma, C. J. Hieggelke, and A. Van Heuvelen, "Surveying Students' Conceptual Knowledge of Electricity and Magnetism," *Am. J. Phys.* **69**, S12 (2001); C. Singh and D. Rosengrant, "Multiple-choice Test of Energy and Momentum Concepts," *Am. J. Phys.* **71**, 607 (2003); L. Ding, R. Chabay, B. Sherwood, and R. Beichner, "Evaluating an Electricity and Magnetism Assessment Tool: Brief Electricity and Magnetism Assessment," *Phys. Rev: ST PER* **2**, 010105 (2006).
[3] R.R. Hake, "Interactive-engagement vs. Traditional Methods: A Six-thousand-student Survey of Mechanics Test Data for Introductory Physics Courses," *Am. J. Phys.* **66**, 64-74 (1998).
[4] C. Henderson, private communication.
[5] M. H. Dancy, C. Henderson, and J. Smith, "Understanding Educational Transformation: Findings From a Survey of Past Participants of the Physics and Astronomy New Faculty Workshop," submitted to *PERC Proceedings 2013*.
[6] http://perusersguide.org
[7] S. J. Pollock and N. D. Finkelstein, "Impacts of Curricular Change: Implications from 8 Years of Data in Introductory Physics," *PERC Proceedings 2012*, AIP Press. Melville NY (2013).
[8] C. Henderson, N. Finkelstein, and A. Beach, "Beyond Dissemination in College Science Teaching: An Introduction to Four Core Change Strategies," *Journal of College Science Teaching* **39** (5), 18-25 (2010).
[9] J. F. Volkwein, L. R. Lattuca, B. J. Harper, and R. J. Domingo, "Measuring the Impact of Professional Accreditation on Student Experiences and Learning Outcomes," *Research in Higher Education* **48** (2), 251-282 (2007).
[10] M. Borrego and C. Henderson, "Theoretical Perspectives on Change in STEM Higher Education and their Implications for Engineering Education Research and Practice," submitted to *Journal of Engineering Education*.
http://homepages.wmich.edu/~chenders/Publications/2014BorregoJEEPerspectivesonChange.pdf
[11] G. Mettetal, "The What, Why and How of Classroom Education Research," *Journal of the Scholarship of Teaching and Learning* **2**(1) (2001).
[12] W. K. Adams, K. K. Perkins, N. Podolefsky, N. D. Finkelstein, and C. E. Wieman, "A New Instrument for Measuring Student Beliefs about Physics and Learning Physics: The Colorado Learning Attitudes about Science Survey," *Phys. Rev: ST PER* **2**, 010101 (2006).
http://link.aps.org/doi/10.1103/PhysRevSTPER.2.010101
[13] E. F. Redish, J. M. Saul, and R. N. Steinberg, "Student Expectations in Introductory Physics," *Am. J. Phys.* **66**, 212 (1998). http://dx.doi.org/10.1119/1.18847
[14] http://compadre.org
[15] C. Henderson and M. Dancy, "Physics Faculty and Educational Researchers: Divergent Expectations as Barriers to the Diffusion of Innovations," *Am. J. Phys.* **76** (1), 79-91 (2008).
[16] W. H. Hsu, J. P. Lancaster, M. S. R. Paradesi, and T. Weninger, "Structural Link Analysis from User Profiles and Friends Networks: A Feature Construction Approach," in N. S. Glance, N. Nicolov, E. Adar, M. Hurst, M. Liberman, & F. Salvetti (Ed.), *Proceedings of the 1st International Conference on Weblogs and Social Media (ICWSM 2007)*, (pp. 75-80). Boulder, CO, USA (2007).
[17] D. Caragea, V. Bahirwani, W. Aljandal, and W. H. Hsu, "Ontology-Based Link Prediction in the LiveJournal Social Network," *Proceedings of the 8th Symposium on Abstraction, Reformulation and Approximation (SARA 2009)* (2009).
[18] M. S. R. Paradesi, D. Caragea, and W. H. Hsu, "Structural Prediction of Protein-Protein Interactions in *Saccharomyces cerevisiae*," *Proceedings of IEEE 7th International Symposium on BioInformatics and BioEngineering (BIBE 2007)*, (pp. 1270-1274). Boston, MA, USA (2007).

[19] H. Guo, *Algorithm Selection for Sorting and Probabilistic Inference: A Machine Learning-based Approach* (Ph.D. dissertation). Kansas State University, Department of Computing and Information Sciences, Manhattan, KS, USA (2003).
[20] H. Guo and W. H. Hsu, "A Machine Learning Approach to Algorithm Selection for NP-hard Optimization Problems: A Case Study on the MPE Problem," *Annals of Operations Research, Special Issue on Stochastic Search Algorithms*, 156(1), 61-82 (2007).
[21] S. Volkova and W. H. Hsu, "Computational Knowledge and Information Management in Veterinary Epidemiology," in C. C. Yang, D. Zeng, K. Wang, A. Sanfilippo, H. H. Tsang, M.-Y. Day, . . . H. Chen (Ed.), *Proceedings of the 8th IEEE International Conference on Intelligence and Security Informatics (ISI 2010)*, May 23-26, 2010, Vancouver, BC, Canada (pp. 120-125). IEEE Press (2010).
[22] S. Volkova, D. Caragea, W. H. Hsu, J. Drouhard, and L. Fowles, "Boosting Biomedical Entity Extraction by using Syntactic Patterns for Semantic Relation Discovery," *Proceedings of the 2010 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT 2010)* (pp. 272 - 278). Toronto, ON, Canada: IEEE Press (2010).
[23] S. O Volkova, "*Entity Extraction, Animal Disease-related Event Recognition and Classification from Web*" (M.S. thesis), Kansas State University, Department of Computing and Information Sciences, Manhattan, KS, USA (2010). Retrieved July 2, 2013, from http://hdl.handle.net/2097/4593
[24] S. Roy Chowdhury, "*Mathematical Models for Prediction and Optimal Mitigation of Epidemics"* (M.S. thesis), Kansas State University, Department of Electrical Engineering and Computer Engineering, Manhattan, KS, USA (2010). Retrieved July 2, 2013, from http://hdl.handle.net/2097/3874
[25] S. Volkova, D. Caragea, W. H. Hsu, and S. Bujuru, "Animal Disease Event Recognition and Classification," *Proceedings of the First International Workshop on Web Science and Information Exchange in the Medical Web (MedEx 2010)*, April 30, 2010, Raleigh, NC, USA (2010).
[26] S. Bujuru, "*Event Recognition in Epizootic Domains"* (M.S. thesis), Kansas State University, Department of Computing and Information Sciences, Manhattan, KS, USA (2010). Retrieved July 2, 2013, from http://hdl.handle.net/2097/7070
[27] S. Kanim, private communication
[28] http://www.gapminder.org/world
[29] http://www.babynamewizard.com/voyager
[30] C. Romero, "Educational Data Mining: A Review of the State of the Art". *IEEE Transactions on Systems, Man, and Cybernetics - Part C: Applications and Review* **40**(6), 601-618 (2010).
[31] B. Mobasher, H. Dai, T. Luo, and M. Nakagawa, "Effective Personalization based on Association Rule Discovery from Web Usage Data," in R. H.-L. Chiang, & E.-P. Lim (Ed.), *Proceedings of the 3rd International Workshop on Web Information and Data Management (WIDM 2001)* (pp. 9-15). New York, NY, USA: ACM Press.
[32] R. S., Baker, Z. A. Pardos, S. M. Gowda, B. B. Nooraeil, and N. T. Heffernan, "Ensembling Predictions of Student Knowledge within Intelligent Tutoring Systems," in J. A. Konstan, R. Conejo, J. L. Marzo, & N. Oliver (Ed.), *Proceedings of the 19th International Conference on User Modeling, Adaption and Personalization (UMAP 2011): Lecture Notes in Computer Science Volume 6787* (pp. 13-24). New York, NY, USA: Springer (2011).
[33] L. Razzaq, R. W. Maloy, S. Edwards, D. Marshall, I. Arroyo, and B. P. Woolf, "4MALITY: Coaching Students with Different Problem-Solving Strategies Using an Online Tutoring System," in J. A. Konstan, R. Conejo, J. L. Marzo, & N. Oliver (Ed.), *Proceedings of the 19th International Conference on User Modeling, Adaption and Personalization (UMAP 2011): Lecture Notes in Computer Science Volume 6787* (pp. 359-364). New York, NY, USA: Springer (2011).
[34] J. Han, M. Kamber, and J. Pei, *Data Mining: Concepts and Techniques* (3rd ed.), San Francisco, CA, USA: Morgan Kaufmann (2011).
[35] I. H. Witten, E. Frank, and M. A. Hall, *Data Mining: Practical Machine Learning Tools and Techniques* (3rd ed.), San Francisco, CA, USA: Morgan Kaufmann (2011).
[36] T. M. Mitchell, *Machine Learning*, New York, NY, USA: McGraw-Hill (1997).
[37] P. Domingos, "A Few Useful Things to Know about Machine Learning," *Communications of the ACM* **55**(10), 78-87 (October, 2012).
[38] R. Mazza, and V. Dimitrova, "Generation of Graphical Representations of Student Tracking Data in Course Management Systems," in E. Banissi, M. Sarfraz, J. C. Roberts, & B. Loften (Ed.), *Proceedings of*

the 9th International Conference on Information Visualisation (IV 2005) (pp. 253-258). New York, NY, USA: IEEE Press (2005).
[39] A. Aamodt and E. Plaza, "Case-Based Reasoning: Foundational Issues, Methodological Variations, and System Approaches," *Artificial Intelligence Communications*, **7**(1), 39-59 (1994).
[40] T. Verma, and J. Pearl, "An Algorithm for Deciding if a Set of Observed Independencies has a Causal Explanation," in D. Dubois, & M. P. Wellman (Ed.), *Proceedings of the 8th Annual Conference on Uncertainty in Artificial Intelligence (UAI 1992)* (pp. 323-330). San Mateo, CA, USA: Morgan Kaufmann (1992).
[41] R. Kohavi and G. H John, "Wrappers for Feature Subset Selection," *Artificial Intelligence* **97**(1-2), 273-324 (1997).
[42] M. L. Raymer, W. F. Punch, E. D. Goodman, P. C. Sanschagrin, and L. A. Kuhn, "Simultaneous Feature Extraction and Selection Using a Masking Genetic Algorithm," in T. Bäck (Ed.), *Proceedings of the 7th International Conference on Genetic Algorithms (ICGA 1997)* (pp. 561-567). San Francisco, CA, USA: Morgan Kaufmann (1997).
[43] I. Guyon and A. Elisséeff, "An Introduction to Variable and Feature Selection," *Journal of Machine Learning Research*, **3**(Mar), 1157-1182 (2003). Retrieved July 2, 2013, from http://jmlr.org/papers/special/feature03.html
[44] S. K. Donoho and L. A. Rendell, "Rerepresenting and Restructuring Domain Theories: A Constructive Induction Approach," *Journal of Artificial Intelligence Research* **2**, 411-446 (1995).
[45] R. K. Thornton and D. R. Sokoloff, "Assessing Student Learning of Newton's Laws: The Force and Motion Conceptual Evaluation and the Evaluation of Active Learning Laboratory and Lecture Curricula," *Am. J. Phys.* **66**, 338 (1998). http://dx.doi.org/10.1119/1.18863
[46] Benjamin M. Zwickl, Noah Finkelstein, and H. J. Lewandowski, "Development and Validation of the Colorado Learning Attitudes about Science Survey for Experimental Physics," *PERC Proceedings 2012*, AIP Press. Melville NY (2013). http://link.aip.org/link/doi/10.1063/1.4789747
[47] C. Turpen, M. Dancy, and C. Henderson, "Faculty Perspectives on Using Peer Instruction: A National Study," *PERC Proceedings 2010*, AIP Press. Melville NY (2010). http://dx.doi.org/10.1063/1.3515235
[48] http://www.physics.indiana.edu/~sdi/SurveyForm03201997.pdf
[49] C. Henderson and M. H. Dancy, "Impact of Physics Education Research on the Teaching of Introductory Quantitative Physics in the United States," *Phys. Rev: ST PER* **5**, 020107 (2009). http://link.aps.org/doi/10.1103/PhysRevSTPER.5.020107; http://prst-per.aps.org/multimedia/PRSTPER/v5/i2/e020107/e020107_app.pdf
[50] M. Borrego, S. Cutler, M. Prince, C. Henderson, and J. Froyd, "Fidelity of Implementation of Research-Based Instructional Strategies (RBIS) in Engineering Science Courses," *Journal of Engineering Education* (in press).
[51] T. M. Andrews, M. J. Leonard, C. A. Colgrove, S. T. Kalinowski, "Active Learning not Associated with Student Learning in a Random Sample of College Biology Courses," *CBE Life Sci. Educ.* **10**, 394–405 (2011). http://www.lifescied.org/content/10/4/394.full; http://www.lifescied.org/content/suppl/2011/11/17/10.4.394.DC1/CombinedSupMats4.pdf
[52] C. F. Blaich and K. S. Wise, "From Gathering to Using Assessment Results: Lessons from the Wabash National Study," NILOA Occasional Paper No. 8, Urbana, IL: University of Illinois and Indiana University, National Institute of Learning Outcomes Assessment (2011). http://www.learningoutcomeassessment.org/documents/Wabash_000.pdf; http://www.liberalarts.wabash.edu/study-research/
[53] J. C. Libarkin and J. P. Kurdziel, "Research Methodologies in Science Education: Human Subjects and Education Research," *Journal of Geoscience Education* **52**, 199-203 (2004); http://geoscienceconceptinventory.wikispaces.com/
[54] D.E. Denning and P.J. Denning, "Data Security," in *ACM Computing Surveys* **11**(3), 227-249 (1979).
[55] R.J. Anderson, "A Security Policy Model for Clinical Information Systems," in *Proceedings of the IEEE Symposium on Security and Privacy*, 30-43 (1996).
[56] R.J. Anderson, "An Update on the BMA Security Policy," *Personal Medical Information*, 233-250 (1997).
[57] V. Matyás Jr., "Protecting the Identity of Doctors in Drug Prescription Analysis," *Health Informatics Journal* **4**, 205-209 (1998).

[58] P. Doyle, J.I. Lane, J.J.M. Theeuwes, and L.V. Zayatz, "Confidentiality, Disclosure, and Data Access: Theory and Practical Applications for Statistical Agencies," Elsevier Science (2001).
[59] S. White and R. Chu, "Physics Enrollments in Two-Year Colleges: Results from the 2012 Survey of Physics in Two-Year College", AIP Statistical Research Center, (2013).
[60] P. J. Mulvey and S. Nicholson, "Physics Enrollments Results from the 2008 Survey of Enrollments and Degrees", AIP Statistical Research Center, (2011).
[61] C. Henderson, "The Challenges of Instructional Change under the Best of Circumstances: A Case Study of One College Physics Instructor," *Am. J. Phys.* **73**, 778 (2005).
[62] C. Henderson and M. H. Dancy, "Barriers to the Use of Research-based Instructional Strategies: The Influence of both Individual and Situational Characteristics," *Phys. Rev: ST PER* **3**, 020102 (2007); M. H. Dancy and C. Henderson, "Pedagogical Practices and Instructional Change of Physics Faculty," *Am. J. Phys.* **78**, 1056-1063 (2010).
[63] Association of American Universities Undergraduate Stem Education Initiative: http://www.aau.edu/policy/article.aspx?id=12588 (2011).
[64] C. Henderson and M. Dancy, *Increasing the Impact and Diffusion of STEM Education Innovations*, A White Paper commissioned for the Characterizing the Impact and Diffusion of Engineering Education Innovations Forum, New Orleans, LA, Feb 7-8, 2011. (2011); M. Dancy and C. Henderson, *Barriers and Promises in STEM Reform*, Paper commissioned for Workshop on Linking Evidence and Promising Practices in STEM Undergraduate Education, The National Academies Division of Behavioral and Social Sciences and Education. (2008).