

Curriculum Vitae for Bruce Martin McLaren, Ph.D.

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PROFESSIONAL BIO

Dr. Bruce M. McLaren has an extensive background in both research and practical applications, specifically in educational technology, computer-supported collaborative learning, intelligent tutoring, eCommerce, and artificial intelligence. Dr. McLaren is currently a senior systems scientist at Carnegie Mellon University engaged in research on human learning and educational technology. He is particularly interested in intelligent tutoring systems, e-learning principles, and collaborative learning. McLaren's research with intelligent tutors, for instance, investigates how students learn when presented with erroneous examples in conjunction with tutors (See the AdaptErrEx project page: <http://www.cs.cmu.edu/~bmclaren/projects/AdaptErrEx/>). Dr. McLaren has also conducted a series of experiments investigating how chemistry students learn when presented with polite hints and feedback from an intelligent tutor (See the project page: <http://learnlab.web.cmu.edu/~pact/chemstudy/learn/>). Dr. McLaren also has interests in collaborative learning and technology for analyzing collaborative argumentation. In his work in Germany as an adjunct researcher at the Center for e-Learning Technology (CeLTech) and the German Research Center for Artificial Intelligence, Dr. McLaren has focused on developing educational technology using AI techniques to help teachers moderate collaborative e-Discussions and online arguments (See the projects LASAD (<http://cscwlab.in.tu-clausthal.de/lasad/>), ARGUNAUT (<http://www.argunaut.org/>), and Metafora (<http://www.metafora-project.org/>)). Dr. McLaren has over 100 publications spanning peer-reviewed journals, conferences, workshops, symposiums and book chapters.

Dr. McLaren also has over 20 years experience in the commercial sector, applying research ideas to practical problems. As Director of eCommerce Technologies at OpenWebs Corporation from 2000 to 2002, he led a group of engineers in the development of an intelligent inter-company (B2B) trading product. He was also the leader of many expert system projects during over 10 years working for Carnegie Group, Inc. (now Logica) and Carnegie (U.K.) Limited.

EDUCATION

Ph.D., Artificial Intelligence (Intelligent Systems Program), 1999

Dissertation Title: *Assessing the Relevance of Cases and Principles Using Operationalization Techniques*,
University of Pittsburgh

Ph.D. Committee: Dr. Kevin Ashley (chair): Professor of Intelligent Systems, Senior Scientist at Univ. of Pitt.
Dr. Manuela Veloso: President of AAAI; Herbert A. Simon Prof. of C.S. at CMU
Dr. Bruce Buchanan: Past President of AAAI; Inventor of the Mycin program; Retired
Dr. Martha Pollack: Past President of AAAI; Prof. of C.S. and Engineering at U. of Mich.
(Note: All committee members are elected members of the prestigious AAAI Fellows)

M.S., Artificial Intelligence (Intelligent Systems Program), 1994

University of Pittsburgh

M.S., Computer Science, 1984

University of Pittsburgh

B.S., Computer Science, *Cum Laude*, 1981

Millersville University of Pennsylvania

SUMMARY OF PROFESSIONAL EXPERIENCE

Carnegie Mellon University	Pittsburgh, Pa. Human-Computer Interaction Institute Senior Systems Scientist (Promoted in 2009) Systems Scientist	June 2003 – Present
Saarland University	Saarbrücken, Germany Center for e-Learning Technology (CeLTech) Adjunct Principal Researcher	Sept. 2010 – Present
German Research Center for Artificial Intelligence (Deutsches Forschungszentrum für Künstliche Intelligenz – DFKI)	Saarbrücken, Germany Competence Center for e-Learning Visiting Senior Researcher	July 2006 – Aug 2010
Carnegie Mellon University	Pittsburgh, Pa. Institute for Software Research, International Adjunct Systems Scientist	Sept. 2002 – May 2003
OpenWebs Corporation (Later CarParts Technology)	Pittsburgh, Pa. Director, eCommerce Technologies Director, Research and Development (Promoted 2001) Manager, Intelligent Trading Technologies	May 2000 - Nov. 2002
The IBM Transarc Laboratory	Pittsburgh, Pa. Technical Consultant (Independent)	Mar. 1999 - Feb. 2000
MAYA Design Group	Pittsburgh, Pa. Technical Consultant (Independent)	Aug. 1998 - Feb. 1999
Carnegie Group, Inc.	Pittsburgh, Pa. Project Manager (Promoted in 1996) Senior Engineer	Dec. 1989 - May 1998
Carnegie (U.K.) Limited	Ascot, England Senior Consultant	Sept. 1986 - Dec. 1989
Carnegie Mellon University	Pittsburgh, Pa. Project Supervisor (Promoted in 1986) Research Programmer	Jan. 1985 - Sept. 1986
General Electric	Erie, Pa. Computer Programmer	Oct. 1981 - Dec. 1982

AWARDS AND RECOGNITION

- **Top-Rated Author in Computers and Education, according to Microsoft Scholar.** As of 07/20/11, rated as the *fourth top author* in Computers and Education over the past 5 years, according to Microsoft's academic search engine (See <http://academic.research.microsoft.com/RankList?entitytype=2&topdomainid=2&subdomainid=23&last=5>)
- **Finalist for the Best Paper Award.** *Studying the Effects of Personalized Language and Worked Examples in the Context of a Web-Based Intelligent Tutor*; McLaren, B.M., Lim, S., Gagnon, F., Yaron, D., and Koedinger,

K. R. In the Proceedings of the 8th International Conference on Intelligent Tutoring Systems, Jhongli, Taiwan, June 26-30, 2006.

- **Best Paper Award.** *Toward Tutoring Help Seeking: Applying Cognitive Modeling to Meta-Cognitive Skills* by Aleven, V., McLaren, B.M., Roll, I. and Koedinger, K. R. In the Proceedings of the Seventh International Conference on Intelligent Tutoring Systems (ITS-2004). Maceio, Brazil.
- **Most Distinguished Paper Award.** *Reasoning with Reasons in Case-Based Comparisons.* The First International Conference on Case-Based Reasoning, 1995, Sesimbra, Portugal. Co-authored with K. D. Ashley and based on my 1994 Artificial Intelligence Masters project.
- **Patent Number 5995920.** Granted November 30, 1999. Computer-based Method and System for Monolingual Document Development. Jointly held with a team from Carnegie Group, Inc. (now Logica) and Carnegie Mellon University.
- **Patent Number 5677835.** Granted October 14, 1997. Integrated Authoring and Translation System. Jointly held with a team from Carnegie Group, Inc. (now Logica) and Carnegie Mellon University.
- **Pending, Number PCT/US01/05609.** Submitted in August 7, 2001. Method and System for Creating and Using a Peer-to-Peer Trading Network. Jointly submitted with Philip J. Hayes and Aidan J. McKenna.

PUBLICATIONS

Peer-Reviewed Journal Papers

- McLaren, B.M., DeLeeuw, K.E., & Mayer, R.E. (2011). Polite web-based intelligent tutors: Can they improve learning in classrooms? *Computers & Education*, 56(3), 574-584. doi: 10.1016/j.compedu.2010.09.019.
- McLaren, B.M., DeLeeuw, K.E., & Mayer, R.E. (2011). A politeness effect in learning with web-based intelligent tutors. *International Journal of Human Computer Studies*, 69(1-2), 70-79. doi:10.1016/j.ijhcs.2010.09.001.
- Tsovaltzi, D., Melis, E., & McLaren, B.M. (submitted). Erroneous Examples: Effects on Learning Fractions in a Web-Based Setting. Submitted to the *International Journal of Technology Enhanced Learning*.
- Roll, I., Aleven, V., McLaren, B. M., & Koedinger, K. R. (2011). Improving students' help-seeking skills using metacognitive feedback in an intelligent tutoring system. *Learning and Instruction*, 21(2), 267-280.
- McLaren, B.M., Scheuer, O., & Mikšátko, J. (2010). Supporting collaborative learning and e-Discussions using artificial intelligence techniques. *International Journal of Artificial Intelligence in Education (IJAIED)* 20(1), 1-46.
- Aleven, V., Roll, I., McLaren, B.M., & Koedinger, K.R. (2010). Automated, unobtrusive, action-by-action, assessment of self-regulation during learning with an intelligent tutoring system. *Educational Psychologist*, 45(4), 224 - 233. doi: 10.1080/00461520.2010.517740.
- Salden, R.J.C.M., Koedinger, K.R., Renkl, A., Aleven, V., & McLaren, B.M. (2010). Accounting for beneficial effects of worked examples in tutored problem solving. *Educational Psychology Review*, 22(4), 379-392. doi: 10.1007/s10648-010-9143-6.
- Tsovaltzi, D., Rummel, N., McLaren, B.M., Pinkwart, N., Scheuer, O., Harrer, A. and Braun, I. (2010). Extending a virtual chemistry laboratory with a collaboration script to promote conceptual learning. *International Journal of Technology Enhanced Learning*, Vol. 2, Nos. 1/2, 91-110.
- Scheuer, O., Loll, F., Pinkwart, N. & McLaren, B.M. (2010). Computer-supported argumentation: A review of the state of the art. *International Journal of Computer-Supported Collaborative Learning*, 5(1), 43-102.
- Wegerif, R., McLaren, B.M., Chamrada, M., Scheuer, O., Mansour, N., Mikšátko, J., & Williams, M. (2010). Exploring creative thinking in graphically mediated synchronous dialogues. *Computers & Education*, 54(3), 613-621 doi:10.1016/j.compedu.2009.10.015

- Aleven, V., McLaren, B.M., Sewall, J., & Koedinger, K.R. (2009). A new paradigm for intelligent tutoring systems: Example-tracing tutors. *International Journal of Artificial Intelligence in Education*, 19(2), 105-154.
- Aleven, V., McLaren, B.M., & Sewall, J. (2009). Scaling up programming by demonstration for intelligent tutoring systems development: An open-access website for middle school mathematics learning. *IEEE Transactions on Learning Technologies*, 2(2), 64-78.
- Harrer, A., Pinkwart, N., McLaren, B.M., & Scheuer, O. (2008). The scalable adapter design pattern: Enabling interoperability between educational software tools. *IEEE Transactions on Learning Technologies*, 1(2), 131-143.
- Roll, I., Aleven, V., McLaren, B.M., & Koedinger, K.R. (2007). Designing for metacognition - Applying cognitive tutor principles to the tutoring of help seeking. *Metacognition and Learning*, 2(2), 125-140.
- Harrer, A., McLaren, B.M., Walker, E., Bollen, L., & Sewall, J. (2006). Creating cognitive tutors for collaborative learning: Steps toward realization. *User Modeling and User-Adapted Interaction: The Journal of Personalization Research (UMUAI)*, 16, 175-209.
- McLaren, B.M. (2006). Computational models of ethical reasoning: Challenges, initial steps, and future directions. *IEEE Intelligent Systems*, Published by the IEEE Computer Society. July/August 2006. 29-37.
- Aleven, V., McLaren, B., Roll, I., & Koedinger, K. (2006). Toward meta-cognitive tutoring: A model of help seeking with a cognitive tutor. *International Journal of Artificial Intelligence in Education (IJAIED)*, 16(2), 101-128.
- McLaren, B.M. (2003). Extensionally defining principles and cases in ethics: An AI model. *Artificial Intelligence Journal*, 150, 145-181.

Book Chapters

- Loll, F., Pinkwart, N., Scheuer, O., & McLaren, B.M. (to appear 2011). "How Tough Should It Be? Simplifying the Development of Argumentation Systems using a Configurable Platform." To appear in N. Pinkwart, & B. M. McLaren (Eds.), *Educational Technologies for Teaching Argumentation Skills*, Bentham Science Publishers.
- Scheuer, O., McLaren, B.M., Loll, F., & N. Pinkwart (to appear 2011). "Automated Analysis and Feedback Techniques to Support and Teach Argumentation: A Survey." To appear in N. Pinkwart & B.M. McLaren (Eds.) *Educational Technologies for Teaching Argumentation Skills*, Bentham Science Publishers.
- Scheuer, O. & McLaren, B.M. (to appear 2011). "Educational Data Mining." To appear in the *Encyclopedia of the Sciences of Learning*, Springer.
- McLaren, B.M. (2011). "Computational Models of Ethical Reasoning: Challenges, Initial Steps, and Future Directions." In M. Anderson & S.L. Anderson (Eds.), *Machine Ethics*. Chapter 17, 297-315, Cambridge University Press.
- Tchounikine, P., Rummel, N. & McLaren, B.M. (2010). "Computer Supported Collaborative Learning and Intelligent Tutoring Systems." In R. Nkambo, J.Bourdeau, & R. Mizoguchi (Eds.) *Advances in Intelligent Tutoring Systems*. Chapter 22, 447-463, Springer.
- Aleven, V., McLaren, B.M., & Koedinger, K.R. (2006). "Toward Computer-Based Tutoring of Help-Seeking Skills." In *Help Seeking in Academic Settings: Goals, Groups and Contexts*, Published in March 2006, ISBN 0-8058-5220-4, Chapter 10, 259-296, Lawrence Erlbaum Publishers.

Peer-Reviewed Conference, Workshop, and Symposium Papers

- Scheuer, O., McLaren, B.M., Harrell, M., & Weinberger, A. (submitted). Scripting collaboration: What affect does it have on student argumentation? Submitted to the 19th *International Conference on Computers in Education (ICCE-2011)*. To occur in Chang Mai, Thailand, Nov. 28 - Dec. 2, 2011.

- Gogvadze, G., Sosnovsky, S., Isotani, S. & McLaren, B.M. (submitted). Towards a bayesian student model for detecting decimal misconceptions. Submitted to the *19th International Conference on Computers in Education (ICCE-2011)*. To occur in Chang Mai, Thailand, Nov. 28 - Dec. 2, 2011.
- McLaren, B.M. & Ashley, K.D. (2011). Can temporal representation and reasoning make a difference in automated legal reasoning? Lessons from an AI-based ethical reasoner. In the *Proceedings of the Thirteenth International Conference on Artificial Intelligence and Law (ICAIL 2011)*. (pp. 229-238). ACM Press.
- McLaren, B.M. & Isotani, S. (2011). When is it best to learn with all worked examples? In G. Biswas, S. Bull, J. Kay, & A. Mitrovic (Eds.), *Proceedings of the 15th International Conference on Artificial Intelligence in Education (AIED-2011)*. Lecture Notes in Computer Science, 6738. (pp. 222-229). Berlin: Springer.
- Scheuer, O., McLaren, B.M., Harrell, M., & Weinberger, A. (2011). Will structuring the collaboration of students improve their argumentation? In G. Biswas, S. Bull, J. Kay, & A. Mitrovic (Eds.), *Proceedings of the 15th International Conference on Artificial Intelligence in Education (AIED-2011)*. Lecture Notes in Computer Science, 6738. (pp. 544-546). Berlin: Springer.
- Roll, I., Alevin, V., McLaren, B.M., & Koedinger, K.R. (2011). Metacognitive practice makes perfect: Improving students' self-assessment skills with an intelligent tutoring system. In G. Biswas, S. Bull, J. Kay, & A. Mitrovic (Eds.), *Proceedings of the 15th International Conference on Artificial Intelligence in Education (AIED-2011)*. Lecture Notes in Computer Science, 6738. (pp. 288-295). Berlin: Springer.
- Gogvadze, G., Sosnovsky, S., Isotani, S. & McLaren, B.M. (2011). Evaluating a bayesian student model of decimal misconceptions. In M. Pechenizkiy, T. Calders, C. Conati, S. Ventura, C. Romero, & J. Stamper (Eds.), *Proceedings of the 4th International Conference on Educational Data Mining (EDM 2011)*. (pp. 301-306). ISBN: 978-90-386-2537-9.
- Dragon, T., McLaren, B.M., Mavrikis, M., & Geraniou, E. Scaffolding collaborative learning opportunities: Integrating microworld use and argumentation. In: A. Paramythi, L. Lau, S. Demetriadis, M. Tzagarakis, & S. Kleantous (Eds.) *Proceedings of the International Workshop on Adaptive Support for Team Collaboration 2011 (ASTC 2011)*, held in conjunction with the *International Conference on User Modeling, Adaptation, and Personalization (UMAP2011)*, (pp. 27-35). CEUR Workshop Proceedings, ISSN 1613-0073, online CEUR-WS.org/Vol-743/ASTC2011_Paper4.pdf
- Loll, F., Pinkwart, N., Scheuer, O., & McLaren, B.M. (2011). Developing Collaborative Argumentation Systems: What Advice Do the Experts Have? In H. Spada, G. Stahl, N. Miyake & N. Law: *Connecting Computer-Supported Collaborative Learning to Policy and Practice: CSCL-2011 Conference Proceedings. Volume II – Short Papers & Posters*. (pp. 980-981). International Society of the Learning Sciences.
- Isotani, S., Adams, D., Mayer, R.E., Durkin, K., Rittle-Johnson, B., & McLaren, B.M. (2011). Can erroneous examples help middle-school students learn decimals? Accepted for full paper presentation at the *Sixth European Conference on Technology Enhanced Learning: Towards Ubiquitous Learning (EC-TEL-2011)*.
- Wichmann, A., McLaren, B. M., Giemza, A., & Hoppe, H.U. (2011). Enabling teachers to become effective moderators while moderating multiple e-discussions. Poster presented at AERA in New Orleans.
- McLaren, B.M., DeLeeuw, K.E., & Mayer, R.E. (2010). A politeness effect in learning with web-based intelligent tutors. Presented at the *2010 American Educational Research Association (AERA) Annual Meeting*, April - May, 2010, Denver, Colorado.
- Loll, F., Pinkwart, N, Scheuer, O. & McLaren, B.M. (2010). Ein generisches Framework zur Erstellung von argumentationsunterstützenden Systemen. To appear in M. Schumann, L. M. Kolbe & M. H. Breitner (Eds.): *Tagungsband der Multikonferenz Wirtschaftsinformatik (MKWI) 2010*. Göttingen (Germany).
- Loll, F., Scheuer, O., McLaren, B.M., & Pinkwart, N. (2010). Learning to argue using computers – A view from teachers, researchers, and system developers. In V. Alevin, J. Kay, J. Mostow (Eds.), *Proceedings of the 10th International Conference on Intelligent Tutoring Systems (ITS-10)*, Lecture Notes in Computer Science, 6094 (pp. 377-379). Berlin: Springer.
- Tsovaltzi, D., McLaren, B.M., Melis, E., Meyer, A-K., Dietrich, M., & Gogvadze G. (2010). Learning from erroneous examples. In V. Alevin, J. Kay, J. Mostow (Eds.), *Proceedings of the 10th International Conference*

on *Intelligent Tutoring Systems* (ITS-10), Lecture Notes in Computer Science, 6094 (pp. 420-422). Berlin: Springer.

- Isotani, S., McLaren, B.M., & Altman, M. (2010). Towards intelligent tutoring with erroneous examples: A taxonomy of decimal misconceptions. In V. Alevan, J. Kay, J. Mostow (Eds.), *Proceedings of the 10th International Conference on Intelligent Tutoring Systems* (ITS-10), Lecture Notes in Computer Science, 6094 (pp. 346-348). Berlin: Springer.
- Tsovaltzi, D., Melis, E., McLaren, B.M., Meyer, A-K., Dietrich, M. & Gogvadze, G. (2010). Learning from erroneous examples: When and how do students benefit from them? In M. Wolpers, P. A. Kirschner, M. Scheffel, S. Lindstaedt, & V. Dimitrova (Eds.), *Proceedings of the 5th European Conference on Technology Enhanced Learning, Sustaining TEL: From Innovation to Learning and Practice* (EC-TEL 2010), LNCS 6383, September/October, Barcelona, Spain. (pp. 357-373). Springer-Verlag Berlin Heidelberg.
- Loll, F., Scheuer, O., McLaren, B.M., & Pinkwart, N. (2010). How can students learn to argue from computer-based systems? A survey of teachers, researchers, and system developers. In M. Wolpers, P. A. Kirschner, M. Scheffel, S. Lindstaedt, & V. Dimitrova (Eds.), *Proceedings of the 5th European Conference on Technology Enhanced Learning, Sustaining TEL: From Innovation to Learning and Practice* (EC-TEL 2010), LNCS 6383, September/October 2010, Barcelona, Spain. (pp. 530-535). Springer-Verlag Berlin Heidelberg.
- Borek, A., McLaren, B.M., Karabinos, M., & Yaron, D. (2009). How much assistance is helpful to students in discovery learning? In U. Cress, V. Dimitrova, & M. Specht (Eds.), *Proceedings of the Fourth European Conference on Technology Enhanced Learning, Learning in the Synergy of Multiple Disciplines* (EC-TEL 2009), LNCS 5794, September/October 2009, Nice, France. (pp. 391-404). Springer-Verlag Berlin Heidelberg.
- Tsovaltzi, D., Melis, E., McLaren, B.M., Dietrich, M., Gogvadze, G., & Meyer, A-K. (2009). Erroneous examples: A preliminary investigation into learning benefits. In U. Cress, V. Dimitrova, & M. Specht (Eds.), *Proceedings of the Fourth European Conference on Technology Enhanced Learning, Learning in the Synergy of Multiple Disciplines* (EC-TEL 2009), LNCS 5794, September/October 2009, Nice, France. (pp. 688-693). Springer-Verlag Berlin Heidelberg.
- McLaren, B.M., Wegerif, R., Mikšátko, J., Scheuer, O., Chamrada, M., & Mansour, N. (2009). Are your students working creatively together? Automatically recognizing creative turns in student e-Discussions. In V. Dimitrova, R. Mizoguchi, B. du Boulay, & A. Graesser (Eds.), *Proceedings of the 14th International Conference on Artificial Intelligence in Education* (AIED-09), Artificial Intelligence in Education: Building Learning Systems that Care: From Knowledge Representation to Affective Modelling. (pp. 317-324). IOS Press.
- Scheuer, O., McLaren, B.M., Loll, F., & Pinkwart, N. (2009). An analysis and feedback infrastructure for argumentation learning systems. In V. Dimitrova, R. Mizoguchi, B. du Boulay, & A. Graesser (Eds.), *Proceedings of the 14th International Conference on Artificial Intelligence in Education* (AIED-09), Artificial Intelligence in Education: Building Learning Systems that Care: From Knowledge Representation to Affective Modelling. (pp. 629-631). IOS Press.
- Loll, F., Pinkwart, N., Scheuer, O., & McLaren, B.M. (2009). Towards a flexible intelligent tutoring system for argumentation. In I. Adeo, N. Chen, Kinshuk, D. Sampson, & L. Zaitseva (Eds.), *Proceedings of the 9th IEEE International Conference on Advanced Learning Technologies* (ICALT 2009) (p. 647-648). Los Alamitos (CA), IEEE Computer Society.
- Wegerif, R., McLaren, B.M., Chamrada, M., Scheuer, O., Mansour, N. & Mikšátko, J. (2009). Recognizing creative thinking in graphical e-Discussions using artificial intelligence graph-matching techniques. In C. O'Malley, D. Suthers D., P. Reimann, & A. Dimitracopoulou (Eds.) *Computer Supported Collaborative Learning Practices, Proceedings of the 9th International Conference on Computer Supported Collaborative Learning* (CSCL-09), Vol. I (pp. 108-112). International Society of the Learning Sciences, Inc. ISBN978-1-61584-137-0.
- Loll, F., Pinkwart, N., Scheuer, O., & McLaren, B.M. (2009). An architecture for intelligent CSCL argumentation systems. In A. Dimitracopoulou, C. O'Malley, D. Suthers, & P. Reimann (Eds.), *Computer Supported Collaborative Learning Practices, Proceedings of the 9th International Conference on Computer*

Supported Collaborative Learning (CSCL-09), Vol. II (pp. 189-191). International Society of the Learning Sciences, Inc. ISBN: 978-1-4092-8598-4.

- Salden, R., Koedinger, K., Alevan, V. & McLaren, B.M. (2009). Does cognitive load theory account for beneficial effects of worked examples in tutored problem solving? *Presented at the 3rd International Cognitive Load Theory Conference* (CLT-09). Heerlen, the Netherlands, March 2-4, 2009. (No published paper, presentation only)
- McLaren, B.M., Lim, S., & Koedinger, K.R. (2008). When and how often should worked examples be given to students? New results and a summary of the current state of research. In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (pp. 2176-2181). Austin, TX: Cognitive Science Society.
- Koedinger, K.R., Pavlik, P., McLaren, B.M., & Alevan, V. (2008). Is it better to give than to receive? The assistance dilemma as a fundamental unsolved problem in the cognitive science of learning and instruction. In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (pp. 2155-2160). Austin, TX: Cognitive Science Society.
- McLaren, B.M., Lim, S., & Koedinger, K.R. (2008). When is assistance helpful to learning? Results in combining worked examples and intelligent tutoring. In B. Woolf, E. Aimeur, R. Nkambou, S. Lajoie (Eds.), *Proceedings of the 9th International Conference on Intelligent Tutoring Systems* (ITS-08), Lecture Notes in Computer Science, 5091 (pp. 677-680). Berlin: Springer.
- Mikšátko, J. & McLaren, B.M. (2008). What's in a cluster? Automatically detecting interesting interactions in student e-Discussions. In B. Woolf, E. Aimeur, R. Nkambou, S. Lajoie (Eds.), *Proceedings of the 9th International Conference on Intelligent Tutoring Systems* (ITS-08), Lecture Notes in Computer Science, 5091 (pp. 333-342). Berlin: Springer.
- Scheuer, O. & McLaren, B.M. (2008). Helping teachers handle the flood of data in online student discussions. In B. Woolf, E. Aimeur, R. Nkambou, S. Lajoie (Eds.), *Proceedings of the 9th International Conference on Intelligent Tutoring Systems* (ITS-08), Lecture Notes in Computer Science, 5091 (pp. 323-332). Berlin: Springer.
- Tsovaltzi, D., McLaren, B.M., Rummel, N., Scheuer, O., Harrer, A., Pinkwart, N. & Braun, I., (2008). Using an adaptive collaboration script to promote conceptual chemistry learning. In B. Woolf, E. Aimeur, R. Nkambou, S. Lajoie (Eds.), *Proceedings of the 9th International Conference on Intelligent Tutoring Systems* (ITS-08), Lecture Notes in Computer Science, 5091 (pp. 709-711). Berlin: Springer.
- Harrer, A., Pinkwart, N., McLaren, B.M., & Scheuer, O., (2008). How do we get the pieces to talk? A new software architecture to support interoperability between educational software tools. In B. Woolf, E. Aimeur, R. Nkambou, S. Lajoie (Eds.), *Proceedings of the 9th International Conference on Intelligent Tutoring Systems* (ITS-08), Lecture Notes in Computer Science, 5091 (pp. 715-718). Berlin: Springer.
- Melis, E., McLaren, B.M., & Solomon, S. (2008). Towards accessing disparate educational data in a single, unified manner. In P. Dillenbourg and M. Specht (Eds.), *Proceedings of the Third European Conference on Technology Enhanced Learning* (EC-TEL 2008), Lecture Notes in Computer Science 5192 (pp. 280-283). Berlin: Springer.
- Tsovaltzi, D., Rummel, N., Pinkwart, N., Scheuer, O., Harrer, A., Braun, I. & McLaren, B.M. (2008). CoChemEx: Supporting conceptual chemistry learning via computer-mediated collaboration scripts. In P. Dillenbourg and M. Specht (Eds.), *Proceedings of the Third European Conference on Technology Enhanced Learning* (EC-TEL 2008), Lecture Notes in Computer Science 5192 (pp. 437-448). Berlin: Springer.
- McLaren, B.M., Rummel, N., Pinkwart, N., Tsovaltzi, D., Harrer, A., & Scheuer, O. (2008). Learning chemistry through collaboration: A wizard-of-oz study of adaptive collaboration support. In the *Proceedings of the Workshop on Intelligent Support for Exploratory Environments* (ISSE 08) at the *European Conference on Technology Enhanced Learning* (EC-TEL 2008), Maastricht, the Netherlands, September 17, 2008. <http://sunsite.informatik.rwth-aachen.de/Publications/CEUR-WS/Vol-381/>

- McLaren, B.M., Scheuer, O., De Laat, M., Hever, R., De Groot, R., & Rosé, C.P. (2007). Using machine learning techniques to analyze and support mediation of student e-Discussions. In R. Luckin, K.R. Koedinger, & J. Greer (Eds.), *Proceedings of the 13th International Conference on Artificial Intelligence in Education (AIED-07)*, Artificial Intelligence in Education: Building Technology Rich Learning Contexts That Work. (pp. 331-338). Amsterdam: IOS Press.
- McLaren, B.M., Lim, S., Yaron, D., & Koedinger, K.R. (2007). Can a polite intelligent tutoring system lead to improved learning outside of the lab? In R. Luckin, K.R. Koedinger, & J. Greer (Eds.), *Proceedings of the 13th International Conference on Artificial Intelligence in Education (AIED-07)*, Artificial Intelligence in Education: Building Technology Rich Learning Contexts That Work. (pp. 433-440). Amsterdam: IOS Press.
- Walker, E., McLaren, B.M., Rummel, N., & Koedinger, K.R. (2007). Who says three's a crowd? Using a cognitive tutor to support peer tutoring. In R. Luckin, K.R. Koedinger, & J. Greer (Eds.), *Proceedings of the 13th International Conference on Artificial Intelligence in Education (AIED-07)*, Artificial Intelligence in Education: Building Technology Rich Learning Contexts That Work. (pp. 399-406). Amsterdam: IOS Press.
- Roll, I., Aleven, V., McLaren, B.M., & Koedinger, K.R. (2007). Can help seeking be tutored? Searching for the secret sauce of metacognitive tutoring. In R. Luckin, K.R. Koedinger, & J. Greer (Eds.), *Proceedings of the 13th International Conference on Artificial Intelligence in Education (AIED-07)*, Artificial Intelligence in Education: Building Technology Rich Learning Contexts That Work. (pp. 203-210). Amsterdam: IOS Press.
- McLaren, B.M., Rummel, N., Tsovaltzi, D., Braun, I., Scheuer, O., Harrer, A., & Pinkwart, N. (2007). The CoChemEx project: Conceptual chemistry learning through experimentation and adaptive collaboration. In the *Proceedings of the Workshop on 'Emerging Technologies for Inquiry Based Learning in Science'*, (AIED-07). (pp. 36-48). Los Angeles (CA).
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- McLaren, B. M. & Ashley, K. D. (1995). Case-Based Comparative Evaluation in TRUTH-TELLER. In J.D. Moore & J.F. Lehman (Eds.), *Proceedings of the Seventeenth Annual Conference of the Cognitive Science Society* (pp. 72-77). Lawrence Erlbaum Associates, Publishers 1995 Mahwah, New Jersey Hove, UK.
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- McLaren, B., Neuss, P., & De Groote, O. (1988). The Integrated Modeling Package (IMP): An object-oriented module for manufacturing simulation. In the *Proceedings of the Second European Simulation Multiconference*, June 1988, Nice, France and the Knowledge Forum, Volume 2, Issue 3, June, 1988, Printed by Carnegie Group Inc., Pittsburgh, Pa.
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Technical Reports

- *A Theoretical Analysis on the Challenges of Applying Case-Based Reasoning for Composable Behavior Modeling* (Technical Report AIC-04-001); Summers, J., Aha, D., McLaren, B., Reece, D., and McCormack, J., Washington, DC: Naval Research Laboratory, Navy Center for Applied Research in Artificial Intelligence. January 2004.

Application-Oriented Conference and White Papers

- *Trading Network Connectivity and Standards for the Automotive Aftermarket*; Van Den Berg, P. and McLaren, B.M. CarParts white paper, October 2002.
- *Uncertainty Management Using Knowledge Craft (TM)*; Herbert, D. and McLaren, B., The Knowledge Forum, Volume 1, Issue 1, February 1987, Printed by Carnegie Group Inc., Pittsburgh, Pa.

GRANTS

Awarded and Active

- *U.S. Department of Education (IES)*, Award No: R305A090460. PI: Bruce M. McLaren, "AdaptErrEx: Exploring the Learning Benefits of Erroneous Examples and Their Dynamic Adaptations Within the Context of Middle School Mathematics," (\$1,302,928). Period: 09/01/09 to 08/31/12. (See <http://www.cs.cmu.edu/~bmclaren/projects/AdaptErrEx/>)
- *U.S. Department of Education (IES)*, PI: Michael Timms (WestEd); Co-PIs: Bruce M. McLaren, Douglas Weihnacht "Voyage to Galapagos: Development of a Differentiated Assistance Model in an Inquiry Learning Environment," (Subcontract amount: \$237,812) Period: 03/01/11 to 02/31/14.
- *European Commission, 7th Framework Programme on Research, Technological Development and Demonstration (FP7-ICT-2009-5)*, PI: The Hebrew University of Jerusalem (Baruch Schwarz); Co-PIs: Saarland University (Bruce M. McLaren), Researchers from five other European institutions, "METAFORA - Learning to Learn Together: A Visual Language for Social Orchestration of Educational Activities,"

(Subcontract amount: 230,000 Euros ~\$300,000) Period: 07/01/10 to 06/30/13. (See <http://www.metafora-project.org/>)

- *Deutsche Forschungsgemeinschaft* (DFG, the German Research Foundation), PIs: Bruce M. McLaren, Niels Pinkwart, “Learning to Argue: Generalized Support Across Domains (LASAD)” (Approximate funding over 4 years: 700,000 Euros = \$1,000,000). Period: 11/01/08 to 10/31/12. Unlike U.S. grants, DFG allows equal PIs, as opposed to designating a single PI, so McLaren and Pinkwart are equal PIs.) (See <http://cscwlab.in.tu-clausthal.de/lasad/>)

Pending

- *National Science Foundation (NSF), Innovative Technology Experiences for Students and Teachers (ITEST) Program.* PI: Bruce M. McLaren, Co-PI: Vincent Aleven “Learning to Program Robots with Intelligent Tutors and Virtual Worlds: Effects on Learning and Interest in STEM and ICT Careers.” Submitted May 13, 2011; Proposed Period: 10/01/11 to 09/30/14.
- *U.S. Department of Education (IES),* PI: Bruce M. McLaren, Co-PIs: Dave Yaron, Tamara van Gog “Can Self-Regulated Learning be Trained and Transferred? An Exploration in the Domain of Chemistry.” Submitted June 23, 2011; Proposed Period: 03/01/12 to 02/28/15.

Awarded and Completed

- *U.S. Department of Education (IES),* Award No: R305A080093. PI: Vincent Aleven, Co-PI: Bruce M. McLaren. “Bringing Cognitive Tutors to the Internet: A Website that Helps Middle-School Students Learn Math.” (\$1,490,705). Period: 03/01/08 to 04/30/11. (See <https://mathtutor.web.cmu.edu/>)
- *Deutsche Forschungsgemeinschaft* (DFG, the German Research Foundation), PIs: Erica Melis, Bruce M. McLaren, “Adaptive Learning with Erroneous Examples (ALoE)” (~\$250,000). Period: 09/01/08 to 08/31/10.
- *National Science Foundation (NSF)* Award No: 0627513. PI: Norman Sadeh, Co-PIs: Bruce M. McLaren, Lorrie Cranor, Ljudevit Bauer, and Jason Hong, “CT-T: User-Controllable Security and Privacy for Pervasive Computing.” (\$1,968,217). Period: 09/01/06 to 08/31/10.
- *Office of Naval Research (ONR)* Award No: N000140310220. PI: Kenneth R. Koedinger, Co-PIs: Neil Heffernan, Bruce M. McLaren, and Vincent Aleven. “Demonstrating Affordable Behavioral Modeling with CTAT Through Machine Learning and Human-Computer Interaction Techniques.” (\$887,362). Period: 12/01/05 to 11/30/08. (See the CTAT project webpage: <http://ctat.pact.cs.cmu.edu/>)
- *European Commission, Sixth Framework Programme IST – Technology-Enhanced Learning* (STREP Contract No. 027728), PI: The Hebrew University of Jerusalem; Co-PIs: DFKI (Bruce M. McLaren), Researchers from five other European institutions, “ARGUNAUT – An Intelligent Guide to Support Productive Online Dialogue,” Period: 12/01/05 to 08/31/08.
- *National Science Foundation (NSF)* Award No: SBE0354420. PI: Kenneth R. Koedinger, “Pittsburgh Sciences of Learning Center: Robust Learning with Learning Experiments in Real Classrooms.” Period: 10/01/04 to 09/30/09. McLaren has submitted and been awarded the following learning center projects under this grant.
 - “Exploring the Assistance Dilemma and Robust Learning in the Context of the Stoichiometry Tutors,” PI: Bruce M. McLaren, Co-PIs: Dave Yaron, Ken Koedinger (\$83,266). Period: 01/01/08 to 09/30/09. (See the Stoich studies webpage: <http://learnlab.web.cmu.edu/~pact/chemstudy/learn/>)
 - “CTAT: Start-to-Finish Creation of Computer-Based Tutors Without Programming,” PI: Vincent Aleven, Co-PIs: Bruce M. McLaren, Jonathan Sewall (\$598,990). Period: 10/01/07 to 09/30/09. (See the CTAT project webpage: <http://ctat.pact.cs.cmu.edu/>)
 - “Supporting Conceptual Learning in Chemistry through Collaboration Scripts and Adaptive, Online Support,” PI: Bruce M. McLaren, Co-PIs: Nikol Rummel, Andi Harrer, Hans Spada, Niels Pinkwart (\$169,122). Period: 01/01/07 to 06/30/08.
 - “Improving Algebra Learning and Collaboration through Collaborative Extensions to the Algebra Cognitive Tutor,” PI: Bruce M. McLaren, Co-PIs: Nikol Rummel, Mindy Kalchman, Hans Spada (\$503,500). Period: 01/01/05 to 12/31/07.

- “CTAT: Authoring Tools and Services for Computer-Based Tutors in LearnLab Experiments and Courses,” PI: Vincent Aleven, Co-PIs: Bruce M. McLaren, Jonathan Sewall, John laPlante (\$428,528). Period: 10/01/06 to 09/30/07. (See the CTAT project webpage: <http://ctat.pact.cs.cmu.edu/>)
- “Studying the Learning Effect of Personalization and Worked Examples in the Solving of Stoichiometry Problems,” PI: Bruce M. McLaren, Co-PIs: Dave Yaron, Ken Koedinger (\$44,842). Period: 08/01/05 to 12/31/05. (See the Stoich studies webpage: <http://learnlab.web.cmu.edu/~pact/chemstudy/learn/>)
- “CTAT: Tools to Author Intelligent and Pseudo-Intelligent Tutors: A PSLC Enabling Technology Proposal,” PI: Vincent Aleven, Co-PIs: Bruce M. McLaren, Jonathan Sewall (\$785,167). Period: 10/01/04 to 09/30/06. (See the CTAT project webpage: <http://ctat.pact.cs.cmu.edu/>)

INVITED PRESENTATIONS

- Kaleidoscope Symposium, Oberhausen, Germany, July 2006. Title of talk: “The Pittsburgh Science of Learning Center: Learning Studies and Technology in Actual Classroom Settings.” A video of this talk is available at http://www.noe-kaleidoscope.org/pub/lastnews/symposium_2005/mclaren.html
- GE Research, Albany, New York, February 2003.
- Robert Gordon University, Aberdeen, Scotland, February 2003.
- Fraunhofer Institute, Berlin, Germany, February 2003.
- University of Edinburgh, Edinburgh, Scotland, February 2003.
- University of Ulm, Ulm, Germany, September 1999.

PARTICIPATION IN ACADEMIC CONFERENCES AND WORKSHOPS

- On the Program Committee for the *15th International Conference on Artificial Intelligence in Education* (AIED-2011).
- On the Program Committee for the *9th International Conference on Computer-Supported Collaborative Learning* (CSCL-2011).
- Co-Chair, Local Organization of *Intelligent Tutoring Systems 2010* (ITS-2010), Pittsburgh, June 2010.
- Committee member, *International Society of the Learning Sciences* (ISLS) web publicity, since September 2009.
- On the Editorial Board of the *Journal of Educational Data Mining* (JEDM) since November 2008.
- On the Program Committee for the *FLAIRS-2009 Special Track on Artificial Intelligence Education* on Sanibel Island, Florida, 2009.
- On the Program Committee for the *14th International Conference on Artificial Intelligence in Education* (AIED-09), July 8-10, 2009, Brighton, U.K.
- On the Program Committee for the *First International Conference on Educational Data Mining* (EDM-08) in Montreal, Canada, 2008.
- On the Program Committee for the *First International Conference on Educational Data Mining* (EDM-08) in Montreal, Canada, 2008.
- On the Program Committee for *FLAIRS-2008, Special Track on Intelligent Tutoring Systems* in Coconut Grove, Florida, 2008.
- On the Program Committee for the *Workshop on Intelligent Tutoring Systems in Ill-Defined Domains* (ITS-08) in Montreal, Canada, 2008.

- On the Program Committee for the *Workshop on AIED Applications in Ill-Defined Domains (AIED-07)* in Los Angeles, California, 2007.
- On the Program Committee for the *Eighth European Conference on Case-Based Reasoning (ECCBR-06)*.
- On the Program Committee for *IJCAI-05*, the *Nineteenth International Joint Conference on Artificial Intelligence*, Edinburgh, Scotland July 30-August 5, 2005.
- On the Program Committee for *ICCBR-05*, the *Sixth International Conference on Case-Based Reasoning*, Chicago, Illinois, August 23-26, 2005.
- On the Program Committee for the *Second Workshop on Agent-based Computing for Enterprise Collaboration (ACEC)* in Modena, Italy, June 2004.
- On the Program Committee for the *Seventh European Conference on Case-Based Reasoning (ECCBR-04)* in Madrid, Spain, 2004.
- Workshop Chair for the *Fifth International Conference on Electronic Commerce (ICEC 2003)*, Pittsburgh, PA - October 1-3, 2003.
- On the Program Committee for the *Fifth International Conference on Case-Based Reasoning (ICCBR-03)* in Trondheim, Norway, 2003.
- Reviewer for the *AAAI-2002 Workshop on Agent-Based Technologies for B2B E-Commerce*, 2002.
- Reviewer for the *International Journal of Electronic Commerce - Agent Technologies for B2B E-Commerce*, 2002.
- On the Program Committee for the *Fourth International Conference on Case-Based Reasoning (ICCBR-01)* in Vancouver, Canada, 2001.

PERSONAL ACHIEVEMENTS

- Hiked the entire Appalachian Trail, Georgia to Maine, in 1989.

REFERENCES

- Available upon request or accessible at <http://www.cs.cmu.edu/~bmclare/references.html>.