# *Ido Roll*

Centre for Teaching, Learning, and Technology
University of British Columbia
214-1961 East Mall
Vancouver, BC, V6T 1Z1, Canada
Phone: (778) 938-4141 Fax: (604) 822-5324
Email: ido.roll@ubc.ca URL: http//www.idoroll.com


## Education

**Ph.D., Human-Computer Interaction.** Carnegie Mellon University. Winter 2009
Thesis title: Structured Invention Activities to Prepare Students for Future Learning: Means, Mechanisms, and Cognitive Processes.
Committee chairs: Kenneth Koedinger (Human-Computer Interaction & Psychology) and Vincent Aleven (Human-Computer Interaction).
Committee members: David Klahr (Psychology) and Daniel Schwartz (Education, Stanford University).

**M.Sc., Human-Computer Interaction.** Carnegie Mellon University. Summer 2008

**B.Sc., Mathematics and Physics.** The Hebrew University, Jerusalem, Israel. Spring 1996

## Professional Experience

**Senior Manager: Research and Evaluation.** Centre for Teaching, Learning, and Technology, University of British Columbia. 2014-present
*Leads research on teaching and learning in UBC. Studying support for self-regulated learning in classroom and online settings. Identifying impact and design guidelines for Massive Open Online Courses (MOOCs). Modelling learning processes across contexts. Applying educational data mining and learning analytics methods to evaluate impact of instructional technologies on knowledge, skills, and dispositions. Heading the Institute for Scholarship of Teaching and Learning at UBC. Guiding and supporting research projects on teaching and learning by faculty members and students across UBC.*

**Research Associate.** Carl Wieman Science Education Initiative, Department of Physics and Astronomy, and Department of Educational and Counseling Psychology and Special Education, University of British Columbia. 2012-2013
*Studied and supported self-regulated learning in online environments using educational data mining and learning analytics. Evaluated and improved students' ability to learn from errors ("Productive Failure"). Designed technology-intensive assessments of learning skills and attitudes.*

**Postdoctoral Researcher.** Carl Wieman Science Education Initiative, Department of Physics and Astronomy, University of British Columbia. 2009-2012
*Evaluated learning in Productive Failure and guided invention activities using interactive learning environments. Used cognitive modeling methods to identify and evaluate strategies in inquiry learning environments. Designed assessments of students' ability to reason with data. Worked with instructors to apply and evaluate evidence-based curricula.*

**Graduate Fellow.** Human-Computer Interaction Institute, Carnegie Mellon University. 2003-2009
*Used artificial intelligent techniques to adapt inquiry activities to individual learners. Studied and improved students' help-seeking and self-assessment skills in problem-solving environments in a sustainable manner. Created computational cognitive models of students' help-seeking skills and inquiry strategies. Used learning analytics techniques to identify productive learning behaviours in online environments.*

**Graduate Research Assistant.** School of Education, Stanford University. Summer 2006
*Studied how students learn from errors in Productive Failure and guided invention activities.*

**Project manager.** The Directorate for the Development of Technological Infrastructure, Israel. 2002-2003
*Managed software development projects in the area of unmanned aerial vehicles. Managed a large-scale virtual simulation for defining roles and responsibilities that support collaboration in dynamic high-risk environments.*

**Human Factors Engineer.** The Research and Development Department, The Israeli Air Force. 1995-1998; 1999-2001
*Designed and evaluated novel interfaces for advanced systems. Studied decision making capabilities in dynamic situations with high uncertainties.*

**Commander.** Senior year of the Talpiot program, The Hebrew University and the Ministry of Defense. 1998-1999
*Managed the senior year in the Talpiot program - an Israeli excellence program for qualifying elite students for leadership positions in the academia, industry, and military research units. Designed curriculum and defined requirements from an academic training program.*

## Learning and Institutional Analytics

**MOOC and Online Course Evaluation and Design.**
Useful Genetics. University of British Columbia. 2013-present
Climate Literacy: Navigating Climate Change Conversations. University of British Columbia. 2013-present
*Using learning analytics to identify productive patterns of engagement in Massive Open Online Courses (MOOCs), offered by Coursera.*

Introductory Physics. University of British Columbia. 2012-2013
*Supported the transformation of the course from an on-site to an online format. Established guidelines to maintain student engagement in the new format.*

**Institutional Analytics.**
Retention Among International Students. University of British Columbia. 2012
*Identified factors that contribute to retention among international students in the Faculty of Arts at UBC.*

## Teaching Experience

**Instructor and Course Designer.** Teaching Techniques in Physics and Astronomy. 2012-2013
University of British Columbia. *Graduate-level course. Instructor rating: 4.2 out of 5.*

**Course Designer, TA Training and Supervision.** Introductory Physics Labs. 2010-2013
University of British Columbia. *First-year general science labs for non-scientists, with 800 students.*

**Instructor and Course Designer.** Methods and Theories in Human-Computer Interaction. 2009-2012
Haifa University, Israel. *Graduate-level course in the Cognitive Psychology program. Instructor rating: 4.9-5 out of 5.*

**Course Designer.** Educational Game Design. 2006-2007
With Dr. Vincent Aleven, Eben Myers, Matthew Easterday, and Amy Ogan. Carnegie Mellon University.

**Teaching Assistant.** Cognitive Modeling and Intelligent Tutoring Systems. Fall 2005
With Dr. Vincent Aleven. Carnegie Mellon University.

**Teaching Assistant.** The History of Arab Israeli Relations. Spring 2005
With Dr. Richard Scheines. Carnegie Mellon University.

**Teacher and Course Designer.** Mathematical Thinking.
Community Day Middle School, Pittsburgh, PA. Fall 2007
The Gifted Children Program, Lod, Israel. 2002-2003
GMAT and GRE preparation, GMAX Inc., Israel. 2002-2003

## Grants

**Pioneering Next-Generation Assessments of STEM Learning.** Funded by the Gordon and Betty Moore Foundation, $863,719 (Co-PI). 2013

**Assessing and Improving Students' Self-Regulation in Inquiry Tasks with Adaptive Online Physics Simulations.** Funded by the Social Studies and Humanities Research Council, $34,516 (Applicant). 2012

**Motivation, Metacognition, and Learning in Guided Invention Activities.** Funded by the Pittsburgh Science of Learning Center, $22,200 (Principal investigator). 2012

**Teaching Students to Think with Data Using Guided Invention Activities.** Funded by the Pittsburgh Science of Learning Center, $51,000 (Principal investigator). 2011

**Helping Students Become Better Scientists.** Funded by the Pittsburgh Science of Learning Center, $80,000 (Principal investigator). 2009

**Deciphering Invention as Preparation for Future Learning.** Funded by the Pittsburgh Science of Learning Center, $173,033 (Principal investigator). 2007

**First Annual Inter-Science of Learning Center (iSLC) Student/Post-doc Summer Conference.** Funded by the National Science Foundations (SBE-0751038), $96,499 (Co-PI). 2007

**Operation Application Reification.** Funded by the Pittsburgh Science of Learning Center, $108,404 (Principal investigator). 2006

## Educational Technologies

**The Invention Support Environment.**
*An environment for teaching data analysis skills at the college level. The environment facilitates different forms of interactive activities such as Productive Failure, problem solving, and self-explanation activities. The environment is in regular use in courses at UBC.*

**The Invention Lab.**
*An environment for facilitating Productive Failure activities for middle school math. The environment supports students in generating complex mathematical models without advanced algebraic notations. It uses novel artificial-intelligence techniques to adapt the open-ended task to individual learners based on their competencies.*

**The Help Tutor.**
*An automated tutoring agent for giving students adaptive feedback on their help-seeking behaviours in the context of high-school Geometry. The system was shown to improve students' help-seeking behaviours in a sustainable manner that transfers to new, unsupported, tasks.*

**The Self-Assessment Tutor.**
*An environment for improving students' self-assessment in high-school Geometry. The environment supports students in assessing their ability prior to, during, and after the problem-solving process. The system was shown to improve the accuracy of students' self-assessments.*

## Publications († denotes work under my guidance)

### ◆ Journal Articles

[1] **Roll, I.,** Baker, R.S.J.d., Aleven, V., & Koedinger, K. R. (2014). On the benefits of seeking (and avoiding) help in online problem solving environment. *Journal of the Learning Sciences*, doi: 10.1080/10508406.2014.883977

[2] †Holmes, N. G., Day, J., Park, A. H. K., Bonn, D. A., & **Roll, I.** (2013). Making the failure more productive: scaffolding the invention process to improve inquiry behaviours and outcomes in productive failure activities. *Instructional Science*, doi:10.1007/s11251-013-9300-7

[3] **Roll, I.**, Holmes, N. G., Day, J., & Bonn, D. (2012). Evaluating metacognitive scaffolding in guided invention activities. *Instructional Science*, 40, 691-710.

[4] **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, 267-280.

[5] 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.

[6] Baker, R. S. J. d., Corbett, A. T., **Roll, I.**, & Koedinger, K. R. (2008). Developing a generalizable detector of when students game the system. *User Modeling and User-Adapted Interaction*, 18(3), 287-314.

[7] Baker, R., Walonoski, J., Heffernan, N., **Roll, I.**, Corbett, A., & Koedinger, K. R. (2008). Why students engage in "gaming the system" behavior in interactive learning environments. *Journal of Interactive Learning Research*, 19(2), 185-224.

[8] **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.

[9] Aleven, V., McLaren, B. M., **Roll, I.**, & Koedinger, K. R. (2006). Toward meta-cognitive tutoring: A model of help seeking with a Cognitive Tutor. *International Journal of Artificial Intelligence in Education* 16, 101-130.

## ◆ Book Chapters

[10] **Roll, I.,** Wiese, E., Long, Y., Aleven, V., & Koedinger, K. R. (accepted). Tutoring self- and co- regulation with intelligent tutoring systems to help students acquire better learning skills. In R. Sottilare, A. Graesser, X. Hu, & B. Goldberg (Eds.), *Design Recommendations for Adaptive Intelligent Tutoring Systems: Volume 2 - Adaptive Instructional Strategies.* Orlando, FL: U.S. Army Research Laboratory.

[11] Baker, R. S. J. d., Corbett, A. T., **Roll, I.**, Koedinger, K. R., Cocea, M., Hershkovitz, A., et al. (2013). Modeling and studying gaming the system with educational data mining. In R. Azevedo, & V. Aleven (Eds.), *International Handbook of Metacognition and Learning Technologies* (pp. 97-115). Berlin: Springer.

[12] Koedinger, K. R., & **Roll, I.** (2012). Learning to think: Cognitive mechanisms of knowledge transfer. In K. J. Holyoak, & R. G. Morrison (Eds.), *The Oxford Handbook of Thinking and Reasoning*. (pp. 789-806) New York: Oxford University Press.

[13] Aleven, V., **Roll, I.**, & Koedinger, K. R. (2012). Progress in assessment and tutoring of lifelong learning skills: An intelligent tutor agent that helps students become better help seekers. In P. J. Durlach & A. M. Lesgold (Eds.), *Adaptive Technologies for Training and Education* (pp. 67-95). New York: Cambridge University Press.

[14] Koedinger, K. R., Aleven, V., **Roll, I.**, & Baker, R. S. J. d. (2009). In vivo experiments on whether supporting metacognition in intelligent tutoring systems yields robust learning. In D. J. Hacker, J. Dunlosky, & A. C. Graesser (Eds.), *Handbook of Metacognition in Education* (pp. 383-412). New York: Routledge.

## ◆ Strictly Refereed Conference Full Papers (in parentheses - acceptance rate)

[15] **Roll, I.,** Briseno, A., Yee, N., & Welsh, A. (to appear). Not a magic bullet: the effect of scaffolding on knowledge and attitudes in online simulations. *To appear in the Proceedings of the International Conference of the Learning Sciences.* (30%)

[16] †Kardan, S., **Roll, I.,** & Conati, C. (to appear). The usefulness of log based clustering in a complex simulation environment. *To appear in the Proceedings of the International Conference on Intelligent Tutoring Systems.* (17%)

[17] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2011). Metacognitive practice makes perfect: Improving students' self-assessment skills with an intelligent tutoring system. In G. Biswas (Ed.), *Proceedings of the International conference on artificial intelligence in education* (pp. 288-295). Berlin: Springer Verlag. (32%)

[18] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2011). Outcomes and mechanisms of transfer in invention activities. In L. Carlson, C. Hölscher, & T. Shipley (Eds.), *Proceedings of the 33rd Annual Conference of the Cognitive Science Society* (pp. 2824-2829). Austin, TX: Cognitive Science Society. (32%)

[19] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2010). The invention lab: Using a hybrid of model tracing and constraint-based modeling to offer intelligent support in inquiry environments. In V. Aleven, J. Kay, & J. Mostow (Eds.), *Proceedings of the 10th International Conference on Intelligent Tutoring Systems* (pp. 115-24). Berlin: Springer Verlag. (30%)

[20] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2009). Helping students know 'further' - increasing the flexibility of students' knowledge using symbolic invention tasks. In N. A. Taatgen, & H. van Rijn (Eds.), *Proceedings of the 31st Annual Conference of the Cognitive Science Society* (pp. 1169-1174). Austin, TX: Cognitive Science Society. (32%)

[21] **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* (pp. 203-210). Amsterdam: IOS Press. (30%)

[22] **Roll, I.**, Aleven, V., McLaren, B. M., Ryu, E., Baker, R. S., & Koedinger, K. R. (2006). The help tutor: Does metacognitive feedback improve students' help-seeking actions, skills and learning? In M. Ikeda, K. D. Ashley, & T. W. Chan (Eds.), *Proceedings of the 8th International Conference on Intelligent Tutoring Systems* (pp. 360-369). Berlin: Springer Verlag. (35%)

[23] Baker, R. S. J. d., Corbett, A. T., Koedinger, K. R., & **Roll, I.** (2006). Generalizing detection of gaming the system across a tutoring curriculum. In M. Ikeda, K. D. Ashley, & T. W. Chan (Eds.), *Proceedings of the 8th international Conference on Intelligent Tutoring Systems* (pp. 402-411). Berlin: Springer Verlag. (35%)

[24] Baker, R. S. J. d., Corbett, A. T., Koedinger, K. R., Evenson, E., **Roll, I.**, Wagner, A. Z., et al. (2006) Adapting to when students game an intelligent tutoring system. In M. Ikeda, K. D. Ashley, & T. W. Chan (Eds.), *Proceedings of the 8th international Conference on Intelligent Tutoring Systems* (pp. 392-401). Berlin: Springer Verlag. (35%)

[25] **Roll, I.**, Baker, R. S., Aleven, V., McLaren, B., & Koedinger, K. (2005). Modeling students' metacognitive errors in two intelligent tutoring systems. In L. Ardissono, P. Brna and A. Mitrovic (Eds.), *Proceedings of the 10th International Conference on User Modeling* (pp. 379-388). Berlin: Springer Verlag. (23%)

[26] Aleven, V., **Roll, I.**, McLaren, B., Ryu, E. J., & Koedinger, K. R. (2005). An architecture to combine meta-cognitive and cognitive tutoring: Pilot testing the Help Tutor. In C. K. Looi, G. McCalla, B. Bredeweg, & J. Breuker (Eds.), *Proceedings of the 12th International Conference on Artificial Intelligence in Education* (pp. 17-24). Amsterdam, IOS Press. (31%)

[27] Baker, R. S., **Roll, I.**, Corbett, A. T., & Koedinger, K. R. (2005) Do performance goals lead students to game the system? In C. K. Looi, G. McCalla, B. Bredeweg, & J. Breuker (Eds.), *Proceedings of the 12th International Conference on Artificial Intelligence in Education* (pp. 57-64). Amsterdam, IOS Press. (31%)

[28] Aleven, V., McLaren, B., **Roll, I.**, & Koedinger, K. (2004). Toward tutoring help seeking: Applying cognitive modeling to meta-cognitive skills. In J. C. Lester, R. M. Vicario, & F. Paraguaçu (Eds.), *Proceedings of 7th International Conference on Intelligent Tutoring Systems* (pp. 227-239). Berlin: Springer Verlag. (39%)

## ◆ Other Selected Publications

[29] †Rieger, G. W., Sitwell, M., Carolan, J., & **Roll, I.** (accepted). A "flipped" approach to large-scale first-year labs. *Physics in Canada, Special Issue on Physics Education Res*earch.

[30] **Roll, I.**, Holmes, N. G., Day, J., Park, A. H. K., & Bonn, D. A. (2013, July). Process and outcome benefits for orienting students to analyze and reflect on available data in productive failure activities. *In proceedings of the Workshop on Scaffolding in Open-Ended Learning Environments (OELE), in conjunction with Artificial Intelligence in Education 2013*. Memphis, TN.

[31] **Roll, I.** & Wise, A.F. (2013, April). Developing students' understanding of graphical data representations using rotating expertise. *The annual meeting of the American Education Research Association (AERA) 2013*, San Francisco, CA.

[32] **Roll, I.** & Clarke-Midura, J. (2012, August) Towards a shared grammar: logging and analyzing interactions across a variety of inquiry environments. *Workshop conducted at EARLI SIG 20 Conference: Computer-Supported Inquiry Learning.* Buchum, Germany

[33] **Roll, I.** Aleven, V., & Koedinger, K. R. (2012, July) Automated task adaptation to support students' inquiry Learning. In P. Blikstein (Chair), building (timely) bridges between learning analytics, educational data mining and core learning sciences perspectives. *Symposium conducted at the 10th International Conference of the Learning Sciences (ICLS)*. Sydney, Australia.

[34] **Roll, I.** (2012, April). Co-evolution of qualitative and symbolic reasoning in invention activities. In **I. Roll** (Chair), on the design, implementation, and Outcomes of Using Contrasts in Learning. *Symposium conducted at the annual meeting of the American Education Research Association (AERA) 2012*, Vancouver, BC.

[35] **Roll, I.** (2012, April). Adaptive support and task generation in exploratory learning environments. In P. Blikstein (Chair), using learning analytics and educational data mining to understand scripted and exploratory learning environments: towards a common theoretical and methodological framework to investigate the trajectory to expertise. *Symposium conducted at the annual meeting of the American Education Research Association (AERA) 2012*, Vancouver, BC.

[36] Aleven, V., **Roll, I.**, McLaren, B. M., & Koedinger, Kenneth R. (2012, April). Assessing self-regulated learning: a (meta)cognitive modeling approach. *Symposium conducted at the annual meeting of the American Education Research Association (AERA) 2012*, Vancouver, BC.

[37] **Roll, I.**, (2011, August). Assessments that matter. *The 8th Annual Conference of the Alternative Education Resource Organization (AERO).* Portland, OR.

[38] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2011, April). The relationships between data mining, cognitive modeling, and learning theories: assessing and improving help-seeking skills. *The annual meeting of the American Education Research Association (AERA).* New Orleans, LA.

[39] **Roll, I.**, (2010, June). Scaffold and feedback in scientific inquiry environments: The case of the invention lab. In **I. Roll**, M. Mavrikis, & S. G. Santos (chairs), *Proceedings of the Workshop on Intelligent Support in Exploratory Environments, in conjunction with the 9th International Conference of the Learning Sciences (ICLS),* Chicago, IL.

[40] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2010, June). Analysis of students' actions during online invention activities - seeing the thinking through the numbers. *The 9th International Conference of the Learning Sciences (ICLS)* (pp. 45-52). Chicago, IL.

[41] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2008). Instruments and challenges in assessing help-seeking knowledge and behavior. In **I. Roll**, & V. Aleven (Eds.), *Proceedings of the Workshop on Metacognition and Self-Regulated Learning in Educational Technologies (SRL@ET), in conjunction with the International Conference on Intelligent Tutoring Systems (ITS)* (pp. 41-50). Montreal, QC.

[42] Kao, Y. S., **Roll, I.**, & Koedinger, K. R. (2007). Sources of difficulty in multi-step geometry area problems. In D. S. McNamara & J. G. Trafton (Eds.), *Proceedings of the 29th Annual Conference of the Cognitive Science Society* (pp. 1145-1150). Austin, TX: Cognitive Science Society.

[43] **Roll, I.**, Ryu, E., Sewall, J., Leber, B., McLaren, B. M., Aleven, V., et al. (2006). Towards teaching metacognition: Supporting spontaneous self-assessment. *Proceedings of the international conference on intelligent tutoring systems* (pp. 738-740). Berlin: Springer Verlag.

[44] **Roll, I.**, Aleven, V., & Koedinger, K. R. (2004). Promoting effective help-seeking behavior through declarative instruction. In J. C. Lester, R. M. Vicario, & F. Paraguaçu (Eds.), *Proceedings of 7th International Conference on Intelligent Tutoring Systems (ITS)* (pp. 857-9). Berlin: Springer-Verlag.

[45] **Roll, I.**, Baker, R. S., Aleven, V., & Koedinger, K. R. (2004). A metacognitive ACT-R model of students' learning strategies in intelligent tutoring systems. In J. C. Lester, R. M. Vicario, & F. Paraguaçu (Eds.), *Proceedings of 7th International Conference on Intelligent Tutoring Systems (ITS)* (pp. 854-6). Berlin: Springer-Verlag.

[46] **Roll, I.**, Baker, R. S., Aleven, V., & Koedinger, K. R. (2004). What goals do students have when choosing the actions they perform? In M. Lovett, C. Schunn, C. Lebiere, & P. Munro (Eds.), *Proceedings of the 6th International conference on cognitive modeling* (pp. 380-1). Mahwah, NJ: Lawrence Erlbaum.

## Supervision and Advising

**Post-doctoral Fellows.**

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|---|---|
| Adriana Briseno. Curriculum and Pedagogy, University of British Columbia. | 2013-present |

**Masters Students.**

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|---|---|
| Heather Fisher (with Marina Milner-Bolotin). Curriculum Studies, University of British Columbia. | In progress |
| Ilana Ram (with Yaffa Yeshurun). Cognitive Psychology, Haifa University. | 2012 |
| Adiela Meshulam (with Morre Goldsmith). Cognitive Psychology, Haifa University. | 2012 |

**Graduate Research Assistants.**

Lauren Fratamico. Computer Science, University of British Columbia. 2014-present
Nikki Yee. Educational & Counselling Psychology and Special Education, University of British Columbia. 2012-present
Samad Kardan. Computer Science, University of British Columbia. 2013-present
Ashley Welsh. Curriculum and Pedagogy, University of British Columbia. 2012-2013
Natasha Holmes. Physics and Astronomy, University of British Columbia. 2010-2012

**Mentoring.**

Professional Development Facilitator. The Carl Wieman Science Education Initiative, University of British Columbia. 2009-2013
*Facilitating professional development workshops for Science Teaching and Learning Fellows.*

Graduate Level Directed-Reading Projects. University of British Columbia. 2010-present
*Mentor graduate students who work on limited-scale science education projects.*

Undergraduate Research Assistants. University of British Columbia and Carnegie Mellon University 2004-present
*Mentor students in programming interfaces, and data collection and analysis.*

The Pittsburgh Science of Learning Center Summer School. Carnegie Mellon University. 2004-2007
*Mentored groups of students who designed educational technologies and research projects in a one-week workshop focusing on research methods for the learning sciences.*

## Selected Honors

**Fellow in the Program for Interdisciplinary Education Research (PIER).** 2005-2009
*A pre-doctoral training program funded by the Institute of Educational Sciences, Department of Education.*

**Best Paper award.**

The International Conference on Intelligent Tutoring Systems. Jhongli, Taiwan. 2006
The International Conference on Intelligent Tutoring Systems. Maceio, Brazil. 2004

**Finalist for Best Paper by Student First Author award.**

The International Conference on Intelligent Tutoring Systems. Jhongli, Taiwan. 2006
User Modeling. Edinburgh, UK. 2005

**Fellow in the Talpiot Program for Technological Excellence.** 1992-1995
*An Israeli training program for qualifying elite students for leadership positions in the Israeli academia, industry, and military research units.*

## Invited Talks

**Academic Audiences.**

One Size Fits Few: Adapting Instruction to Support Students in Becoming Expert Learners. University of Ontraio, Institute of Technology, Oshawa, ON. April, 2014

Learning Analytics in the Service of the Learning Sciences: Modelling and Supporting Help Seeking in Intelligent Learning Environments. Ben-Gurion University of the Negev, Be'er Sheva, Israel. December, 2013

Causing Fires in Virtual Labs: Implicit versus Explicit Scaffolding in Physics Simulations. Haifa University, Israel. December, 2013

Failing the Task, Winning the Lesson - Designing Opportunities for Productive Failure in College Science Courses. University of British Columbia, Vancouver, BC. January, 2013

Applied Metacognition: Studying Metacognition in Natural Settings. University of the Fraser Valley, Abbotsford, BC. December, 2012

Assessing and Improving Students' Metacognition using Learning Analytics and Educational Data Mining. University of British Columbia, Vancouver, BC. November, 2012

Learning Analytics and Educational Data Mining in the Service of Learning: Modelling and Supporting Help Seeking in Online Environments. National Institute of Education, Singapore. July, 2012

Novel Educational Technologies that Prepare Students for Future Learning. Haifa University, Haifa, Israel. June, 2012

Failing the Task, Winning the Lesson: On Instructional Activities that Prepare for Robust Learning. University of British Columbia, Vancouver, BC. December, 2010

Knowing 'Further' – The Effect of Symbolic Invention Tasks on the Flexibility of Students' Knowledge. Haifa University, Haifa, Israel. July, 2009

Debugging the Learning Process - Can Tutoring Systems Teach General Help-Seeking Skills? Worcester Polytechnic Institute, Worcester, MA. July, 2007

**Non-Academic Audiences.**

Assessments that Matter. The Society for the Advancement of Noncoercive Education, Vancouver, BC. November, 2011

Current Trends in Science Education - Lessons From the Carl Wieman Science Education Initiative. Catalyst Conference of the B.C. Science Teachers' Association, Richmond, BC. October, 2011

How Children Learn. BC Children's Hospital, Vancouver, BC. April, 2010

## Academic Service

**Associate Editor.** The International Journal of Artificial Intelligence in Education. 2014-present

**Executive Committee Member.** The International Artificial Intelligence in Education Society. 2013-present

**Editorial Board Member.** The International Journal of Artificial Intelligence in Education. 2013-present

**Communications Chair.** Learning@Scale 2015 2014-present

**Guest Editor.** The Journal of Learning Analytics 2014

**Senior Program Committee Member.** The International Conference on Artificial Intelligent in Education.

Memphis, TN July 2013
Christchurch, New Zealand. June 2011

**Program Committee Member.** The International Conference on Intelligent Tutoring Systems.

Honolulu, Hawaii. June 2014
Crete, Greece. June 2012
Pittsburgh, PA. June 2010

**Chair.** The Workshop on Metacognition and Self-Regulated Learning in Educational Technologies.

In conjunction with the International Conference on Intelligent Tutoring Systems, Crete, Greece. June 2012
In conjunction with the International Conference on Intelligent Tutoring Systems, Montreal, QC. June 2008
In conjunction with the International Conference on Artificial Intelligence in Education, Marina Del Rey, CA. July 2007

**Co-Chair.** The Workshop on Intelligent Support in Exploratory Environments.
In conjunction with the European Conference on Technology Enhanced Learning, Barcelona, Spain. September 2010
In conjunction with the International Conference of the Learning Sciences, Chicago, IL. June 2010

**Co-Founder and Co-Chair.** The First Inter-Science of Learning Centers Students and Post-docs Conference.
Pittsburgh, PA. February 2008

**Journal Reviewing:**

Journal of the Learning Sciences.
Learning and Instruction.
Journal of Educational Psychology.
Journal of Online Learning and Teaching.
Learning and Individual Differences.
Cognitive Science.
Instructional Science.
Journal of Mathematics Teacher Education.
Transactions on Learning Technologies.
Education Research International.

**Selected Conference Reviewing:**

International Conference of the Learning Sciences.
Annual Meeting of the Cognitive Science Society.
American Education Research Association.
Computer Supported Collaborative Learning.
Technology Enhanced Learning for Math and Science.
International Conference on Computers in Education.
International Conference on Intelligent Tutoring Systems.
International Conference on Artificial Intelligence in Education.
National Association for Research in Science Teaching.

**Grant reviewing:**

The Israeli Science Foundation (ISF).

**Professional Memberships:**

American Education Research Association (AERA).
The Psychonomic Society.
Pittsburgh Science of Learning Center (PSLC).
International Society of the Learning Sciences (ISLS).
International Artificial Intelligence in Education Society (AIED).