Dor Abrahamson, Ph.D.

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Education

2004 Ph.D. in Learning Sciences, Northwestern University, Evanston, IL

2000 MA in Cognitive Psychology, Tel Aviv University, Israel (Magna Cum Laude)

1992 Music Diploma (cello performance), Jerusalem Academy of Music, Israel.

Research Interest and Experience

University of California, Berkeley: Graduate School of Education

2005 – pres. I specialize in the study of mathematical intuition, reasoning, and learning from the synergistic perspectives of cognitive and socio-cultural theory. I investigate in particular the roles that mediated, reflective interaction with a range of technologies plays in students' content-specific development, which I view as negotiated trajectories from intuition to inscription. A core aspect of my professional practice is the design, production, implementation, and evaluation of innovative mixed-media concept-targeted curricular artifacts aligned with the emerging empiricism of individual cognition in social contexts. Operating in design-based research methodology, I am particularly interested in instances of spontaneous multimodal coordination of distributed epistemic and material resources and in the roles of teachers in facilitating conceptual insight. The work contributes toward developing rich theoretical models of learning as well as principled instructional-design methodology for implementing constructivist philosophy in the form of effective learning materials. I also explore the impact of Complexity Studies perspectives and methodologies on education research and have used agent-based modeling to advance theory of individual learning in social context. During my tenure as a Spencer Postdoctoral Fellow, I developed computer-based modules for learning probability. I have published in *Cognition and Instruction,* the *Handbook of Mathematical Cognition*, *International Journal of Computers for Mathematical Learning* (member of the ed. board), *The Journal of the Learning Sciences*, For *the Learning of Mathematics*, *Mathematics Teaching in the Middle School*, *Mathematics Thinking and Learning*, *Educational Studies in Mathematics*, and the *Journal of Statistics Education*, I am a member of the ed. board of *JLS*, and I contribute regularly to major conferences. My teaching focuses on embodied-cognition analysis of mathematical concepts toward designing, producing, implementing, and researching innovative learning materials.

Northwestern University: School of Education and Social Policy

On both research projects, below, I initiated contacts with district officials and school principals and teachers, designed learning materials and activities, led teacher workshops, classroom implementations, data analysis, and writing up for publications, reports, and presentations. Data treatment combined qualitative and quantitative methodologies.

2003-5 *The Center for Connected Learning and Computer-Based Modeling at Northwestern University's School of Education and Social Policy*:
Post-Doctoral Fellow leading the NSF-funded ISME project at the Northwestern site (Integrated Simulation and Modeling Environments, Uri Wilensky, PI). On this project that investigated student cognition of complex systems, science, social sciences, and mathematics, I interviewed individual students to probe for incipient understanding, then led cycles of design, programming, and facilitation of computer-authored learning environments for middle-school student focus groups and classrooms. Also, I recruited staff and led weekly project meetings.

2001-3 *Fuson Laboratory for the Development of Mathematics Curricula*:
NSF-funded doctoral dissertation project included the design and research of an innovative curricular unit in the mathematical domain of ratio and proportion (Prof. Karen C. Fuson, PI). My design is now part of an acclaimed curriculum.

Teaching Experience

University of California, Berkeley: Graduate School of Education

2005-present **Instructor**

Courses:

- EDUC 290C: Principles for Embodied Design: Exploring Learning-Sciences Perspectives on a Body-Based Approach to the Design of Learning Environments
- EDUC 290C: Design-Based Research in Mixed-Media Learning Environments
- EDUC 290C: Cognitive Ergonomics in STEM Education Research: A Multi-Disciplinary Analysis of Objects-to-Think-With
- EDUC 290C: Modeling-Based Methodology for Design, Learning, and Research
- EDUC 290C: Learning Chance: Computer-Supported Inquiry into Probability
- EDUC 224B: Paradigmatic Didactical–Mathematical Problematic Situations
- EDUC 223B: Research Group: Embodied Design Research Laboratory
- EDUC 130: Knowing & Learning in Math & Science (CalTeach course)

Northwestern University: School of Education and Social Policy

2002-4 **Teaching Assistant**
Courses:
- LSC 426: A Constructionist Approach to the Design of Learning Environments (Uri Wilensky, Professor).
- Teach-Ed326: Mathematics in the Elementary School From an Advanced Point of View (Karen C. Fuson, Professor).

Related Work Experience:

2004-5 Assistant to Editor in Chief, *International Journal for Computers in the Learning of Mathematics*. Responsibilities include occasional reviewing of contributions.

1992-9 *Tel Aviv*: Tutoring of dozens of elementary, middle-, and high-school students with learning difficulties, primarily in mathematics: bi-weekly sessions included para-therapeutic interactions and extramural activities.

1990-5 *Tel Aviv University*: Tutoring a new-immigrant faculty member in speaking, translating, and editing in Hebrew.

1990-2 *Ministry of Education and the Van Leer Jerusalem Institute* joint project. Instruction of science in enrichment programs at elementary schools. Development and research of innovative teaching methods and tools.

1990-1 *Israeli Ministry of Defense: Rehabilitation Department*. Bi-weekly activity-and-conversation sessions with veteran senior officer suffering from post-traumatic stress disorder and bipolar psychopathological syndrome.

Languages: Native speaker of English and Hebrew; moderate command of French.

Publications

1. Refereed Journal Publications and Conference Proceedings

a. Refereed Journal Articles

Abrahamson, D., & Cigan, C. (2003). A design for ratio and proportion. *Mathematics Teaching in the Middle School, 8*(9), 493-501.

Abrahamson, D. (2006). The shape of things to come: The computational pictograph as a bridge from combinatorial space to outcome distribution. *International Journal of Computers for Mathematics Learning, 11*(1), 137-146.

Abrahamson, D., Berland, M.W., Shapiro, R. B., Unterman, J. W., & Wilensky, U. J. (2006). Leveraging epistemological diversity through computer-based argumentation in the domain of probability. *For the Learning of Mathematics, 26*(3), 39-45.

Abrahamson, D., Janusz, R., M., & Wilensky, U. (2006). There once was a 9-Block… -- A middle-school design for probability and statistics. *Journal of Statistics Education, 14*(1). Retrieved August 12, 20010, at http://www.amstat.org/publications/jse/v14n1/abrahamson.html.

Abrahamson, D., & Wilensky, U. (2007). Learning axes and bridging tools in a technology-based design for statistics. *International Journal of Computers for Mathematics Learning, 12*(1), 23-55.

Abrahamson, D. (2009). Embodied design: Constructing means for constructing meaning. *Educational Studies in Mathematics, 70*(1), 27-47.

Abrahamson, D. (2009). Orchestrating semiotic leaps from tacit to cultural quantitative reasoning—the case of anticipating experimental outcomes of a quasi-binomial random generator. *Cognition and Instruction, 27*(3), 175-224.

Abrahamson, D. (2009). A student's synthesis of tacit and mathematical knowledge as a researcher's lens on bridging learning theory. In M. Borovcnik & R. Kapadia (Eds.), Research and developments in probability education [Special Issue]. *International Electronic Journal of Mathematics Education*, *4*(3), 195-226. Retrieved Aug. 12, 2010 from http://www.iejme.com/032009/main.htm

Veeragoudar Harrell, S., & Abrahamson, D. (2010). Second Life unplugged: a design for fostering at-risk students' STEM agency. In H. Gazit, D. L. Garcia, G. LeMasers, & L. Morgado (Eds.), The metaverse assembled [Special Issue]. *Journal of Virtual Worlds Research.* Retrieved Aug. 12, 2010, at https://journals.tdl.org/jvwr/article/view/834/716

Abrahamson, D., Trninic, D., Gutiérrez, J. F., Huth, J., & Lee, R. G. (2011). Hooks and shifts: a dialectical study of mediated discovery. *Technology, Knowledge, and Learning, 16*(1), 55-85.

Abrahamson, D., Gutiérrez, J. F., & Baddorf, A. K. (2012). Try to see it my way: the discursive function of idiosyncratic mathematical metaphor. *Mathematical Thinking and Learning, 14*(1), 55-80.

Abrahamson, D. (in press). Rethinking intensive quantities via guided mediated abduction. *The Journal of the Learning Sciences*.

Abrahamson, D. (in press). Discovery reconceived: product before process. *For the Learning of Mathematics.*

Journal Articles Under Review

- Prodromou, T., & Abrahamson, D. (under review). Learners' formal and informal resources for conceptualizing an event space as a model of a probability experiment. In R. Biehler & D. Pratt (Eds.) Probability in reasoning about data and risk [Special issue]. *ZDM: The international Journal on Mathematics Education.*
- Abrahamson, D., & Trninic, D. (under review). Embodied-interaction design for mathematics learning: toward a manual of arms. In P. Marshall, A. N. Antle, E. v.d. Hoven, & Y. Rogers (Eds.), The theory and practice of embodied interaction in HCI and interaction design [Special issue]. *ACM Transactions on Human–Computer Interaction*.

b. Refereed Conference Proceedings

Abrahamson, D. (2002). When "the same" is the same as different differences: Aliya reconciles her perceptual judgment of proportional equivalence with her additive computation skills. In D. Mewborn, P. Sztajn, E. White, H. Wiegel, R. Bryant, and K. Nooney (Eds.), *Proceedings of the Twenty Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Athens, GA, October 26-29, 2002: Vol. 4* (pp. 1658 – 1661). Columbus, OH: Eric Clearinghouse for Science, Mathematics, and Environmental Education.

Abrahamson, D. (2003). Text talk, body talk, table talk: A design of ratio and proportion as classroom parallel events. In N. A. Pateman, B. J. Dougherty, & J. Zilliox (Eds.), *Proceedings of the Twenty Seventh Annual Meeting of the International Group for the Psychology of Mathematics Education, Honolulu, Hawaii, 2003*: *Vol. 2* (pp. 1 – 8). Columbus, OH: Eric Clearinghouse for Science, Mathematics, and Environmental Education.

Abrahamson, D., & Wilensky, U. (2003). The quest of the bell curve: A constructionist approach to learning statistics through designing computer-based probability experiments. In M. A. Mariotti (Ed.)*, Proceedings of the Third Conference of the European Society for Research in Mathematics Education*. Pisa, Italy: University of Pisa. Retrieved June 1, 2009, from http://www.dm.unipi.it/didattica/CERME3/proceedings/Groups/TG5/TG5_abrahamson_cerme3.pdf

Abrahamson, D. (2004). Embodied spatial articulation: A gesture perspective on student negotiation between kinesthetic schemas and epistemic forms in learning mathematics. In D. E. McDougall and J. A. Ross (Eds.), *Proceedings of the Twenty Sixth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (Vol 2, pp. 791 – 797). Windsor, Ontario: Preney.

Abrahamson, D., & Wilensky, U. (2004). S.A.M.P.L.E.R.: Collaborative interactive computer-based statistics learning environment. In M. Niss (Ed.), *Proceedings of the 10th International Congress on Mathematical Education*, Copenhagen, Denmark. Retrieved June 1, 2009, from http://www.icme-organisers.dk/tsg11/Papers/Abrahamson%20&%20Wilensky.doc

Abrahamson, D., & Wilensky, U. (2004). ProbLab: A computer-supported unit in probability and statistics. In M. J. Hoines & A. B. Fuglestad (Eds.), *Proceedings of the 28th Annual Meeting of the International Group for the Psychology of Mathematics Education* (Vol 1, p. 369). Bergen University College.

Abrahamson, D., Berland, M.W., Shapiro, R. B., Unterman, J. W., & Wilensky, U. (2004). Leveraging epistemological diversity through computer-based argumentation in the domain of probability. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, F. Herrera (Eds.), *Proceedings of The Sixth International Conference of the Learning Sciences* (pp. 28-35). Mahwah NJ: Lawrence Erlbaum Associates.

Abrahamson, D., & Wilensky, U. (2005). ProbLab goes to school: Design, teaching, and learning of probability with multi-agent interactive computer models. In M. Bosch (Ed.), *Proceedings of the Fourth Congress of the European Society for Research in Mathematics Education* (pp. 570-579). Universitat Ramon Llull, Catalonia, Spain: FUNDEMI IQS.

Abrahamson, D., Blikstein, P., Lamberty, K. K., & Wilensky, U. (2005). Mixed-media learning environments. In M. Eisenberg & A. Eisenberg (Eds.), *Proceedings of the Fourth International Conference for Interaction Design and Children (IDC 2005)*. Boulder, Colorado: IDC.

Blikstein, P., Abrahamson, D., & Wilensky, U. (2005). NetLogo: Where we are, where we're going. In M. Eisenberg & A. Eisenberg (Eds.), *Proceedings of the Fourth International Conference for Interaction Design and Children (IDC 2005)*, Boulder, Colorado.

Abrahamson, D., & Wilensky, U. (2005). Understanding chance: From student voice to learning supports in a design experiment in the domain of probability. In G. M. Lloyd, M. Wilson, J. L. M. Wilkins, & S. L. Behm (Eds.), *Proceedings of the Twenty Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (Vol. 7, pp. 1-8). Roanoke, VA – Virginia Tech: PME-NA.

Abrahamson, D. (2006). Learning chance: lessons from a learning-axis and bridging-tools perspective. In A. Rossman & B. Chance (Eds.), *Proceedings of the Seventh International Conference on Teaching of Statistics*. Salvador, Brazil.

Abrahamson, D. (2006). "Because in the world, there are more blocks of this type": The real-worldness of immersive combinatorial analysis as a grounding of simulated probability experiments. In **D. Abrahamson (Organizer)**, What's a situation in situated cognition? – A constructionist critique of authentic inquiry. In S. Barab, K. Hay, & D. Hickey (Eds.), *Proceedings of the Seventh International Conference of the Learning Sciences* (Vol. 2, pp 1015 – 1021). Mahwah, NJ: Lawrence Erlbaum Associates.

Abrahamson, D., & Cendak, R. M. (2006). The odds of understanding the law of large numbers: A design for grounding intuitive probability in combinatorial analysis. In J. Novotná, H. Moraová, M. Krátká, N. Stehlíková (Eds.), *Proceedings of the Thirtieth Conference of the International Group for the Psychology of Mathematics Education* (*Vol. 2,* pp. 1 – 8). Charles University, Prague, Czech Republic: PME.

Abrahamson, D. (2006). Mathematical representations as conceptual composites: Implications for design. In S. Alatorre, J. L, Cortina, M. Sáiz, & A. Méndez (Eds.), *Proceedings of the Twenty Eighth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 464-466). Universidad Pedagógica Nacional.

Brar, R., Galpern, A. J., & Abrahamson, D. (2006). Lost in translation: The 'bean snare' as a case of the situated–symbolic divide. In S. Alatorre (Ed.), *Proceedings of the Twenty Eighth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 390-391). Universidad Pedagógica Nacional, Mérida, Yucatán, México: PME-NA.

Abrahamson, D., Blikstein, P., & Wilensky, U. (2007). Classroom model, model classroom: Computer-supported methodology for investigating collaborative-learning pedagogy. In C. Chinn, G. Erkens, & S. Puntambekar (Eds.), *Proceedings of the Biennial Conference on Computer Supported Collaborative Learning*. NJ: Rutgers University.

Abrahamson, D. (2007). Both rhyme and reason: Toward design that goes beyond what meets the eye. In T. Lamberg & L. Wiest (Eds.), *Proceedings of the Twenty Ninth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 287 – 295). Stateline (Lake Tahoe), NV: University of Nevada, Reno.

Abrahamson, D. (2007). Handling problems: Embodied reasoning in situated mathematics. In T. Lamberg & L. Wiest (Eds.), *Proceedings of the Twenty Ninth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 219 – 226). Stateline (Lake Tahoe), NV: University of Nevada, Reno.

Abrahamson, D., Blikstein, P., & Wilensky, U. (2007). Classroom model, model classroom: Computer-supported methodology for investigating collaborative-learning pedagogy. In C. Chinn, G. Erkens, & S. Puntambekar (Eds.), *Proceedings of the Computer Supported Collaborative Learning (CSCL) Conference* (Vol. 8, Part 1, pp. 46 – 55). NJ: Rutgers University. CD-ROM

Veeragoudar Harrell, S., & Abrahamson, D. (2007). Computational literacy and mathematics learning in a virtual world: Identity, embodiment, and empowered media engagement. In C. Chinn, G. Erkens, & S. Puntambekar (Eds.), *Proceedings of the Computer Supported Collaborative Learning (CSCL) Conference* (Vol. 8, Part 1, pp. 264 - 265). NJ: Rutgers University. CD-ROM.

Abrahamson, D. (2007). The complexity of education research and why we like it. In M. Jacobson (Symposium Organizer & Chair) & W. Clancey (Discussant), Cognitive systems and the cognitive sciences: Potential for pervasive theoretical and research implications? In G. Trafton & D. S. McNamara (Eds.), *Proceedings of the Twenty-Ninth Meeting of the Cognitive Science Society* (pp. 29 – 30). Austin, TX: Cognitive Science Society. CD-ROM

Veeragoudar Harrell, S., & Abrahamson, D. (2008). It takes a virtual village: Transforming urban-youth intellectual agency through critical computational literacy. In S. Veeragoudar Harrell (Chair, Organizer) & S. Barab (Discussant), Virtually there: Emerging designs for STEM teaching and learning in immersive online 3D microworlds. Symposium in G. Kanselaar, J. van Merriënboer, P. Kirschner, & T. de Jong (Eds.), *Proceedings of the International Conference of the Learning Sciences (ICLS)* (Vol. 3, pp. 383-391). Utrecht, The Netherlands: ICLS.

Blikstein, P., Abrahamson, D., & Wilensky, U (2008). The classroom as a complex adaptive system: An agent-based framework to investigate students' emergent collective behaviors. In G. Kanselaar, J. van Merriënboer, P. Kirschner, & T. de Jong, *Proceedings of the International Conference of the Learning Sciences (ICLS2008)* (Vol. 3, pp. 12-13). Utrecht, The Netherlands: ISLS.

Abrahamson, D, & White, T. (2008). Artifacts and aberrations: On the volatility of design research and the serendipity of insight. In G. Kanselaar, J. van Merriënboer, P. Kirschner, & T. de Jong, *Proceedings of the International Conference of the Learning Sciences (ICLS2008)* (Vol. 1, pp. 27-34). Utrecht, The Netherlands: ISLS.

Abrahamson, D. (2008). Bridging theory: A case study of an 11-year-old student engaged in activities designed to support the grounding of outcome-based combinatorial analysis in event-based intuitive judgment. In M. Borovcnik & D. Pratt (Eds. of Topic Study Group 13, Research and Development in the Teaching and Learning of Probability), in the *Proceedings of the International Congress on Mathematical Education (ICME 11)*. Monterrey, Mexico: ICME. Retrieved May 26, 2009, from http://tsg.icme11.org/tsg/show/14

Abrahamson, D., Bryant, M. J., Gutierrez, J. F., Mookerjee, A. V., Souchkova, D., & Thacker, I. (2009). Figuring it out: mathematical learning as guided semiotic disambiguation of useful yet initially entangled intuitions. In S. L. Swars, D. W. Stinson, & S. Lemons–Smith (Eds.), *Proceedings of the Thirty-First Annual Meeting of the North-American Chapter of the International Group for the Psychology of Mathematics Education* (Vol. 5, pp. 662-670). Atlanta, GA: Georgia State University.

Abrahamson, D. (2010). A tempest in a teapot is but a drop in the ocean: action-objects in analogical mathematical reasoning. In K. Gomez, L. Lyons, & J. Radinsky (Eds.), *Learning in the Disciplines: Proceedings of the 9th International Conference of the Learning Sciences (ICLS 2010)* (Vol. 1, pp. 492-499). University of Illinois at Chicago: International Society of the Learning Sciences: Chicago IL.

Reinholz, D., Trninic, D., Howison, M., & Abrahamson, D. (2010). It's not easy being green: embodied artifacts and the guided emergence of mathematical meaning. In P. Brosnan, Erchick, D., & Flevares, L. (Eds.), *Proceedings of the Thirty-Second Annual Meeting of the North-American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA 32)* (Vol. VI, Ch. 18: Technology, pp. 1488 – 1496). Columbus, OH: PME-NA.

Trninic, D., Reinholz, D., Howison, M., & Abrahamson, D. (2010). Design as an object-to-think-with: semiotic potential emerges through collaborative reflective conversation with material. In P. Brosnan, Erchick, D., & Flevares, L. (Eds.), *Proceedings of the Thirty-Second Annual Meeting of the North-American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA 32)* (Vol. VI, Ch. 18: Technology, 1523 – 1530). Columbus, OH: PME-NA.

Howison, M., Trninic, D., Reinholz, D., & Abrahamson, D. (2011). The Mathematical Imagery Trainer: from embodied interaction to conceptual learning. In G. Fitzpatrick, C. Gutwin, B. Begole, W. A. Kellogg, & D. Tan (Eds.), *Proceedings of the annual meeting of CHI: ACM Conference on Human Factors in Computing Systems (CHI 2011)*, Vancouver, May 7-12, 2011 (Vol. "Full Papers," pp. 1989-1998). ACM: CHI (CD ROM).

Trninic, D., Gutiérrez, J. F., & Abrahamson, D. (2011). Instruction and embodied design. In A. Antle, P. Marshall, & E. van den Hoven (Chairs), workshop on Embodied Interaction: Theory and Practice in HCI. In G. Fitzpatrick & C. Gutwin (Eds.), *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI 2011)*, Vancouver, May 7-12, 2011.

Trninic, D., Gutiérrez, J. F., & Abrahamson, D. (2011). Virtual mathematical inquiry: problem solving at the gestural–symbolic interface of remote-control embodied-interaction design. In G. Stahl, H. Spada,, N. Miyake, & N. Law (Eds.), *Connecting Computer-Supported Collaborative Learning to Policy and Practice: CSCL2011 Conference Proceedings* (Vol. 1—Long Papers, pp. 272-279). Hong Kong: International Society of the Learning Sciences.

Abrahamson, D., & Trninic, D. (2011). Toward an embodied-interaction design framework for mathematical concepts. In P. Blikstein & P. Marshall (Eds.), *Proceedings of the 10th Annual Interaction Design and Children Conference (IDC 2011)*, Ann Arbor, MI, June 20-23 (Vol. "Full papers," pp. 1-10). IDC.

Trninic, D., & Abrahamson, D. (2011). Emergent ontology in embodied interaction: automated feedback as conceptual placeholder. In L. R. Wiest & T. Lamberg (Eds.), *Proceedings of the 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1777-1785). Reno, NV: University of Nevada, Reno.

c. Conference Presentations (refereed acceptance)

Fuson, K. C., Kalchman, M., Abrahamson, D., & Izsák, A. (2002, April). *Bridging the addition–multiplication learning gap: Teaching studies in four multiplicative domains.* Symposium conducted at the annual meeting of the American Educational Research Association, New Orleans, LA.

Abrahamson, D. (2003, April). A situational–representational didactic design for fostering conceptual understanding of mathematical content: The case of ratio and proportion. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Abrahamson, D., & Wilensky, U. (2004, April). S.A.M.P.L.E.R.: Statistics As Multi-Participant Learning-Environment Resource. In U. Wilensky (Chair) & S. Papert (Discussant), *Networking and complexifying the science classroom: Students simulating and making sense of complex systems using the HubNet networked architecture*. Symposium conducted at the annual meeting of the American Educational Research Association, San Diego, CA.

Abrahamson, D., & Wilensky, U. (2005, April). Collaboration and equity in classroom activities using Statistics As Multi-Participant Learning-Environment Resource (S.A.M.P.L.E.R.). In W. Stroup U. Wilensky (Chairs), C. D. Lee (Discussant), *Patterns in group learning with next-generation network technology*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Abrahamson, D., & Wilensky, U. (2005, April). The stratified learning zone: Examining collaborative-learning design in demographically-diverse mathematics classrooms. In D. Y. White (Chair) & E. H. Gutstein (Discussant), *Equity and diversity studies in mathematics learning and instruction.* Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Abrahamson, D., & Wilensky, U. (2005, June) Piaget? Vygotsky? I'm game: Agent-based modeling for psychology research. In M. Mascolo (Chair) *Theoretical issues,* the annual meeting of the Jean Piaget Society, Vancouver, Canada.
applet: http://ccl.northwestern.edu/research/conferences/JPS2005/jps2005.html

Abrahamson, D. (2006, April). Bottom-up stats: Toward an agent-based "unified" probability and statistics. In D. Abrahamson (Org.), U. Wilensky (Chair), and M. Eisenberg (Discussant), *Small steps for agents… giant steps for students?: Learning with agent-based models*. Symposium conducted at the annual meeting of the American Educational Research Association, San Francisco, CA.

Wilensky, U., & Abrahamson, D. (2006, April). *Is a disease like a lottery?: Classroom networked technology that enables student reasoning about complexity.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Abrahamson, D. (2006, April). Bottom-up stats: Toward an agent-based "unified" probability and statistics. In D. Abrahamson (Org.), U. Wilensky (Chair), and M. Eisenberg (Discussant), *Small steps for agents… giant steps for students?: Learning with agent-based models*. Symposium conducted at the annual meeting of the American Educational Research Association, San Francisco, CA.

Abrahamson, D. (2006, June). *The three M's: Imagination, embodiment, and mathematics*. Paper presented at the annual meeting of the Jean Piaget Society, Baltimore, MD, June 1-3.

Blikstein, P., Abrahamson, D., & Wilensky, U. (2006, June). *Minsky, mind, and models: Juxtaposing agent-based computer simulations and clinical-interview data as a methodology for investigating cognitive-developmental theory.* Paper presented at the annual meeting of the Jean Piaget Society, Baltimore, MD.

Abrahamson, D., Wilensky, U., & Levin, J. (2007, April). Agent-based modeling as a bridge between cognitive and social perspectives on learning. In **D. Abrahamson (Organizer),** U. Wilensky (Chair), & R. Lesh (Discussant), *Learning Complexity: Agent-based modeling supporting education research on student cognition in social contexts*. Paper accepted for presentation at the annual meeting of the American Educational Research Association, Chicago, IL, April 9 – 13.

Blikstein, P., Abrahamson, D., & Wilensky, U. (2007, April). Multi-agent simulation as a tool for investigating cognitive–developmental theory. In **D. Abrahamson (Organizer),** U. Wilensky (Chair), & R. Lesh (Discussant), *Learning Complexity: Agent-based modeling supporting education research on student cognition in social contexts.* Paper accepted for presentation at the annual meeting of the American Educational Research Association, Chicago, IL, April 9 – 13.

Abrahamson, D. (2007, April). *The real world as a trick question: Undergraduate statistics majors' construction-based modeling of probability*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL, April 9 – 13.

Abrahamson, D. (2007, June). *From gesture to design: Building cognitively ergonomic learning tools*. Paper presented at the annual conference of the International Society for Gesture Studies. Northwestern University, June 18-20.

Abrahamson, D. (2007, September). *From intuition to inscription: Emerging design principles for mathematics education*. Presented at the annual meeting of the International Society for Design and Development in Education (ISDDE), Berkeley, CA, September 17 – 20.

Abrahamson, D. (2008, April). Toward intuitive grasps of binomial distributions: A mixed-media approach. In A. Rubin (Chair) and P. Vahey (Discussant), *Contrasting perspectives on connecting important ideas in probability*. Symposium presented at the National Council of Teachers of Mathematics Research Presession, Salt Lake City, UT, April 7 – 9.

Abrahamson, D., Bryant, M. J., Howison, M. L., & Relaford-Doyle, J. J. (2008, March). *Toward a phenomenology of mathematical artifacts: A circumspective deconstruction of a design for the binomial.* Paper presented at the annual conference of the American Educational Research Association, New York, March 24 – 28.

Abrahamson, D. (2008, March). Fostering the emergence of an embodied cognitive artifact: The case of the number line in a design for probability. In **D. Abrahamson** (Chair), D. Earnest (Org.), & H. Bass (Discussant), *The many values of the number line—An interdisciplinary forum*. Symposium presented at the annual conference of the American Educational Research Association, New York, March 24 – 28.

Abrahamson, D. (2008, March). From gesture to design: Building cognitively ergonomic learning tools. In S. Gerofsky (Chair & Org.) & M. Nathan (Discussant), *Math education meets gesture studies: How mathematics education adapts gesture studies to its own purposes.* Symposium presented at the annual conference of the American Educational Research Association, New York, March 24 – 28.

Blikstein, P., Abrahamson, D., & Wilensky, U. (2008, March). *Groupwork as a complex adaptive system: A methodology to model, understand, and design classroom strategies for collaborative learning.* Paper presented at the annual conference of the American Educational Research Association, New York, March 24 – 28.

Veeragoudar Harrell, S., & Abrahamson, D. (2008, March). *It takes a virtual village: Living and learning in online virtual reality*. In J. Mahiri (Chair & Org.) & C. D. Lee (Discussant), Reversing underachievement: Digital media in teaching and learning with highly marginalized students. Symposium presented at the annual conference of the American Educational Research Association, New York, March 24 – 28.

Blikstein, P., Wilensky, U., & Abrahamson, D. (2009, April). *Towards a framework for cognitive research using agent-based modeling and complexity sciences*. In M. Jacobson (Symposium Chair), M. Kapur (Organizer), & N. Sibelli (Discussant). Complexity, learning, and research: Under the microscope, new kinds of microscopes, and seeing differently**.** Paper presented at the annual meeting of the American Educational Research Association, San Diego, April 13 – 17.

Abrahamson, D. (2009, April). *Appropriate tools: On grounding mathematical procedures in perceptual intuitions.* Paper presented at the annual meeting of the American Educational Research Association, San Diego, April 13 – 17.

Mauks–Kaupke, K. P., Buchanan, K., Relaford–Doyle, J., Sushkova, D., & Abrahamson, D. (2009, April). *The double-edged sword of constructivist design*. Paper presented at the annual meeting of the American Educational Research Association, San Diego, April 13 – 17.

Zolkower, B., & Abrahamson, D. (2009, April). *Studying paradigmatic didactical-mathematical situations: Design and implementation of an experimental graduate level course for pre-service mathematics teachers and doctoral students.* Paper presented at the annual meeting of the American Educational Research Association, San Diego, April 13 – 17.

Veeragoudar, S., & Abrahamson, D. (2009, April). At-risk voices speak, theory is all ears: Toward an empirically-based model of agency for STEM learning. Paper presented at the annual meeting of the American Educational Research Association, San Diego, April 13 – 17.

Abrahamson, D., & Howison, M. L. (2010, May). Kinemathics: exploring kinesthetically induced mathematical learning. Paper presented at the annual meeting of the American Educational Research Association, April 30 – May 4.

Abrahamson, D., & Howison, M. L. (2010, May). Embodied artifacts: coordinated action as an object-to-think-with. In D. L. Holton (Chair) & J. P. Gee (Discussant), *Embodied and enactive approaches to instruction: implications and innovations*. Paper presented at the annual meeting of the American Educational Research Association, April 30 – May 4.

Gutiérrez, J. F., Trninic, D., Lee, R. G., & Abrahamson, D. (2011, April). *Hooks and shifts in instrumented mathematics learning.* Paper presented at the annual meeting of the American Educational Research Association (SIG Learning Sciences). New Orleans, LA, April 8 – 12, 2011.

Trninic, D., Gutiérrez, J. F., Lee, R. G., & Abrahamson, D. (2011, April). *Generative immersion and immersive generativity in instructional design*. Paper presented at the annual meeting of the American Educational Research Association (SIG Research in Mathematics Education). New Orleans, LA, April 8 – 12, 2011.

Abrahamson, D., Gutiérrez, J. F., Lee, R. G, Reinholz, D., & Trninic, D. (2011, April). *From tacit sensorimotor coupling to articulated mathematical reasoning in an embodied design for proportional reasoning.* In R. Goldman (Chair), H. Kwah & D. **Abrahamson** (Organizers), & R. P. Hall (Discussant), Diverse perspectives on embodied learning: what's so hard to grasp? Symposium presented at the annual meeting of the American Educational Research Association (SIG Advanced Technologies for Learning). New Orleans, LA, April 8 – 12, 2011.

Abrahamson, D., Trninic, D., & Gutiérrez, J. F. (i2011, June). *Dialectical investigations of mathematical discovery: the emergence of disciplinary forms in an embodied-interaction design for proportions*. Paper presented at the annual meeting of the Jean Piaget Society, Berkeley, June 2-4.

Visintainer, T., Little, A., & Abrahamson, D. (2011, May). *Pedagogical heuristics for teacher preparation: reflections from CalTeach*. Paper presented at the annual UTeach Institute/NIMSI conference, UT Austin, Austin, TX, May 24-26.

Charoenying, T., Trninic, D., & Abrahamson, D. (2012, April). *The choreography of conceptual development: cognitive schemes meet cultural practice in instructional design*. Poster presented at the annual meeting of the American Educational Research Association, Vancouver, April 13-17.

Abrahamson, D., & Charoenying, T. (2012, April). *Doing-for-seeing, seeing-for-doing: demonstration and imitation as critical opportunities for schema development in embodied-interaction mathematics learning.* Paper presented at the annual meeting of the American Educational Research Association, Vancouver, April 13-17.

Abrahamson, D., Negrete, A. G., & Gutiérrez, J. F. (2012, April). *Adding up to multiplicative concepts: the role of embodied reasoning.* Paper presented at the annual meeting of the American Educational Research Association (SIG Research in Mathematics Education), Vancouver, April 13-17.

Abrahamson, D., Gutiérrez, J. F., Charoenying, T., Negrete, A. G., & Bumbacher, E. (2012, April). Fostering mathematical discovery: one tutor's strategies for ushering the construction of proportional schemas via mediated embodied interaction. In J. Radinsky (Chair) & J. Lemke (Discussant), *Emergent methods for studying spatial and embodied dimensions of learning*. Symposium presented at the annual meeting of the American Educational Research Association (SIG Learning Sciences), Vancouver, April 13-17.

d. Refereed Conference Workshops

Abrahamson, D., Blikstein, P., & Wilensky, U. (2005, June). *NetLogo tutorial*. Workshop given at the annual meeting of Interaction Design and Children 2005, Boulder, Colorado.

2. Non-Refereed Publications, Technical Reports, and Educational Software

a. Non-Refereed Journal Article

Abrahamson, D. (2006). What do we think about when we calculate? *Einayim* (http://www.einayim.com/). [children's magazine published in Israel]

b. Invited Presentations

Abrahamson, D. (2003, March). *The role of gesture in the teaching and learning of ratio and proportion*. Presentation at the weekly meeting of the laboratory of Susan Goldin-Meadow, Department of Psychology, University of Chicago, March 19, 2003.

Abrahamson, D. (2003, March). *Learning probability and statistics by building agent-based computer models*. Presentation and NetLogo workshop at the Third Conference of the European Society for Research in Mathematics Education, Bellaria, Italy, Feb. 28 – March 3.

Abrahamson, D. (2006, May). *Mathematical intuition – what is it good for? Reflections from design research on young student understanding of the binomial function.* In P. Blikstein & R. Lerner, Colloquium Series at the School of Education and Social Policy. Northwestern University, Evanston, IL.

Abrahamson, D. (2007, October). *From intuition to inscription: Designing learning experiences for deep mathematical understanding*. In N. L. Stein (Organizer), The Spencer Conference: Developmental and Learning Sciences Go to School: Implications for Education and Policy. Chicago, October 10 – 14.

Abrahamson, D. (2007, November). *Agents, agency, equity: A complexity-studies perspective on classroom participation patterns*. In K. W. Fischer (President) and M. Schwartz (Chair), The Inaugural Conference of the International Mind, Brain, and Education Society (IMBES): The Nature of Human Learning and How Educational Policy Can Profit from Research, Fort Worth, TX, November 1 – 3.

Abrahamson, D (2007, December). *Weaving epistemic & material resources: An embodied-mathematics design-research perspective on situated problem solving*. Paper presented at the Research on Embodied Mathematical Cognition, Technology, and Learning (REMCTL) Workshop. Stanford, Palo Alto: Center for Advanced Study in Behavioral Sciences (CASBS), Dec 10 – 11.

Abrahamson, D. (2008, December). *The abduction of Peirce: The missing link between perceptual judgment and mathematical reasoning?* Presentation at the Townsend Working Group in Neuroscience and Philosophy (A. Rokem, J. Staziker, & A. Noë, Organizers), UC Berkeley.

Abrahamson, D. (2009, January). *Close listening to gesture - an embodied-design perspective on mathematical reasoning*. Presentation at Leonardo Art/Science Evening Rendezvous (LASER; P. Scaruffi, Chair), San Francisco State University, San Francisco.

Abrahamson, D. (2009, February). *Promoting computational literacy: a view from mathematics-education research; or, What might it even mean to start with principles?!* Presentation at the National Academies—Computational Thinking for Everyone: A Workshop Series, Keck Center, Washington, DC, February 19-20, 2009.

Abrahamson, D. (2010, May). *Complex systems in the study of ecologies of learning.* Chair of the Presidential Address at the annual meeting of the American Educational Research Association, April 30 – May 4.

Abrahamson, D. (2010, May). *Embodying proportion: more than hand waving?* Presentation at the Curriculum Studies and Teachers Education Departmental Colloquium Series (C. Goldenberg, Coordinator), Stanford, May 12.

Abrahamson, D. (2011, January). *Dialectical investigations of mathematical discovery: the emergence of disciplinary forms in an embodied-interaction design for proportions*. In Y. Kali (Organizer), Humans, Education, and Technology, a seminar series hosted by the Innovative Technologies in Education Program in the Department of Learning, Instruction, and Teacher Education at the University of Haifa, Israel, January 5, 2011. http://www.edtech.haifa.ac.il/Seminars/Archive/page

Abrahamson, D. (2011, May). *Build first, ask questions later*. Invited guest lecture in the course "Beyond Bits and Atoms" (P. Blikstein, Instructor of record). Learning, Design, and Technology program at the Graduate School of Education, Stanford, May 6, 2011.

c. Non-Refereed Conference Proceedings

Abrahamson, D. (2008). Writes of passage: From phenomenology to semiosis in mathematical learning. In T. Rikakis & A. Kelliher (Eds.), Proceedings of CreativeIT: Success factors in fostering creativity in IT research and education. Tempe, AZ: Arizona State University. http://l3dswiki.cs.colorado.edu:3232/CreativeIT/247

Trninic, D., & Abrahamson, D. (2010). A key problem: pedagogical tradeoffs along familiar and generic dimensions. In C. Reading (Ed.), *"Data and context in statistics education: towards an evidence-based society." Proceedings of the Eighth International Conference on Teaching Statistics (ICOTS8)*. Ljubljana, Slovenia, July, 2010. Voorburg, The Netherlands: International Statistical Institute. www.stat.auckland.ac.nz/~iase/publications.php

d. Technical Reports and Educational Software

Abrahamson, D. & Wilensky, U. (2003). Participatory Simulation Guide: *S.A.M.P.L.E.R.* [S.A.M.P.L.E.R., Statistics As Multi-Participant Learning-Environment Resource, is a computer-based probability-and-statistics classroom learning activity. The document, a user manual for facilitators of S.A.M.P.L.E.R., details the rationale, interface features, and suggested activities. Activity designed and programmed by author at the Center for Connected Learning and Computer-Based Modeling (Uri Wilensky, Director).] http://ccl.northwestern.edu/ps/guide/Computer%20Part%20Sims%20Guide.pdf

Abrahamson, D., & Wilensky, U. (2002). *ProbLab*. The Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL. [ProbLab is a suite of 30 innovative, interactive, fully documented, computer-based activities designed and developed by the author, through iterated studies, for students learning probability and basic statistics. Activities include 'Participatory Simulation Sctivities' in which an entire classroom collaborates, each student operating their own avatar, in a group inquiry into mathematical phenomena, within a shared virtual space. Most these activities are also accessible online, in the form of guided activities with Java applets embedded in html] http://ccl.northwestern.edu/curriculum/ProbLab/index.html

3. Book Chapters

Fuson, K. C., & Abrahamson, D. (2005). Understanding ratio and proportion as an example of the Apprehending Zone and Conceptual-Phase problem-solving models. In J. Campbell (Ed.), *Handbook of mathematical cognition* (pp. 213-234). New York: Psychology Press.

Abrahamson, D. (2011). Towards instructional design for grounded mathematics learning: the case of the binomial. In N. L. Stein & S. Raudenbush (Eds.), *Developmental cognitive science goes to school* (pp. 267-281). New York: Taylor & Francis / Routledge.

Trninic, D., & Abrahamson, D. (in press). Embodied interaction as designed mediation of conceptual performance. In D. Martinovic & V. Freiman, *Visual mathematics and cyberlearning*. Mathematics education in digital era (MEDEra).

Chapters Under Review

- Fuson, K. C., Murata, A., & Abrahamson, D. (under review). Mathematics education arrives at the balanced middle: teaching/learning for fluency and understanding. In R. Cohen Kadosh & A. Dowker (Eds.), *The Oxford handbook of numerical cognition*. Oxford, UK: Oxford University Press.

Awards and Fellowships

- Recipient of a National Academy of Education/Spencer Foundation Postdoctoral Fellowship 2005–2006
- Committee on Research Junior Faculty Research Grant ($6,000) to study UCB stats-major undergraduate students' intuition (2007).
- UCB COR FRG ($5,000) to study embodied mathematical learning (2009)
- UCB COR FRG ($7,000): "Both Rhyme and Reason: Toward Students' Synthesis of Tacit and Cultural Resources in the Service of Connected Mathematics Learning" (2010)
- UCB COR FRG ($9,000): "Scaling Up the Mathematical Imagery Trainer: From Prototype to Classroom" (2011)

Editorials

- Member of the editorial board of:
  - *Technology, Knowledge, and Learning* (formerly*, International Journal of Computers for Mathematics Learning*)
  - *The International Journal of the Learning Sciences*

- Ad hoc reviewer for
  - *Canadian Journal of Science, Mathematics and Technology Education*
  - *Cognitive Development*
  - *Cognitive Science*
  - *Educational Evaluation and Policy Analysis*
  - *Educational Studies in Mathematics*
  - *Human Development*
  - *Journal of Mathematical Behavior*
  - *Journal for Research in Mathematics Education*
  - *Journal of Statistics Education*
  - *Journal of Teacher Education*
  - *International Journal of Science and Mathematics Education*
  - *Mathematics Thinking and Learning*
  - *Science*
  - *Statistics Education Research Journal*

- Regular reviewer of conference proceedings proposals for:
  - AERA – American Educational Research Association
  - C&C – Cognition & Creativity (ACM)
  - CSCL – Computer-Supported Collaborative Learning
  - ICLS – International Conference of the Learning Sciences (**member of the ICLS 2010 Program Committee**)
  - IDC – International Conference for Interaction Design and Children
  - PME-NA – North-American Chapter of PME

Professional Memberships

- AERA – American Educational Research Association
- CogSci – Cognitive Science Society
- ICBS – UC Berkeley's Institute of Cognitive and Brain Sciences
- ISDDE – International Society for Design and Development in Education
- ISLS – International Society of the Learning Sciences
- JPS – Jean Piaget Society
- PME-NA – International Group for the PME, North-American Chapter