

## **CURRICULUM VITAE**

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#### **Education**

- Doctor of Philosophy (Mathematics Education), The University of Georgia, 1998.  
Dissertation: “What Works as Proof in the Mathematics Class”  
Director: Professor Jeremy Kilpatrick
- Master of Arts (Mathematics Education), The University of Georgia, 1995.  
Thesis: “The Construction of the Real Number System in Textbooks: A Contribution to the Analysis of Discursive Practices in Mathematics.”  
Director: Professor Jeremy Kilpatrick.
- Profesor en Matemática y Cosmografía (Teacher of Mathematics and Cosmography)  
Facultad de Ciencias Exactas y Naturales y Agrimensura. Universidad Nacional del Nordeste, Argentina, 1987. Graduated with highest honors.

#### **Employment**

- Professor of Education and Mathematics. University of Michigan. May 2013 to present.
- Director, GRIP Lab (Grasping the Rationality of Instructional Practice), School of Education, University of Michigan, 2001-present
- Educational Studies Program Chair, School of Education, University of Michigan, September 2015 to August 2018.
- Associate Professor of Mathematics Education. School of Education. University of Michigan. September 2005 to 2013. (Since 2010 also Associate Professor of Mathematics, College of Literature, Science, and the Arts. University of Michigan.)
- Assistant Professor of Mathematics Education. School of Education, The University of Michigan. September 1999 to September 2005.
- Visiting Assistant Professor (postdoctoral position), Department of Counseling, Educational Psychology and Special Education (CEPSE) and Department of Mathematics. Michigan State University. August 1998- August 1999.
- Graduate Assistant. Department of Mathematics Education, University of Georgia, 1994-1998.
- Mathematics instructor and research fellow. National Council for Research of Argentina (CONICET), Department of Mathematics and Group of Mathematics, Science, and Technology Education, Facultad de Matemática, Astronomía, y Física, Universidad Nacional de Córdoba, Argentina, 1990-1993.

- Mathematics instructor. Facultad de Ciencias Exactas y Naturales y Agrimensura, Universidad Nacional del Nordeste, Argentina, 1988-1990
- Mathematics Teacher (various secondary schools 8-12, 1987-1992)

#### **Awards and Honors**

- New Leadership Academy Fellow, 2018-2019. National Forum for Education and the Public Good, University of Michigan.
- Pattishall Award, 2009. School of Education. University of Michigan.
- National Science Foundation Early Career Award, 2002-2007
- Early Publication Award, SIG/RME, 2003.
- Antorchas Foundation Doctoral Fellowship, Argentina, 1997-1998.
- Del Jones Memorial Scholarship Award from the College of Education, University of Georgia, 1995-96.
- Fulbright Scholarship, 1993-1995.

#### **Publications**

##### **Books**

Herbst, P., Fujita, T., Halverscheid, S., and Weiss, M. (2017). *The learning and teaching of secondary school geometry: A modeling perspective*. New York: Routledge.

Herbst, P., Cheah, U., Jones, K., & Richard, P. (Eds., 2018). *International Perspectives on the Teaching and Learning of Geometry in Secondary Schools*. Cham, Switzerland: Springer.

Zazkis, R. & Herbst, P. (Eds, 2018). *Scripting approaches in mathematics education: Mathematical dialogues in research and practice*. New York: Springer.

##### **Articles In Peer Reviewed Journals**

Herbst, P. and Chazan, D. (2020). Mathematics teaching has its own imperatives: Mathematical practice and the work of mathematics instruction. *ZDM-Mathematics Education*, 52,1149–1162 <https://doi.org/10.1007/s11858-020-01157-7>

Herbst, P., Ko, I.<sup>1</sup>, & Milewski, A. (2020). A heuristic approach to assess change in mathematical knowledge for teaching geometry after a practice-based professional learning intervention. *Research in Mathematics Education*, 22(2), 188-208 <https://doi.org/10.1080/14794802.2019.1704851>

Dimmel, J.\*<sup>2</sup> and Herbst, P. (2020). Presenting proofs in geometry classrooms: A study of what teachers expect from student mathematical communication. *Educational Studies in Mathematics*, 105(1), 71–89 <https://doi.org/10.1007/s10649-020-09975->

Ko, I.\* and Herbst, P. (2020). Subject matter knowledge of geometry needed in tasks of teaching: Relationship to prior geometry teaching experience. *Journal for Research in Mathematics Education*, 51(5), 600-630.

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<sup>1</sup> ^ indicates co-authors who were postdoctoral mentees when involved in the published research.

<sup>2</sup> \* indicates co-authors who were graduate students when involved in the published research.

Ko, I.<sup>^</sup> and Herbst, P. (2020). Are teachers amenable to increasing students' scope of work in doing proofs? Estimating teachers' decision-making using a diagnostic classification model. *Journal of Educational Research in Mathematics*, Special Issue, pp. 169-183. <https://doi.org/10.29275/jerm.2020.08.sp.1.169>

Aaron, W.<sup>^</sup> and Herbst, P. (2019). The teacher's perspective on the separation between conjecturing and proving in high school geometry classrooms. *Journal of Mathematics Teacher Education*, 22(3), 231-256. doi 10.1007/s10857-017-9392-0.

Shultz, M\*., Herbst, P., & Schleppegrell, M. (2019). The expression of agency by graduate teaching assistants and professors in relation to their professional obligations. *Linguistics and Education*, 52, 33-43.

Herbst, P. (2018). Teoría y métodos para la investigación de la racionalidad de la práctica en la enseñanza de las matemáticas [Theory and methods for research on the practical rationality of mathematics teaching]. *Educación Matemática*, 30(1), 11-47.

Dimmel, J.\* and Herbst, P. (2018). What details do teachers expect from students' proofs? A study of routines for checking proofs in geometry. *Journal for Research in Mathematics Education*, 49(3), 261-291.

Erickson, A.<sup>^</sup> and Herbst, P. (2018). Will teachers create opportunities for discussion when teaching proof in a geometry classroom? *International Journal of Mathematics and Science Education*, 16, 167-181.

Milewski, A., Herbst, P., Bardelli, E.,\* and Hetrick, C.\* (2018). The role of simulations for supporting professional growth: Teachers' engagement in virtual professional experimentation. *Journal of Technology and Teacher Education*, 26(1), 103-126.

Dimmel, J.\* and Herbst, P. (2017). Secondary mathematics teachers' expectations of student communication practices when doing proofs in geometry. *Teaching and Teacher Education*, 68, 151-160.

Herbst, P., Chazan, D., Kosko, K.,<sup>^</sup> Dimmel, J.\* and Erickson, A.\* (2016). Using multimedia questionnaires to study influences on the decisions mathematics teachers make in instructional situations. *ZDM-The International Journal of Mathematics Education*, 48, 167-183. DOI 10.1007/s11858-015-0727-y

Chieu, V. M. and Herbst, P. (2016). A study of the quality of interaction among participants in online animation-based conversations about mathematics teaching. *Teaching and Teacher Education*, 57, 139-149.

Ghousseini, H.\* & Herbst, P. (2016). Pedagogies of practice and opportunities to learn about classroom mathematics discussions. *Journal of Mathematics Teacher Education*, 19(1), 79-103.

Herbst, P. and Chazan, D. (2015). Using multimedia scenarios delivered online to study professional knowledge use in practice. *International Journal of Research and Method in Education*, 38(3), 272-287.

Aaron, W.\* and Herbst, P. (2015). Teachers' perceptions of students' mathematical work while making conjectures: An examination of teacher discussions of an animated geometry classroom scenario. *International Journal of STEM Education*, 2(10), 1-13

Chieu, V. M., Kosko, K. W.,<sup>^</sup> and Herbst, P. (2015). An analysis of evaluative comments in teachers' online discussions of representations of practice. *Journal of Teacher Education*, 66(1), 35-50. DOI: 10.1177/0022487114550203

Dimmel, J.\* and Herbst, P. (2015). The semiotic structure of geometry diagrams: How textbook diagrams convey meaning. *Journal for Research in Mathematics Education*, 46(2), 147-195

Weiss, M.\* and Herbst, P. (2015). Geometry teachers' mathematical sensibility: The role of theory-building and problem-solving in the secondary Geometry course. *Educational Studies in Mathematics*, 89(2), 205-229

Herbst, P., Chieu, V., & Rougée, A.\* (2014). Approximating the practice of mathematics teaching: What learning can web-based, multimedia storyboarding software enable? *Contemporary Issues in Technology and Teacher Education*, 14(4). Retrieved from <http://www.citejournal.org/vol14/iss4/mathematics/article1.cfm>

Herbst, P. and Kosko, K.<sup>^</sup> (2014). Using representations of practice to elicit mathematics teachers' tacit knowledge of practice: A comparison of responses to animations and videos. *Journal of Mathematics Teacher Education*, 17(6), 515-537

Kosko, K.<sup>^</sup> Rougée, A.,\* and Herbst, P. (2014). What actions do teachers envision when asked to facilitate mathematical argumentation in the classroom? *Mathematics Education Research Journal*, 26(3), 459-476

González, G.\* and Herbst, P. (2013). An oral proof in a geometry class: How linguistic tools can help map the content of a proof. *Cognition and Instruction*, 31(3), 271-313.

Chen, C.\* and Herbst, P. (2013). The interplay among gestures, discourse, and diagrams in students' geometrical reasoning. *Educational Studies in Mathematics*, 83(2), 285-307.

Herbst, P. & Chazan, D. (2012). On the instructional triangle and sources of justification for actions in mathematics teaching. *ZDM Mathematics Education*, 44(5), 601-612.

Herbst, P. (2012). Las tareas matemáticas como instrumentos en la investigación de los fenómenos de gestión de la instrucción: un ejemplo en geometría [Mathematical tasks as instruments for research on the phenomena of instruction management: An example in geometry]. *Avances de Investigación en Educación Matemática*, 1, 5-22.

Aaron, W.\* and Herbst, P. (2012). Instructional identities of geometry students. *Journal of Mathematical Behavior*, 31, 382– 400.

Herbst, P., Nachlieli, T.,<sup>^</sup> and Chazan, D. (2011). Studying the practical rationality of mathematics teaching: What goes into “installing” a theorem in geometry? *Cognition and Instruction*, 29(2), 218-255.

Herbst, P. and Chazan, D. (2011). On creating and using representations of mathematics teaching in research and teacher development: Introduction to this issue. *ZDM Mathematics Education* 43(1), 1–5.

Herbst, P., Chazan, D., Chen, C.,\* Chieu, V.M., and Weiss, M. (2011). Using comics-based representations of teaching, and technology, to bring practice to teacher education courses. *ZDM Mathematics Education*, 43(1), 91–103.

Chazan, D., Sela, H., and Herbst, P. (2012). Is the role of equations in the doing of word

problems in school algebra changing? Initial indications from teacher study groups. *Cognition and Instruction*, 30(1), 1-38.

Chazan, D. and Herbst, P. (2012). Animations of Classroom Interaction: Expanding the Boundaries of Video Records of Practice. *Teachers' College Record*, 114(3), 1-34.

Cirillo, M. and Herbst, P. (2012). Moving Toward More Authentic Proof Practices in Geometry. *The Mathematics Educator*, 21(2), 11-33.

Kosko, K.<sup>^</sup> and Herbst, P. (2012). A deeper look at how teachers say what they say: A quantitative modality analysis of teacher-to-teacher talk. *Teaching and Teacher Education*, 28, 589-598.

Chazan, D. and Herbst, P. (2011). Challenges of particularity and generality in depicting and discussing teaching. *For the Learning of Mathematics*, 31(1), 9-13.

Chieu, V.M.<sup>^</sup> Herbst, P., and Weiss, M.\* (2011). Effect of an animated classroom story embedded in online discussion on helping mathematics teachers learn to notice. *Journal of the Learning Sciences* 20(4), 589-624.

Chieu, V.M. and Herbst, P. (2011). Designing an intelligent teaching simulator for learning to teach by practicing in the practice of mathematics teaching. *ZDM Mathematics Education*, 43(1), 105–117.

Mesa, V. and Herbst, P. (2011). Designing representations of trigonometry instruction to study the rationality of community college teaching. *ZDM Mathematics Education*. 43(1), 41–52

González, G.\* and Herbst, P. (2009). Students' conceptions of congruency through the use of dynamic geometry software. *International Journal of Computers for Mathematical Learning* 14(2), 153-182.

Herbst, P. and Chazan, D. (2009). Methodologies for the study of instruction in mathematics classrooms. *Recherches en Didactique des Mathématiques*, 29(1), 11-32.

Weiss, M.\* Herbst, P., and Chen, C.\* (2009). Teachers' perspectives on "authentic mathematics" and the two-column proof form. *Educational Studies in Mathematics*, 70 (3), 275-293.

Nachlieli, T.<sup>^</sup> and Herbst, P. with González, G.\* (2009). Seeing a colleague encourage a student to make an assumption while proving: What teachers put to play in casting an episode of geometry instruction. *Journal for Research in Mathematics Education*, 40(4), 427-459.

Herbst, P. and Miyakawa, T.<sup>^</sup> (2008). When, how, and why prove theorems: A methodology to study the perspective of geometry teachers. *ZDM Mathematics Education*, 40(3), 469-486

Herbst, P. (2006). Teaching geometry with problems: Negotiating instructional situations and mathematical tasks. *Journal for Research in Mathematics Education*, 37, 313-347.

González, G.\* and Herbst, P. (2006). Competing arguments for the geometry course: Why were American high school students supposed to study geometry in the twentieth century? *International Journal for the History of Mathematics Education*, 1(1), 7-33.

Herbst, P. and Brach, C.\* (2006). Proving and 'doing proofs' in high school geometry classes: What is 'it' that is going on for students and how do they make sense of it? *Cognition and Instruction*, 24, 73-122.

Herbst, P. (2005). Knowing about “equal area” while proving a claim about equal areas. *Recherches en Didactique des Mathématiques*, 25, 11-56.

Herbst, P., González, G.,\* and Macke, M. (2005). How can geometry students understand what it means to define in mathematics? *The Mathematics Educator*, 15(2), 17-24.

Herbst, P. (2004). Interactions with diagrams and the making of reasoned conjectures in geometry. *ZDM Mathematics Education*, 36(5), 129-139.

Herbst, P. (2003). Using novel tasks to teach mathematics: Three tensions affecting the work of the teacher. *American Educational Research Journal*, 40, 197-238.

Herbst, P. and Chazan, D. (2003). Exploring the practical rationality of mathematics teaching through conversations about videotaped episodes: The case of engaging students in proving. *For the Learning of Mathematics*, 23(1), 2-14.

Herbst, P. (2002). Engaging students in proving: A double bind on the teacher. *Journal for Research in Mathematics Education*, 33, 176-203.

Herbst, P. (2002). Establishing a custom of proving in American school geometry: Evolution of the two-column proof in the early twentieth century. *Educational Studies in Mathematics*, 49, 283-312.

Herbst, P. (1999). On devolving a voice to the participants of the mathematics classroom culture: a methodological critique. *Educational Review*, 51, 183-190.

Herbst, P. and Kilpatrick, J. (1999). Pour lire Brousseau. *For the Learning of Mathematics*, 19(1), 3-10.

Herbst, P. (1997). The number-line metaphor in the discourse of a textbook series. *For the Learning of Mathematics*, 17(3), 36-45.

### **Articles in peer reviewed conference proceedings**

Margolis, C.\*, Ion, M.\*, Herbst, P., Milewski, A., & Shultz, M.\* (2020). Understanding instructional capacity for high school geometry as a systemic problem through stakeholder interviews. In Sacristán, A.I., Cortés-Zavala, J.C. & Ruiz-Arias, P.M. (Eds.). *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 620-627). Mexico. Cinvestav / AMIUTEM / PME-NA. <https://doi.org/10.51272/pmna.42.2020>

Stevens, I. ^, Ko, I. ^, Paoletti, T., Boileau, N.\*, & Herbst, P. (2020). Introducing inverse function to high school students: Relating convention and reasoning. In Sacristán, A.I., Cortés-Zavala, J.C. & Ruiz-Arias, P.M. (Eds.). *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 227-235). Mexico. Cinvestav / AMIUTEM / PME-NA. <https://doi.org/10.51272/pmna.42.2020>.

Herbst, P. and Milewski, A. (2020, February). Using StoryCircles to inquire into the social and representational infrastructure of lesson-centered teacher collaboration. In H. Borke & D. Potari (Eds.), *Teachers of Mathematics Working and Learning in Collaborative Groups: Proceedings from ICMI Study 25* (pp. 629-636). Lisbon, Portugal: University of Lisbon.

Ion, M.\*, Herbst, P., Margolis, C.\*, Milewski, A., and Ko, I.\* (2019, November). Developing practical measures to support the improvement of geometry for teachers courses. In Otten, S., Candela, A. G., de Araujo, Z., Haines, C., & Munter, C. (Eds.). *Proceedings of the forty-first annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 352-359). St Louis, MO: University of Missouri.

Milewski, A., Bardelli, E.\*, and Herbst, P. (2019, November). The role of emotions in simulations of practice. In Otten, S., Candela, A. G., de Araujo, Z., Haines, C., & Munter, C. (Eds.). *Proceedings of the forty-first annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 470-479). St Louis, MO: University of Missouri.

Shultz, M.\* & Herbst, P. (2019). The Choice to Use Inquiry-Oriented Instruction: The INQUIRE instrument and differences across upper and lower division undergraduate courses. In Weinberg, A., Moore-Russo, D., Soto, H., & Wawro, M. (Eds.). (2019). *Proceedings of the 22<sup>nd</sup> Annual Conference on Research in Undergraduate Mathematics Education* (pp. 558-567). Oklahoma City, Oklahoma.

Herbst, P., Shultz, M.\*, Ko, I.\*, Boileau, N.\*, and Erickson, A. (2018, October). Expanding students' role when doing proofs in geometry. In T. Hodges, G. Roy, & A. Tyminski (Eds.), *Proceedings of the 40<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Greenville, SC: University of South Carolina.

Herbst, P., Milewski, A., Ion, M.\*, and Bleecker, H. (2018, October). What influences do instructors of the geometry for teachers course need to contend with? In T. Hodges, G. Roy, & A. Tyminski (Eds.), *Proceedings of the 40<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Greenville, SC: University of South Carolina.

Herbst, P., Boileau, N.\*, Clark, L., Milewski, A., Chieu, V. M., Gürsel, U.\*, & Chazan, D. (2017, October). Directing focus and enabling inquiry with representations of practice: Written cases, storyboards, and teacher education. In Galindo, E., & Newton, J., (Eds.). *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 789-796). Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

Herbst, P. & Ko, I.\* (2017, October). Measuring recognition of the professional obligations of mathematics teaching. In Galindo, E., & Newton, J., (Eds.). *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 1242-1245). Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

Milewski, A., Gürsel, U.\*, & Herbst, P. (2017, October). Working collectively to design online teacher education curriculum: How do teacher educators manage to do it? In Galindo, E., & Newton, J., (Eds.). *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 112-119). Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

Shultz, M.\* & Herbst, P. (2017, October). Stories of agency: Do graduate students perceive themselves as part of the mathematical community? In Galindo, E., & Newton, J., (Eds.). *Proceedings of the 39th annual meeting of the North American Chapter of the*

*International Group for the Psychology of Mathematics Education*. (pp. 1250-1253). Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

Boileau, N.,\* Dimmel, J.K.,^ & Herbst, P. G. (2016, November). Teachers' recognition of the diagrammatic register and its relationship with their mathematical knowledge for teaching. In M.B. Wood, E.E. Turner, M. Civil, & J.A. Eli (Eds.), *Proceedings of the Thirty-Eighth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 266-269). Tucson, Arizona. <http://hdl.handle.net/2027.42/137972>

Boileau, N.,\* & Herbst, P. G. (2015, November). Teachers' expectations about geometric calculations in high school geometry. In T.G. Bartell, K.N. Bieda, R.T. Putnam, K. Bradfield & H. Dominguez (Eds.), *Proceedings of the Thirty-Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 269-276). East Lansing, MI. <http://hdl.handle.net/2027.42/137971>

Dimmel, J.\* & Herbst, P. (2015, November). Investigating secondary mathematics teachers' attitudes toward alternative communication practices while doing proofs in geometry. In T. Bartell, K. Bieda, R. Putnam, K. Bradfield, & H. Dominguez. (Eds.). *Proceedings of the 37<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 277-284). East Lansing, MI: Michigan State University.

Erickson, A.^ & Herbst, P. (2015, November). What influences a teacher's willingness to create opportunities for discussion in a geometry classroom? In T. Bartell, K. Bieda, R. Putnam, K. Bradfield, & H. Dominguez. (Eds.). *Proceedings of the 37<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1110-1113). East Lansing, MI: Michigan State University.

Herbst, P., Chazan, D., Milewski, A., Gürsel, U.,\* Amidon, J., Buchbinder, O., Walkoe, J., & Wieman, R. (2015, November). Representations of mathematics teaching and their use in transforming teacher education: Studying preservice teachers' learning from work with representations of practice. Working group held at PME-NA. East Lansing, MI.

Milewski, A., Erickson, A.,^ Herbst, P., & Dimmel, J.^ (2015, November). When mathematics teachers consider acting on behalf of the discipline, what assumptions do they make? In T. Bartell, K. Bieda, R. Putnam, K. Bradfield, & H. Dominguez. (Eds.). *Proceedings of the 37<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1130-1133). East Lansing, MI: Michigan State University.

Chieu, V. M., Boileau, N.,\* & Herbst, P. (2015, March). An Instrumental Co-Genesis Approach to Developing an Online Practice-based Environment for Teacher Education. In D. Rutledge and D. Sylkhuus (Eds.), *Society for Information Technology & Teacher Education International Conference* (Vol. 2015, No. 1, pp. 2763-2772).

Herbst, P., Dimmel, J.,^ Erickson, A.,^ Ko, I.,\* & Kosko, K.^ (2014). Mathematics teachers' recognition of an obligation to the discipline and its role in the justification of instructional actions. In C. Nicol, P. Liljedahl, S. Oesterle, & D. Allen (Eds.), *Proceedings of the 2014 annual meeting of the International Group for the Psychology of Mathematics Education* (Vol. 3, pp. 273-280). Vancouver, Canada: Simon Fraser University.

Dimmel, J.\* and Herbst, P. (2014). What details do geometry teachers expect in students' proofs? A method for experimentally testing possible classroom norms. In C. Nicol, P. Liljedahl,



S. Oesterle, & D. Allen (Eds.), Proceedings of the 2014 Annual Meeting of the International Group for the Psychology of Mathematics Education (Volume 2, pp. 393-400). Vancouver, BC: Simon Fraser University.

Herbst, P., Kosko, K.,<sup>^</sup> & Dimmel, J.\* (2013). *How are geometric proof problems presented? Conceptualizing and measuring teachers' recognition of the diagrammatic register.* In Martinez, M. & Castro Superfine, A (Eds.). Proceedings of the 35th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 179-186). Chicago, IL: University of Illinois at Chicago. Available from Deep Blue at the University of Michigan <http://hdl.handle.net/2027.42/97761>

Herbst, P., Aaron, W.,<sup>^</sup> Balacheff, N., Bieda, K., Chazan, D., Chieu, V. M., Dimmel, J.,\* Erickson, A.,\* Mesa, V., and Moore-Russo, D. (2013, November). Representations of students' mathematical conceptions and their use in teacher education. Proceedings of the 2013 Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education.

Chieu, V.M.,<sup>^</sup> & Herbst, P.G. (2013, June). Designing reference points in animated classroom stories to support teacher learners' online discussions. In N. Rummel, M. Kapur, M. Nathan, & S. Puntambekar (Eds.), To See the World and a Grain of Sand: Learning across Levels of Space, Time, and Scale. *The 10th International Conference on Computer Supported Collaborative Learning*, (vol. 1, pp. 89-96). Madison, WI: University of Wisconsin.

Herbst, P. & Kosko, K.<sup>^</sup> (2012, November). Mathematical Knowledge for Teaching High School Geometry. *Proceedings of the 34th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education.* Kalamazoo, MI. Available on Deep Blue at The University of Michigan. <http://hdl.handle.net/2027.42/91279>

Herbst, P., Aaron, W.,\* Bieda, K., and Moore-Russo, D. (2012, November). *Representations of mathematics teaching and their use in transforming teacher education: The role of approximations of practice.* Proceedings of the 34th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Kalamazoo, MI. Available on Deep Blue at The University of Michigan. <http://hdl.handle.net/2027.42/91280>

Aaron, W.\* & Herbst, P. (2012). *Teachers' and students' perceptions of classroom discussions.* Proceedings of the 34th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Kalamazoo, MI.

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Kosko, K.<sup>^</sup> & Herbst, P. (2012). *Evaluating Teachers' Decisions in Posing a Proof Problem.* Proceedings of the 34th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Kalamazoo, MI. Available on Deep Blue at the University of Michigan, <http://hdl.handle.net/2027.42/91282>

Chieu, V. M.<sup>^</sup> & Herbst, P. (2012). LessonSketch: A Rich-Media Scenario based learning environment for teacher development. In P. Resta (Ed.), *Proceedings of Society for*

*Information Technology & Teacher Education International Conference 2012* (pp. 968-973). Chesapeake, VA: AACE.

Chieu, V.M.<sup>^</sup> & Herbst, P.G. (2011). Supporting mathematics teachers' online discussion with the use of animated classroom stories as reference point. *In Proceedings of the 11th IEEE International Conference on Advanced Learning Technologies* (pp. 479-481). DOI 10.1109/ICALT.2011.149. Washington, DC: IEEE Computer Society.

Herbst, P., Aaron, W.,\* Bieda, K., González, G., and Chazan, D. (2011). Representations of mathematics teaching and their use in transforming teacher education: Contributions to a pedagogical framework. Discussion document for the working group 'representations of mathematics teaching'. *Proceedings of the 2011 Annual PME-NA Conference*. Reno, NV.

Chieu, V. M.<sup>^</sup> Herbst, P., & Weiss, M.\* (2010). The use of animations and online communication tools to support mathematics teachers in the practice of teaching. In Gomez, K., Lyons, L., & Radinsky, J. (Eds.), *Learning in the Disciplines: Proceedings of the 9th International Conference of the Learning Sciences (ICLS 2010) - Volume 2, Short Papers, Symposia, and Selected Abstracts* (pp. 290-291). International Society of the Learning Sciences: Chicago, IL.

Chazan, D., Herbst, P., Sela, H., and (T) R. Hollenbeck, (2011). Rich Media Supports For Practicing Teaching: Introducing Alternatives Into A "Methods" Course. In B. Ubuz (Ed.), *Proceedings of the 35th Conference of the International Group for the Psychology of Mathematics Education*. (Vol. I: pp. 119-123). Ankara, Turkey: PME.

Aaron, W.\* and Herbst, P. (2011). An Exploration of 'Studenting' in High School Geometry Classrooms. *Proceedings of the 2011 Annual PME-NA Conference*. Reno, NV.

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### **Peer reviewed book chapters**

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***Non-peer-reviewed articles, book chapters, book reviews, proceedings, and white papers***

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### **Conference papers**

Ko, I.,<sup>^</sup>, Herbst, P., and Shultz, M\* (2021, April). Comparing how college mathematics instructors and high-school teachers recognize professional obligations of mathematics teaching



when making instructional decisions. Paper presented at the Annual Meeting of the American Educational Research Association, Online.

Bardelli, E.\*, Ion, M.\*, Ko, I., & Herbst, P. (2020, April). Who Benefits from Mathematics Courses for Teachers? An Analysis of MKT-G Growth During Geometry for Teachers Courses. Paper accepted to be presented at the Annual Meeting of AERA, San Francisco.

Boileau, N.\*, Herbst, P., & Milewski, A. (2020, April). Framing Novel Tasks as Familiar: Some Reasons Why and a Resulting Tension. Paper accepted to be presented at the Annual Meeting of AERA, San Francisco.

Shultz, M.\* & Herbst, P. (2020, February). The Decision to use Inquiry-Oriented Instruction: Why Don't Beliefs Align with Practice? Paper accepted to be presented at the Research in Undergraduate Mathematics Education conference, Boston.

Herbst, P. and Shultz, M.\* (2019, August). How professional obligations can help understand decisions in the teaching of calculus across institutional contexts. In J. Monaghan, E. Nardi, & T. Dreyfus (Eds.), *Calculus in upper secondary and beginning university mathematics* (pp. 107-110). Kristiansand, Norway. [https://matric-calculus.sciencesconf.org/data/pages/CalcConf2019\\_Papers\\_190910.pdf](https://matric-calculus.sciencesconf.org/data/pages/CalcConf2019_Papers_190910.pdf)

Herbst, P. (2019, May). Recursos para la gestión de problemas de modelaje en clases de geometría. Paper presented at the XV CIAEM (Inter American Conference in Mathematics Education), Medellín, Colombia.

Milewski, A., Ion, M.\*, Herbst, P., Shultz, M.\*, Ko, I.,\* & Bleecker, H. (2019, April). Tensions in teaching mathematics to future teachers: Understanding the practice of undergraduate mathematics instructors. Paper presented at the Annual Meeting of AERA. Toronto, Canada.

Ko, I.\* and Herbst, P. (2019, April). Estimating Teachers' Decision Making in Doing Proofs Using a Diagnostic Classification Model. Paper presented at the Annual Meeting of AERA. Toronto, Canada.

Herbst, P. and Ko, I.\* (2019, April). Reconsidering the Organization of Mathematical Knowledge for Teaching. Paper presented at the Annual Meeting of AERA. Toronto, Canada.

Shultz, M.\*, Bardelli, E.\*, Milewski, A., Boileau, N.\*, and Herbst, P. (2019, April). What can we learn about the differences between experts and novices from a teaching simulation? Paper presented at the Annual Meeting of AERA. Toronto, Canada.

Herbst, P. (2019, March). Resemblance and Analogy across Mathematical Practices. Paper presented at the conference "Mathematics and practice," Rostock, Germany.

Herbst, P. and Ko, I. (2018, April). Recognition of professional obligations of mathematics teaching and their role in justifying instructional actions. Paper presented at the Annual Meeting of AERA, New York, NY.

Boileau, N., Ko, I., and Herbst, P. (2018, April). Uncovering the Relationship Between Expertise in Teaching Mathematics and Teachers' Recognition of their Professional Obligations. Paper presented at the Annual Meeting of AERA, New York, NY.

Ko, I., & Herbst, P. (2018, April). Relationship between Response Time and Characteristics of Items Measuring Teachers' Mathematical Knowledge. National Council of Measurement in Education Annual Meeting. New York City, NY.

Shultz, M., Herbst, P., Boileau, N., and Erickson, A. (2018, April). Measuring Geometry Teachers' Willingness to Expand Proof Practices. Paper presented at the Annual Meeting of AERA, New York, NY.

Chieu, V. M., Boileau, N., Huisinga, M., Milewski, A., and Herbst, P. (2017, May). Can a Teaching Simulation Predict Novice and Expert Teachers' Decision Making? Paper presented at the Annual Meeting of AERA, San Antonio, TX.

Erickson, A., Boileau, N., Huisinga, M., and Herbst, P. (2017, April). Measuring Secondary Geometry Teachers' Relationships With an Instructional Norm. Paper presented at the Annual Meeting of AERA, San Antonio, TX.

Ko, I., and Herbst, P. (2017, April). Investigating the Dimensionality of the Instrument Measuring Teachers' Mathematical Knowledge for Teaching Secondary Geometry. Paper presented at the Annual Meeting of AERA, San Antonio, TX.

Ko, I., Milewski, A., and Herbst, P. (2017, April). How Are Preservice Teachers' Educational Experiences Related to Their Mathematical Knowledge for Teaching Geometry? Paper presented at the Annual Meeting of AERA, San Antonio, TX.

Milewski, A., Herbst, P., and Gürsel, U. (2017, April). Teachers' Opportunities to Learn Through Collaborative Storytelling and Visualization. Paper presented at the Annual Meeting of AERA, San Antonio, TX.

Herbst, P. (2016, July). Is the work of teaching geometry subject specific? Paper presented at the 13th International Congress on Mathematical Education, Hamburg, Germany.

Chazan, D. & Herbst, P. (2016, July). Reconciling two uses of norm in mathematics education research. Paper presented at the 13th International Congress on Mathematical Education, Hamburg, Germany.

Fleming, E., Chazan, D., Herbst, P., & Grosser-Clarkson, D. (2016, July). Describing curricular materials for mathematics teacher education in an online, rich media platform. Paper presented at the 13th International Congress on Mathematical Education, Hamburg, Germany.

Ko, I., & Herbst, P. (2016, July). Subject matter knowledge of geometry needed in tasks of teaching and teachers' geometry teaching experience. Paper presented at the 13th International Congress on Mathematical Education, Hamburg, Germany.

Erickson, A., Herbst, P., Dimmel, J., and Ko, I (2016, April). When What Routinely Happens Conflicts With What Ought to Be Done: A Scenario-Based Assessment. Paper presented at the Annual Meeting of the American Educational Research Association, Washington DC.

Erickson, A. and Herbst, P. (2016, April). Supporting Preservice Teachers' Ability to Anticipate in Secondary Mathematics: A Comparison of Animations and Video. Paper presented at the Annual Meeting of the American Educational Research Association, Washington DC.

Herbst, P., Dimmel, J., and Erickson, A. (2016, April). High School Mathematics Teachers' Recognition of the Diagrammatic Register in Proof Problems. Paper presented at the Annual Meeting of the American Educational Research Association, Washington DC.

Milewski, A., Hanby, K., and Herbst, P. (2016, April). If at First You Don't Succeed ...: Using "StoryCircles" to Provide Preservice Teachers Opportunities to Practice. Paper presented at the Annual Meeting of the American Educational Research Association, Washington DC.

Dimmel, J., Milewski, A., & Herbst, P. (2015, April). Representing Professional Scenarios: Can nondescript cartoon graphics portray a range of human emotions? Paper presented at the Annual Meeting of the American Educational Research Association, Chicago.

Dimmel, J. & Herbst, P. (2015, April). Examining Regularities for Presenting and Checking Proofs in Geometry: A Planned Comparison Study. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago.

Hanby, K. & Herbst, P. (2015, April). What do elementary teachers notice about students' informal methods of early subtraction and how do they respond to those methods? Paper presented at the NCTM Research Conference, Boston.

Herbst, P., Aaron, W., and Erickson, A. (2013, April). How Preservice Teachers Respond to Representations of Practice: A Comparison of Animations and Video. Paper presented at the 2013 meeting of the American Educational Research Association, San Francisco. Deep Blue at the University of Michigan. <http://hdl.handle.net/2027.42/97424>

Herbst, P., Aaron, W., Dimmel, J., and Erickson, A. (2013, April). Expanding students' involvement in proof problems: Are geometry teachers willing to depart from the norm? Paper presented at the 2013 meeting of the American Educational Research Association. Deep Blue at the University of Michigan. <http://hdl.handle.net/2027.42/97425>

Chieu, V. M., Aaron, W., and Herbst, P. (2013, April). Impact of Critical Events in an Animated Classroom Story on Teacher Learners' Online Comments. Paper presented at the 2013 Annual Meeting of the American Educational Research Association, San Francisco, CA. Deep Blue at the University of Michigan. <http://hdl.handle.net/2027.42/97551>

Ghousseini, H. and Herbst, P. (2013, April). Learning about Leading Classroom Mathematics Discussions in, from, and for Practice. Paper presented at the 2013 Annual Meeting of the American Educational Research Association, San Francisco, CA.

Kosko, K., Rougée, A., and Herbst, P. (2013, April). What Actions do Teachers Envision When Asked to Facilitate Mathematical Argumentation in the Classroom? Paper presented at the 2013 Annual Meeting of the American Educational Research Association, San Francisco, CA.

Herbst, P. and Kosko, K. (2012, April). *Using Cases as Triggers for Teachers' Thinking about Practice: A Comparison of Responses to Animations and Videos*. Paper presented at the 2012 Annual Meeting of the American Educational Research Association, Vancouver, BC, Canada.

Aaron, W., Mesa, V., and Herbst, P. (2012, February). Challenges and tools in the facilitation of combined professional development and research sessions: The case of community college trigonometry instructors. Paper presented at the 15<sup>th</sup> Annual Conference on Research on Undergraduate Mathematics Education, Portland, Oregon.

Herbst, P. and Dimmel, J. (2011, April). *Teaching geometry through problems and its demands of knowledge management*. Paper presented at the 2011 Annual Meeting of the American Educational Research Association. New Orleans, LA.

Herbst, P. (2011, April). *Categories of perception and categories of appreciation: An operationalization of those constructs for the study of teacher study group discourse using ideas from systemic functional linguistics*. Paper presented at the 2011 Research Pre-session of the Annual Meeting of the National Council of Teachers of Mathematics. Indianapolis, IN.

Herbst, P. (2010, April). *What practical rationality is*. Paper presented at the Research Pre-session of the Annual Meeting of the NCTM. San Diego, CA.

Mesa, V., & Herbst, P. (2011, February). *Using animations of teaching to probe the didactical contract in community college mathematics*. Paper presented at the 14th Annual Conference on Research on Undergraduate Mathematics Education, Portland, Oregon.

González, G. and Herbst, P. (2010, May). *On proving relationships between possible facts: What do geometry teachers consider as valuable?* Paper presented at the 2010 Annual Meeting of AERA, Denver, CO.

Weiss, M. and Herbst, P. (2010, May). *Geometry teachers' mathematical sensibility: The role of Theory-Building and Problem-Solving in the secondary Geometry course*. Paper presented at the 2010 Annual Meeting of AERA, Denver, CO.

Chieu, V.M, Weiss, M., and Herbst, P. (2009, April). *A pilot study toward building web-based interactive rich-media virtual settings for teacher preparation and development*. Paper presented at the Annual Meeting of AERA, San Diego, CA.

Mehrotra, M. and Herbst, P. (2009, April). *How and why geometry teachers respond to students' errors*. Paper presented at the Annual Meeting of AERA, San Diego, CA.

Miyakawa, T. & Herbst, P. (2008, July). *Why some theorems are not proven in geometry class: dispositions and constraints*. Presented at TSG 18, ICME 11, Mexico.

González, G. & Herbst, P. (2008, March). *Students' geometry toolbox: How do teachers manage students' prior knowledge when teaching with problems?* Paper presented at the American Educational Research Association annual meeting in New York City, New York.

González, G. & Herbst, P. (2008, March). *How teachers of geometry use diagrams as repository of the collective memory of a class*. Paper presented at the American Educational Research Association annual meeting in New York City, New York.

Aaron, W. and Herbst, P. (2007, April). *The Use of Animated Sketches in Constructing Narratives of Geometry Teaching*. Paper presented at the annual meeting of AERA. Chicago.

Chae, J., González, G. and Herbst, P. (2007, April). *Considering Alternatives in Teaching Geometry: What Expert Teachers Reported Learning about their Practice*. Paper presented at the annual meeting of AERA. Chicago.

González, G. and Herbst, P. (2007, April). *Mathematical tasks and the collective memory: The work of the teacher*. Paper presented at the annual meeting of AERA. Chicago.

González, G. and Herbst, P. (2007, April). *Revealing Students' Conceptions of Congruency through the Use of Dynamic Geometry: Affordances and Constraints of Artifacts in a Geometry Class*. Paper presented at the annual meeting of AERA. Chicago.

Herbst, P. and Nachlieli, T. (2007, April). *Studying the practical rationality of mathematics teaching: What goes into "installing" a theorem in geometry?* Paper presented at the annual meeting of AERA. Chicago.

Weiss, M. and Herbst, P. (2007, April). "Every single little proof they do, you could call it a theorem": *Translation between abstract concepts and concrete objects in the Geometry classroom*. Paper presented at the annual meeting of AERA. Chicago.

Nachlieli, T., González, G., and Herbst, P. (2006, April). *What do they call the episode? - Teachers' casting of an episode in which students engage in proving*. Annual Meeting of AERA, San Francisco.

Weiss, M., Chen, C. and Herbst, P. (2006, April). *Teachers' Perspectives on Mathematical Proof and the Two-Column Form*. Annual Meeting of AERA, San Francisco.

Chen, C. and Herbst, P. (2005, August). *The descriptive mode of interaction with diagrams in proving triangles congruent*. Paper presented at the 3<sup>rd</sup> East Asia Research Conference in Mathematics Education.

Herbst, P. (2004, September). *Conceptualizing and proving*. Paper presented at the Proof Collaborative Conference. September 16, Providence, Rhode Island.

Gonzalez, G. and Herbst, P. (2004). *Competing Discourses That Define The Geometry Course: What Was New In The Twentieth Century?* Paper presented at the Working Group on Geometry, 10<sup>th</sup> International Conference in Mathematics Education, Copenhagen, Denmark.

Herbst, P. and Brach, C. (2004). *Proving and proof in high school geometry: What is 'it' that is going on for students and how do they make sense of it?* Paper presented at the Annual Meeting of the American Educational Research Association. San Diego, CA.

Silver, E. and Herbst, P. (2004). 'Theory' in mathematics education scholarship. Paper presented at the Research Pre-session of the 2004 Annual Meeting of the National Council of Teachers of Mathematics.

Herbst, P. (2003, April). *Triangles of Equal Area as a Proof Generated Concept*. Paper presented at the Research Pre-session of the 81<sup>st</sup> Annual Meeting of the National Council of Teachers of Mathematics, San Antonio, TX.

Herbst, P. (2002, April). *Using tasks to develop new knowledge in a geometry classroom: Tensions that underlie the work of the teacher*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.

Herbst, P. (2001, April). *Managing the production of arguments about area—The work of the teacher*. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle.

Herbst, P. and Wall, E. (2000, April). *Mathematics teaching as work: The use of metaphors in conceptualizing mathematics teaching as an object of study*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.

Herbst, P. (1999, August). *Prouver et enseigner la démonstration dans la classe de mathématiques aux Etats-Unis*. [Proving and teaching proof in school mathematics in the United States]. Paper presented at the 10<sup>th</sup> Summer School in Didactique of Mathematics, Houlgate, France. Available at the repository of the *International Newsletter on the Teaching and Learning of Mathematical Proof* (November 2000, <http://www-didactique.imag.fr/preuve/>)

Herbst, P. (1999, April). *What Do the Practices Associated With Two-Column Proofs Say About the Possibilities of Argumentation?—The role of the teacher*. Paper presented at the

Annual Meeting of the American Educational Research Association, Montreal. Available at the repository of the *International Newsletter on the Teaching and Learning of Mathematical Proof*.

***Articles In Press, in Review, in Revision***

Herbst, P. & Chazan, D. (resubmitted). Keeping Theorizing in Touch with Practice: Practical Rationality as a Middle Range Theory of Mathematics Teaching. To be included in C. Charalambous and A. Praetorius, *Theorizing teaching*. Springer.

Herbst, P., Chazan, D., and Boileau, N.\* (accepted). Framing, normativity, and serviceability in teachers' decision making during lessons. Accepted to be presented at TSG 37, ICME 14, Shanghai, China, 2021.

Herbst, P., Shultz, M.\*, Bardelli, E.\*, Boileau, N.\*, & Milewski, A. (in review). How can teaching simulations help us study at scale the tensions mathematics teachers have to manage when considering policy recommendations? Resubmitted after request to do major revisions for *Educational Studies in Mathematics*.

An, T., Berzina-Pitcher, I., Bigelow, V., Buchbinder, O., Herbst, P., Milewski, A., Miller, N., Prasad, P., Pyzdrowski, L., St Goar, J., Sears, R., Szydlik, S., & Vestal, S. (forthcoming Spring 2022). A cross-institutional faculty online learning community: Community-guided faculty development in teaching college geometry for teachers. To be included in S. Linder, C. Lee, and K. High (Eds.), *Handbook of STEM Faculty Development*. IAP.

Chazan, D. and Herbst, P. (accepted). Teacher educators use of technology to represent instruction. Paper submitted to TSG29, ICME 14, Shanghai, China, 2021.

Chazan, D., Herbst, P., Crespo, S., Matthews, P., and Lichtenstein, E. (2021, in press). Archival infrastructures for supporting research that treats mathematics education research as a situated activity. Editorial, forthcoming in *Journal for Research in Mathematics Education*, 52(4)

Erickson, A.^, Herbst, P., Ko, I\*., & Dimmel, J.^ (in press, online first). When what routinely happens conflicts with what ought to be done: A scenario-based assessment of secondary mathematics teaching. *Research in Mathematics Education*.  
<https://doi.org/10.1080/14794802.2020.1855600>

Ko, I., Herbst, P., and Shultz, M. (in preparation). Comparing how college mathematics instructors and high-school teachers recognize professional obligations of mathematics teaching when making instructional decisions. Ready to be submitted.

Ko, I^., Mesa, V., Duranczyk, I., Herbst, P., Kohli, N., Ström, A., & Watkins, L. (in review). Understanding the characteristics of mathematical content knowledge for teaching algebra in high schools and community colleges.

Milewski, A., Bardelli, E.\*, Herbst, P., & Dimmel, J.^ (in preparation). The role of emotions in simulations of teaching practice. To be submitted.

Milewski, A., Erickson, A.,^ and Herbst, P. (in press). What factors into mathematics teachers' judgements of practice? Learning from the ambiguities that teachers notice in classroom scenarios. *Canadian Journal of Mathematics and Science Education*. Online first  
<https://link.springer.com/article/10.1007%2Fs42330-021-00141-x>

Milewski, A., Herbst, P., and Hanby, K.\* (in preparation). Assessing the potential of innovative pedagogies of teaching: An analytic model for gauging the kinds of instructional practices made available for novice to practice through various forms of approximation. To be submitted.

Milewski, A. and Herbst, P. (in revision). Working collectively to design online teacher education curriculum: How do teacher educators manage to do it? Invited to major revisions at *Digital Experiences in Mathematics Education*

Milewski, A., Stevens, I., Herbst, P., & Huhn, C. (in press). Confronting teachers with contingencies as a way to support their learning about situation-specific pedagogical decisions in an online context. To be included in K. Hollebrands & R. Anderson (Eds.), *Online learning in mathematics education*. Springer

### ***Software***

Herbst, P., Chazan, D., & Lavu, S. (2020, November). ***LessonDepict***. Web-based collaborative software tool for the creation of storyboards and storyboard maps. Disclosed to the Office of Technology Transfer, University of Michigan. [www.lessondepict.org](http://www.lessondepict.org)

Herbst, P., Chazan, D., & Lavu, S. (2019, March). ***Anotemos***. Web-based collaborative software tool for the annotation of video. Disclosed to the Office of Technology Transfer, University of Michigan. [www.anotemos.com](http://www.anotemos.com)

## **Presentations**

### ***Invited Talks***

Herbst, P. (2019, December). How can we account for the decisions mathematics teachers make in instruction? Plenary at the Korean Society for Mathematics Education Conference, Ajou University, Korea.

Herbst, P. (2018, February). On mathematics textbook writing as storytelling. Invited response to plenary talk by Scott Baldridge. Research Council on Mathematics Learning Conference, Baton Rouge, LA.

Herbst, P. (2017, November). A modeling approach in the teaching of secondary geometry: What difficulties does it present to the teacher? Invited talk at the Problem Solving in Patagonia Conference, University of Magallanes, Punta Arenas, Chile.

Herbst, P. (2017, June). A modeling approach in the teaching of secondary geometry: What difficulties does it present to the teacher? Invited talk at the First International Week, University of Vechta, Germany.

Herbst, P. (2016, July). How Theory-Building Research on Instruction can Support Instructional Improvement: Toward a Modeling Perspective in Secondary Geometry. Keynote address at the 39<sup>th</sup> conference of the Mathematics Education Research Group of Australasia, Adelaide, Australia. (Available in ERIC ED572403)

Herbst, P. (2015, September). Teorías y métodos para la investigación de la racionalidad de la práctica en la enseñanza de las matemáticas. Plenary at the 3rd International doctoral colloquium in mathematics education. Mexico City, CINVESTAV.

Herbst, P. (2014, May). Scenario-based assessments and the Standards for Mathematical Practice. Invited talk at the Annual Meeting of the Michigan Section of the Mathematical Association of America and AMATYC. Flint, Michigan.

Herbst, P. (2013, January). Thought Experiments on Mathematics Teaching: How animated cartoons can help broker conversations about practice. Weizmann Institute of Science, Rehovot, Israel.

Herbst, P. (2013, April). The many functions of proof in high school mathematics. Invited presentation at the Research on Proof Strand, Annual Meeting of the National Council of Teachers of Mathematics (NCTM), Denver, CO.

Herbst, P. (2010, October). Practical rationality and the justification of actions in mathematics teaching. Invited plenary talk at the Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Columbus, Ohio.

Herbst, P. (2010, February). Researching the practical rationality of mathematics teaching. Invited plenary lecture at the Annual Meeting of the Special Interest Group of the Mathematical Association of America on Research in Undergraduate Mathematics Education (RUME). Raleigh, NC.

Herbst, P. (2009, March). What “doing mathematics” could look like in high school. Invited plenary lecture. Conversations among Colleagues conference, Dearborn, MI.

Assude, T., Boero, P., Herbst, P., Lerman, S., and Radford, L. (2008, July). *The Notions and Roles of Theory in Mathematics Education Research*. Invited survey team presentation at the ICME 11<sup>th</sup>, Monterrey, Mexico. (I was not present for the talk.)

Herbst, P. (2007, November). *The Roles of Theory in Mathematics Education Scholarship: How We Make Use of and Build Theory*. Invited plenary at the conference "Justification of findings in mathematics and science education research, with particular regard to the role of theory in such justification" organized by the National Danish Graduate School of Mathematics and Science Education (NADIFO) and the Nordic Graduate School of Mathematics Education (NoGSME). Nyborg, Denmark.

Herbst, P. and Chazan, D. (2006, March). Active Representations of Mathematics and Its Teaching. Invited plenary talk. Conversations among Colleagues conference, Ann Arbor, MI.

Herbst, P. (2004, July) *Proof, proving, and the work of teachers and students in classrooms*. Invited regular talk. 10<sup>th</sup> International Conference in Mathematics Education, Copenhagen, Denmark.

I've given invited colloquia at Universidad Antonio Nariño (Bogotá, Colombia), University of Arizona, Arizona State University, Boston College, Texas State University, University of Bremen (Germany), University of Delaware, Educational Development Center (EDC), University of Georgia, University Joseph Fourier (Grenoble I, France), University of Haifa (Israel), University of Maryland, University of Michigan, Michigan State University, Portland State University, Sun-Yat Sen University (Taiwan), University of Utah, Virginia Technological University, Western Michigan University.



***Selected other presentations (listed only those not listed as papers)***

Herbst, P., Boileau, N., and Ko, I. (2017, April). Understanding the Rationality of Mathematics Teaching Using Multimedia Questionnaires: The ThEMaT Online study. Presentation at the Research conference of the National Council of Teachers of Mathematics (NCTM), San Antonio, TX.

Herbst, P. (2014, April). Practical rationality and beliefs. Symposium presentation at the Research Conference of the National Council of Teachers of Mathematics (NCTM), New Orleans, LA.

Herbst, P., Chazan, D., Aaron, W., Buchbinder, O., Dimmel, J., Erickson, A., and Kosko, K. (2013, April). Methods to study decisions in mathematics teaching. Symposium presentation at the Research Pre-session of the Annual Meeting of the National Council of Teachers of Mathematics (NCTM), Denver, CO.

Herbst, P. (2013, April). Depicting classroom scenarios to facilitate discussions about mathematical practice and its Standards. Presentation at the Annual Meeting of the National Council of Supervisors of Mathematics (NCSM), Denver, CO.

Herbst, P., Aaron, W., Chieu, V.M., and Moore-Russo, D. (2013, January). A Software Tool for Authoring Online Experiences in Mathematics Teacher Development. Presentation at the annual meeting of AMTE (Association of Mathematics Teacher Educators), Orlando, FL.

Cirillo, M. and Herbst, P. (2013, January). The role of rigor in mathematical proof. Presentation at the annual meeting of AMTE (Association of Mathematics Teacher Educators), Orlando, FL.

Herbst, P. and Chieu, V. M. (2012, July). *LessonSketch*: An online, practice-based environment for teacher development. Presentation at the SLOAN-C/MERLOT conference, July 27, Las Vegas, NV.

Herbst, P., Chazan, D., and Aaron, W. (2012, July). Using stories of *learning* and *teaching* in practice-based teacher education: The affordances of *LessonSketch*. Presentation at the conference Connecting Advances in Learning Research and Teacher Practice: A Conference about Teacher Education. Teachers' College, Columbia University, NYC, July 18.

Herbst, P. (2012, April). How do high school teachers relate to alterations in the practice of “doing proofs” in geometry? Presentation at a symposium organized by Michelle Cirillo at the NCTM Research Pre-session, Philadelphia, PA.

Herbst, P. (2012, April). Design Considerations for Representations of Teaching: The ThEMaT II Multimedia Surveys. Presentation at a symposium organized by Gloriana Gonzalez at the NCTM Research Pre-session, Philadelphia, PA.

Herbst, P. (2012, April). *LessonSketch*: An online, practice-based environment for learning to teach mathematics. Presentation at the Annual Meeting of NCTM, Philadelphia, PA.

Herbst, P. (2012, March). Animations and comics as representations of mathematical practice. Presentation at the Critical Issues in Mathematics Education 2012: Teacher education in view of the Common Core. Mathematical Sciences Research Institute (MSRI), Berkeley, CA.

Crespo, S., Aaron, W., Herbst, P., and Moore-Russo, D. (2012, February). Designing Practice-Based Mathematics Teacher Education Using Virtual and Interactive Technologies. Association of Mathematics Teacher Educators, Fort Worth, TX.

Herbst, P. (2011, April). Using an “impossible” construction problem to teach a geometric theorem. Presentation at the Annual Meeting of NCTM, Indianapolis, IN.

Herbst, P. (2011, April). Some Features of LessonSketch and How It Can Be Used with Preservice Teachers. Presentation at a symposium. NCTM Research Presession, Indianapolis, IN.

Herbst, P. and Chazan, D. (2011, March). Practical Rationality and its relationship with Mathematical Knowledge for Teaching. Presentation at a Conference in the Institute of Mathematics and Education, Tucson, AZ.

Herbst, P., Aaron, W., Chieu, V. M., Dimmel, J., Erickson, A., Kosko, K., and Rougee, A. (2011, February). Learning about the Work of Doing Mathematics from Geometric Problem Solving. Presentation at the Mathematics in Action – Conversations among Colleagues Joint Conference. Grand Valley State University.

Herbst, P. (2010, May). Representations of teaching and their roles in teacher education. Presentation on the occasion of receiving the Pattishall Award. School of Education, University of Michigan.

Herbst, P., Ball, D., Chazan, D., and Philipp, R. (2010, April). Practical rationality and mathematical knowledge for teaching. Symposium organized at the NCTM Research Presession, San Diego, CA.

Herbst, P. (2010, January). Assessing teacher thinking using online experiences with rich media. Presentation at a symposium. Association of Mathematics Teacher Educators, Irvine, CA.

Herbst, P. (2009, October). The many functions of proof in classroom mathematics. Invited address. Sun-Yat-Sen University, Kaohsiung, Taiwan.

Herbst, P. (2009, October). Researching the practical rationality of mathematics teaching. Invited address. Sun-Yat-Sen University, Kaohsiung, Taiwan.

Herbst, P., Aaron, W., González, G., & Weiss, M. (2009, April). Studying teachers’ rationality using representations of teaching. Paper presented at the NCTM Research Presession, Washington, DC.

Herbst, P. (2009, April). Animations of classroom episodes: Visualizing opportunities to engage a class in proving. Presentation at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, DC.

Herbst, P. (2008, October). Representations of teaching and their role in teacher learning. Presentation at the CKC Workshop, Laboratoire LIG, Grenoble, France.

Herbst, P. with T. Nachlieli and T. Miyakawa (2008, April). What a teacher needs to do to “install” a theorem: A study of practical rationality. Presentation at the NCTM Research Presession, Salt Lake City, UT.

Herbst, P., Chazan, D., and Nachlieli, T. (2007, April). *Toward an Experimental Paradigm for the Study of Mathematics Teaching: The Case of “Installing a Theorem.”* Presented at a symposium at the annual meeting of AERA, Chicago.

Herbst, P. Hsu, H., Chen, C., González, G., and Jeppsen, A. (2007, April). Conceptions of *figure* in high school geometry instruction. Poster presented at the annual meeting of AERA, Chicago.

Herbst, P., Chazan, D., González, G., Weiss, M., Sandow, D., Nachlieli, T., Lueke, M., & Aaron, W. (2006, April). Creating and using representations of instruction to probe hypotheses. Presented at the NCTM Research Presession, St. Louis, MO.

Herbst, P. (2006, April). Managing the transaction between work and learning in the mathematics classroom. Intervention in a symposium on classroom management. Annual Meeting of AERA, San Francisco.

Herbst, P. (2005, April). *What can didactique offer to a teacher?* Intervention in the Symposium in honor of Guy Brousseau, ICMI Klein Medalist, at the NCTM Annual Meeting, Anaheim, CA.

Herbst, P. (2004). *A discussion of the papers by Fang, Izsák et al., Langrall et al., and Le et al. Session 25.045*, Division K. 2004 Annual Meeting of the American Educational Research Association. San Diego, CA.

Herbst, P. (2003, April). *Conceptualizing and Proving in Mathematics Classrooms*. A 150-minute symposium organized by Herbst at the Research Pre-session to the Annual Meeting of the National Council of Teachers of Mathematics in San Antonio, TX.

Herbst, P. (2003, April). Invited intervention as recent author in the session titled “Publishing In The Journal For Research In Mathematics Education” organized by the Editorial Panel of the Journal. Research Pre-session to the Annual Meeting of the National Council of Teachers of Mathematics in San Antonio, TX.

Herbst, P. (2002, May). Relating the Schism between “Doing Proofs” and “Coming to Know” to Teachers’ Practical Reason. Poster presented at the NSF-REC Principal Investigator Annual Meeting, Arlington, VA.

Herbst, P. (2002, April). Didactique of Mathematics and mathematics education: Connecting two research traditions as we discuss Brousseau’s Theory of Didactical Situations. Organizer of and presenter in this discussion group at the Research Presession for the NCTM 80<sup>th</sup> Annual Meeting. Las Vegas, NV.

Herbst, P. & Macke, M. (2001, September). Dilemmas and Tensions in Collaborative Classroom Research. Poster presented at the NCTM Conference on Practitioner Research in Mathematics Education, Albuquerque, NM.

Herbst, P. (1999, August) *Le future de la recherche sur la preuve*. Participation in a round table. *Xéme Ecole d’Été de Didactique des Mathématiques*, Houlgate, France.

Herbst, P. (1999, April). Fostering argumentation in the mathematics class. Organizer and presenter of this symposium at the Annual Meeting of the American Educational Research Association, Montreal.

### **Funded Research and Development Projects**

Principal investigator in “Managing students’ contributions to mathematical work in whole class discussions in high school: How do teachers decide what to do?” Funded by the James S. Mc Donnell Foundation, AWD No. 220020524, 2018-2023, \$2,065,318.

Principal investigator in “GeT Support: An online professional learning community to support the geometry course for teachers.” Funded by the National Science Foundation, Directorate of Education and Human Resources (EHR), Division of Undergraduate Education (IUSE Program) DUE- 1725837, \$2,299,865, 2017-2022.

Principal investigator in “Embracing Mathematics, Assessment & Technology in High Schools through LessonSketch StoryCircles” contract with Macomb Intermediate School District, funded by the State of Michigan and the US Department of Education Math and Science Partnership Program for a grand total of \$370,800. APR # MI50804, 2015-2017

Principal investigator in “LessonSketch Online Modules for Implementing the Common Core Standards for Mathematical Practice” contracts with the districts of Gaylord, Dearborn, East Detroit, Orchard View, Charlotte, and Woodhaven for a grand total of \$23,840 funded by Michigan Department of Education. 2015-2016

Principal investigator in “SIMTEACH: What Can Practical Knowledge Modeled in a Teaching Simulator Contribute to Support Mathematics Teacher Learning?” Funded by the National Science Foundation, EHR, DRL-1420102, \$ 515,755. 2014-2018.

Co-principal investigator in "Developing Rich Media-based Materials for Practice-based Teacher Education" (P. I., D. Chazan). Funded by the National Science Foundation, DRL-1316241, Michigan Subcontract for \$1,146,373.00. 2013-2018.

Principal Investigator in Animation Production Agreement. Contract funded by NCTM to produce an animation, \$21,600. 2010-2011.

Principal Investigator in Supports for learning to manage classroom discussions: Exploring the role of practical rationality and mathematical knowledge for teaching. Funded by the National Science Foundation, DRL- 0918425, \$3,467,721, 2009-2018.

Principal Investigator in ThEMaT: Thought Experiments in Mathematics Teaching. Funded by the National Science Foundation, ESI-0353285, \$ 4,376,477, 2004-2011.

Principal Investigator in CAREER: Reasoning in high school geometry classrooms: Understanding the practical logic underlying the teacher’s work. Funded by the National Science Foundation, REC-0133619, \$561,893, 2002-2009.

Principal Investigator Reasoning and proving in high school geometry—A study of teaching. Funded by the Office of the Vice President for Research. The University of Michigan. \$ 6,851. 2000-2001.

## **Service to the profession**

### **International**

Chair, Topic Study Group on research on secondary mathematics instruction. ICME 14, Shanghai, China, 2020. Resigned after firming up the program due to schedule conflicts when the conference was rescheduled.

Curriculum evaluator, Ministry of Education of Colombia 2013-2014

Chair, Topic Study Group on the teaching and learning of geometry at the secondary level. ICME 13, Hamburg, Germany 2016

Member, Survey Team on Theory, ICME 12, Monterrey, Mexico 2012

### **National**

Founder, Chief Executive, and Designer of the LessonSketch platform, [www.lessonsketch.org](http://www.lessonsketch.org)

### **University and School**

Educational Studies Program Chair, 2015-2018

Director of the GRIP Lab, School of Education, University of Michigan, 2001-present

Principal, ScenarioSketch Team, Michigan I-CORPS 2013

Member, Graduate Affairs Committee 2013-2015

Member, Research Advisory Committee, 2008-2013

Member, Promotion and Tenure Committee, 2014-2015, 2010-2012

Lead Faculty for Secondary Mathematics, Teacher Education Program, University of Michigan, 1999-2015

Unit coordinator, EMST (Education in Mathematics, Science, and Technology), 2014-2015

Mathematics Education Search Committee Chair, 2014-2015

Member of the Mendez Commission on Information Technology

### **Local**

Assistant Coach, MathCounts, Forsythe Middle School (2012-2014)

Head Coach, Math Counts, Forsythe Middle School (2006-2008)

Treasurer of the Board of Directors, Interfaith Hospitality Network at Alpha House, 2012-2014

Member of the Board of Directors, Interfaith Hospitality Network at Alpha House, 2011-2018

### **Reviewing and Editing**

Editor in Chief, *Journal for Research in Mathematics Education*, 2019-2024

Guest Editor, *Journal of Technology and Teacher Education*, 2018(1)

Guest Editor, *ZDM Mathematics Education*, 2011(1)

Guest Editor, Special Issue 29(1), 2009, on Methodologies for studying mathematics classrooms, *Recherches en Didactique des Mathématiques*

Program Chair, Division C Section 3 (Mathematics), 2009 AERA Annual Meeting, San Diego.

Strand Leader Geometry, *PMENA 2012*, *PMENA 2013*, *PMENA 2018* conferences

Editorial Board Member, 2017-present, *Revista de Educación Matemática*, Argentina

Editorial Board Member, 2015-2018, *Journal for Research in Mathematics Education*

Editorial Board Member, 2006-2019. *Educational Studies in Mathematics*.

Editorial Board Member, 2003-present. *Recherches en Didactique des Mathématiques*.

Editorial Board Member, 2001-present. *Journal of Mathematics Teacher Education*.

Editorial Board Member, 2004-present. *International Newsletter on the Teaching and Learning of Mathematical Proof*.

Associate Editor of the *International Newsletter on the Teaching and Learning of Mathematical Proof*. 2000-2004.

Reviewer for grants submitted to the National Science Foundation's Directorate of Education and Human Resources, the Social Sciences and Humanities Research Council of Canada, the Israel Science Foundation (ISF), and the National Research Foundation of South Africa.

Reviewer of grant proposals submitted to the Provost office, University of Michigan.

Reviewer of reappointment and promotion and tenure dossiers for higher education institutions. Various years and several institutions in the US, South Africa, and Lebanon.

Member of the National Selection Committee for the Presidential Award for Excellence in Mathematics and Science Teaching.

Reviewer for scholarly journals: Educational Assessment, Journal for Research in Mathematics Education, Cognition and Instruction, Journal of Mathematics Teacher Education, Educational Review, Recherches en Didactique des Mathématiques, Educational Psychologist, Educational Studies in Mathematics, American Educational Research Journal, For the Learning of Mathematics, Research in Collegiate Mathematics Education, Journal of the Learning Sciences, Zentralblatt für Didaktik der Mathematik (ZDM), Review of Educational Research, Mathematical Thinking and Learning, Yupana (Argentina), Revista Latinoamericana de Matemática Educativa (RELIME, México), Journal of Mathematical Behavior, Journal of Teacher Education, Learning and Individual Differences, Journal of Educational Psychology, Revista de Educación Matemática (Argentina) .

Reviewer for annual meetings of AERA (Divisions C, K, and SIG/RME), PME, and PMENA, multiple years, since 1998. Member of the Editorial Board of Division C3 (2008-2010).

Translator of many articles into Castilian for their publication in the online Newsletter on Proof (<http://www-cabri.imag.fr/Preuve/>).

### ***Offices in professional organizations***

SIG/RME (Special Interest Group on Research in Mathematics Education), Steering committee member, 2003-2005

Workforce Education Initiative, Chair. School of Education, University of Michigan. 2018-2019

***Membership in professional organizations***

American Educational Research Association (AERA), Division C (Learning and Instruction), Division J (Education in the Professions), Division K (Teaching and Teacher Education), and SIG-RME (Special Interest Group for Research in Mathematics Education)  
National Council of Teachers of Mathematics (NCTM)  
Michigan Council of Teachers of Mathematics (MCTM)  
International Group for the Psychology of Mathematics Education (PME) and North American Chapter (PME-NA)  
Association of Mathematics Teacher Educators (AMTE) and Michigan Chapter (MI-AMTE)  
Association pour la Recherche en Didactique des Mathématiques, France (ARDM)  
PDK (Phi Delta Kappa)  
MERLOT (Multimedia Educational Resource for Learning and Online Teaching)  
Mathematical Association of America (MAA) and SIGMAA-RUME

**Mentoring and advising**

***Postdoctoral fellows***

Nicolas Boileau (postdoctoral mentee, 2021-present)  
Irma Stevens (postdoctoral mentee, 2019-present)  
Inah Ko (postdoctoral mentee, 2019-present)  
Enes Akbuga (postdoctoral mentee, 2018-2019, currently at Drake University)  
Ander Erickson (postdoctoral mentee, 2014-2016, now an assistant professor at University of Washington Tacoma)  
Justin Dimmel (postdoctoral mentee, 2014-2015, now an assistant professor at University of Maine)  
Amanda Milewski (postdoctoral mentee 2013-2015, now Assistant Research Scientist at University of Michigan)  
Yung-Chi (Jack) Lin (postdoctoral mentee, 2012-2013, now at National Chiayi University, Taiwan)  
Wendy Aaron (postdoctoral mentee, 2011-2012, now at Oregon State University)  
Karl Kosko (postdoctoral mentee, 2010-2012, now at Kent State University)  
Takeshi Miyakawa (postdoctoral mentee, 2006-2009, now at Waseda University, Japan)  
Vu Minh Chieu (postdoctoral mentee, 2006-2009, now at Amazon)  
Talli Nachlieli (postdoctoral mentee, 2004-2006, now at Levinski College, Israel)  
Jeong-lim Chae (postdoctoral mentee, 2005-2006)

***Doctoral students (completed)***

Nicolas Boileau (advisor and dissertation chair, defended December 2020, now a postdoc at University of Michigan)

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Mollee Shultz (advisor and dissertation chair, defended April 2020, now a postdoc at Texas State University)

Inah Ko (advisor and dissertation chair, defended April 2019, now postdoc at University of Michigan)

Kristi Hanby (advisor and dissertation chair, defended December 2017, now a Consultant at Wayne RESA)

Justin Dimmel (advisor and dissertation chair, defended December 2014, now an assistant professor at University of Maine)

Ander Erickson (advisor and dissertation chair, defended December 2014, now an assistant professor at University of Washington Tacoma)

Elaine Lande (member of dissertation committee, defended December 2014, now at University of Michigan's Comprehensive Studies Program)

Chialing Chen (advisor and dissertation chair, defended December 2011)

Wendy Aaron (advisor and dissertation chair, defended November 2010, now at Oregon State University Mathematics Department)

Hui-Yu (Angela) Hsu (member dissertation committee, defended July 2010, now an assistant professor in Taiwan)

Michael Weiss (dissertation chair, defended June 2009, now at University of Michigan Mathematics Department)

Mark Hoover (member dissertation committee, defended April 2009, now a Research Scientist at the University of Michigan School of Education)

Gloriana González (advisor and dissertation chair, defended December 2008, now a professor at University of Illinois at Urbana-Champaign)

Hala Ghouseini (member dissertation committee, defended December 2007, now an associate professor at University of Wisconsin-Madison)

Maria Lizzette Hamlin (co-chair, defended May 2006)

Babette Marie Benken (member doctoral committee, defended October 2004, now at California State University Long Beach)

***Doctoral students (current)***

Michael Ion (advisor, candidate)

Scott Bridges (advisor, precandidate)

***Master students (interns)***

Umut Gürsel (2017)

Liangke Yang (2018)

Jinxhi Zhou (2019)

Matt Park (2019)

***Undergraduate students (UROP and independent studies)***



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Xinzhu Chen (2013-2014)

Maranda Discenna (2013-2015)

Corin Cooney (2015-2016)

Steven Katofiasc (2015-2016)

Keith Chung (2015-2016)

Yasmine Abushukur (2015-2016)

Daniel Thompson (2016-2017)

Lawrence Teng (2016-2017)

Jason Vande Velde (2017-2018)

Kirsten Birman (2018-2019)

Andrew Spiteri (2020-2021)

Michael Green (2020-2021)

***Doctoral Education Roles in other Universities***

Doctoral committee member for Margarita Curiel Neri (Advisor: Claudia Acuña; CINVESTAV-IPN, México, defended April 2019)

Member of the doctoral faculty for the Doctorate in Science Education, University of Córdoba, Argentina (current).

Committee member in the doctoral dissertation by Arnon Avitzur (Advisor: Martin Simon; New York University, discontinued)

External evaluator of the doctoral dissertation by Ana Lage Ramírez (Advisor: Patrick Thompson; Arizona State University, defended August 2010).

External evaluator of the doctoral dissertation by Leong Yew Hoong (Advisor: Helen Chick; University of Melbourne, Australia, defended June 2008)

Opponent (external critic and defense examiner) in the dissertation by Johan Prytz (Advisor: Staffan Rodhe; University of Uppsala, Sweden, defended June 2007).

June 2021