Orly Buchbinder - Curriculum Vitae

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EDUCATION

2010 **Ph.D., Mathematics Education**

Dept. of Education in Technology & Science. Technion, Israel.

Thesis: The role of examples in establishing the validity of universal and existential mathematical statements. (Supervisors: Orit Zaslavsky & Uri Leron).
English abstract: http://www.graduate.technion.ac.il/Theses/Abstracts.asp?Id=25132

2005 **M.Sc. (Cum Laude), Mathematics Education**

Dept. of Education in Technology & Science. Technion, Israel.

Thesis: Counter Examples in Mathematics: Generation Processes and Modes of their Use. (Supervisor: Orit Zaslavsky). English abstract: http://www.graduate.technion.ac.il/Theses/Abstracts.asp?Id=19175

1998 **B.Sc. (Cum Laude), Mathematics Education**

Dept. of Education in Technology & Science. Technion, Israel.

Further Education and Professional Development

2022-2023 HERS (Higher Education Resource Services) Leadership Institute

2015 Research and Engagement Academy, University of New Hampshire

PROFESSIONAL EXPERIENCE

2014 – to date **Associate Professor of Mathematics Education**

Department of Mathematics and Statistics, University of New Hampshire

Courses taught:

MATH 425 – Calculus 1
MATH 709 – Teaching Mathematics in Grades 6-12
MATH 760 – Geometry
MATH 790 – Historical Foundations of Mathematics
MATH 797 – Senior Seminar: Mathematical Reasoning and Proof for Secondary Teachers
MATH 902 – Classroom Practicum
MATH 928 – Reasoning and Proof across Secondary Curriculum
MATH 958 – Foundations of Mathematics Education
MATH 978 – Topics in Mathematics Education
MATH 968 – Learning Theories in Mathematics Education
MATH 998 – Reading course in Mathematics Education

2014 – 2018 **Research Affiliate**

The Center for Mathematics Education, *University of Maryland, US.*

Thought Experiments in Mathematics Teaching (ThEMaT). PIs: D. Chazan, University of Maryland – College Park, and P. Herbst, University of Michigan.

2011 – 2014 **Research Associate / Postdoctoral fellow**

The Center for Mathematics Education, *University of Maryland, US.*

NSF-funded project *ThEMaT II* PIs: D. Chazan and P. Herbst. The project examined mathematics teachers' practical rationality using online media-rich surveys. I supervised a team of graduate students and coordinated work on: design and piloting of rich-media online surveys; data collection and analysis; managing project documentation; writing technical reports and journal papers.

2013 – 2014 **Co-Instructor and Instructor**

The Center for Mathematics Education, *University of Maryland, US.*

EDCI 457 - Teaching and Learning Middle School Mathematics;
MATH 312 - Mathematical Reasoning and Proof for Pre-Service Middle School Teachers.

2007 – 2015 **Co-Author and Consultant**

Curriculum Development Project, *Technion, Israel.*

Co-Author of a team-written mathematics textbook series for grades 7-9, including teacher guides, and of a mathematical and pedagogical resource book for teachers on Teaching and Learning Calculus.

2008 – 2011 **Mentor**

Outreach program for fostering excellence in mathematics, *Technion, Israel.*

Responsible for designing and conducting in-service professional development workshops for middle and high school mathematics teachers.

2008 – 2011 **Instructor, Clinical faculty**

Dept. of Education in Technology & Science, Technion

214206 – Algebra in Junior High school

214207 – Geometry in Junior High School

2004 – 2011 **Co-instructor and Teaching Assistant**

Dept. of Education in Technology & Science- Technion

214103 – Teaching Methods and Skills

214206 – Algebra in Junior High school

214207 – Geometry in Junior High School

214208 – Mathematics in Senior High School

2000 – 2005 **Secondary Mathematics Teacher**

Bosmat High School, Haifa, Israel.

Taught all secondary mathematics courses: Algebra, Geometry, Statistics, Trigonometry and Calculus; specialized in preparing students for the National Matriculation Examinations at three ability levels: low, middle and high.

2000 - 2002 **Science and Mathematics Instructor**

Education Center of Israel National Museum of Science, Technology and Space.

Developed and implemented educational modules in physics and mathematics for the Museum's Education Center; taught a variety of science topics for all levels and grades: K-12; designed and taught workshops for mathematics and science teachers, and for general public.

1998 - 2001 **Secondary Mathematics Teacher**

Krayot Gymnasium- High School and College, Israel.

AWARDS AND HONORS

2008 Award for Consistent Excellence in Teaching, Technion.

2007	Israeli Ministry of Education special scholarship for excellent doctoral candidates.
2007	The Levi Eshkol, Israeli Ministry of Science special scholarship for excellent doctoral candidates.
2007	Kaplan Award for excellent doctoral candidates, Technion.
2006	M.Sc. in Mathematics Education - Cum Laude.
2006	Avital Foundation Prize for promoting teaching initiatives in mathematics education.
2006, 2007, 2008	Three times winner of Vivian Konigsberg Award for Excellence in Teaching, Technion.
2005	Kaplan Award for excellent master candidates, Technion.
1998	B.Sc. in Mathematics Education - Cum Laude.

GRANT WORK

Grants Awarded & Pending

2025 – 2027: National Science Foundation IUSE 189749. *UPSCALE: Unlocking Potential: AI-Enabled Self-Regulated Learning in Calculus Education.* **PI: Orly Buchbinder**, $750,000.

2020 – 2025: National Science Foundation 1941720: *CAREER: Investigation of Beginning Teachers' Expertise to Teach Mathematics via Reasoning and Proof.* **PI: Orly Buchbinder**, $903,581.

2020 – 2024: National Science Foundation IUSE 2013427: *Transforming STEM Gateway Teaching and Learning through Interdisciplinary Practices.* PI: Chris Bauer; Co-PIs: Melissa Aikens, **Orly Buchbinder,** Karen Graham, Dawn Meredith. $1,999,572.

2017 – 2022: National Science Foundation - Noyce Scholarship Program 111089470*: Culturally Responsive and Effective Stem Teaching (CREST): Strengthening the Foundation for Teacher Success in High Needs Schools.* PI: Dawn Meredith; Co-PIs: **Orly Buchbinder**, Margaret Greenslade, Carrie Hall, and Elyse Hambacher; $1,429,337

2017 - 2020: National Science Foundation - IUSE 1711163: *Enhancing Preparation of Secondary Preservice Mathematics Teachers: Mathematical Reasoning and Proving as a Lens for Teaching.* PI: **Orly Buchbinder,** Co-PI: Sharon McCrone. $283,249.

2018 – 2023: National Science Foundation - Noyce Research Grant 1758401. PI: Rebecca Mcgraw, University of Arizona. Sub-award to UNH: Orly Buchbinder and Sharon McCrone. Project title: *Teacher Education for Equitable Mathematics Instruction: An Exploratory Study of Noyce Program Impacts.* $1,259,937. (Withdrawn)

Grant Related Activities

Invited Consultant:

FCT (Fundação para a Ciência e a Tecnologia) – Portuguese Science Foundation. Project REASON-Mathematical Reasoning and Teacher Education. PI: João Pedro da Ponte. University of Lisbon, Portugal (€ 222,282. Funded March 2019)

European Commission. Project title: Digital Support for Teachers' Collaborative Reflection on Mathematics Classroom Situations. PI: Sebastian Kuntze. Ludwigsburg University of Education, Germany. (€ 398,314. Funded September 2019)

2014 – 2019: *LessonSketch Research and Development Fellow.* One of ten fellows in the U.S. selected by the ThEMaT 3 project (PI Daniel Chazan) to create and disseminate rich media modules for mathematics teacher preparation courses.

PUBLICATIONS

Journal Articles

Schwarts, G., Herbst, P., Chazan, D., **Buchbinder**, O., Clark, L. M., Wieman, R., & Zahner, W. (2024). Mathematics teacher educators' navigational expertise when designing multimodal representations of practice: a semiotic analysis. *Journal of Mathematics Teacher Education.* https://doi.org/10.1007/s10857-024-09658-y

Liu, J.[P] & **Buchbinder**, O. (2024). Instructional Technology Tetrahedron and Network Visualization: Conceptualizing Online Teaching Through a Lens of Reflective Noticing. *Digital Experiences in Mathematics Education*. https://doi.org/10.1007/s40751-024-00151-y

Hazzan, O., Zazkis, R., Levy, M., Hadar, I., & **Buchbinder**, O. (2024). An Ode to a Mathematician: Commemorating Uri Leron. A paper submitted to *Digital Experiences in Mathematics Education.* https://doi.org/10.1007/s40751-024-00145-w

Buchbinder, O., & Zazkis, R. (2024). On convincing power of counterexamples. *The Mathematics Enthusiast 21*(1&2), 443-458. https://doi.org/10.54870/1551-3440.1636

Weingarden, M.[P], & **Buchbinder**, O. (2023). Examining Prospective Mathematics Teachers' Learning to Teach Mathematics via Reasoning and Proving through the Commognitive Lens. *Frontiers in Education, 8.* https://doi.org/10.3389/feduc.2023.1154531

Buchbinder O., & McCrone, S. (2023). Prospective secondary teachers' learning to teach mathematical reasoning and proof: The case of the role of examples in proving. *ZDM – Mathematics Education, 55*(5), 779–792. https://doi.org/10.1007/s11858-023-01493-4

Wasserman, N., **Buchbinder**, O., & Buchholtz, N. (2023). Making university mathematics matter for secondary teacher preparation. *ZDM – Mathematics Education,55*(5), 719–736. https://doi.org/10.1007/s11858-023-01484-5

Buchbinder, O., McCrone, S., Butler, R., & Capozzoli, M. (2022). Mathematical Knowledge for Teaching Proof: Comparing secondary teachers, pre-service secondary teachers, and undergraduate majors. *International Journal for Research in Mathematics Education*. https://doi.org/10.1007/s40753-022-00187-8

Buchbinder, O., Brisard, S., Butler, R. & McCrone, S. (2021). Preservice Secondary Mathematics Teachers' Reflective Noticing from 360-degree Video Recordings of Their Own Teaching. *Journal of Technology and Teacher Education*, 29(3), 279-308. https://www.learntechlib.org/primary/p/219593/.

Buchbinder, O. & McCrone, S. (2020). Preservice Teachers Learning to Teach Proof through Classroom Implementation: Successes and Challenges. *Journal of Mathematical Behavior, 58, 100779.* doi.org/10.1016/j.jmathb.2020.100779

Buchbinder, O., Chazan, D. I., & Capozzoli, M. (2019). Solving Equations: Exploring Instructional Exchanges as Lenses to Understand Teaching and Its Resistance to Reform. *Journal for Research in Mathematics Education*, *50*(1), 51-83.

Buchbinder, O., & Zaslavsky, O. (2019). Students' understanding of the role of examples in proving: strengths and inconsistencies. *Journal of Mathematical Behavior, 53, 129-147*. doi.org/10.1016/j.jmathb.2018.06.010

Buchbinder, O. (2018). Supporting prospective secondary mathematics teachers in creating instructional explanations through video-based experience. *Journal of Technology and Teacher Education 26*(1), 33-56.

Buchbinder, O. (2017). Guided discovery of the Nine-point Circle Theorem and its proof. *International Journal of Mathematical Education in Science and Technology, 49*(1), 138-153. https://doi.org/10.1080/0020739X.2017.1363422

Buchbinder, O., Chazan, D., & Fleming, E. (2015). Insights into the school mathematics tradition from solving linear equations. *For the Learning of Mathematics, 35*(2), 1-8.

Pedemonte, B. & **Buchbinder**, O. (2011). Examining the role of examples in proving processes through a cognitive lens. *ZDM - The International Journal on Mathematics Education*, *43*(2), 257-267.

Buchbinder, O. & Zaslavsky, O. (2011). Is this a coincidence? The role of examples in fostering a need for proof. *ZDM - The International Journal on Mathematics Education*, *43*(2), 269-281.

Edited Books and Special Issues

Buchbinder, O., Wasserman, N., & Buchholtz, N. (Eds). Exploring and strengthening university mathematics courses for secondary teacher preparation. *ZDM – Mathematics Education, 55*(4). https://link.springer.com/journal/11858/volumes-and-issues/55-4

Buchbinder, O., & Kuntze, S. (2018). *Mathematics Teachers Engaging with Representations of Practice*. Springer, Cham.

Book Chapters

Buchbinder, O., Vestal, S., Mingus, T., & An, T. (in print). Enhancing students' proficiency with proof in Geometry for Teachers' courses. To appear in P. Herbst, A. Milewski, N. Miller & L. Pyzdrowski (Eds)., *The GeT (Geometry for Teachers) Book*.

Dawkins, P. C., & **Buchbinder**, O. (in print). Why and how to engage teachers in evaluating geometric proofs and arguments: Commentary on SLO2. To appear in P. Herbst, A. Milewski, N. Miller & L. Pyzdrowski (Eds)., *The GeT (Geometry for Teachers) Book*.

An, T., Krupa, E., Vestal, S., & **Buchbinder**, O. (in print). The Importance and Application of Technology in a Geometry for Teachers Course. To appear in P. Herbst, A. Milewski, N. Miller & L. Pyzdrowski (Eds)., *The GeT (Geometry for Teachers) Book*.

Koichu, B., Cooper, J., **Buchbinder**, O., McCrone, S. & Papadopoulos, I. (2023). Implementation of digital resources in relation to policy: Theoretical considerations and illustrative cases from Greece, Israel, and the US. In Pepin, B., Gueudet, G., Choppin, J. (Eds.) Handbook of Digital Resources in Mathematics Education. Springer International Handbooks of Education. (pp. 1307–1330). Springer. https://doi.org/10.1007/978-3-031-45667-1_53.

An, T., Boyce, S., Brown, A., **Buchbinder, O**., Cohen, S., Dumitrascu, D., Escuadro, H., Herbst, P., Ion, M., Krupa, E., Miller, N., Pyzdrowski, L., J., Sears, R., St. Goar, J., Szydlik, S., Vestal, S. (2024). (Toward) Essential student learning objectives for teaching geometry to secondary pre-service teachers. *AMTE Professional Book Series, Volume 5: Reflection on Past, Present and Future: Paving the Way for the Future of Mathematics Teacher Education,* (pp. 175 – 197). Information Age Publishing.

Buchbinder, O., Abrams, E., Britton, D., Bryce, J. G., Couse, L. J., McGaughy, J., Rock, B. (2022). The Research and Engagement Academy: A Model for STEM Faculty Development. In S. Linder, C. Lee & K. High (Eds.), *Handbook of STEM Faculty Development,* (pp. 279 – 290). Information Age Publishing. https://tinyurl.com/45jpv32t

An, T., Berzina-Pitcher, I., Bigelow, V., **Buchbinder**, O., Herbst, P., Milewski, A., Miller, N., Prasad, P. V., Pyzdrowski, L. J., St. Goar, J., Sears, R., Szydlik, S., Vestal, S. (2022). A Cross-Institutional Faculty Online Learning Community: Community-Guided Faculty Development in Teaching College Geometry for Teachers. In S. Linder, C. Lee & K. High (Eds.), *Handbook*

of STEM Faculty Development, (pp. 325 – 336). Information Age Publishing. https://tinyurl.com/yttxhn6b

Buchbinder, O. (2018). Systematic exploration of examples as proof: analysis with four theoretical frameworks. In G. Harel and A. Stylianides (Eds.). *Advances in mathematics education research on proof and proving: An international perspective.* (pp. 253-268). Springer, Cham. doi.org/10.1007/978-3-319-70996-3_18

Buchbinder, O., & Cook, A. (2018). Examining the mathematical knowledge for teaching of proving in scenarios written by pre-service teachers. In O. Buchbinder & S. Kuntze (Eds.). *Mathematics Teachers Engaging with Representations of Practice* (pp. 131-154). Springer, Cham. doi.org/10.1007/978-3-319-70594-1_8

Buchbinder, O., & Kuntze, S. (2018). Representations of Practice in Teacher Education and Research—Spotlights on Different Approaches. In O. Buchbinder & S. Kuntze (Eds.). *Mathematics Teachers Engaging with Representations of Practice* (pp. 1-8). Springer, Cham.

Buchbinder, O. (2018). "Who is right?" What students' and prospective teachers' responses to scripted dialog reveal about their conceptions of proof. In R. Zazkis & P. Herbst (Eds.), *Scripting approaches in mathematics education: Mathematical dialogues in research and practice* (pp. 89-113), New York, NY: Springer doi.org/10.1007/978-3-319-62692-5_5

Buchbinder, O., Ron, G., Zodik, I. & Cook, A. (2017). What can you infer from this example? Applications of on-line, rich-media task for enhancing pre-service teachers' knowledge of the roles of examples in proving. In A. Leung and J. Bolite-Frant (Eds.), *Digital Technologies in Designing Mathematics Education Tasks – Potential and Pitfalls*. (pp. 215-235). Springer. Cham. doi.org/10.1007/978-3-319-43423-0_11

Mathematics Textbooks

Pedagogical Secretariat, Israeli Ministry of Education (2013). *Teaching and Learning of Calculus: mathematical and pedagogical resource book for teachers*. (In Hebrew). Tel-Aviv: Maalot Publications. Team-written resource book for secondary mathematics teachers. E-book: http://cms.education.gov.il/EducationCMS/Units/Mazkirut_Pedagogit/Matematika/ChativaElyona/Analiza.htm

Efshar Gam Acheret (2010). [*There is another way*]. Team-written mathematics textbooks and teacher guides for 7th, 8th and 9th grades. Bonus Books Publishing Company (in Hebrew). A product of the curriculum design projects. Sample electronic version: http://matheducation.co.il/node/33

Buchbinder, O. & Shmueli, E. (2005): *Mathematics for State Final Examination – module 3*. Ort Publications, Tel-Aviv. Mathematical textbook for high schools (in Hebrew). Includes chapters on Algebra, Geometry, and Calculus.

Peer-reviewed conference proceedings

Designations: [S] Graduate Student, [P] Postdoctoral Researcher

Butler, R.[s] & Buchbinder, O. (submitted). Learning assistants' development as mathematics teachers: Insights from an undergraduate to graduate teaching journey. Paper submitted to the *14th Congress of the European Society for Research in Mathematics Education (CERME 14),* Bozen-Bolzano, Italy.

Butler, R.[s] & Buchbinder, O. (submitted). Linguistic analysis of beginning mathematics teachers' discourse about reasoning and proof. Paper submitted to the *14th Congress of the European Society for Research in Mathematics Education (CERME 14),* Bozen-Bolzano, Italy.

Sears, R. & Buchbinder, O. (submitted). Using FullProof to develop geometrical reasoning and proof skills within a practicum course for preservice teachers. Paper submitted to the *14th Congress of the European Society for Research in Mathematics Education (CERME 14),* Bozen-Bolzano, Italy.

Buchbinder, O., & Brisard, S. [s] (submitted). Navigating the Transition from University to School: A Case Study of Incorporating Reasoning and Proving in Secondary Mathematics Teaching. Paper submitted to the *27th Annual Conference on Research in Undergraduate Mathematics Education,* Alexandria, VA.

Buchbinder, O., & Allen, M. [s] (submitted). Calculus I Students' Logical Reasoning about the Definition of Continuity of Function. Paper submitted to the *27th Annual Conference on Research in Undergraduate Mathematics Education,* Alexandria, VA.

Buchbinder, O., Brisard, S. [s] & Butler, R. [s] (accepted). How beginning secondary mathematics teachers reconcile competing professional obligations. To appear in the *Proceedings of the 46th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA),* Cleveland, OH.

Ben-Dor, N. [P] & **Buchbinder**, O. (accepted). Beginning teacher's trajectory of identity formation in the figured worlds of reform and traditional instruction. To appear in the *Proceedings of the 46th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA),* Cleveland, OH.

Butler, B. [s] & **Buchbinder**, O. (accepted). Implicit differentiation in a college calculus classroom: interaction between students and learning assistants. Paper submitted to the *46th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA),* Cleveland, OH.

Buchbinder, O. (accepted). Affordances of 360-degree video for researching secondary classroom teaching practice. Paper submitted to the *15th International Congress on Mathematical Education (ICME 15)*, Sydney, Australia.

Sager, L., Butler, R., Altindis, N., **Buchbinder**, O., & Graham, K. (2024). Exploring graduate teaching assistants' teaching practices in a purposefully designed active learning environment. Paper submitted to the *15th International Congress on Mathematical Education (ICME 15)*, Sydney, Australia.

Buchbinder, O. & Allen, M. [S] (2024). Calculus I Students' Understanding of Implicit Differentiation. In S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 26th Annual Conference on Research in Undergraduate Mathematics Education*, Omaha, NE.

Sager, L., Butler, R. [S], Altindis, N., **Buchbinder**, O., Graham, K. (2024). Exploring Graduate Teaching Assistants' Teaching Practices in a Purposefully Designed Active Learning Environment. In S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 26th Annual Conference on Research in Undergraduate Mathematics Education*, Omaha, NE.

Buchbinder, O. (2023). How novice teachers recontextualize the teaching of mathematics via reasoning proving – a dual case study. In P. Drijvers, C. Csapodi, H. Palmér, K. Gosztonyi, & E. Kónya (Eds.), *Proceedings of 13th Congress of the European Society for Research in Mathematics Education (CERME 13)* (pp. 88–95). Alfréd Rényi Institute of Mathematics and ERME.

Butler., R.[S] & **Buchbinder**, O. (2023). Learning Assistant- Student Interaction in Calculus: A Critical Discourse Analysis. In Lamberg, T., & Moss, D. (Eds.), *Proceedings of the 45th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA),* Vol. 2., (pp. 515–524). University of Nevada, Reno.

Dennis, C.[S], & **Buchbinder**, O. (2023). Opportunities for instrumental genesis in mathematics lessons. In Lamberg, T., & Moss, D. (Eds.), *Proceedings of the 45th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA),* Vol. 2., (pp. 317–325). University of Nevada, Reno.

Weingarden, M. [P], & **Buchbinder**, O. (2023). From University to school: exploring Beginning Teachers Integrating Reasoning and Proving. In M. Ayalon, B. Koichu, R. Leikin, L. Rubel., & M.

Tabach (Eds.). *Proceedings of the 46th Conference of the International Group for the Psychology of Mathematics Education*, Vol. 4, (pp. 347–354). PME

Weingarden, M.[P], & **Buchbinder**, O. (2023). Applying a commognitive-based framework to promote teachers' communication about reasoning and proving. In M. Ayalon, B. Koichu, R. Leikin, L. Rubel., & M. Tabach (Eds.). *Proceedings of the 46th Conference of the International Group for the Psychology of Mathematics Education*, Vol. 4, (pp. 339–346). PME

Buchbinder, O., Tuyin An., & Vestal. S. (2023). Lessons learned using FullProof, a digital proof platform, in a Geometry for Teachers course. S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th annual Conference on Research in Undergraduate Mathematics Education,* (pp. 163–171). Omaha, Nebraska.

Weingarden, M [P]., & **Buchbinder**, O. (2023). Opportunities for reasoning-and-proving in mathematical tasks: A discursive perspective. *Proceedings of the 11th Jerusalem Conference for Research in Mathematics Education (JCRME 11).* (pp. 105–108) Jerusalem, Israel.

Liu, J [P]., **Buchbinder**, O., & Weingarden, M. (2022). Understanding Preservice Teachers' Noticing of Online Teaching. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (2022). *Proceedings of the 44th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, (pp. 1807–1816). Middle Tennessee State University.

Weingarden, M [P]., **Buchbinder**, O., & Liu, J [P]. (2022). Opportunities for reasoning and proving in mathematical tasks: A discursive perspective. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.). *Proceedings of the 44th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, (pp. 857– 866). Middle Tennessee State University.

Butler, R [S]., **Buchbinder**, O., & McCrone, S. (2022). Comparing STEM Majors, Practicing and Prospective Secondary Teachers' Feedback on Mathematical Arguments: Towards Validating MKT-Proof. In Karunakaran, S. S., & Higgins, A. (Eds.). *Proceedings of the 24th annual Conference on Research in Undergraduate Mathematics Education*, (pp. 91– 99). Boston, MA.

Liu, J [P]., & **Buchbinder**, O., (2022). Learning to Teach Reasoning and Proof in an Online Setting: The Case of Nancy. In Karunakaran, S. S., & Higgins, A. (Eds.) *Proceedings of the 24th annual Conference on Research in Undergraduate Mathematics Education*, (pp. 357–365). Boston, MA.

Buchbinder, O., & McCrone, S. (2022) Guiding principles for teaching mathematics via reasoning and proving. In J. Hodgen, E. Geraniou, G. Bolondi & F. Ferretti. (Eds.), *Proceedings of the 12th Congress of European Research Society in Mathematics Education (CERME12)* (pp.1–8). Free University of Bozen-Bolzano and ERME. https://hal.archives-ouvertes.fr/hal-03746878

Buchbinder, O., McCrone, S., Capozzoli, M., & Butler, R. (2021). Mathematical Knowledge for Teaching Proof: Comparing Secondary Teachers, Pre-Service Teachers, and Undergraduate STEM Majors. In Olanoff, D., Johnson, K., & Spitzer, S. (Eds.). *Proceedings of the 43rd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education,* (pp. 427–436). Philadelphia, PA.

Milewski, A., Strickland, S., **Buchbinder, O**., Herbst, D., & Chazan, D. (2021). Moves teachers use to respond to students' non-canonical approaches for solving equations. In Olanoff, D., Johnson, K., & Spitzer, S. (Eds.). *Proceedings of the 43rd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education,* (pp. 1411–1419). Philadelphia, PA.

Fifty, D [S]., Buchbinder, O., & McCrone, S. (2021). Contrasting social and sociomathematical norms of two groups of students in A Postsecondary Precalculus Class. In A.I. Sacristán, J.C. Cortés-Zavala, & P.M. Ruiz-Arias, (Eds.). *Proceedings of the 42nd annual meeting of the North*

American Chapter of the International Group for the Psychology of Mathematics Education, (pp. 1130–1138) Mexico. Cinvestav / AMIUTEM / PME-NA. https:/doi.org/10.51272/pmena.42.2020.

Buchbinder, O. & McCrone, S. (2020). Secondary Prospective Teachers' Strategies to Determine Equivalence of Conditional Statements. In S. S. Karunakaran, Z. Reed, & A. Higgins (Eds.). *Proceedings of the 23rd Annual Conference on Research in Undergraduate Mathematics Education.* (pp. 62–69) Boston, MA *http://sigmaa.maa.org/rume/RUME23.pdf*

Fifty, D S., **Buchbinder**, O., & McCrone, S. (2020). Characterizing Student Engagement in a Post-Secondary Precalculus Class. *Proceedings of the 23rd annual Conference on Research in Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America*. (pp. 193–200) Boston, MA *http://sigmaa.maa.org/rume/RUME23.pdf*

Buchbinder, O. & McCrone, S. (2019). Indirect reasoning task for prospective secondary teachers: opportunities and challenges. In Otten, S., Candela, A. G., de Araujo, Z., Haines, C., & Munter, C. (2019). *Proceedings of the 41st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 1259–1263). St Louis, MO: University of Missouri. https://www.pmena.org/pmenaproceedings/PMENA%2041%202019%20Proceedings.pdf

Buchbinder, O. & McCrone, S. (2019). Prospective teachers enacting proof tasks in secondary mathematics classrooms. Jankvist, U. T., Van den Heuvel-Panhuizen, M., & Veldhuis, M. (Eds.). (2019). *Proceedings of the 11th Congress of the European Society for Research in Mathematics Education* (pp. 147–154). Utrecht, the Netherlands: Freudenthal Group & Freudenthal Institute, Utrecht University and ERME. http://www.mathematik.uni-dortmund.de/~prediger/ERME/CERME11_Proceedings_2019.pdf

Buchbinder, O. & McCrone, S. (2019). Opportunities to Engage Secondary Students in Proof Generated by Pre-service Teachers. *Proceedings of the 22nd Annual Conference on Research in Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America*. (pp. 76– 83) Oklahoma City, OK. February 2019. http://sigmaa.maa.org/rume/RUME22_Proceedings.pdf

Buchbinder, O. & McCrone, S. (2018) Mathematical Reasoning and Proving for Prospective Secondary Teachers. In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown, (Eds.) *Proceedings of the 21st Annual Conference on Research in Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America*: San Diego, CA. (pp. 115–128). http://sigmaa.maa.org/rume/RUME21.pdf

Buchbinder, O. (2017). Supporting classroom implementation of proof-oriented tasks: lessons from teacher researcher collaboration. In T. Dooley & G. Gueudet (Eds.) *Proceedings of the 10th Congress of European Research in Mathematics Education (CERME 10).* Dublin, Ireland: DCU Institute of Education & ERME (pp. 107–114) https://hal.archives-ouvertes.fr/hal-01873221/document

Buchbinder, O. (2016). Attending to structure of mathematical statements: secondary students' difficulties and interpretations. Paper presented at AERA 2016 Conference. http://www.aera.net/Publications/OnlinePaperRepository/AERAOnlinePaperRepository

Buchbinder, O., & Cook, A. (2015). Pre-service teachers' construction of algebraic proof through exploration of math-tricks. In K. Krainer; N. Vondrová (Eds.). *Proceedings of 9th Congress of European Research in Mathematics Education*, Prague, Czech Republic (pp.100–106). https://hal.archives-ouvertes.fr/CERME9-TWG01/hal-01280547v1

Buchbinder, O., & Zaslavsky, O. (2013). A Holistic Approach for Designing Tasks that Capture and Enhance Mathematical Understanding of a Particular Topic: The Case of the Interplay between

Examples and Proof. In C. Margolinas (Ed.). *Proceedings of ICMI Study 22: Task Design in Mathematics Education Conference*, (Vol. 1, pp. 27–35) Oxford, UK.

Buchbinder, O., & Zaslavsky, O. (2013). Inconsistencies in students' understanding of proof and refutation of mathematical statements. In A. M. Lindmeir & A. Heinze (Eds.). *Proceedings of the 37th Conference of the International Group for the Psychology of Mathematics Education*, (Vol. 2, pp. 129–136). Kiel, Germany: PME.

Buchbinder, O. & Zaslavsky, O. (2009). A framework for understanding the status of examples in establishing the validity of mathematical statements. In Tzekaki, M., Kaldrimidou, M. & Sakonidis, C. (Eds.). *Proceedings of the 33rd Conference of the International Group for the Psychology of Mathematics Education*. (Vol. 2, pp. 225–232). Thessaloniki, Greece.

Buchbinder, O., & Zaslavsky, O. (2009). Uncertainty: A driving force in creating a need for proving. Online collection of accepted papers of the *International Commission on Mathematical Instruction (ICMI), Study 19*: *Proof and Proving in Mathematics Education*, Taipei, Taiwan, May 2009.

Buchbinder, O. & Zaslavsky, O. (2007). How to decide? Students' ways of determining the validity of mathematical statements. In D. Pita-Fantasy & G. Philippot (Eds.), *Proceedings of the 5th Congress of the European Society for Research in Mathematics Education* (pp. 561–571), Larnaca, University of Cyprus.

Peer-reviewed short oral presentations and posters

Designations: [S] Graduate Student, [P] Postdoctoral Researcher

Butler, R.[S] & **Buchbinder**, O. (in press). Discourse between learning assistants and calculus students on implicit differentiation. In S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education*, Omaha, NE. Poster.

Ben-Dor, N.[P] & **Buchbinder**, O. (in press). Beginning Teacher's Identity Trajectory in the Figured Worlds of Dialogic and Direct Instruction. In S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education*, Omaha, NE. Poster

Brisard, S.[S], Butler, R.[S], & **Buchbinder**, O. (in press). Holding on to Reasoning and Proving while Navigating Professional Obligations: Secondary Teachers' Transition from University to Schools. In S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education*, Omaha, NE. Poster

Pinto, A., **Buchbinder**, O., Wasserman, N. (2023). The affordances of advanced mathematics for secondary mathematics teaching: Comparing research approaches and theoretical perspectives. Working group proposal accepted for In M. Ayalon, B. Koichu, R. Leikin, L. Rubel., & M. Tabach (Eds.). *Proceedings of the 46th Conference of the International Group for the Psychology of Mathematics Education*, Vol. 1, pp. 199-200). PME.

Altindis, N[P]., **Buchbinder**, O., Graham, K. (2023). Students' Voice in an Active Calculus Learning Environment: How Do Students Perceive Purposeful Design Learning Environments. (Poster). In S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education,* (pp. 1282-1284), Omaha, Nebraska.

Butler, R[S]., Brisard, S., Weingarden, M., **Buchbinder**, O. (2023). Prospective Secondary Mathematics Teachers Integrating Reasoning and Proving in their Teaching. (Poster). S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education,* (pp. 1280 - 1281), Omaha, Nebraska.

Butler, R [S]., & **Buchbinder**, O. (2023) Novice Calculus Learning Assistants' Learning to Notice. (Poster). S. Cook., B., Katz., & D. Moore-Ruso (Eds)., *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education,* (pp. 1285 -1286). Omaha, Nebraska.

Weingarden, M [P]., & **Buchbinder**, O. (2023). Understanding beginning teachers' transition from university to supervised internship: Implementing opportunities for reasoning and proving. *Annual Meeting of the American Educational Research Association* (AERA), Chicago, IL, April 2023.

Brisard, S. [S], **Buchbinder**, O., & McCrone, S (2022). Prospective Secondary Mathematics Teachers' Understanding of the Role of Examples in Proving. In Karunakaran, S. S., & Higgins, A. (Eds.) *Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education*, (pp. 1204-1205). Boston, MA.

Weingarden, M [P]. & **Buchbinder**, O. (2022). A Sociocultural Perspective on Beginning Teachers Enacting Reasoning and Proving Practices. In Karunakaran, S. S., & Higgins, A. (Eds.) *Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education*, (pp. 1191). Boston, MA.

Hempel, A.[S], & **Buchbinder, O**. (2022). Undergraduate Students' Use of Everyday Language to Make Sense of Indirect Proof. In Karunakaran, S. S., & Higgins, A. (Eds.) *Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education*, (pp. 1222-1223). Boston, MA.

Buchbinder, O. & McCrone, S. (2021). Characterizing mathematics teachers' proof-specific knowledge, dispositions, and classroom practices. Paper presented at the *ICME 14th International Congress on Mathematical Education,* Shanghai, China. *www.icme14.org/static/en/news/37.html?v=1639379359941*

Buchbinder, O. & McCrone, S. (2021). Advancing reasoning and proof in secondary mathematics classrooms: instructional modules for supporting teachers. In Sacristán, A.I., Cortés-Zavala, J.C. & Ruiz-Arias, P.M. (Eds.). *Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education,* (pp. 890) Mexico. Cinvestav / AMIUTEM / PME-NA. https:/doi.org/10.51272/pmena.42.2020

Buchbinder, O. & McCrone, S. (2018) Taking proof into secondary classrooms – supporting future mathematics teachers. In T. E. Hodges, G, J. Roy, & A. M. Tyminski, (Eds.), *Proceedings of the 40th Annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA),* Greenville, SC. (pp. 711- 714). https://s3.us-east-2.amazonaws.com/pmena2018/documents/public/PMENA+2018+Proceedings.pdf

Fifty, D.[S], **Buchbinder**, O., & McCrone, S. (2019). Sociomathematical norms revealed during a Precalculus breaching instructional activity. In Otten, S., Candela, A. G., de Araujo, Z., Haines, C., & Munter, C. (2019). *Proceedings of the 41st Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 986 – 990). St Louis, MO: University of Missouri. https://www.pmena.org/pmenaproceedings/PMENA%2041%202019%20Proceedings.pdf

Non-peer reviewed publications

Vestal, S., Buchbinder, O., & An, T. (2022) Using *FullProof* in Geometry for Teachers Courses. Newsletter of the GRIP lab.

Moutsios-Rentzos, A., **Buchbinder**, O., Azrou, N., Bredow, F., Deslis, D., Durand-Guerrier, V., Reid, D. A., & Yang, M. (2023). Introduction to Thematic Working Group 1: Argumentation and Proof. In P. Drijvers, C. Csapodi, H. Palmér, K. Gosztonyi, & E. Kónya (Eds.), *Proceedings of the 13th Congress of the European Society for Research in Mathematics Education (CERME 13),* (pp. 52–55). Alfréd Rényi Institute of Mathematics and ERME.

Moutsios-Rentzos, A, **Buchbinder**, O., Cramer, J., Durand-Guerrier, V., Reed, D. Introduction to Thematic Working Group 1: Argumentation and Proof. (2022). Hodgen J., Geraniou E., Bolondi G., & Ferretti, F. (Eds.), *Proceedings of the 12th Congress of the European Society for Research in Mathematics Education (CERME12),* (pp. 73-77). Free University of Bozen-Bolzano, Italy and ERME.

Stylianides, G. J., **Buchbinder**, O., Cramer, J., Durand-Guerrier, V., Moutsios-Rentzos, A., Valenta, A. Introduction to Thematic Working Group 1: Argumentation and Proof. In Jankvist, U. T., Van den Heuvel-Panhuizen, M., & Veldhuis, M. (Eds.). (2019). *Proceedings of the 11th Congress of the European Society for Research in Mathematics Education* (pp. 100 -103). Utrecht, the Netherlands: Freudenthal Group & Freudenthal Institute, Utrecht University and ERME. http://www.mathematik.uni-dortmund.de/~prediger/ERME/CERME11_Proceedings_2019.pdf

Buchbinder O., Cooper, J., Stylianides, G. & Pfeiffer, K. (2018) Introducing CERME's Thematic Working Group 1 – Argumentation and Proof. *European Mathematical Society Newsletter*. pp. 45-46.

Stylianides, G. J., Antonini, S., **Buchbinder**, O., Pfeiffer, K., & Hemmi, K. (2017). Introduction to Thematic Working Group 1: Argumentation and Proof. In T. Dooley & G. Gueudet (Eds.) *Proceedings of the 10th Congress of the European Society for Research in Mathematics Education,* (pp. 78-82). Dublin, Ireland: DCU Institute of Education & ERME.

Stylianides, G. J., Antonini, S., **Buchbinder**, O., Pfeiffer, K., & Hemmi, K. (2017). Introduction to Thematic Working Group 1: Argumentation and Proof. In K. Krainer & N. Vondrová (Eds.) *Proceedings of the 9th Congress of the European Society for Research in Mathematics Education,* (pp. 67-70). Prague, Czech Republic: Charles University in Prague, Faculty of Education and ERME.

Journal articles in Progress

Buchbinder, O., Butler, R., & McCrone, S. (submitted). Discursive differences in written feedback of individuals with varied teaching experiences: Towards validating Knowledge of Content and Teaching Specific to Proof. Paper submitted to *Journal of Mathematical Behavior*. (September 2024).

Ben-Dor, N.[P] & **Buchbinder**, O. (submitted). Beginning Teacher's Trajectory of Identity Formation in the Figured Worlds of Reform and Traditional Instruction. Paper submitted to the journal Teaching and Teacher Education. (August 2024).

Weingarden, M.[P], & **Buchbinder**, O. (submitted). Opportunities for Reasoning and Proving in Mathematical Tasks: Consolidation of Logic-Related and Reasoning Processes. Paper submitted to the journal *Educational Studies in Mathematics*. (July 2024).

Fifty. D.[S], & **Buchbinder**, O. (under revision). Implementing Multiple Solutions Activities in a Postsecondary Precalculus Course: The Cautionary Tale of Norms. Paper submitted to the *Journal of Mathematical Behavior*. Submitted September 2022. Rejected January 2023.

CONFERENCES AND SEMINARS

Invited Plenaries

October 2024: *Longitudinal insights on university preparation and novice teachers' implementation of reasoning and proof.* Plenary lecture at the 8th Northeastern Conference on Research in Undergraduate Mathematics Education. Boston, MA.

January 2023: *Carving their own way: Novice mathematics teachers transitioning from university to school practice.* Colloquium lecture for the Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel.

January 2023: *Learning to teach mathematics via reasoning and proving: beginning teachers' transition between university and school practice*. Colloquium lecture presented at the Institute of Mathematics, University of Rostock, Germany.

February 2021: *Supporting Future Secondary Teachers' Ability to Teach Mathematics via Reasoning and Proof*. Plenary lecture at the 9th Jerusalem Conference on Research in Mathematics Education. Jerusalem (JCRME 9), Israel.

January 2021*: Enhancing Preparation of Prospective Secondary Mathematics Teachers: Mathematical Reasoning and Proving as a Lens for Teaching*. Invited lecture for the Seminar REASON-Mathematical Reasoning and Teacher Training. Institute of Education of the University of Lisbon, Portugal.

January 2021: Enhancing *Preparation of Prospective Secondary Mathematics Teachers: Mathematical Reasoning and Proving as a Lens for Teaching*. Colloquium lecture for the Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel.

Conference Presentations, Plenaries, Colloquia

Designation: * presenter, if not O. Buchbinder.

October 2024: *Using FullProof (The Magical Math Tutor) to Develop Geometrical Reasoning and Proof Skills within a Practicum Course for Preservice Teachers* (With R. Sears*) American Mathematical Society (AMS) Southeastern Sectional Meeting at Georgia Southern University in Savannah, GA.

October 2024: *The Importance and Application of Technology in a Geometry for Teachers Course* (With T. An*, S. Vestal*, & E. Krupa*) American Mathematical Society (AMS) Southeastern Sectional Meeting at Georgia Southern University in Savannah, GA. (Not attended).

February 2024: *Calculus I Students' Understanding of Implicit Differentiation.* (With M. Allen). Paper presented at the 25th Annual Conference on Research in Undergraduate Mathematics Education, Omaha, NE.

February 2024: Exploring Graduate Teaching Assistants' Teaching Practices in a Purposefully Designed Active Learning Environment. (with L. Sager, R. Butler, K. Graham & N. Altindis) Paper presented at the 25th Annual Conference on Research in Undergraduate Mathematics Education, Omaha, NE.

October 2023: *Exploring and Strengthening University Mathematics Courses for Secondary Teacher Preparation*. ZDM-Mathematics Education Webinar on the journal's special issue edited by O. Buchbinder, N. Wasserman & N. Buchholtz.

October 2023: *Learning Assistant- Student Interaction in Calculus: A Critical Discourse Analysis.* (With R. Butler*). Paper presented at the 45th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA), Reno, NV.

October 2023: *Opportunities for instrumental genesis in mathematics lessons.* (With C. Dennis). Paper presented at the 45th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA), Reno, NV.

July 2023: *From University to school: exploring Beginning Teachers Integrating Reasoning and Proving.* (With M. Weingarden). Paper presented at the 46th Conference of the International Group for the Psychology of Mathematics Education. PME. Haifa, Israel.

July 2023: *Applying a commognitive-based framework to promote teachers' communication about reasoning and proving*. (With M. Weingarden). Paper presented at the 46th Conference of the International Group for the Psychology of Mathematics Education. PME. Haifa, Israel.

July 2023: *How novice teachers recontextualize the teaching of mathematics via reasoning proving – a dual case study*. Paper presented at the 13th Congress of European Research in Mathematics Education (CERME), Budapest, Hungary.

February 2023: *Students' Voice in an Active Calculus Learning Environment: How Do Students Perceive Purposeful Design Learning Environments*. (With N. Altindis*, & K. Graham). Poster presented at the 25th Annual Conference on Research in Undergraduate Mathematics Education, Omaha, NE.

February 2023: *Prospective Secondary Mathematics Teachers Integrating Reasoning and Proving in their Teaching*. (With R. Butler, S. Brisard*, and M. Weingarden). Poster presented at the 25th Annual Conference on Research in Undergraduate Mathematics Education, Omaha, NE.

February 2023: *Novice Calculus Learning Assistants' Learning to Notice*. (With R. Butler*). Poster presented at the 25th Annual Conference on Research in Undergraduate Mathematics Education, Omaha, NE.

February 2023: *Opportunities for reasoning-and-proving in mathematical tasks: A discursive perspective.* (With M. Weingarden). Paper presented at the 11th Jerusalem Conference for Research in Mathematics Education (JCRME 11). Jerusalem, Israel.

February 2023: *Supporting prospective secondary teachers' engagement with proof learning using the FullProof digital environment*. (With T. An & S. Vestal) Presentation at the 27th Annual Conference of the Association of Mathematics Teacher Educators, New Orleans, LA.

February 2023: *Supporting prospective secondary teachers selecting and designing mathematical tasks with opportunities for reasoning and proving*. (With M. Weingarden) Presentation at the 27th Annual Conference of the Association of Mathematics Teacher Educators, New Orleans, LA.

November 2022: *From Preparation to Practice: Secondary Mathematics Student Teachers' Enactment of Reasoning and Proof.* Preliminary research report presented at Northeastern section of the Mathematical Association of America NES/MAA conference at Keene State College. (With R. Butler*, S. Brisard, Merav Weingarden; presented by R. Butler).

October 2022: *From Preparation to Practice: Secondary Mathematics Student Teachers' Enactment of Proof and Reasoning*. Preliminary research report presented at the *6th Northeastern Conference on Research in Undergraduate Mathematics Education.* Online. (With R. Butler*, S. Brisard*, & M. Weingarden). https://sites.google.com/view/pcrg/events/nerume/6th-ne-rume-conference?authuser=0

June 2022: *Preparing Secondary Teachers to Teach Mathematics via Reasoning and Proof.* Colloquium lecture presented at the MOFET Institute - a Consortium of Israeli Colleges of Education.

April 2022: *Lessons Learned from Using FullProof, a Digital Proof Tool, in a Geometry for Teachers (GeT) Course.* Colloquium lecture presented at Georgia Southern University. (With T. An & S. Vestal).

April 2022: Berzina-Pitcher, I., Ion, M., An, T., **Buchbinder**, O., Herbst, P., Milewski, A., Miller, N., Prasad, P., Pyzdrowski, L., St. Goar, J., Sears, R., Szydlik, S., Vestal, S. (in press). *Learning and Participating in Scholarship of Teaching and Learning through a Faculty Online Learning Community.* Presented at The Annual Conference of the American Educational Research Association (AERA), April 2022, San Diego, CA. (not attended)

March 2022: *Prospective Secondary Mathematics Teachers Learning to Integrate Reasoning and Proving in Teaching Mathematics*. Colloquium lecture presented at the Simon Fraser University, Vancouver, CA.

February 2022: *Comparing STEM Majors, Practicing and Prospective Secondary Teachers' Feedback on Mathematical Arguments: Towards Validating MKT-Proof*. Paper presented at the 24rd Annual Conference on Research in Undergraduate Mathematics Education. (With R. Butler & S. McCrone).

February 2022: *Learning to Teach Reasoning and Proof in an Online Setting: The Case of Nancy*. Paper presented at the 24th Annual Conference on Research in Undergraduate Mathematics Education. Boston, MA. (With J. Liu).

February 2022: *A Sociocultural Perspective on Beginning Teachers Enacting Reasoning and Proving Practices*. Poster presented at the 24th Annual Conference on Research in Undergraduate Mathematics Education. Boston, MA. (With M. Weingarden).

February 2022: *Prospective Secondary Mathematics Teachers' Understanding of the Role of Examples in Proving*. Poster presented at the 24th Annual Conference on Research in Undergraduate Mathematics Education. Boston, MA. (With S. Brisard* & S. McCrone).

February 2022: Undergraduate Students' Use of Everyday Language to Make Sense of Indirect Proof. Poster presented at the 24th Annual Conference on Research in Undergraduate Mathematics Education. Boston, MA. (With A. Hempel*).

February 2022: *Guiding principles for teaching mathematics via reasoning and proving.* Paper Presented at 12th Congress of the European Society for Research in Mathematics Education (With S. McCrone).

January 2022: Milewski*, A., Strickland, S., **Buchbinder**, O., Herbst, D., & Chazan, D. *Managing students' non-canonical approaches to solving equations: Linguistic resources teachers use to respond to students' mathematical work.* Paper presented NCTM research conference (online). (not attended)

October 2021: *Mathematical Knowledge for Teaching Proof: Comparing Secondary Teachers, Pre-Service Teachers and Undergraduate STEM Majors.* Paper presented at the 43rd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Philadelphia, PA. (With S. McCrone, M. Capozzoli & R. Butler).

July 2021: *Characterizing mathematics teachers' proof-specific knowledge, dispositions and classroom practices.* (With S. McCrone). Paper presented at the ICME 14th International Congress on Mathematical Education, Shanghai, China. (online)

June 2021: *Advancing reasoning and proof in secondary mathematics classrooms: instructional modules for supporting teachers*. (With S. McCrone) Poster presented at the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Mexico. (online)

February 2021: *Mathematical Reasoning and Proving in Secondary Classrooms: Instructional Modules for Prospective Teachers*. (With McCrone, S., Butler, R., Denis, C., Brizard, S., & Fifty, D.) Paper presented at the 25th *Annual Conference of the Association of Mathematics Teacher Educators*. (online).

January 2021: *CERME 11 ¼* (with A. Moutsios-Rentzos, J. Cramer, & N. Leon). International virtual meeting of The Working Group on Argumentation and Proof of the European Research in Mathematics Education.

February 2020: *Secondary Prospective Teachers' Strategies to Determine Equivalence of Conditional Statements*. (With McCrone, S). Paper presented at the Annual Conference of the Research in

Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America. Boston, MA

February 2020: Fifty, D., Buchbinder, O., McCrone, S. *Characterizing Student Engagement in a Post-Secondary Precalculus Class.* Paper presented at the Annual Conference of the Research in Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America. Boston, MA

February 2020: *Mathematical Knowledge for Teaching Proof*. (With McCrone, S., Lesseig, K., & Cirillo, M.) Symposium presented at the Annual Conference of the Association of Mathematics Teacher Educators (AMTE), Phoenix, AZ.

February 2020: *Learning to plan instructional units: Reexamining the grain-size in teacher preparation*. (With Males, L). Individual session presented at the Annual Conference of the Association of Mathematics Teacher Educators (AMTE), Phoenix, AZ.

November 2019: *Indirect reasoning task for prospective secondary teachers: opportunities and challenges*. Paper presented at the 41st Annual Meeting of North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA), St Louis, MO.

April 2019: *Teachers dealing with non-standard student solutions to linear equations* (with A. Milewski, D. Chazan, P. Herbst). Paper presented by A. Milewski at the *NCTM Research conference*, San Diego, CA. (Not in attendance. Available on: https://www.researchgate.net/publication/332670291)

February 2019: *Opportunities to Engage Secondary Students in Proof Generated by Pre-service Teachers* (with S. McCrone). Paper presented at the Annual Conference of the Research in Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America. Oklahoma City, OK.

February 2019: *Student Engagement in a Post-Secondary Developmental Mathematics Class* (with D. Fifty & S. McCrone). Poster presented at the Annual Conference of the Research in Undergraduate Mathematics Education, Special Interest Group of the Mathematical Association of America. Oklahoma City, OK.

February 2019: *Prospective teachers enacting proof tasks in secondary mathematics classrooms.* Paper presented at the 11th Congress of European Research in Mathematics Education (CERME), Utrecht, The Netherlands.

November 2018: *Taking proof into Secondary Classrooms – Supporting Future Mathematics Teachers* (with S. McCrone). Paper presented at the 40th Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME - NA), Greenville, SC.

March 2018: *Addressing Opportunities to Learn to Teach Mathematics (AMTE Standard P.3)* (with B. Zahner, and E. Alibegovic). Association of Mathematics Teacher Educators (AMTE) Webinar Series, Materials for Practice-based Teacher Education 4 Part Series. https://amte.net/content/webinar-materials-practice-based-teacher-education-4-part-series-session-4-addressing

February 2018: *Mathematical Reasoning and Proving for Prospective Secondary Teachers*. (with S. McCrone) Poster presented at RUME conference, San Diego, CA.

December 2017: *Enhancing Preparation of Secondary Preservice Mathematics Teachers: Mathematical Reasoning and Proving as a Lens for Teaching*. Colloquium lecture given at Maine Center for Research in STEM Education (RiSE), Orono, ME.

April 2017: *Can algebra word problems be solved without an equation? Surveying teachers.* (with D. Chazan and S. Sharpe). Paper presented at NCTM research conference, San Antonio, TX.

February 2017: *Supporting classroom implementation of proof-oriented tasks: lessons from teacher researcher collaboration.* Paper presented at the 10th Congress of European Research in Mathematics Education (CERME), Dublin, Ireland

February 2017: *Technique and Purpose: Separating and Integrating Doing and Thinking in Representations of Practice* (with R. Wieman, K. Bieda, A. Cook, L. Males, T. McAneny and R. Sears). Symposium held at 21th Annual Conference of the Association of Mathematics Teacher Educators (AMTE), Orlando, FL. Presentations at the symposium: *Supporting students' reasoning and proving in geometry: Analysis of PSTs' lesson scripts.* (With A. Cook, R. Sears), and *Considering Technique and Purpose as Represented in Lesson Plans.* (With K. Bieda, L. Males).

July 2016: *Systematic exploration of examples as proof: analysis from four theoretical perspectives*. Paper presented at ICME 13 - International Congress on Mathematical Education, Hamburg, Germany.

July 2016: *Using representations of practice for teacher education and research – opportunities and challenges*. (With S. Kuntze, C. Webel, A. Dreher, M. Friesen). Discussion Group presented at ICME 13 - International Congress on Mathematical Education, Hamburg, Germany.

April 2016: *Attending to structure of mathematical statements: secondary students' difficulties and interpretations*. Paper presented at AERA - The Annual Conference of the American Educational Research Association, Washington DC.

February 2016: *Enhancing prospective teachers' knowledge of proof and dispositions towards productive struggle through exploration of Math-tricks*. (With A. Cook). Paper presented at the 20th Annual Conference of the Association of Mathematics Teacher Educators (AMTE), Irvine, CA.

February 2016: *Supporting Prospective Secondary Teachers' Understanding of the Common Core Standards for Mathematical Practice*. (With K. Bieda, L. Males, S. Otten). Paper presented at the 20th Annual Conference of the Association of Mathematics Teacher Educators (AMTE), Irvine, CA.

November 2015: *What can you infer from this example? An experience for enhancing pre-service teachers' knowledge of the roles of examples in proving*. Working Group on Representations of Mathematics Teaching and Their Use in Transforming Teacher Education: Studying Preservice Teachers' Learning from Work with Representations of Teaching. (With P. Herbst, D. Chazan, A. Milewski, U. Gursel, J. Amidon, O. Buchbinder, R. Wieman). 37th Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA 2015). Michigan State University, East Lansing, MI.

April 2015: *Surveying an exchange at the heart of the doing of word problems in school* (With D. Chazan) Paper presented in the Research Symposium at AERA, The Annual Conference of the American Educational Research Association, Chicago, IL. (Did not attend) http://www.aera.net/Publications/OnlinePaperRepository/AERAOnlinePaperRepository

Have reform impact teachers' views on solving word problems without equations? (With D. Chazan). Paper presentation at NCTM 2015, Boston, MA. (Not in attendance)

February 2015: *Pre-service teachers' construction of algebraic proof through exploration of math-tricks* (With A. Cook). Paper presented at the 9th Congress of European Research in Mathematics Education (CERME), Prague, Czech Republic.

April 2014: *Using Representations of Practice in Survey Research with Mathematics Teachers.* (With D. Chazan, J. Dimmel, A. Erikson, K. Hanby, P. Herbst, R. Pillip) Research Symposium given at NCTM research pre-session, New Orleans, LA.

February 2014: *The use of pedagogies of enactment in practice-based mathematics teacher education and professional development.* (With J. Walkoe and A. Edwards) Extended sessions given at AMTE, Irvine, CA.

April 2013: *Assessing recognition of norms of doing word problems: Multimedia questionnaires and analytic techniques.* (With D. Chazan) Paper presented at the NCTM research pre-session, Denver, CO.

April 2013: *Is this a coincidence? Students' understanding of the role of examples in proving or refuting of algebraic statements.* (With O. Zaslavsky). Paper presented at the NCTM research pre-session, Denver, CO.

April 2013: *Using non-standard student solutions to probe what it means to solve linear equations in school.* (With D. Chazan). Paper presented at AERA, The Annual Conference of the American Educational Research Association, San Francisco, CA. Available at: file:///C:/Users/Orly%20Buchbinder/Downloads/609937.1.pdf

June 2012: *Helping teachers support students' understanding of the roles of examples in determining the validity of mathematical statements: workshop in planning*. Poster presentation at The 3rd Conference Creating and Using Representations of Mathematics Teaching in Research and Teacher Education. University of Michigan, Ann Arbor, MI.

July 2011: *The role of examples in establishing the validity of universal and existential mathematical statements*. Colloquium Lecture at Institut fur Mathematik and Informatik, Ludwigsburg, Germany.

October 2007: Attended an international workshop: *The role of examples in mathematical thinking and learning.* Certosa di Pontignano, Siena, Italy. Workshop hosted by University of Siena, Italy on the role and effective use of examples in teaching and learning mathematics.

PROFESSIONAL DEVELOPMENT AND OUTREACH

October 2024: *Re-envisioning the teaching and learning of geometry with technology.* Workshop at the ATMNE (Association of Teachers of Mathematics in New England) conference, Nashua, NH.

October 2023: *"It can't be so, since otherwise…" - Empowering critical thinking and reasoning in STEM.* Workshop at the ATMNE (Association of Teachers of Mathematics in New England) conference, Portland, ME.

June 2023: *ROAR – Reimagining opportunities to advance reasoning in mathematics*. (With M. Weingarden). A two-day workshop for secondary teachers, Tampa, FL.

September 2019: Integrating SMP3 in traditional curriculum: moving beyond geometry. (With S. McCrone, K. Rebrovich). Presentation at NCTM Regional Conference & Exposition, Boston, MA.

April 2018: *Mathematical Modeling Through Scientific Inquiry: The Viewing Tubes Problem* (Lead by S. McCrone). Workshop for teachers at Joint Conference of New Hampshire Teachers of Mathematics (NHTM) and New Hampshire Science Teachers Association (NHSTA) in Derry, New Hampshire.

November 2017: *Enhancing mathematical reasoning in the classroom through collaborative learning strategies.* (With S. McCrone). Presentation at the Association of Teachers of Mathematics in New England (ATMNE) Annual Conference in Marlborough, MA.

July, 2017: *Is this a coincidence? A model for mathematical discovery*. Workshop for teachers at Lesley University 5th Annual Summer Mathematics Institute, Boston, MA.

October 2016: *Argumentation and critical thinking in and outside the classroom – more of the same, or totally different?* Presentation at The Association of Teachers of Mathematics in New England (ATMNE) annual conference in Manchester NH.

March 2016: *Proportional Reasoning in the Elementary Grades: Beyond Ratios and Missing-Value Problems* (With S. McCrone). NHTM Spring Conference at Keene, NH.

March 2016: *Exploring Ratios in Nature with Technology*. Workshop session at 2016 Girls Technology Day, Durham, NH.

September – November 2015: *Enhancing engagement with CCSS MP3: Developing students' capacity to construct viable arguments and critique the reasoning of others*. Professional development workshop series for secondary teachers.

May 2014: *LessonSketch Workshops: Using animated representations of teaching in Research and Teacher Education*. Workshop for researchers of the University of Pittsburgh, PA and Education Development Center, Boston, MA.

February – March 2013: *LessonSketch Workshops: Using animated representations of teaching in Teacher Education.* (With D. Chazan) College of Education, University of Maryland. Workshop series to support teacher educators at the College of Education at UMD to implement High Leverage Teaching Practices in methods courses.

November 2012: *Blue Teacher, green student: Using animations to discuss interaction in the mathematics classroom.* Developer and Instructor of the two-day seminar for teachers. College of Education, University of Maryland.

March 2007: *Counterexamples in mathematics as vehicles to enhance content knowledge and argumentation skills.* Workshop at the Annual Conference of Kesher-Cham – The Israeli Pedagogical Center for the Improvement of Mathematics Education.

March 2007: *Proofs and Refutations – the model of knowledge construction*. Workshop session for the Annual Conference of Kesher-Cham – The Israeli Pedagogical Center for the Improvement of Mathematics Education.

ADVISING

Dissertation committee advising

2024 Sophia Brisard (Ph.D.) University of New Hampshire. *Major advisor*.

2023 Rebecca Butler (Ph.D.) University of New Hampshire. *Major advisor*.

Meaghan Mahoney (Ph.D. Minor in Mathematics Education). University of New Hampshire.

2021 Alice Hempel (Ph.D. Minor in Mathematics Education). University of New Hampshire.

2020 David Fifty (Ph. D). University of New Hampshire. *Major advisor*.

Dissertation committee membership

2024 Catherine Dennis (Ph.D). University of New Hampshire

Jessica Harper (Ph.D). University of New Hampshire.

2023 Emily Wilk (Ph.D.) University of New Hampshire

Alice Hempel (Ph.D.) University of New Hampshire.

2022 Arezou Valadkhani (Ph.D). Simon Fraser University, CA.

Gabriel Lee (Ph.D.) University of Oxford, UK

2021 Cammie Gray (Ph. D). University of New Hampshire.

Maryna Yeroshkina (Ph.D). University of New Hampshire – expected graduation May 2024

2020 Dalton Marsh (Ph. D). University of New Hampshire.

2018 Willem Wallinga (Ph. D). University of New Hampshire

2017 David Earls (Ph. D). University of New Hampshire
Neil Bornstein (Ph. D). University of New Hampshire
Marita Freisen (Ph. D). Pedagogosche Hohschule Ludwigsburg, Germany

2016 Eyob Demke (Ph.D.) University of New Hampshire

2013 Jason Miller (Ph.D.) University of Maryland

Undergraduate research advising

2021 Sophia Brisard. Honors Thesis (B.Sc. 2021)

2017 Hannah Bush. Honors Thesis. (B.Sc. 2017).

PROFESSIONAL SERVICE

Editing

2021-2023 Guest co-editor of the Special Issue of the journal: *ZDM – Mathematics Education.* Titled: Exploring and strengthening university mathematics courses for secondary teacher preparation. (With N. Buchholz and N. Wasserman, N) https://link.springer.com/journal/11858/volumes-and-issues/55-4

2020 - date Editorial Board Member, *Journal of Mathematical Behavior.*

2016 - 2017 Co-Editor of *ICME 13 - International Congress on Mathematical Education Post-Conference Monograph of DG on Representations of Teaching*. Springer.

2013– present Associate Editor, *International Newsletter on the Teaching and Learning of Mathematical Proof.*

Working-Group & Discussion Group Leadership

2023 - Chair of the Topic Study Group 3.10 - Research on Mathematics Classroom Practice at Secondary Level. 15th International Congress on Mathematics Education (ICME 15) Sydney, Australia.

2023 Co-leader of the Working Group 7- The affordances of advanced mathematics for secondary mathematics teaching: comparing research approaches and theoretical perspectives. At the conference of the International Group for the Psychology of Mathematics Education (PME 46), Haifa, Israel.

2022 – 2024 Co-leader of the Working Group on Argumentation and Proof at 13th Congress of European Research in Mathematics Education (CERME 13), Budapest, Hungary.

2019 – 2022 Co-leader of the Working Group on Argumentation and Proof at 12th Congress of European Research in Mathematics Education (CERME 12), Bolzano, Italy

2018 – 2019 Co-leader of the Working Group on Argumentation and Proof at 11th Congress of European Research in Mathematics Education (CERME 11), Utrecht, The Netherlands

2016 - 2017 Co-leader of the Working Group on Argumentation and Proof at 10th Congress of European Research in Mathematics Education (CERME 10), Dublin, Ireland

2015 - 2016 Co-organizer of the Discussion Group on: Using representations of practice for teacher education and research – opportunities and challenges, at ICME-13: International Congress on Mathematical Education. Hamburg, Germany.

2014 - 2015 Co-leader of the Working Group on Argumentation and Proof at 9th Congress of European Research in Mathematics Education (CERME), Prague, Czech Republic.

Reviewing

Book / Monograph review

2022 World Scientific Publishing: Book proposal review.

2020 Routledge. Book proposal review

2016-2017 Peer review of chapters for G. Harel and A. Stylianides (Eds.). *Advances in mathematics education research on proof and proving: An international perspective*.

2015- 2016 Peer review of book chapters for R. Zazkis and P. Herbst (Eds.), *Mathematical Dialogue: Scripting approaches in mathematics education research and practice.* Springer.

Peer review of book chapters of A. Leung and J. Bolite-Frant (Eds.), *Digital Technologies in Designing Mathematics Education Tasks – Potential and Pitfalls*. Springer.

Other review work

2022 Review of a P&T packet of Dr. Liora Nutov who is going for a rank of Associate Professor at Gordon College of Education, Israel.

2015 National Science Foundation Review Panel for Education and Human Resources Directorate.

Reviewer for scholarly journals

2011 – present Journal for Research in Mathematics Education
Journal of Mathematical Behavior
Mathematical Thinking and Learning
International Journal of Research in Undergraduate Mathematics Education
Cognition and Instruction
Journal of Computer Assisted Learning
Educational Studies in Mathematics
Canadian Journal of Science, Mathematics and Technology Education
ZDM - The International Journal on Mathematics Education

Review for Professional Conference Proceedings

2011 – present AMTE - Association of Mathematics Teacher Educators
NCTM Research Pre-Session
CERME 9 -13: proceedings of TWG1: Working Group on Argumentation and Proof.
RUME – Research in Undergraduate Mathematics Education annual conference
PME – International Group for the Psychology of Mathematics Education
PME-NA - The North American Chapter of the International Group for the Psychology of Mathematics Education
ICME – International Congress on Mathematics Education

Discussant

2021 Research Symposium: *Using vignettes in Mathematics teacher education and research: The role of knowledge and beliefs*. EARLI 2021 International Symposium.

2016 Research Symposium: *Transforming Teacher Learner through Mathematics Professional Development*. AERA, Washington DC.

University Service Committees

- CEPS representative to the working group of the provost' council on UNH School of Education
- CEPS search committee: TT in Engineering Education

- Undergraduate Research Conference – Interdisciplinary Science and Engineering
- Symposium program committee
- Research and Engagement Academy applications reviewer
- College of Engineering and Physical Sciences teaching awards committee
- STEM education learning community
- Preservice Teaching Council.

Department Service Committees

- Graduate program committee
- Search committee (tenure track positions and DEI postdoc positions)
- Personnel Committee, dept. of Mathematics & Statistics
- Elementary Mathematics Education Specialists. Certification Program development.
- Calculus Committee
- Undergraduate program committee

Professional Affiliations

American Educational Research Association.
Association of Mathematics Teacher Educators
European Society for Research in Mathematics Education
International Group for the Psychology of Mathematics Education
National Council of Teachers of Mathematics
New Hampshire Teachers of Mathematics

RESEARCH INTERESTS

- Teaching and learning of reasoning and proof at the secondary level
- Argumentation processes, mathematical reasoning and decision making.
- Mathematics teacher education, and teacher knowledge of proof.
- Educational technologies and e-learning.
- Instructional and curriculum design for secondary school.