Elon Langbeheim **October 2025**

CURRICULUM VITAE

Personal Details

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Education

- B.A. 2000-2002 - Integrated Exact Science Program (Physics and Chemistry). Hebrew University of Jerusalem, Jerusalem, Israel,
- M.Sc. 2003-2005 - Applied Physics, Hebrew University of Jerusalem, Jerusalem, Israel . Thesis: "The effect of self-assembled monolayers on electric sensing of transistors" Advisors: Prof. Shlomo Itzchaik and Prof. Joseph Shafir
- Ph.D. 2008-2013 - Science Teaching, Weizmann Institute of Science, Rehovot, Israel. Dissertation: *Curriculum design of a contemporary, interdisciplinary science course for high school students* Advisors: Prof. Edit Yerushalmi and Prof. Samuel Safran

Employment History

- 2019–present **Senior Lecturer**, Graduate Program for Science and Mathematics Education, Ben Gurion University of the Negev.
- 2016-2019 **Senior Intern, Weizmann Institute of Science,** Department of Science Teaching.
- 2014-2016 **Postdoctoral Fellow, Arizona State University,** Mary Lou Fulton Teachers College,
- 2013 -2014 **Postdoctoral Fellow, University of Haifa,** Faculty of Education, Technologies in Education Program.
- 2011-2014 **Lecturer and Teacher didactic mentor, David Yellin Academic college of Education.**
- 2002-2014 **Physics and Chemistry** high school teacher, (various schools)

Professional Activities

(a) Positions in academic administration

- Departmental teaching "ambassador" (2021-present)
- School of education seminar coordinator (2022-2024)

(b) Professional functions outside universities/institutions

- Strand coordinator - the National Association for Research in Science Teaching (NARST) (2018-2021)
- Member of organizing committee, The Annual Israeli Learning Sciences Conference, July 2022, Ben Gurion University.

(c) Significant professional consulting

Academic Advisor for school textbook – Kineret publishing (2022-2023)

(d) Editor or member of editorial board of scientific or professional journal

- Editorial board member **-** International Journal of Science Education

(e) Ad-hoc reviewer for journals

- American Journal of Physics (2019)
- Journal of Research in Science Teaching (JRST) (2018-present)
- European Journal of Physics (2016-present)
- National Association for Research in Science Teaching (NARST) Annual Meeting proposals (2014-present)
- Chemistry Education Research and Practice (2016,2022-present)
- Instructional Science (2022 – present)
- International Journal of Science Education (2022 – present)
- Journal of Chemical Education (2015-2016, 2019,2022-present)
- American Education Research Association Conference proposal (2015).
- Physics Education **(**2021-present).
- Physical Review – Physics Education Research (2019-present)

(f) Membership in professional/scientific societies

- AAPT- American Association of Physics Teachers (2012-2013 and 2017-2018)
- AERA - American Education Research Association (2013-2016, 2020-2021)
- ESERA – European Science Education Research Association (2017-present)
- NARST - National Association for Research in Science Teaching (2014-present)
- ISLS – International Society of the Learning Sciences (2022-2023)
    - 1. Introduction to energy and Thermodynamics, 2. Fundamentals of Electricity 3. Didactics of physics teaching.

Awards, Citations, Honors, Fellowships

- 2012 Physics Education Research Leadership Organizing Council (PERLOC) scholar-in- residence grant. American Association of Physics Teachers (AAPT)
- 2012-2013 Mandel Scholars in Education Dissertation Fellowship
- 2013-2014 Presidential Postdoctoral Fellowship, University of Haifa
- 2014 Orly Kaplan Prize for outstanding Ph.D dissertation, Weizmann Institute of Science

Scientific Publications

a. ISI H-index = 6, Google Scholar H-index = 9
b. ISI citations = 96, Google Scholar citations = 245
c. ISI citations without self-citations = 78

(a) Refereed articles and in scientific journals

1. **Langbeheim, E**, Livne, S., Safran, S. A. and Yerushalmi E (2012) Introductory Physics Going Soft, *American Journal of Physics* 80, 51-60. (Citations ISI 12; GS 18; IF 0.9 60/86; Q3)
2. **Langbeheim, E.**, Livne, S., Safran, S. A. and Yerushalmi E. (2013) Evolution in Students' Understanding of Thermal Physics with increasing Complexity, *Physical Review Special Tocs PER* 9, 020117 (Citations, ISI: 13 GS: 25; IF 2.58; 27/239; Q1)
3. **Langbeheim, E.**, Safran, S. A. and Yerushalmi E. (2014) Visualizing the Entropy Change of a Thermal Reservoir. *Journal of Chemical Education* 91, 380–385 (Citations; ISI 4. GS 7; 2.5; 23/86; Q2)
4. **Langbeheim, E.** (2015) Reinterpretation of Students' Ideas when Reasoning about Particle Model Illustrations, *Chemistry Education Research and Practice*, 16, 697–700. (Citations ISI: 6 GS 9; IF 2.6, 120/760; Q1)
5. **Langbeheim, E.** (2015) A Project-based Course on Newton's Laws for Talented Junior High School Students, *Physics Education*, 50, 410–415. (Citations: ISI – not indexed: GS 35)
6. **Langbeheim, E.** and Levy, S.T. (2016). Learning by Being: Playing Particles in the MeParticle-WeMatter Simulation. *Journal of Chemical Education*.93,1145-1147 (Citations; ISI 2 IF 6; IF 2.5; 23/86; Q2)
7. **Langbeheim, E.** and Rez, P (2017). Sustainable Energy for University Science Majors - Develong Guidelines for Educators and Exploring Student Learning, *Journal of GeoScience Education* 65(2), 86-92. (Citations: ISI – not indexed: GS 4)
8. **Langbeheim, E.** and Levy, S.T. (2018) Feeling the Forces inside Materials: bringing Intermolecular Bonding to the fore using Embodied Modelling. *International Journal of Science Educati*on, 40(13), 1567-1586. (Citations ISI: 9, GS: 17; IF: 2.2; 169/760; Q1)
9. **Langbeheim, E.** and Levy, S.T. (2019) Diving into the Particle Model - Examining the Affordances of Role-Playing Particles in a Participatory Simulation. *Computers & Education*. *139*(1), 65-80 (Citations ISI: 8, GS: 14; IF: 8.9; 3/760; Q1)

10. **Langbeheim, E.,** Abrashkin, A., Steiner, A., Edri, H., Safran, S. A., & Yerushalmi, E. (2020). Shifting the learning gears: redesigning a project-based course on soft matter through the perspective of constructionism. *Physical Review Physics Education Research*. 16(2), 020147. (Citations ISI: 7, GS: 12; IF: 3.1; 120/760; Q1)
11. **Langbeheim**, **E.,** Perl, D. & Yerushalmi, E. (2020). Science Teachers' Attitudes towards Computational Modeling in the Context of an Inquiry-Based Learning Module. *Journal of Science Education and Technology*. 29(6), 785-796. (Citations ISI: 11, GS: 23; IF: 3.3; 64/760; Q1)
12. **Langbeheim**, **E.** (2020). Simulating the Effects of Excluded-Volume Interactions in Polymer Solutions. *Journal of Chemical Education.* 97(6), 1613-1619. (Citations; ISI 4; GS 5; IF 2.5; 23/76; Q2)
13. Saba, J., **Langbeheim**, **E. ,** Hel-Or, H., & Levy, S. T., (2023). Identifying Aspects of Complex and Technological Systems in the Mental Models of Students Who Constructed Computational Models of Electric Circuits *Journal of Research in Science Teaching*. 60 (4) 681-723 (Citations ISI 4; GS 5; IF 3.6 ;48/760; Q1)
14. **Langbeheim**, **E**. Ben-Eliyahu, E., Adadan, E., Akaygun, S., & Ramnarain, U., (2022). Intersecting visual and verbal representations and levels of reasoning in the structure of matter learning progression *Chemistry Education Research and Practice* 23 (4), 969-979 (Citations ISI: 3 GS 3; IF 2.6, 120/760; Q1)
15. **Langbeheim**, **E.,** Hlatshwayo M., Adadan, E., Akaygun, S., & Ramnarain, U., (2023) Relating ctorial and verbal forms of assessments of the particle model of matter in two communities of students. *International Journal of Science and Mathematics Education,* 1-17 (Citations ISI 4; GS 6; IF 1.9 212/760; Q2)
16. **Langbeheim**, **E** Ben-Hamo, S, Weintraub G and Shaipra S., (2023) Reasoning about crowd evacuations as emergent phenomena when using participatory computational models. *Frontiers in Educ*ation, 8:1137828 (IF 1.9; 212/760; Q2)
17. **Langbeheim, E,** Saba, J. and Levy, S.T. (2024), Invented models– relating students' constructions of computational models to their learning gains*. Interactive Learning Environments. P. 1-16.* (IF 3.7, 45/760; Q1)
18. Al-Atawna N.*,* and **Langbeheim**, E., (2025) Concreteness of energy and bonding concepts in 9th grade chemistry – examining Learning among High and Low Achievers. *International Journal of Science Education* (Citations: ISI 1; GS 1; IF: 2.2; 169/760; Q1)
19. **Langbeheim, E,** and Bielik, T., (accepted). Student engagement in constructing computer models in K-12 science education: a systematic review*. Studies in Science Education (*IF 9.9; 6/756; Q1).

b) Refereed chapters in collective volumes, Books.

1. **Langbeheim, E.**, Safran, S. A. and Yerushalmi E., (2016) Scaffolding students' engagement in modeling in research apprenticeships for talented high school students, in Keith, S. Taber and Manabu Sumida (Eds). *International Perspectives on Science Education for the Gifted: Key issues and challenges* Routledge. NY.

2. Henderson, B. **Langbeheim, E.** and Chi, M.T.H. (2017) Addressing Robust Misconceptions through the Ontological Distinction between Sequential and Emergent Processes. In Tamer Amin and Olivia Leverini (Eds). *Converging and Complementary Perspectives on Conceptual Change* Routledge. (GS citations 20)
3. **Langbeheim**, Edri[S], H. Schulmann, N. Safran, S. A. and Yerushalmi E., (2019) Pushing the boundaries of High School Physics: Talented Students Develop Computer Models of Physical Processes in Matter, In Sunal, D. W. ed. *Research in Science Education (RISE) Series - Volume 8, Physics Teaching and Learning: Challenging the Paradigm.* Information Age Publishing.
4. **Langbeheim**, Merzel, A. & Lehavi, Y., (2023) Physics in K-12 integrated science curricula. In Tasar F. T., & Heron, P. Eds. *International Handbook of Physics Education Research*, American Institute of Physics (AIP)

(c) Refereed Conference Proceedings

1. **Langbeheim, E.**, Safran, S. A. and Yerushalmi E. (2012) Design guidelines for adapting scientific research articles: An example from an introductory level, interdisciplinary program on soft matter, *AIP Conf. Proc.* 1513, pp. 23-26.
2. **Langbeheim**, E., Adadan, E., Akaygun, E., Hlatswayo, M., and Ramnarain, U., A (2017) Comparison of Student Responses to ctorial And Verbal items focusing on conceptual, understanding of the particle model of matter. In Finlayson, O.E., McLoughlin, E., Erduran, S., & Childs, P. (Eds.) (2018). *Electronic Proceedings of the ESERA 2017 Conference. Research, Practice and Collaboration in Science Education*. Dublin, Ireland: Dublin City University. ISBN 978-1-873769-84-3
3. **Langbeheim, E.** and Levy, S. T. (2017) ”You evaporated?” vs. ”It escaped”: a comparison of students’ reasoning about vaporization when using participatory and non-participatory simulations. In Y. Eshet-Alkalai, I. Blau, A. Cas, N. Geri, Y, Kalman and V. Silber-Varod (Eds.), *Proceedings of the 12th Chais conference for the Study of Innovation and Learning Technologies: Learning in the Technological Era*. Ra'anana: The Open University of Israel, pp. 52E-56E.

Lectures and Presentations at International Meetings

(a) Oral presentation of papers at international conferences

2010 Yerushalmi, E., **Langbeheim, E.,** Livne, S., and Safran, S., Thermal Physics Going Soft – New Approach to Introduce Contemporary Science in High School, *American Association of Physics Teachers (AAPT) Annual Meeting*, Portland, OR.

2012 **Langbeheim E.,** Safran, S., and Yerushalmi, E., Students’ comprehension of a research article adapted for an interdisciplinary high school program, *American Association of Physics Teachers (AAPT) Physics Education Research Conference (PERC)*, Philadelphia, PA.

2012 **Langbeheim, E.,** Safran, S., and Yerushalmi, E., Adapting a Research Article for an Interdisciplinary High School Program: Design Strategies and Study of Students’ Comprehension, *Theory Research Practice - International Conference on Excellence in Education*, Jerusalem, Israel.

2013 Yerushalmi, E., **Langbeheim E.,** Schulmann, N. and Safran, S., Randomness and structure: Introductory-level conceptual framework for biological materials, *American Association of Physics Teachers (AAPT)* Annual Meeting, Portland, OR.

2015 **Langbeheim, E**. Marking the dance of particles–an embodied approach to deeper understanding of a complex phenomenon. In D. Abrahamson (Chair), J. S. Krajcik (Discussant), When chemistry education researchers met a new paradigm: a graduate seminar reflects on embodied cognition. Presented at the *National Association for Research in Science Teaching (NARST*) annual meeting, Chicago, IL.

2015 **Langbeheim, E.** and Levy, S.T. Learning Affordances related to Participation-in and Observation-of Particle Simulations: Hints from Seemingly Off-task Talk. Presented at the *National Association for Research in Science Teaching (NARST) annual meeting,* Chicago, IL.

2015 **Langbeheim, E**. An analysis of Teacher Educators' Classroom Observation Reports. Paper presented at the *American Educational Research in Education Association (AERA)* annual meeting, Chicago, IL.

2016 **Langbeheim, E.** Using Written and ctorial Tasks for analyzing Middle School Students' Models of Phase Change. In E. Langbeheim (chair), Correlating student drawings and texts to assess understanding of the particle model of matter. Presented *at the annual conference of the National Association for Research in Science Teaching (NARST),* Baltimore, MD.

2016 **Langbeheim, E**. Puterkovsky, M. Bagno, E. and Yerushalmi, E. Failing better? Reflecting on an activity in which students analyze common mistakes. Presented at the *annual conference of the National Association for Research in Science Teaching (NARST),* Baltimore, MD.

2016, **Langbeheim, E**. Using written and ctorial tasks to analyze middle school students' models of phase change In Levy, S. T. (chair) Connections between drawings and written text in student-generated particle model realizations, Presented at the *annual meeting of the American Educational Research Association (AERA),* Washington, DC.

2017 **Langbeheim, E.** and Levy, S.T.. "You evaporated?" vs. "It escaped": a comparison of students' reasoning about vaporization when using participatory and non-participatory simulations. Paper presented at the *12th Chais Conference for the Study of Innovation and Learning Technologies,* Open University, Raanana, Israel

2017 Henderson, J.B. **Langbeheim, E.** and Chi, M.T.H. . What Makes a Misconception Robust to Change? Presented at the *annual conference of the National Association for Research in Science Teaching (NARST)*, San Antonio, TX.

2017 **Langbeheim, E.** Design and Evaluation of an Advanced Undergraduate Course on Sustainable Energy for Science Majors. Presented at the *annual conference of the National Association for Research in Science Teaching (NARST)*, San Antonio, TX.

2017 **Langbeheim**, **E**., Adadan, E., Akaygun,E., Hlatswayo, M., and Ramnarain, U., A Comparison of Student Responses to ctorial And Verbal items focusing on conceptual

understanding of the particle model of matter. Presented at the *biannual conference of the European Science Education Research Association (ESERA*), Dublin. Ireland

2017 **Langbeheim, E.** Professional development on sustainable energy tocs - Mapng teachers' knowledge and beliefs. Presented at the *biannual conference of the European Science Education Research Association (ESERA),* Dublin. Ireland

2019 **Langbeheim.** and Yerushalmi[P], E. Step-by-Step modeling for inquiry-based learning in 9th grade physics. In Weintrop, D. (discussant) and Langbeheim, E. (chair) Disentangling coding in Secondary School Science: Contexts, Interfaces and Assessments. Presented at the *annual conference of the National Association for Research in Science Teaching (NARST),* Baltimore, MD

2019 **Langbeheim** and Yerushalmi[P], E. Gateway to Physics: Teachers' Approaches towards Physics-Based Inquiry in a Professional Development Workshop. Presented at the 7th International Conference on Teacher Education, Tel-Aviv, Israel

2019 **Langbeheim** and Yerushalmi, E. The impact of A Physics-Based Inquiry workshop on high school and middle school science teachers. presented at the *biannual conference of the European Science Education Research Association (ESERA), Bologna, Italy.*

2020 **Langbeheim.** Saba[S], J. and Levy, S.T Constructing micro-level models for promoting macro-level conceptualization of electric circuits in middle school. *Virtual annual meeting of the American Association of Physics Teachers (AAPT) Physics Education Research Conference (PERC).*

2021 **Langbeheim, E.** Saba, J. Hel-Or, H and Levy, S.T. Students' Development of Mental Models when Constructing Particle-Based Computational Models of Electric Conductors. The virtual *annual meeting of the National Association for Research in Science Teaching (NARST).*

2021 **Langbeheim, E.,** How teaching practices (may) explain differences in Learning Progression performance. In Neumann, K. (discussant) and Krajcik, J. (chair) Learning progression assessments and teachers' classroom enactments of curricula. The virtual *annual conference of the National Association for Research in Science Teaching (NARST).*

2021 **Langbeheim, E.,** Emine, S. Adadan, E Hlatshwayo, M, and Ramnarain, U., A situated-cognition perspective of the atomic/molecular model of matter learning progression, in Golan-Duncan, R. (Discussant and Chair) Tracing learning progressions/trajectories: Novel theoretical and methodological perspectives at the intersection of mathematics and science. The virtual annual meeting of the American Educational Research Association (AERA).

2021 Ben-Eliyahu, E. and **Langbeheim, E.,** Alignment between pictures and verbal explanations in a two-tier assessment. Presented virtually at the virtual conference of the European Science Education Research Association (ESERA), Braga, Portugal.

2022 **Langbeheim**, **E** Ben-Hamo[S], S, Weintraub[S] G and Shara S., Reasoning about clogging in crowd evacuation through bottlenecks In Krist, C. (discussant) *Applying estemic heuristics to characterize student reasoning about mechanisms with computational tools.* Symposium at the National Association for Research in Science Teaching (NARST) annual conference. Vancouver, Canada

2022 **Langbeheim, E.,** and Yerushalmi, E., The motivational consequence of pattern-seeking fatigue. Paper presented at the National Association for Research in Science Teaching (NARST) annual conference. Vancouver, Canada

2022 Shay, L., and **Langbeheim, E.,** Scaffolding math learning and motivation by integrating casual play in a digital learning platform for fifth graders. Poster presented virtually at the International Conference of the Learning Sciences, Hiroshima, Japan

2022 Al-Atawna, N., and **Langbeheim, E.,** Improving 9th grade students? understanding of energy change in chemical reactions by measuring temperature changes European Conference on Research in Chemical Education (Ecrice), Rehovot, Israel

2023 **Langbeheim**, E., Saba, J., & Levy, S.T., Learning with invented models of electric conductors in a computational microworld. presented at the biannual conference of the European Science Education Research Association (ESERA), Cappadocia, Turkey

2023 Ben-Eliyahu., E., **& Langbeheim**, E., Comparing ctorial, verbal and mixed multiple-choice assessments of middle school chemistry concepts, presented at the biannual conference of the European Science Education Research Association (ESERA), Cappadocia, Turkey.

2023 Safadi-Darawshe H. K. & **Langbeheim, E.,** Learning the greenhouse effect with computer models– Influences on knowledge and attitudes presented at the biannual conference of the European Science Education Research Association (ESERA), Cappadocia, Turkey.

2024 Al-Atawna, N. & **Langbeheim**, E., 9th grade students' knowledge and self-efficacy gains when learning to explain energy changes in chemical reactions. Paper presented at the National Association for Research in Science Teaching (NARST) annual conference. Denver.

2024 **Langbeheim**, E., Saba, J., & Levy. S.T. How teachers' estemic messages shape students' learning when constructing computational models of electric conductors. Paper presented at the National Association for Research in Science Teaching (NARST) annual conference. Denver.

2024 Ben-Eliyahu, E., **& Langbeheim, E.,** Assessing middle school chemistry concepts using ctorial and verbal multiple-choice questionnaires. Poster presented at the National Association for Research in Science Teaching (NARST) annual conference. Denver.

2025 Levin, A., & **Langbeheim, E.,** Effects of lab sequence and student preferences, combining virtual and physical labs in middle school. Presented virtually at the National Association for Research in Science Teaching (NARST) annual conference. Washington, DC.

2025 Ben-Eliyahu, E., **& Langbeheim, E.,** The role of visual representations in group-based formative assessment in middle school science learning. Presented at the biannual conference of the European Science Education Research Association (ESERA), Copenhagen, Denmark.

2025 Cohen, H[S]., & **Langbeheim, E.,** The effect of a virtual prelab on students' learning experience, cognitive load and self-efficacy in first-year chemistry laboratory in *Concreteness and fading in combinations of physical and virtual science investigations* Symposium presented at the biannual conference of the European Science Education Research Association (ESERA), Copenhagen, Denmark.

2025 Atrash-Genaim, A., & **Langbeheim, E.,** Students' Mechanistic Explanations of Osmosis When Learning with Magnetic Models and Computer Simulations. Poster presented at the biannual conference of the European Science Education Research Association (ESERA), Copenhagen, Denmark.

(b) Invited talks at international conferences

2018 **Langbeheim, E**., Safran, S and Yerushalmi, E. Modeling Structure Formation in Biological Systems, Presented at the *American Association of Physics Teachers (AAPT) Annual Meetin*g, Washington, DC.

Research Grants and prizes

2020 **Langbeheim** E., & Shapira, S. Multidisciplinary internal grant for collaborations between humanities and social sciences and other faculties. Ben-Gurion University of the Negev. A participatory simulation for evacuation training of school children. Total amount 54,000 NIS

2021 **Langbeheim** E., GIF (German Israel Fund) Young researcher grant – Energy Change in Chemical Reactions as a Gateway for Sustainability Education. Total amount 20,000 Euros (75,000 NIS)

2023 **Langbeheim** E., ISF (Israeli Science Foundation) Personal Research Grant– Exploring science learning with hybrid laboratory investigations. Annual amount 155,000 NIS Total amount 620,000 NIS

2025 **Langbeheim** E., & Harats, M. Multidisciplinary internal grant for collaborations between humanities and social sciences and other faculties. Ben-Gurion University of the Negev. Learning and teaching by observing and touching the invisible. Total amount 25,000 NIS

Present Academic Activities

Books and articles to be published

- Ben-Eliyahu., E., & **Langbeheim**, E. (Revision) Layers of competence: analyzing 8th graders' perceptions of visual and verbal assessment questions on chemical processes vis-à-vis their performance. *Chemistry Education Research and Practice (*Q1)
- Al-Atawna N*., &* **Langbeheim**(Resubmitted after review) Attitudes towards chemistry among low and high achieving 9th grade students in laboratory investigations and theoretical explanations. *Research in Science Education(Q1)*
- Ben-Eliyahu., E., & **Langbeheim**, E. (Submitted) When liabilities become resources: The role of visual representations in Peer Instruction in middle school chemistry. *Instructional Science*. (Q1)

In preparation**:**

- **Langbeheim, E.,** Teachers as mediators of constructionist educational tools – encouragement and criticism of computational model construction
- **Langbeheim, E**., Cultivating mechanistic reasoning and computational thinking in science classrooms in the generative AI era