

SHERMAN ROSENFELD
Curriculum Vitae and List of Publications

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AREAS OF INTEREST AND EXPERTISE

Project-Based Learning (PBL) and Inquiry Learning across the disciplines, Science Education, Bridging between Formal and Informal Science Education, Teacher Professional Development, Curriculum Development, Educational Technology, Visual Cognition.

I. EDUCATION

Ph.D. Biology and Science Education

University of California, Berkeley, 1980

Group in Science and Mathematics Education

Thesis: *Informal Learning in Zoos: Naturalistic Studies of Family Groups*

M.S. Biology

California State University, San Diego, 1974

Thesis: *The Role of Pheromones in the Sexual Behavior of the Domestic Cat*

B.A. Biology

University of California, Berkeley, 1970

II. CURRICULUM DEVELOPMENT, PROFESSIONAL DEVELOPMENT OF TEACHERS, EDUCATIONAL RESEARCH

Staff Member (2013 – present)
IRRESISTIBLE Project
Department of Science Teaching
Weizmann Institute of Science

Member of the Profession Development Work Package in this EU-funded project, with teams from 10 countries. The goal of the project is to design curricula that foster the involvement of students and the public in the process of Responsible Research and Innovation (RRI), by combining formal (school) and informal (science museum) educational approaches that deal with cutting edge research.

<http://www.irresistible-project.eu/index.php/en/>

Academic Advisor (2012 – present)
Amal Network's Experiment with PBL Schools

Academic advisor for an educational innovation, aimed as developing a community of practice based on Project-Based Learning (PBL) in 10 schools in the Amal Network. This innovation is being supported by the Ministry of Education's Division of Experimental Schools and Innovations.

Chairperson, National Committee on Inquiry Learning (2008 – present)
Pedagogical Secretariat, Israeli Ministry of Education

Chairperson for a national Israeli committee that wrote a manual for the Israeli educational system, to promote the culture of inquiry across all the disciplines, from K-12, in Israeli schools. The manual is scheduled to be published in early 2006.

Pedagogical Advisor (2011-2014)
Kaye Teachers College
Beer-Sheva

Worked with 10 lecturers to re-design a course on "Diversity in Education" for first-year college students, using a PBL pedagogy. In the first semester the lecturers were guided to learn PBL through a hands-on approach. In the second semester they were guided to work with their students on specific projects. About 240 college students participated in the course.

Staff Member (1984 - 2012)
Department of Science Teaching
Weizmann Institute of Science

The following work was conducted within the context of the development of a new national curriculum in science and technology for junior high school teachers (Tomorrow '98 and the Harari Report):

"Science and Technology Inservices" (1992 – 2003)

Worked on the staff of several long-term (3-year) teacher development programs for junior high school teachers. Responsible for two major components of these inservices: "Project-Based Science Learning in Science and Technology" and "Educational Innovations."

"Project-Based Learning (PBL) in Science and Technology" (1993-2003)

Directed many teacher workshops, designed to guide teachers to conduct scientific research and to implement project-based science learning in their classrooms. This work is based on the development of a teacher's guide and student workbooks on PBL, which are the basis of these workshops.

Directed the writing, testing and distribution of PBL resources for teachers and students in science and technology: (1) a student's PBL manual and collection of activities, and (2) a 330-page teacher's guide. Academic Advisor and co-writer for CD-ROM software for PBL in science and technology, "The Golden Way" ("Derech Hamelech").

Directed a "Project-Based Science Learning" effort with four junior high schools in Rehovot (30 teachers, 1000 students). Each school integrated the project approach with a different unit in science and technology (e.g., "World of Water," "Senses and Sensors," "About Fibers," "Transport Systems"). Student projects included experiments, surveys, observations, and inventions.

Our group has worked actively in the Arab sector, giving many workshops in such locations as Um El-Fahm, Tira, Kfar Kara and Shfaram. Our PBL materials for teachers and students have been translated into Arabic.

Curriculum Research and Development (1993 - 2002)

Co-writer for the following: (a) a teacher's guide and a student's guide for Project-Based Learning (7th-9th grades), (b) a genetics curriculum for 9th graders (which integrates genetics simulation software with the genetics curriculum), and (c) an interdisciplinary curriculum program on transport systems ("Lev Hainyan") for 8th and 9th graders.

The Agam Program for Visual Cognition
Staff Member (1984 - 1987), Director (1988 - 1990), Managing Director (2004-2009)

Supervised of the project's curriculum development, implementation and research work. The Agam Program is designed to promote the visual cognition of preschool children. Conceived and developed by the Israeli artist, Yaacov Agam, the program has been implemented, refined and researched by staff at the Department of Science Teaching, since 1984. About 150 Israeli preschools implemented this program.

Curriculum Designer (2007-2009)
Arava Institute for Environmental Studies (AIES)
Kibbutz Ketura

Designed the syllabus for a new Masters Program on Energy and the Environment, in cooperation with a special Steering Committee. The plan is for this program to be added to the other programs offered by the Arava Institute.

CONNECT Project (2004-2007)
Department of Science Teaching
Weizmann Institute of Science

Member of the Evaluation and Pedagogical Design Work Packages in this EU-funded project, with teams from 12 countries. The goal of this project was to bridge the gap between formal and informal science learning through the appropriate use of advanced technologies, such as Augmented Reality (AR). The project developed and integrated AR into exhibits located at four science museums in Europe.

Founding Director, Center for Project-Based Learning (PBL) in
Science, Technology and Mathematics (2001 - 2004)
Davidson Institute for Science Education at the Weizmann Institute of Science
Rehovot, Israel

The Center's mission: to actively promote the appropriate use of PBL to advance the teaching and learning of science, technology and mathematics from kindergarten through high school. The Center's activities included:

- (a) guiding schools and their teaching staffs in PBL-related work within Israel,
- (b) developing cooperative projects between students in Israel and abroad,
- (c) advancing the professional development of teachers via PBL inservices, and
- (d) conducting PBL-related educational research.

**Nature and Science Walks
Hebrew University, Jerusalem
(2001 - 2007)**

Conceptual design of the Mac and Tibby Podell Discovery Tree Walk, at the Givat Ram campus of the Hebrew University. The work included background research and development of the related interactive exhibits and programs.

**Exhibition Design Consultant
Bloomfield Jerusalem Science Museum
Jerusalem, Israel (2000-2001)**

Worked on the conceptual design of the exhibition: "Medicines: Things that Are Healthy to Know About," sponsored by the TEVA firm. Conducted background research and worked on the design of the exhibition, which opened in December, 2001.

**Workshop Co-director (November, 1997)
"The Art, Science, Technology of Learning:
Designing Learning Environments for the 21st Century"
Migal, Kiryat Shmona**

Co-initiated and co-directed a combined virtual and face-to-face international workshop; this workshop catalyzed collaborative Internet-based educational projects between classrooms in developed and developing countries.

The process began with a "request for proposals" via the Internet and led to a 3-day workshop in which 30 educators from 14 countries met and worked together on their projects. Workshop mentors included: Prof. Uri Marchaim (Migal), Dr. Ted Kahn (DesignWorlds, Inc.), Dr. Boris Berenfeld (Global Lab Project), Monica Bradsher (National Geographic Kids Network), and Doreen Nelson (City Designs, Inc.).

**Project Director (1993 - 1998)
"Developing Teachers as Pedagogical Guides Teachers to
Facilitate Student Research"
MIGAL Research Center and "Tomorrow '95"**

Directed a 5-year intensive inservice (180-140 hours/year) to train teachers to support student research in the high school science classrooms. Included was an action-research component and the development of related curriculum materials for students and teachers.

Project Director (1995-7)
Osmotic, Inc. and Carolina Biological Supply Company

Directed and supervised a staff of 6 scientists and science educators in the development of a 3-module curriculum on Plant Tissue Culture. The 9- unit curriculum, integrates original text, experiments, equipment and a video. The modules were funded by a grant from the BIRD Foundation and are now available from Carolina Biological Supply Company.

Supervisor and Director (1986-1993)
Department for Science-Oriented Youth, Israeli Ministry of Education and Culture, Jerusalem

Director of Israel's informal science education policy and programs, through the Ministry of Education. These programs (e.g., weekly science clubs, science summer camps, school visit programs, special projects, etc.), are held in all of Israel's universities and research centers and in many of the country's teachers colleges, science centers and natural history museums.

Responsibilities included: (1) supervision and evaluation of informal science programs throughout Israel, (2) budgetary allocations, (3) initiation of innovative programs, and (4) staff inservice training (workshops and conferences).

Educational Coordinator (1982-1986)
Garden of Science
Youth Activities Section
Weizmann Institute of Science

Direction of numerous extracurricular science programs at the Youth Activities Section, including: (1) the School Visit Program (7th - 10th graders) to the "Garden of Science," the Section's outdoor "hands-on" science museum; (2) the Amos de-Shalit Summer Science Workshop, an intensive program for talented 11th graders and (3) a year-long computer course on LOGO, for disadvantaged 7th-9th graders (1984-6).

Awarded grant from "The Program for Innovative Teaching" (Jerusalem) to develop an interactive outdoor biology exhibit ("Hot Grass") on biomass as an energy source.

Executive Director (1979-1982)
The Discovery Center
Fresno, California

Director of 6-acre interactive science museum. Responsibilities included: exhibit development, educational programming, financial planning, supervision of staff, grant-writing and fundraising. Presented science experiments and demonstrations on a weekly television show on science for children.

III. EDUCATIONAL TECHNOLOGY & COMPUTER SOFTWARE DESIGN

Instructional Designer (2012 – present)
Center for Educational Technology (CET)
Ramat Aviv

Development of computer-based science simulations to test scientific literacy in 15-year olds, for the 2015 PISA test. Development of English version of CET's science simulations. CET is a non-profit organization whose core competencies include content development, evaluation and the appropriate use of educational technology. PISA is an international study, set up by the OECD to evaluate education systems around the world; PISA tests focus on how well students can apply what they learn in school to real-world problems.

Instructional Designer and Subject Matter Expert (Life Sciences) (2009-2011)
Pangea Tools
Herzlia

Responsible for designing and writing over 40 interactive digital lessons in the life sciences, for grades 1-8. These lessons became part of the Science Fusion products, marketed by the American publisher, Houghton Mifflin Harcourt (HMH).

Content Writer (2008-2010)
Ekoloko (ekoloko.com)

Ekoloko is a gaming web-site for children aged 8-12 years old, dedicated to teach them about ecology and environmental issues. As a content writer, I prepared background articles on such topics as the importance of biodiversity, water-saving adaptations of desert plants, ecosystems, illegal hunting of wildlife, and the like. These articles and others like them are used as the foundation for the site's games and newspaper.

Association for the Advancement of Science Education in the Upper Galilee (MIGAL) and The Department of Science Teaching, Weizmann Institute of Science (1996 - 2003)

Academic advisor, co-developer and writer of "**The Golden Way**" (Derech Hamelech") a software tool designed to help direct teachers and students in Project-Based Learning in science. This work has included (1) pilot-testing the software with 25 teachers during a teacher development workshop on project-based learning, (2) pilot-testing the software with the students of some of these teachers, and (3) revising several versions of a CD-ROM.

The Golden Way was translated into Arabic, as a basis for widespread PBL work within the Arab sector in Israel.

Creator (2000 - 2001)**Petach Tikva**

Designer and writer of patents for a start-up company which has proprietary technology for bringing together the worlds of toys, computers and the Internet through wireless communication.

Interact, Inc. (1993-1996)**Petach Tikva**

Science consultant on "The Adventures of Professor Solvedore," a home-science series of three CD-ROMs ("Air and Water," "Light and Sound," "Energy"). The first product in the series won the Israeli Software Association's award for "Best Edutainment Product" in 1995.

LOGAL, Inc. (1991 - 1997)**Kiryat Shmoneh, Israel**

Software designer and writer for "Biology Explorer," a series of biology simulation software for the Macintosh computer. Co-designed, wrote and edited activities and teacher's notes for the published models: Genetics, Population Ecology, Photosynthesis, Cardiovascular System and From DNA to Protein. Biology Explorer: Photosynthesis won the 1993 EDUCOM awards for "Best Design" and "Best Natural Science Software." Each of the other won at least one software award.

WINGS for Learning (1990-91)**Scotts Valley, California**

Worked on the design and development of educational simulations in the "Biology Explorer" series for this educational publisher.

Picodyne, Inc. (1986-8)**Portola Valley, CA.**

Worked on the design team for Project Classify ("The Botanist's Apprentice," "The Field Zoologist"), developed for the National Geographic Society.

National Geographic Society (1986)

Reviewed computer software and teacher's guides for "Project Zoo: Adventures with Charts and Graphs."

Edunetics, Inc.
Herzlia, Israel (1985-8)

Designed, wrote and edited numerous scripts for biology computer software, created for Prentice-Hall, Inc.

Atari Institute for Education Action Research
Palo Alto, California (1980-82)

Wrote invited position paper on "Informal Education and Computers". Presented creativity workshops, to produce innovative software for Atari staff in the U.S. and Europe.

IV. ACADEMIC COURSES TAUGHT

1. "Museum Education"
Tel Aviv University (Museum Curator Program), 1987 - 1992.
2. "Creative Self-Education in Science and Science Teaching"
Hebrew University (graduate seminar), 1991-2.
3. "Curriculum Development and Implementation"
Holon College for Educational Technology, 1991-2.
4. "Qualitative Research in Science Education"
Weizmann Institute of Science (graduate seminar), 1992-3.
5. "The Computer-Classroom Interface and Science Teaching"
Weizmann Institute of Science (graduate seminar), 1993.
6. "Research Aspects in the Design and Implementation of Computer-based Learning Environments"
Bar Ilan University (graduate seminar), 1998-9 (with Prof. Bat-Sheva Eylon).
7. "Cognition in the Learning Process"
Bar Ilan University (graduate seminar), 1998-9 (with Prof. Bat-Sheva Eylon).

IN ADDITION: I led many workshops focusing on the professional development of science teachers (via the Weizmann Institute of Science, from 1992 through 2009) on such topics as "Project-Based Learning in Science and Technology," "Using Computer Software to Promote Inquiry in Science and Technology" (The Golden Way)," "Using Science Simulations to Promote Science Learning," "Science Demonstrations," "Scientific Argumentation," and "Developing Thinking Skills and Environmental Awareness."

V. SELECTED PRESENTATIONS AND PUBLICATIONS

Refereed Articles in Journals and Books

- Fallik, O., Rosenfeld, S. and Eylon, B. (2013). School and Out-of-School Science: A Model for Bridging the Gap. *Studies in Science Education*, 49:1, 69-91.
- Rosenfeld, M. and Rosenfeld, S. (2011). Illustrating a Complementary Paradigm for Styles Research: From a Third-Person to a Second- Person Perspective. In: Rayner, S. and Cools, E. (Eds.), *Style Differences in Cognition, Learning, and Management: Theory, Research, and Practice*. N.Y.: Routledge.
- Fallik, O., Eylon, B-S. and Rosenfeld, S. (2008). Motivating Teachers to Enact Free-Choice Project-Based Learning: Effects of a Professional Development Model. *Journal of Science Teachers*, 19 (6): 565-591.
- Rosenfeld, M. and Rosenfeld, S. (2008). Understanding Teachers with Extreme Individual Learning Differences (ILDs): Developing More Effective Teachers. *Teaching Education*, 19 (1), 21-41.
- Rosenfeld, M. and Rosenfeld, S. (2008). Developing Effective Teacher Beliefs about Students: Do Teachers' Own Individual Learning Differences (ILDs) Make a Difference? *Educational Psychology*. 28 (3), 245-272.
- Rosenfeld, M. and Rosenfeld, S. (2006). Understanding Teacher Responses to Constructivist Learning Environments. *Science Education* 90 (3), 385-399.
- Rosenfeld, M. & Rosenfeld, S. (2004). Developing Teacher Sensitivity to Individual Learning Differences. *Educational Psychology* 24 (4), 465-486.
- Hofstein, A. and Rosenfeld, S. (1996). "Bridging the Gap between Formal and Informal Science Learning." *Studies in Science Education*, 28, 87-112.
- Zehavi, N. and S. Rosenfeld. (1996). "The Impact of Computers on Student and Teacher Commitment to Learning and Teaching." In: Katz, Y., Millin, D., and Ofir, B. (Eds.) The Impact of Information Technology. London: Chapman & Hall, pp. 161-167.
- Rosenfeld, S. (1995). "Language: Much More Than Words." In: Kimat Alpaim (Hebrew University), #7, pp. 10-16. (Hebrew)
- Rosenfeld, S. (1995). "We Are All Visual Illiterates." In: Mishkafaim (Israel Museum), #24, pp. 36-37. (Hebrew)
- Pundak, D., Rosenfeld, S. and Luria, Y. (1995). Conceptual Changes in Teachers as a Consequence of Pilot Research Projects in Astronomy." In: Dapim (Mofet Institute), pp. 7-34. (Hebrew)

Rosenfeld, S. "Please Touch! The Revolution in Science Museums." The Chemical Bond (Hakesher Ha-Chemi), April 1984 (in Hebrew).

Rosenfeld, S. and A. Terkel. "A Naturalistic Study of Casual Visitors at an Experimental Mini-Zoo." Curator, Vol. 25, No. 3, 1982, pp. 187-212.

Laetsch, W.M., Diamond, J., Gottfried, J. and S. Rosenfeld. "Children and Family Groups in Science Centers." Science and Children, March 1980, pp. 14-17.

Selected Presentations in Conferences

Blonder, R., Rosenfeld, S., Rap, S., Sakhini, S., Zemler, E., Barad, R., Shaham, A., Kahatib, F., Bar-Dov, Z. (2015). Developing a RRI Module on the Use of Photovoltaic Windows in Schools: Design-Based Research. European Science Education Research Association (ESERA), Helsinki, Finland.

Rosenfeld, S. and Blonder, R. (2009). When Was the Last Time You Saved the World? Children's Informal Science Learning in a Multi-User Virtual Environment (MUVE). European Science Education Research Association (ESERA) Conference. Istanbul, Turkey.

Rosenfeld, S. (2005) (Symposium Organizer). Varieties of Formal-Informal Science Learning Environments: Perspectives of Different Stakeholders. Conference of National Association of Research in Science Teaching, (NARST). San Francisco.

Maoz, N. and Rosenfeld, S. (2005). The Pros and Cons of a Physics Design Competition: Perceptions of Students and Teachers. Conference of National Association of Research in Science Teaching (NARST). San Francisco.

Fallik, O., Rosenfeld, S. and Eylon, B-S. (2005). Motivating Teachers to Enact Free-Choice Project-Based Learning: Effects of a Professional Development Model. Conference of National Association of Research in Science Teaching (NARST). San Francisco.

Rosenfeld, S. (2004). Dancing with the Muses: How Educational Technology Might Help Bridge the Gap between Formal and Informal Science Learning. CONNECT Conference, Athens, Greece.

Contini, H., Rosenfeld, S., Moore, M. and Movshovitz-Hadar, N. (2004) "Bridging School Science with Museum Science: Learning About Energy". Proceedings of the National Association for Research in Science Teaching Annual Conference, Vancouver, Canada

Rosenfeld, M. and Rosenfeld, S. (2001). Teachers' Development from a 'Politically Correct' to a Pluralistic Pedagogy: The Role of Researching Individual Learning Preferences in a Project-Based Learning (PBL) Environment. Conference Proceedings: *8th Biennial Conference of the European Association for Research in Learning and Instruction (EARLI)*.

- Rosenfeld, S. and Ben-Hur, Y. (2001). "Project-Based Learning (PBL) in Science and Technology: A Case Study of Professional Development." In Valentines, N. (Ed), Science and Technology Education: Preparing Future Citizens. Proceedings of the 1st IOSTE Symposium in Southern Europe. Paralimni, Cyprus.
- Rosenfeld, M. and Rosenfeld. S. (2001). "Teachers' Development from a 'Politically-Correct' to a 'Pluralistic Pedagogy: The Role of Researching Individual Learning Preferences in a Project-Based Learning (PBL) Environment." Abstracts of the European Association of Research on Learning and Instruction (EARLI). Fribourg, Sweden.
- Rosenfeld, S., Loria, Y., Scherz, Z. and Eylon, B. (1999). "An 'Interlocking Loops' Model to Support Teacher Development and School Change in Project-Based Learning." Proceedings of the European Association of Research on Learning and Instruction (EARLI). University of Gothenburg, Sweden.
- Rosenfeld, S., Scherz, Z., Breiner, A. and Carmeli, M. (1999). "Integrating Content And PBL Skills: A Case Study of Teachers from Four Schools." Proceedings of the European Association of Research on Learning and Instruction (EARLI), University of Gothenburg, Sweden.
- Rosenfeld, M., and Rosenfeld, S. (1999). "Understanding the 'Surprises' in PBL: An Exploration into the Learning Styles of Teachers and their Students." Proceedings of the European Association of Research on Learning and Instruction (EARLI). University of Gothenburg, Sweden.
- Loria, Y., Shaltiel, L., Pieterse, E., Rosenfeld, S. (1999). "The Development of Software to Support Teachers and their Students in PBL: 'The Golden Way'." Conference Proceedings of the European Association of Research on Learning and Instruction (EARLI). University of Gothenburg, Sweden.
- Rosenfeld, S. Scherz, Z. Orion, N. and Eylon, B. (1997). "An Evolving Model for Long-term Teacher Development." In: Vosniadou, S. et al. Conference Proceedings for the 7th European Conference for Research on Learning and Instruction. University of Athens, Greece.
- Rosenfeld, S., Pundak, D., and Luria, Y. (1995). "Preparing Teachers to Cultivate Student Learning and Research in the Natural Sciences." In: Loedwijks, et. al. Learning to Learn and Teaching How to Learn: Conference Proceedings of the 5th European Conference for Research on Learning and Instruction. University of Nijmegen, Netherlands.
- Rosenfeld, S. (1989). "Educational Technology and Zoo Education." Conference of the European Zoo Educators: "Zoos towards the Year 2000. Ramat Gan, Israel,
- Rosenfeld, S. (1988) "Interactivity in Learning: From Zoo Games to Computers." First International Children's Zoo Symposium. Philadelphia.

Other Articles and Reports

Eylon, B., and Rosenfeld, S. Promoting the Visual Cognition of Young Children: The Agam Project for Visual Education. Department of Science Teaching, Weizmann Institute of Science. December, 1990. 188 pages.

Rosenfeld, S. "Informal Science Education in Israel: Young, Innovative and Growing." (1988) Association of Science-Technology Centers (ASTC) Newsletter. January/February, p. 15.

Rosenfeld, S. and T. Baumer-Fraenkel. "What Do Preschool Children Think About the Agam Program and Its Activities?" Technical Report, Department of Science Teaching, Weizmann Institute of Science, 1986.

Eylon, B., Ben-Dov, A., Ben-Zvi, A., Golan, P., Hershkowitz, R., Razel, M. and S. Rosenfeld. The Agam Project: A Research and Curriculum Development Program in Visual Education. Dept. of Science Teaching, Weizmann Institute of Science, 1985.

Maoz, N. and Rosenfeld, S. (2005). The Pros and Cons of a Physics Design Competition: Perceptions of Students and Teachers. Unpublished report.

Rosenfeld, S. (1982). "Informal Education and Computers: A Position Paper." Atari Institute for Education Action-Research. Unpublished.

Selected Publications in Hebrew

רוזנפלד, ש. (בדפוס). הפדגוגיה של PBL והדרישות של המאה ה-21. בתוך: ע. מלמד וא. גולדשטיין (עורכים), היבטים פדגוגיים בשילוב טכנולוגיות מידע בהוראה ובחינוך. הו"א מכון מופ"ת. 40 עמודים.

רוזנפלד, ש., ופליק, א. (2002). למידה באמצעות פרויקטים במדע וטכנולוגיה: אוגדן למורה. רחובות: מכון ויצמן למדע, המחלקה להוראת המדעים.

לוריא, י., שאלתיאל, ל., פסטירה, א., ורוזנפלד, ש. (2001). דרך המלך: סביבת הנחייה ממוחשבת ללמידה באמצעות פרויקטים בגישה של מחקר ופיתוח (תוכנה: גרסה 4.0). קרית שמונה: העמותה לקידום החינוך המדעי בישובי הגליל והמחלקה להוראת המדעים במכון ויצמן.

בריינר, א., רוזנפלד, ש., ופליק, א. (1999). למידה באמצעות פרויקטים במדע וטכנולוגיה: חוברת הנחיה לתלמיד. רחובות: מכון ויצמן למדע, המחלקה להוראת המדעים.