

Dr. Shaul Katzir - Curriculum Vitae

I am historian of science and technology, associate professor and the director of the Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University

Personal status I was born on 31.1.1970, a father of three children (born in 1998, 2001 and 2005).

Education

1997- 2003, PhD, "A history of Piezoelectricity: the first two decades," Tel Aviv university (supervisor Ido Yavetz).

1993-1996 MA History of Science - TA University, "Summa cum laude."

1992-1996 the "Interdisciplinary Programme for Fostering Excellence," Tel Aviv university.

1991-92 physics for the BSc, Tel Aviv University

Research fellowships and appointments

July-October 1994, June-August 96, March-April 97, August 2002, November 2006, July – August 2012, 2013, 2016 and 2018, Sep.-Oct. 2017, research fellow at the Max Planck Institute for the History of Science in Berlin.

September 1999 - June 2000 - visiting scholar, department for History and Philosophy of Science, Pittsburgh University.

October 2001 - October 2002 - Edelstein research fellow at the Hebrew University of Jerusalem.

August 2003 - July 2004 "Vatat fellowship," Haifa University (declined).

August 2003 - July 2004 - Lady Davis fellow at the Hebrew University of Jerusalem.

October 2006 - March 2008 – Leonor Michaelis fellow, Leo-Baeck Institute, London.

October 2007 - August 2008 - Postdoctoral fellow, the Cohn Institute Tel Aviv University.

August 2008 - July 2010 - Alexander von Humboldt fellow, at the MPI for history of science.

August 2010 – September 2011 – fellow, project for the history of quantum physics, Fritz Haber institute of the Max Plank society, research carried at the MPI for history of science

October 2011- September 2012 – researcher, Tel Aviv University

October 2012 – September 2014 – Marie Curie senior research fellow of the Gerda Henkel Foundation (M4HUMAN programme), at Tel Aviv University

October 2014 – September 2018 – senior lecturer the Cohn Institute for the History of Science and Ideas, Tel Aviv University

October 2018 – associate professor

Academic roles at Tel Aviv University:

Director of the Cohn Institute, Oct. 2018 -

Director, Intensive MA programme in Philosophy, Science and Digital Culture, at the Cohn institute Oct. 2016 -

Publications

books:

1. *From Sonar to Quartz Clock: Technology and physics in war, academy and industry*, under preparation.
2. *Chapters in the History of Science*, Raanana: Open University, forthcoming (under preparation), (a Hebrew textbook for an Open university course).
3. *The Beginnings of Piezoelectricity: A study in mundane physics*, Dordrecht: Springer, 2006 ("Boston studies in the philosophy of science," 246), Paperback edition 2010.
4. *On the Nazism in Hebrew: The Hebrew Historiography of the Third Reich* (in Hebrew), Jerusalem: Academon, 2001.

Edited volumes:

5. *Interactions of Interwar Physics: Technology, Instruments, and Other Sciences*, special issue of *Science in Context*, 31(3) (2018).
6. with Christoph Lehner and Jürgen Renn, *Traditions and transformations in the history of quantum physics*, Berlin: Edition open access, 2013 (Max Planck Research Library for the History and Development of Knowledge).

Articles in academic journals and peer-reviewed books:

7. "Employment Before Formulation: Uses of Proto-Energetic Arguments," *Historical Studies in the Natural Sciences*, 49 (2019): 1-40.
8. "The shaping of interwar physics by technology: the case of piezoelectricity," *Science in Context*, 31 (2018): 321-350.
9. "'In war or in peace:?' The technological promise of science following the First World War," *Centaurus*, 59 (2017): 223-237.
10. "Technological Entrepreneurship from Patenting to Commercializing: A Survey of Late Nineteenth and Early Twentieth Century Physics Lecturers," *History and Technology*, 33 (2017): 109-125.
11. "Time standards for the twentieth century – telecommunication, physics and the quartz clock," *The Journal of Modern History*, 89 (2017): 119–150.
12. "Variations and Combinations: Invention and Development of Quartz Clock Technologies at AT&T," *ICON (Journal of the International Committee for the History of Technology)*, 22 (2016): 78-114.
13. "Pursuing frequency standards and control: the invention of quartz clock technologies," *Annals of Science*, 73 (2016): 1-39.
14. "Manchester at war: Bohr and Rutherford on problems of science, war and international communication," Finn Aaserud and Helge Kragh (eds.) *One hundred years of the Bohr atom: Proceedings from a conference - Scientia Danica. Series M · Mathematica et physica*, 1 (2015): 495-510. (Copenhagen: Danish Academy of science)
15. "Scientific practice for technology: Hermann Aron's development of the storage battery," *History of Science*, 51 (2013): 481-500.
16. "Who knew Piezoelectricity? Rutherford and Langevin on submarine detection and the invention of sonar," *Notes and Records of the Royal Society*, 66 (2012): 141-157.

17. with Christian Joas, "Analogy, extension, and novelty: young Schrödinger on electric phenomena in solids," *Studies in History and Philosophy of Modern Physics*, 42 (2011): 43-53.
18. "War and peacetime research in the road to crystal frequency control," *Technology and Culture*, 51 (2010): 99-125.
19. "Hermann Aron's electricity meters: Physics and invention in late nineteenth-century Germany," *Historical Studies in the Natural Sciences*, 39 (2009): 444-481.
20. "From ultrasonic to frequency standards: Walter Cady's discovery of the sharp resonance of crystals," *Archive for History of Exact Sciences*, 62 (2008): 469-487.
21. "Thermodynamic deduction versus quantum revolution: The failure of Richardson's theory of the photoelectric effect," *Annals of Science*, 63 (2006): 447-469.
22. "On the electromagnetic world-view: a comment on an article by Suman Seth," *Historical Studies in the Physical and Biological Sciences*, 36 (2005): 189-192.
23. "Poincaré's relativistic physics, its origins and nature," *Physics in Perspective*, 7 (2005): 268-292.
24. "Poincaré's relativistic theory of gravitation," in J. Eisenstaedt and A.J. Kox (eds.) *The Universe of General Relativity, Einstein Studies 11*, Basel: Birkhäuser, 2005, 15-37.
25. "On the approach to the history of physics: A comment on Trainer's article on 'Kelvin and piezoelectricity,'" *European Journal of Physics*, 26 (2005): L1-L3.
26. "The emergence of the principle of symmetry in physics," *Historical Studies in the Physical and Biological Sciences*, 35 (2004): 35-65.
27. "From explanation to description: Molecular and phenomenological theories of piezoelectricity," *Historical Studies in the Physical and Biological Sciences*, 34 (2003): 69-94.
28. "Measuring constants of nature: Confirmation and determination in piezoelectricity," *Studies in History and Philosophy of modern Physics*, 34 (2003): 579-606.
29. "The discovery of the piezoelectric effect" *Archive for History of Exact Sciences*, 57 (2003): 61-91.
30. "National characteristics of physics at the end of the 19th century" (in Hebrew) *Zmanim*, 82 (2003): 85-93.

Other academic articles:

31. "Challenging problems of classical physics: Radiation and matter," *The Mechanics in Quantum Mechanics: Tradition and Transformation*, Christoph Lehner and Jürgen Renn (eds.), forthcoming
32. With Jaume Navarro, "The Status and Structure of Atoms before Bohr," *The Mechanics in Quantum Mechanics*, forthcoming.
33. "Physics, Technology, and Technics during the Interwar Period," an introduction to the special issue *Interactions of Interwar Physics: Technology, Instruments, and Other Sciences*, *Science in Context*, 31(3) (2018), 251-261

34. With Nurit Kirsh, "Between chemistry and politics: Weizmann's scientific activity in the 1930s and 1940s," in Hebrew עם נורית קירש "בין כימיה לפוליטיקה - פעילותו המדעית של ויצמן בשנות השלושים והארבעים" במאיר חזן ואורי כהן (עורכים) *ויצמן מנהיג הציונות*, ירושלים: מרכז זלמן שזר, in Meir Chazan and Uri Cohen (eds.) *Weizmann the Leader of Zionism* (in Hebrew), Jerusalem: Zalman Shazar Center, 2016, 413-439.
35. "Time Standards from Acoustic to Radio: The First Electronic Clock," Lara Huber and Oliver Schlaudt (eds.) *Standardization in Measurement: Philosophical, Historical and Sociological Issues*, London: Pickering and Chatto, 2015, 111-124.
36. "Theoretical challenges by experimental physics: radiation and its interaction with matter." *Traditions and transformations in the history of quantum physics*, Katzir, Lehner and Renn (eds.), (2013): 11-27.
37. "Symmetry in the physics of Lamé and his contemporaries," *SABIX (École Polytechnique)*, 44 (October 2009): 95-100.
38. "From academic physics to invention and industry: The course of Hermann Aron's (1845-1913) career," *Preprint, Max Planck Institute for the History of Science*, 370 (2009).
39. "Voigt, Woldemar," *Complete Dictionary of Scientific Biography* Vol. 25, Detroit: Charles Scribner's Sons, 2008, 164-166.
40. "Electricity and heat: The connections between two invisible forces," *Albert Einstein: Engineer of the Universe: Essays*, Jürgen Renn (editor), Weinheim: Wiley-VCH, 2005, 64-67 (also in a German translation).

Reviews and reports

41. Review of "André Authier, Early Days of X-ray Crystallography," *ISIS*, 107 (2016): 187-88.
42. With Christopher Neumaier, M. Luísa Sousa, and David Zimmerman, Conference report: "Forty-Second Symposium of the International Committee for the History of Technology and Fourth Meeting of the History of Electrical Technology: History of High-Technologies and Their Socio-Cultural Contexts, Tel Aviv, Israel, 16–20 August 2015" *Technology and Culture*, 57 (2016): 216-224.
43. "Bruce J. Hunt, Pursuing Power and Light: Technology and Physics from James Watt to Albert Einstein," *Technikgeschichte*, 78 (2011): 341-42.
44. "Michael Hedenus, Der Komet in der Entladungsröhre: Eugen Goldstein, Wilhelm Foerster und die Elektrizität im Weltraum," *Centaurus*, 52 (2010): 158-160.

Academic Teaching

I have taught as "a teaching fellow" and an "external lecturer" BA and MA courses on history of science, technology, culture, society and ideas (History of science from antiquity to the Scientific Revolution; History of science and technology since the Renaissance; History of physics 1700-1960; Newton and Einstein; Technology, science and society since the industrial revolution; Metaphysics, technology and science: the energy principle in the 19th century; Physics, industry and state at the first half of the 20th century; Historical perspective on the relationships

between science and society; History of Nazi Germany; Technology, culture, religion and science in early modern Europe).

Lectureships:

2011– Tel Aviv University

Spring 2014 – Weizmann Institute

Spring semesters 2006, 2008, fall semester 2013, program for history and philosophy of science, Hebrew University of Jerusalem

1999 – 2007 the academic College of Tel Aviv - Jaffa.

2004 – 2007 Science, technology and society graduate programme, Bar Ilan University.

Spring semesters 2004, 2005, 2006 - the faculty of engineering, Tel Aviv University.

Fall semester 2005-06, general history Ben Gurion University.

Summer 1998 - Ben Gurion history department at Ahva branch.

1993-95, and 1998-99 teaching assistant and assistant teacher in history and history of science courses at Tel Aviv University.

Conferences and workshops organizer

Co-organizer (with Galili Shahaar and Sagi Schaefer) *Made in Germany: Technology, History, Literature* a workshop at Tel Aviv University, June 2019

Co-organizer (With Karl Hall) *Interactions of interwar physics: technology, philosophy, arts and other sciences* (second meeting) a workshop at the Central European University Budapest, December 2016.

Organizer (with Gal Hertz) *Critical Reflections on Alternative Paths to Modernity – A Conference in Honour of Rivka Feldhay* Tel Aviv and Jerusalem, April 2016

Organizer (with the help of Kijan Espahngizi, Zurich centre for the history of knowledge) *Interactions of interwar physics: technology, philosophy, arts and other sciences* a Workshop at Tel Aviv University, October 2015.

Main organizer, *History of High-Technologies and Their Socio-Cultural Contexts*, a joint annual meeting of the *International Committee for the History of Technology* (ICOHTEC) with IEEE HISTELCON, at Tel Aviv University, August 2015 (about 90 talks and 120 participants).

Member of organizing/programme committee

Programme committee: Annual meeting of the *International Committee for the History of Technology* (ICOHTEC), Katowice, July 2019.

Organizing committee: *Gender and Science in War and Peace* - Conference of the Commission on Women and Gender Studies in History of Science, Technology and Medicine, Tel Aviv and Raanana, June 2019.

Programme committee: *Measurement at the Crossroads: History, Philosophy and Sociology of Measurement*, Paris, June 2018.

Talks

a. at International Workshops and Conferences

“The ‘weakness’ of rigorous theory and the need for ‘weak’ knowledge in technology,” *“Weak” and “Strong” Knowledge in Solid State Physics and the Material Sciences* (Frankfurt am Main, May, 2018)

Symposium organizer: “Between utility and discipline in interwar physics” and speaker: “Channels of influence on interwar physics” *History of Science Society Annual Meeting* (Toronto, November 2017)

Symposium organizer (with Richard Staley) “Histories of the measurement, definition and uses of time in science and technology” and speaker: “Physics, Astronomy and Clocks in the Redefinitions of the Second,” *25th International Congress of History of Science and Technology* (Rio de Janeiro, July 2017)

“When Knowledge Becomes Useful: The Invention of Sonar,” *Knowledge and Its Uses*, (Tel Aviv, April 2017)

“Between a simultaneous discovery and construction: historical views on the emergence of energy conservation,” *7th International Conference of the European Society for the History of Science* (Prague, September 2016)

“The technical resistance to AT&T’s monopoly on the quartz clock,” *Society for the history of technology (SHOT), annual conference* (Singapore, June 2016)

“The second in the long reform of the SI base physical units,” *The Making of Measurement* (Cambridge, July 2015)

“The turn to applied quantum mechanics,” *Fourth Conference on History of Quantum Physics* (Donostia/San Sebastián, July 2015)

“The growing prominence of science at the aftermath of World War One,” *Science, Technology and World War I: International Workshop* (Jerusalem, June 2015)

“Macro and microphysical explanations of piezoelectricity before WWII,” *Emergence in Materials* (Paris, May 2015)

“Technological entrepreneurship from patenting to commercializing,” *Academic entrepreneurship in history. An international survey of current research* (Ghent, March 2015)

“The shaping of interwar physics by technology – the case of piezoelectricity,” *International Conference on the History of Physics* (Cambridge, September 2014)

“Notebooks’ and published drawings as representation of practice, examples from piezoelectricity and electronics,” *Hands on Instruments* (Cambridge, July 2014)

Keynote speaker: “‘In war or in peace.’ The technological promise of science following the First World War,” *The Promises of Science. Historical Perspectives* (Donostia/San Sebastian, April 2014)

Symposium organiser (with Falk Müller) “Between physics and technology: the embodiment of knowledge in the inter-war period,” and speaker “Study following application: the shaping of interwar piezoelectric research,” *24th International Congress of History of Science, Technology and Medicine* (Manchester, July 2013)

- “Manchester at war: Bohr and Rutherford on problems of science, war and international communication” *One hundred years of the Bohr atom, 1913-2013* (Copenhagen, June 2013)
- “Frequency and time standards from acoustics to radio: the road to the quartz clock” *Dimensions of Measurement*, (Bielefeld, March, 2013)
- Commentator on the session “Understanding Noise in Twentieth- Century Physics and Engineering Part 1” *The joint annual meeting of the History of Science Society and the Philosophy of Science Association*, participated by video-conference (San Diego, November 2012)
- Symposium organiser (with Marta Jordi) “Physical sciences between Europe and America before WWII” and speaker “Piezoelectric research between pure and applied, Europe and America,” *5th International Conference of the European Society for the History of Science* (Athens, November 2012)
- “Poincaré’s relativistic modification of Newtonian gravitation,” *the Marcel Grossmann 13th meeting*, presented through a web-conference (Stockholm, July 2012)
- “Science, Technology and Jewishness in the Career of Hermann Aron (1845-1913),” *The Jews and the Sciences* (London, June 2012)
- “Usefulness or purity of research? Conflicting values in physics,” *Science and Values: Epistemic Goals, Economic Aspirations, Social Values*, Humboldt Kolleg (Haifa, April 2012)
- “Reasoning by concrete imagined cases in science and its relation to thought experiments,” *Society for philosophy of science in practice, 3rd conference* (Exeter, June 2011)
- “On the changing character of research between war and peace: Sonar, physics and electronics in WWI and its aftermath,” *Learning from War: Science and Peace* (Berlin-Brandenburg and Israeli Academics, Berlin, April 2011)
- “Linear and quadratic models and the shaping of physics by technology from the sonar to the quartz clock,” *Anwendungsorientierung in der universitären Forschung Historische Perspektiven auf eine aktuelle Debatte* (Munich, March 2011)
- “Definition and establishment of rules through their heuristic use: the principles of symmetry and energy,” *Heuristics in Physics* (Bad Honnef, Dec. 2010)
- Symposium organiser: “Transfer and transformation of knowledge in the modern physical sciences and technologies” (7 speakers) and speaker: “From the phenomena to useful instruments and from them to other phenomena,” *4th International Conference of the European Society for the History of Science* (Barcelona, November 2010)
- “Theoretical challenges by experimental physics: radiation and its interaction with matter,” *3rd International Conference on the History of Quantum Physics* (Berlin, June 2010)
- “Symmetry in the physics of Lamé and his contemporaries,” Colloque international Gabriel Lamé: *Les Pérégrinations d’un ingénieur du XIX^e siècle* (Nantes, January 2009)
- “Scientists as occasional inventors,” *Society for the history of technology, 50th conference*, (Lisbon, October 2008)
- “A scientific style in technology: Neumann’s school of physics in technological research,” *European society for the history of science, 3rd conference* (Vienna, September 2008), electronically published in the proceedings, pp. 1086-89.

- “The choice between explanatory and descriptive theories in photoelectricity and piezoelectricity,” *Society for philosophy of science in practice, 1st conference*, (Twente, Netherlands, August 2007)
- “Hermann Aron’s (1845-1913) path from physics to electrical invention and industry,” *ICOHTEC Symposium* (Copenhagen, August 2007)
- “Basic, applied research and technology through the lens of crystal frequency control,” *Science Impact: Rethinking the Impact of Basic Research on Society and the Economy* (Vienna, May 2007)
- “The discoverers of Energy Conservation and their historians,” *Energy and Culture* (Esbjerg, Denmark, February 2007)
- “Hermann Aron from physics to electric technology,” *Nation, Religion, and Beyond - Jewish Scientists in German Contexts in the 19th and 20th Centuries* (Jerusalem, December 2006)
- “Technological and scientific study in the discovery and application of the piezoelectric resonance,” *The applied science problem* (Hoboken NJ, May 2005).
- “National Styles in Science: the Case of French and German Physics circa 1900,” *Cultural relativity and the scientific enterprise* (Tel Aviv, March 2005)
- “The changing aims of Duhem’s early thermodynamics theories,” *History of philosophy of science 5* (San Francisco, June 2004)
- “Poincaré’s and Minkowski’s relativistic theories of gravitation in the empirical test,” *5th international conferences on the History of General Relativity* (Notre Dame University, IN, July 1999)
- “Poincaré’s Road to his Relativity Theory,” *Physical Interpretations of Relativity Theory* (London, September 1996), published in the conference’s proceedings (Sunderland, 1997, pp. 141-148)
- “Poincaré’s Attempt at a General Theory of Relativity,” *4th international conference on the History of General Relativity* (Berlin, August 1995)

b. As an invited speaker abroad:

- “The shaping of interwar physics by technology: the case of piezoelectricity,” a talk at SPHERE (Sciences, Philosophie, Histoire) History and Philosophy of Physics seminar, Université Paris Diderot (29.5.18)
- “Interactions between Physics and Technology in the Early 20th Century: The Example of Piezoelectricity,” *Wissenschaftshistorische Kolloquium/ Das Forschungszentrum für Historische Geisteswissenschaften*, Goethe Universität Frankfurt a. M. (April 2012)
- “Jews in science and technology in Wilhelminian Germany – the career of Hermann Aron,” *Das Simon-Dubnow-Institut für jüdische Geschichte und Kultur e. V. an der Universität Leipzig* (May 10)
- "Thought experiment and the use of examples in science," Philosophy department, University of Paderborn (December 09)
- “Atomistic and molecular models in the realm of a phenomenological theory: The case of piezoelectricity,” séminaire d'histoire et philosophie de la physique du Rehseis (Recherches Epistémologiques et Historiques sur les Sciences Exactes et les Institutions Scientifiques), Paris (December 08)

“From science to technology (and back): the discovery of crystal frequency control,” The International Centre for the History of Universities and Science, Bologna university (November 06)

c. Other talks:

I delivered talks in Pittsburgh's HPS department, the Max Planck Institute for the History of Science, The Fritz Haber Institute, Technische Universität Berlin, and in all Israeli universities the Technion and Weizmann institute in departments of history and philosophy of science, general history, philosophy and engineering.

d. Talks of interest at Israeli conferences:

“Elkana as a historian of physics,” plenary session *Israeli society for the history and philosophy of science and technology*, annual meeting (December 2013)

“Struggling with Electrochemistry: Hermann Aron's Work on the Storage Battery Around 1880” *Chemistry Applied* (Jerusalem, November 2013) (in English)

Organiser of a session on “thought experiments” and a speaker: “Are thought experiments inherently different from other kinds of scientific thought?” *Israeli society for the history and philosophy of science and technology*, annual meeting (March 2008)

“The health consequences of enforcing cyclists to wear helmets,” with Daniel Mishori, opening plenary session the 13th *conference on education and fostering health in Israel* (November 2007)

Service for the community and other educational and research activities

Secretary Commission of the History of Physics, the *Division of History of Science and Technology* of the International Union of History and Philosophy of Science, 2017-21

Executive committee member *International Committee for the History of Technology* (ICOHTEC) 2015-19

Referee for: National Science Foundation - USA, Israeli Science Foundation

Referee for: Oxford University Press; *Annals of Science*; *Science in Context*; *The European Physical Journal H*: “Historical Perspectives on Contemporary Physics”; *Philosophia Scientiae*; *History of Universities*; *Journal for General Philosophy of Science*; *Studies in History and Philosophy of Modern Physics (SHPS part B)*; *Journal of Research of the National Institute of Standards and Technology*; *SUBSTANTIA. An international journal on History of Chemistry*; *Synthese*; *War in History*

Scientific editor of Hebrew translations for “Resling” academic publishing house.

1995-1998, scientific advisor, an internet museum for science, technology and culture in the Tel Aviv University School of Education.

1994 research assistant to Prof. Dan Diner, head, Institute for German History, Tel Aviv University.

Prizes, scholarships and grants

Study scholarships from the Cohn Institute 1997-2001.

Study prize Yad Vashem, 1995; “Lessing Fellowship” 1999.

Grant-in-aid, center for the history of physics, American institute of physics, 2000.

Travel award, the Lemelson Center/Archives Center at the National Museum of American History, 2004.

Invitation (and a grant) the 9th International Summer School in History of Science, Bologna, 2004

Minerva Short-Term Research Grant, 2006

Austrian Science Fund grant for early-stage researchers for participating in “Science impact” conference, 2007

Integration grant of the Israeli Ministry for Immigrant Absorption, 2011-12.

ERC – Gerda Henkel foundation Marie Curie senior researcher grant, 2012 –14

Israeli Science Foundation – “Redefining the Second: Astronomy, Physics, Technology and Philosophy in the Twentieth Century,” 2018 - 2021

Languages:

Hebrew – mother tongue

English – Fluent

German, reading – good, conversation – basic

French, reading – good