

R E S U M E

January-2023

1. PERSONAL DETAILS

Full Name: David Andres Gelbwaser Klimovsky

Identity No: 328947783

Date of birth: 20/9/1982

Place of birth: Mexico City, Mexico

Marital status: married

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2. ACADEMIC DEGREES

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|------|---|
| 2014 | PhD , Department of Chemical and Biological Physics, Weizmann Institute of Science, Rehovot, Israel |
| 2009 | MSc , Department of Chemical and Biological Physics, Weizmann Institute of Science, Rehovot, Israel |
| 2006 | BSc , Sciences Faculty, UNAM, Mexico |

3. ACADEMIC APPOINTMENTS

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| 2018 - 2021 | Postdoctoral fellow, Faculty of Physics, MIT, USA |
| 2014 - 2018 | Postdoctoral fellow, Faculty of Chemistry, Harvard, USA |

4. PROFESSIONAL EXPERIENCE (OUTSIDE ACADEMIA)

5. RESEARCH INTERESTS (BRIEFLY)

- Open quantum systems
- Quantum thermodynamics

- Strong coupling
- Non-reciprocal systems
- Casimir forces
- Non-equilibrium systems
- Active systems

6. TEACHING EXPERIENCE

2022 - Present	Advanced Topics in Physical Chemistry Introduction and applications of open quantum systems, Lecturer, Technion-Israel Institute of Technology, Haifa
2023 - Present	Quantum mechanics for engineers, Lecturer, Technion-Israel Institute of Technology, Haifa

7. ACTIVITIES

8. DEPARTMENTAL ACTIVITIES

2022 - Present	PhysChem seminar series organizer, Technion-Israel Institute of Technology, Haifa
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9. PUBLIC PROFESSIONAL ACTIVITIES

2014 - Present	Reviewer for the following peer reviewed journals: PRX, PRL, PRA, PRE, JPCL, NJP, Quantum, Scientific Reports, EPL, Entropy, Physica A, Springer Plus, Physics Letter A, Microorganisms, Journal of Statistical Physics
2021 - 2021	PNAS guest editor
2022 - 2022	Thesis Reviewer, Hebrew University, Jerusalem

10. MEMBERSHIP IN PROFESSIONAL SOCIETIES

11. FELLOWSHIPS, AWARDS AND HONORS

2007-2009	CONACYT Scholarship for International Master studies, Mexico
2010-2014	CONACYT Scholarship for International Ph.D. studies, Mexico
2014	CQIQC Postdoctoral Fellowship (declined), Chemistry, University of Toronto
2014-016	CONACYT Postdoctoral Fellowship, Mexico
2015	Dean's prize for Ph.D. students, Chemistry, Weizmann Institute of Science, Rehovot

2018-2021	Physics of Living Systems Fellowship , Physics , MIT
2021	VATAT award for new faculty members

12. GRADUATE STUDENTS

Completed PhD theses

Completed MSc Theses

PhD Theses in Progress

MSc Theses in Progress

2025 Natan Granit ,(David Gelbwaser-Klimovsky)

13. SPONSORED LONG-TERM VISITORS AND POST-DOCTORAL ASSOCIATES

Prof Robert Alicki, Lady Davis Visiting Professor in the Faculty of Chemistry at the Technion 2022;

Thales Augusto Barbosa Pinto Silva, Post-Doctoral Associate, October 2022;

14. RESEARCH GRANTS

Competitive

2021 - 2024	VATAT - Israel Planning and Budgeting committee, Application of non-reciprocal systems for quantum technologies, 400,000 NIS , David Andres Gelbwaser Klimovsky (PI)
2022 - 2025	Israel Science Foundation, New Faculty Equipment Grant, 271,224 NIS , David Andres Gelbwaser Klimovsky (PI)
2022 - 2026	Israel Science Foundation, International cooperation grant, 38,000 NIS , David Andres Gelbwaser Klimovsky (PI)
2022 - 2026	Israel Science Foundation, Thermodynamics of Non-reciprocal systems, 880,000 NIS , David Andres Gelbwaser Klimovsky (PI)

Industrial and other sources

15. PUBLICATIONS

15.1 Theses

15.2 Refereed papers in professional journals

1. C. Chryssomalakos, **D. Gelbwaser-Klimovsky**, H. Hernandez and E. Okon. Wires with Quantum Memory Modern Physics Letters A 23, 3087 (2008);
2. G. Gordon, G. Bensky, **D. Gelbwaser-Klimovsky**, DDB. Rao, N. Erez and G. Kurizki. Cooling down quantum bits on ultrashort time scales, New Journal of Physics 11, 123025 (2009);
3. G. Bensky, G. Gordon, **D. Gelbwaser-Klimovsky**, DDB. Rao, N. Erez and G. Kurizki. Unitary and non-unitary manipulations of qubit-bath entanglement: non-Markov qubit cooling, Quantum Information Processing 8, 607 (2009);
4. G. Bensky, DDB. Rao, G. Gordon, **D. Gelbwaser-Klimovsky**, N. Erez and G. Kurizki. Non-Markovian control of qubit thermodynamics by frequent quantum measurements, Physica E 42, 477 (2010);
5. M. Kolar+, **D. Gelbwaser-Klimovsky**+, R. Alicki and G. Kurizki. Quantum bath refrigeration towards absolute zero: challenging the unattainability principle, Physical Review Letters 109, 090601 (2012). *Editor's Suggestion*. (+First author equal contribution);
6. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki. Minimal universal quantum heat machine, Physical Review E 87, 012140 (2013);
7. K. Szczygielski+, **D. Gelbwaser-Klimovsky**+ and R. Alicki. Markovian master equation and thermodynamics of a two-level system in a strong laser field, Physical Review E 87, 012120 (2013). (+ First author equal contribution);
8. **D. Gelbwaser-Klimovsky**, N. Erez, R. Alicki and G. Kurizki. Work extraction via quantum nondemolition measurements of qubits in cavities: Non-Markovian effects, Physical Review A 88, 022112 (2013);
9. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki. Work and energy gain of heat-pumped quantized amplifiers, Europhysics Letters 103, 60005 (2013);
10. **D. Gelbwaser-Klimovsky**, N. Erez, R. Alicki and G. Kurizki. Can quantum control modify thermodynamic behavior?, Canadian Journal of Chemistry, 92, 160 (2014);
11. **D. Gelbwaser-Klimovsky** and G. Kurizki. Heat-machine control by quantum-state preparation:

from quantum amplifiers to refrigerators, *Physical Review E* 90, 022102 (2014);

12. **D. Gelbwaser-Klimovsky** and G. Kurizki. Work extraction from heat-powered quantized optomechanical setups, *Scientific Reports* 5, 7809 (2015);

13. **D. Gelbwaser-Klimovsky**, K. Szczygielski, U. Vogl, A. Sass, R. Alicki, G. Kurizki, and M. Weitz. Laser-induced cooling of broadband heat reservoirs, *Physical Review A* 91, 023431 (2015);

14. **D. Gelbwaser-Klimovsky** and G. Kurizki. Quantum mechanically enhanced performance of simple heat machines, *Physica Scripta T* 165, 014025 (2015);

15. **D. Gelbwaser-Klimovsky**⁺, W. Niedenzu⁺, P. Brummer and G. Kurizki. Power enhancement of heat engines via correlated thermalization in a three-level "working fluid", *Scientific Reports* 5, 14413 (2015). (+ First author equal contribution);

16. W. Niedenzu, **D. Gelbwaser-Klimovsky** and G. Kurizki. Performance limits of multilevel and multipartite quantum heat machines, *Physical Review E* 92, 042123 (2015);

17. **D. Gelbwaser-Klimovsky** and A. Aspuru-Guzik. Strongly coupled quantum heat machines, *The Journal of Physical Chemistry Letters* 6, 3477 (2015);

18. R. Alicki, and **D. Gelbwaser-Klimovsky**. Non-equilibrium quantum heat machines, *New Journal of Physics* 17, 115012 (2015);

19. R. Alicki, **D. Gelbwaser-Klimovsky** and K. Szczygielski. Solar cell as self-oscillating heat engine, *Journal of Physics A* 49, 015002 (2016);

20. W. Niedenzu, **D. Gelbwaser-Klimovsky** and G. Kurizki. On the operation of machines powered by quantum non-thermal baths, *New Journal of Physics* 18, 083012 (2016);

21. **D. Gelbwaser-Klimovsky**, S. Saikin, R. Goldsmith and A. Aspuru-Guzik. Optical spectra of p-Doped PEDOT nano-aggregates provide insight into the material disorder, *ACS Energy Letters* 1, 1100 (2016);

22. **D. Gelbwaser-Klimovsky** and A. Aspuru-Guzik. On thermodynamic inconsistencies in several photosynthetic and solar cell models and how to fix them, *Chemical Sciences*, 8, 1008 (2017);

23. R. Alicki, **D. Gelbwaser-Klimovsky** and A. Jenkins. A thermodynamic cycle for the solar cells. *Annals of Physics* 378, 71 (2017);

24. Horak, **D. Gelbwaser-Klimovsky**, S. Saikin, A. Aspuru-Guzik and R. Goldsmith. Exploring electronic structure and order in polymers via single-particle microresonator spectroscopy, *Nano Letters* 18, 1600 (2018);
25. R. Hartle, C. Schinabeck, M. Kulkarni, **D. Gelbwaser-Klimovsky**, M. Thoss, and U. Peskin. Cooling by heating in nonequilibrium nanosystems, *Physical Review B* 98, 08140(R) (2018);
26. V. Sundar, **D. Gelbwaser-Klimovsky** and A. Aspuru-Guzik. Reproducing quantum probability distributions at the speed of classical dynamics: a new approach for developing force-field functors, *The Journal of Physical Chemistry Letters* 9, 1721 (2018);
27. **D. Gelbwaser-Klimovsky**, A. Bylinskii, D. Gangloff, R. Islam, A. Aspuru-Guzik and V. Vuletic. Single-atom heat machines enabled by energy quantization, *Physical Review Letters* 120, 170601 (2018);
28. **D. Gelbwaser-Klimovsky**, M. Thoss, A. Aspuru-Guzik and U. Peskin. High voltage-assisted mechanical stabilization of single-molecule junctions, *Nano Letters* 18, 4727 (2018);
29. A. Ghosh, **D. Gelbwaser-Klimovsky**, A. Lvovsky, I. Mazets, M. O. Scully, and G. Kurizki. Two-level masers as heat-to-work converters, *Proceedings of the National Academy of Sciences* 115, 9941 (2018);
30. **D. Gelbwaser-Klimovsky**, W. Kopylov and G. Schaller. Cooperative efficiency boost for quantum heat engines, *Physical Review A* 99, 022129 (2019);
31. ED. Fung, **D. Gelbwaser-Klimovsky**, J. Taylor, J. Low, J. Xia, I. Davydenko, L. Campos, S. Marder, U. Peskin and L. Venkataraman. Breaking down resonance: nonlinear transport and the breakdown of coherent tunneling models in single molecule junctions, *Nano Letters* 19, 2555 (2019);
32. D. Bhaktavatsala Rao, **D. Gelbwaser-Klimovsky**, N. Bar-Gill and G. Kurizki. Spin-bath polarization via disentanglement, *New Journal of Physics* 22, 083035 (2020);
33. R. Alicki, **D. Gelbwaser-Klimovsky**, A. Jenkins and E. von Hauff. Dynamical theory for the battery's electromotive force, *Physical Chemistry Chemical Physics* 23, 9428 (2021);
34. **D. Gelbwaser-Klimovsky**, N Graham, M. Kardar and M. Kruger. Near field propulsion forces from nonreciprocal media. *Physical Review Letters* 126, 170401 (2021);
35. R. Alicki, **D. Gelbwaser-Klimovsky**, A. Jenkins. The leaking elastic capacitor as a model for active matter, *Physical Review E* 103, 052131 (2021);

36. R. Alicki, **D. Gelbwaser-Klimovsky**, A. Jenkins. The problem of engines in statistical physics, Entropy 23, 1095 (2021).

37. **D. Gelbwaser-Klimovsky**, N Graham, M. Kardar and M. Kruger. Equilibrium forces on non-reciprocal materials. PRB 106, 115106 (2022);

Accepted (or in press) papers

1. J. Fiedler, K. Berland, J. Borchert, R. Corkery, A. Eisfeld, **D. Gelbwaser-Klimovsky**, M. Greve, B. Holst, K. Jacobs, M. Kruger and D.F. Parsons, D.F., 2022. Perspectives on weak interactions in complex materials at different length scales. Physical Chemistry Chemical Physics

Submitted papers

1. R. Alicki and **D. Gelbwaser-Klimovsky**. "Violation of Detailed Balance in Quantum Open Systems."

Review papers

15.3 Books

Monographs and textbooks

Edited Books

15.4 Book chapters

1. **D. Gelbwaser-Klimovsky**, W. Niedenzu+ and G. Kurizki. Chapter Twelve - Thermodynamics of quantum systems under dynamical control, Advances in Atomic, Molecular, and Optical Physics 64, 329 (2015);

2. A. Levy and **D. Gelbwaser-Klimovsky**, Quantum features and signatures of quantum thermal machines, Thermodynamics in the Quantum Regime: Fundamental Aspects and New Directions 195, 87 (2018).

15.5 Refereed papers in conference proceedings

15.6 Patents (granted)

15.7 Research reports and other publications

16. CONFERENCES

16.1 Plenary, keynote or invited talks

International

1. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki, Universal Quantum Machines, Quantum Thermodynamics and Quantum Machines, University of Gdansk, Poland, 2012. (Invited Talk)
2. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki, Quantum piston: a completely self-contained and quantum machine, Mathematical Horizons for Quantum Physics 2, NUS, Singapore, 2013. (Invited Talk)
3. **D. Gelbwaser-Klimovsky** and G. Kurizki, Quantum state as a thermodynamic resource, PQE, Snowbird, USA, 2015. (Invited Talk)
4. **D. Gelbwaser-Klimovsky**, A. Bylinskii, D. Gangloff, R. Islam, A. Aspuru-Guzik and V. Vuletic, Quantum vs. classical heat machines, Quantum Thermodynamics workshop, ITAMP, Harvard, Cambridge, USA, 2017. (Invited Talk)
5. **D. Gelbwaser-Klimovsky**, A. Bylinskii, D. Gangloff, R. Islam, A. Aspuru-Guzik and V. Vuletic, Do quantum and classical heat machines have a different performance?, Quantum Thermal Machines Workshop, Max Planck Institute, Erlangen, Germany, 2019. (Invited Talk)
6. **D. Gelbwaser-Klimovsky**, Thermodynamics, non-reciprocal systems and Casimir forces, Spring Workshop on Quantum Thermodynamics, Germany, 2022. (Invited Talk)

National

1. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki, Third law and Universal Quantum Machines, Symposium on Quantum Dissipation and Control, Weizmann Institute of Science, Israel, 2012. (Invited Talk)
2. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki, Autonomous quantized refrigerator: performance beyond the classical bound, Israel Physical Society conference, Rehovot, Israel, 2013. (Invited Talk)
3. **D. Gelbwaser-Klimovsky**, R. Alicki and G. Kurizki, Passive work and quantum systems, Thermodynamics of Quantum Devices, Maagan, Israel, 2014. (Invited Talk)
4. **D. Gelbwaser-Klimovsky**, Application of quantum thermodynamics and open quantum systems for quantum technologies, Quantum retreat day, The Helen Diller Quantum Center, Israel, 2021. (Invited Talk)

5. **D. Gelbwaser-Klimovsky**, Violation of detailed balance in quantum open systems, 86th Annual Meeting of the Israel Chemical Society, Israel, 2022. (Invited Talk)

16.2 Contributed Talks and Posters

International Oral

1. **D. Gelbwaser-Klimovsky** and A. Aspuru-Guzik, Strongly coupled quantum heat machines, 2nd Quantum Thermodynamics Conference, Mallorca, Spain. 04-2015 .
2. **D. Gelbwaser-Klimovsky**, A. Bylinskii, D. Gangloff, R. Islam, A. Aspuru-Guzik and V. Vuletic, Heat Machines Enhanced by Energy Quantization: Theory and an experimental proposal, 4th Quantum Thermodynamics Conference, Erice, Italy. 05-2016 .
3. **D. Gelbwaser-Klimovsky**, N. Sawaya and A. Aspuru-Guzik, Effective working fluid-bath decoupling at the strong coupling regime, Non-Markovianity and Strong Coupling Effects in Thermodynamics, Bad Honnef, Germany. 04-2017 .
4. **D. Gelbwaser-Klimovsky**, N Graham, M. Kardar and M. Kruger, Casimir heat engines, Quantum Thermodynamics Conference 2021, Switzerland. 10-2021 .
5. **D. Gelbwaser-Klimovsky**, R. Alicki N Graham, M. Kardar and M. Kruger, Violation of detailed balance in open quantum systems (Flash Talk), Quantum Thermodynamics Conference 2022, Ireland. 06-2022 .

International Poster

1. **D. Gelbwaser-Klimovsky**, B. Sanchez, A. Jinich and A. Aspuru-Guzik, Energy quantization, heat machines and machine learning poster, 5th Quantum Thermodynamics Conference, Oxford, United Kingdom. 03-2017 .
2. **D. Gelbwaser-Klimovsky**, R. Alicki N Graham, M. Kardar and M. Kruger, Violation of detailed balance in open quantum systems, Quantum Thermodynamics Conference 2022, Ireland. 06-2022 .

National Oral

1. **D. Gelbwaser-Klimovsky** and A. Aspuru-Guzik, On thermodynamic inconsistencies in several photosynthetic models and how to fix them, QuEBS: Quantum Effects in Biological Systems Workshops, Israel. 03-2017 .

National Poster

16.3 Participation in organizing conferences

17. NOTES