Curriculum Vitae - Shira Chapman

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Employment

January 2021 - Present: Senior lecturer at Ben Gurion University of the Negev, Be'er Sheva, Israel.

September 2018 - December 2020: Postdoctoral researcher at the University of Amsterdam, the Netherlands.

November-December 2018: Invited CNRS researcher at École Normale Supérieure Paris, France.

September 2015 - August 2018: Postdoctoral researcher at Perimeter Institute for Theoretical Physics, Ontario, Canada.

Education

May 2010 - August 2015: PhD student in the direct PhD track in theoretical high energy physics. Adviser: Prof. Yaron Oz, Tel Aviv University, Israel. Thesis title: *"Applications of Quantum Field Theory and Gravitational Holography to Particle and Condensed Matter Physics"*.

2009 - 2010: Studies toward M.Sc. in physics, moved to direct PhD track, Tel Aviv University, Israel.

2003-2006: B.Sc. in mathematics and physics, summa cum laude, Bar-Ilan University, Israel.

Grants

2021-2025: Israel Science Foundation personal grant for proposal "Complexity: From Quantum Information to Black Holes and Back" (250,000 NIS per year for a duration of 4 years, with additional 38,000 for international collaboration and 47,000 NIS for purchasing servers).

2022-2027 Co-Investigator in German-Israeli Research Collaboration Grant (DIP) "Holography and the Swampland", supported by the DFG (1.6 Million Euro, divided among 2 PIs and 9 CIs from 5 different institutes in Germany and Israel).

Fellowships and Awards

2021-Present: Alon Fellowship for the Integration of Outstanding Faculty given by the Israeli Council of Higher Education (VATAT).

2021-Present: Carole and Marcus Weinstein Presidential Recruit Donation (125,000 USD).

2016-2017: Women in Science Fellowship for postdoctoral research by the Council for Higher Education in Israel (one year award, renewed annually for 2 years).

2014: Scholarship for academic achievements in the PhD by the Dothan Fund in memory of Professor Yossef Dothan.

2012-2014: Women award for excellence in research in the PhD – Israel Ministry of Science and Technology (one year award, renewed annually for 3 years).

2011-2012: Rector's award for excellence in teaching for the course "Physics for Chemistry Students" based on evaluations by the students taken at the end of each term. This is the highest award for teaching in Tel-Aviv University.

2006: Wolf foundation scholarship for excellent academic achievements in undergraduate studies.

2005: Award for excellence in undergraduate studies given by the committee of headmasters of the Israeli universities.

Teaching Activities

2021-2023: Lecturer – "Theory of Gravity 1" (General Relativity), Ben Gurion University, Israel (teaching evaluations average grade 4.9/5).

2010-2014: Teaching assistant – "Physics for Chemistry Students", Tel-Aviv University, Israel.

2013-2014: Volunteer tutor for students from underprivileged backgrounds / students with learning disabilities – "Physics for Electrical Engineers", Holon Institute of Technology, Israel.

2004-2006: Participation in a project of helping new coming immigrants with their undergraduate studies, Bar Ilan University.

Organization of Scientific Meetings

June 2020: Organizing an online Lorentz Center workshop titled "Complexity: from Quantum Information to Black Holes" (website: sites.google.com/view/complexity-workshop).

2019-2020: Organizing an international virtual seminar series "Quantum Gravity & Information" – a joint initiative of the University of Amsterdam and the Max Planck Institute for Gravitational Physics, Potsdam (see https://gqfi.aei.mpg.de/node/24).

2019-2020: Organizing the string theory group meetings at the University of Amsterdam.

2015 - 2018: Organizing the string theory group meetings at Perimeter Institute.

Supervision of graduate students

2021-Present: Supervising students and postdocs at Ben-Gurion University.

- Master's students: Osher Shoval (graduated), Rotem Berman.
- PhD student: Tal Schwartzman, Osher Shoval.
- Postdocs: Stefano Baiguera (laureate of the Azrieli postdoctoral fellowship), Saskia Demulder, Christian Northe.
- Undergraduate student projects (completed): Raz Monsonego, Dvir Cohen.

2019-2020: Supervising a visiting graduate student – Nicolas Chagnet – on the project – "Complexity in Conformal Field Theories" at the University of Amsterdam.

2018-2019: Supervising a master's student at the Perimeter Institute - Vincent Chen - as a part of the Perimeter Scholars International program.

Institutional Responsibilities

2021-Present: Responsible for the organization of open days and recruitment activities, Ben Gurion University of the Negev, Beer Sheva, Israel.

2021-Present: Responsible for the "Eco-Sister" program supporting female undergraduate students in the physics department in their studies, Ben Gurion University of the Negev, Beer Sheva, Israel.

2022-Present: Organizer of the particles and fields seminar, Physics department, Ben Gurion University of the Negev, Beer Sheva, Israel.

Outreach Activities

2021-Present: Supervising a Bedouin high-school female student in a research project related to climate change via the Tamar Center Negev – an organization bridging the socio-economic gaps between Bedouins and the rest of Israeli society through education. The student received special distinction for her work by the Ben-Gurion University.

June 2021: Publishing an outreach article in Amsterdam Science Magazine Issue 12 - "From Quantum Complexity to Black Holes and Back".

Reviewing Activities

2020 - Present: Evaluator for the Israel Science Foundation (ISF) grants.

2020 - Present: Evaluator for the Azrieli postdoctoral fellowships.

2020 - 2022: Reviewer for PhD theses for students: Stefano Baiguera (Milan-Bicocca), Pierluigi Niro (ULB and VUB Brussels), Antonio Rotundo (University of Amsterdam), Evita Verheijden (University of Amsterdam), Vassilis Papadopoulos (École Normale Supérieure de Paris), and for master's student's thesis: Tamar Simhon (Ben-Gurion University). Member of PhD committee of Asaf Arzi (Ben Gurion University).

2013 - Present: Referee for journals – Physical Review Letters, PRX Quantum, Journal of High Energy Physics (JHEP), Physical Review B, Physical Review D.

Publications

Comment: Note that in our field (high-energy theory) the order of the authors is alphabetic. Total (Inspire HEP data): Papers: 25, Citations: 1693, h-index: 18, Citations/paper (avg): 73.6.

1. **Energy transport for thick holographic branes**
   C. Bachas[PI], S. Baiguera[PD], S. Chapman[PI], G. Policastro[PI], T. Schwartzman[S],
   Submitted for publication in PRL [Preprint, December 2022: arXiv:2212.14058]
2. **Complex geodesics in de Sitter space**
   S. Chapman[PI], D. A. Galante[PD], E. Harris[S], S. U. Sheorey[S], D. Vegh[PI],
   Submitted for publication in JHEP [Preprint, December 2022: arXiv:2212.01398]

3. **Shape deformations of charged Rényi entropies from holography**
   S. Baiguera[PD], L. Bianchi[PI], S. Chapman[PI], D. A. Galante[PD],
   JHEP 06 (2022) 068, [arXiv:2203.15028]
   [7 citations; IF 5.81 ;5/29; Q1]

4. **Quantum computational complexity from quantum information to black holes and back**
   S. Chapman[PI], G. Policastro[PI]
   Invited review article
   Eur.Phys.J.C 82 (2022) 2, 128, [arXiv:2110.14672]
   [33 citations; 4.590; 8/29; Q2]

5. **Holographic complexity and de Sitter space**
   S. Chapman[PI], D. A. Galante[PD], E. D. Kramer[PD],
   JHEP 02 (2022) 198, [arXiv:2110.05522]
   [20 citations; IF 5.81 ;5/29; Q1]

6. **Complexity for Conformal Field Theories in General Dimensions**
   N. Chagnet[S] , S. Chapman[PI], J. de Boer[PI], C. Zukowski[PD]
   Phys.Rev.Lett. 128 (2022) 5, 051601, [arXiv:2103.06920]
   [47 citations; IF 9.161; 7/86; Q1]

7. **Complexity for Charged Thermofield Double States**
   S. Chapman[PI] and H. Z. Chen[S]
   JHEP 02 (2021) 187, [arXiv:1910.07508]
   [29 citations; IF 5.81 ;5/29; Q1]

8. **Renormalization of Galilean Electrodynamics**
   S. Chapman[PI], L. Di Pietro[PI], K. T. Grosvenor[PD], Z. Yan[PD]
   JHEP 10 (2020) 195, [arXiv:2007.03033]
   [15 citations; IF 5.81 ;5/29; Q1]

9. **Energy Reflection and Transmission at 2D Holographic Interfaces**
   C. Bachas[PI], S. Chapman[PI], D. Ge[S], G. Policastro[PI]
   Phys.Rev.Lett. 125 (2020) 23, 231602, [arXiv:2006.11333]
   [19 citations; IF 9.161; 7/86; Q1]

10. **Complexity of Mixed States in QFT and Holography**
    E. Caceres[PI], S. Chapman[PD], J. D. Couch[S], J. P. Hernandez[S], R. C. Myers[PI], S. M. Ruan[S]
    JHEP 03 (2020) 012 [arXiv:1909.10557]
    [78 citations; IF 5.81 ;5/29; Q1]

11. **Holographic Complexity for Defects Distinguishes Action from Volume**
    S. Chapman[PD], D. Ge[S], G. Policastro[PI],
    JHEP 1905 (2019) 049 [arXiv:1811.12549].
    [56 citations; IF 5.875 ;4/29; Q1]

12. **Complexity and entanglement for thermofield double states**
    S. Chapman[PD], J. Eisert[PI], L. Hackl[S], M. P. Heller[PD], R. Jefferson[S], H. Marrochio[S], R. C. Myers[PI],
    SciPost Phys. 6 (2019) no.3, 034 [arXiv:1810.05151].
    [159 citations; IF 5.051; 8/109; Q1]

13. **Holographic complexity in Vaidya spacetimes. Part II**
    S. Chapman[PD], H. Marrochio[S], R. C. Myers[PI],
    JHEP 1806 (2018) 114, [arXiv:1805.07262].
    [128 citations; IF 5.833; 5/29; Q1]

14. **Holographic complexity in Vaidya spacetimes. Part I**
S. Chapman[PD], H. Marrochio[S], R. C. Myers[PI],
JHEP 1806 (2018) 046, [arXiv:1804.07410].
[141 citations; IF 5.833; 5/29; Q1]

15. **Toward a definition of complexity for quantum field theory states**
S. Chapman[PD], M. P. Heller[PD], H. Marrochio[S], F. Pastawski[PD],
Phys.Rev.Lett. 120 (2018) no.12, 121602, [arXiv:1707.08582].
[297 citations; IF 9.227; 6/81; Q1]

16. **On the Time Dependence of Holographic Complexity**
D. Carmi[S], S. Chapman[PD], H. Marrochio[S], R. C. Myers[PI], S. Sugishita[PD],
JHEP 1711 (2017) 188, [arXiv:1709.10184].
[244 citations; IF 5.541; 4/29; Q1]

17. **Complexity of Formation in Holography**
S. Chapman[PD], H. Marrochio[S], R. Myers[PI],
JHEP 1701 (2017) 062 [arXiv:1610.08063].
[212 citations; IF 5.541; 4/29; Q1]

18. **Shape Dependence of Holographic Rényi Entropy in General Dimensions**
L. Bianchi[PD], S. Chapman[PD], X. Dong[PI], D. Galante[S], M. Meineri[S], R. Myers[PI],
JHEP 1611 (2016) 180 [arXiv:1607.07418].
[48 citations; IF 6.063; 3/29; Q1]

19. **Non-Relativistic Scale Anomalies**
I. Arav[S], S. Chapman[PD], Y. Oz[PI],
JHEP 1606 (2016) 158 [arXiv:1601.06795].
[31 citations; IF 6.063; 3/29; Q1]

20. **On Swift Gravitons (Superluminal graviton propagation)**
K. Benakli[PI], S. Chapman[PD], L. Darmé[S], Y. Oz[PI]
Phys.Rev. D94 (2016) no.8, 084026 [arXiv:1512.07245].
[14 citations; IF 4.557; 8/29; Q2]

21. **Supersymmetric Lifshitz Field Theories**
S. Chapman[S], Y. Oz[PI], A. Raviv[S],
JHEP 10 (2015)162 [arXiv:1508.03338],
[20 citations; IF 6.023; 4/28; Q1]

22. **Lifshitz Scale Anomalies**
I. Arav[S], S. Chapman[S], Y. Oz[PI],
JHEP **1502**, 078 (2015) [arXiv:1410.5831],
[39 citations; IF 6.023; 4/28; Q1]

23. **Lifshitz Superfluid Hydrodynamics**
S. Chapman[S], C. Hoyos[PD], Y. Oz[PI],
JHEP **1407**, 027 (2014) [arXiv:1402.2981],
[11 citations; IF 6.111; 3/27; Q1]

24. **Superfluid Kubo Formulas from Partition Function**
S. Chapman[S], C. Hoyos[PD], Y. Oz[PI],
JHEP **1404**, 186 (2014) [arXiv:1310.2247],
[11 citations; IF 6.111; 3/27; Q1]

25. **Fluid/Gravity Correspondence, Local Wald Entropy Current and Gravitational Anomaly**
S. Chapman[S], Y. Neiman[S] and Y. Oz[PI],
JHEP **1207**, 128 (2012) [arXiv:1202.2469].
[34 citations; IF 5.618; 4/27; Q1]

Articles in preparation:

Complexity in Conformal Field Theory with Penalty Factors
N. Chagnet[S], S. Chapman[PI], O. Shoval[S]

Recent Invited Talks (Past 5 years)

June 2022: "Holographic Complexity and de Sitter Space" at conference "Strings 2022", Vienna. This is the largest conference in our field.

April 2022: "Holographic Complexity and de Sitter Space" at workshop "Qubits on the Horizon 2", Aruba.

February 2022: "Holographic Complexity and de Sitter Space" at the Solvay workshop "Selected topics in quantum gravity", ULB, Brussels.

November 2021: "Holographic Complexity and de Sitter Space" at conference "Holography, black holes and gauge theories", University of Barcelona.

November 2021: "Holographic Complexity and de Sitter Space" at conference "Applications of Quantum Information in QFT and Cosmology" organized by University of Lethbridge, Canada (Online).

September 2021: "Energy reflection and transmission at 2D holographic interfaces" at conference "Quantum Field Theory at the Boundary" organized by Mainz Institute for Theoretical Physics – MITP (Online).

August 2021: Mini-course on "Nonrelativistic Quantum Field Theory" for – "1st School on Nonrelativistic Quantum Field Theory, Gravity, and Geometry", organized by Nordita – Nordic Institute for Theoretical Physics, Stockholm, Sweden (Online).

May 2021: "Energy Reflection and Transmission at 2D Holographic Interfaces", at conference – "11th Crete Regional Meeting in String Theory", Greece (Online).

March 2021: "Complexity for CFTs in general dimensions", at the – "Online Workshop on Quantum Gravity, Holography and Quantum Information", Max-Planck-Institute and LMU, Munich (Online).

October 2020: "Energy Reflection and Transmission at 2D Holographic Interfaces", at conference in honour of Prof. David Gross – "The Dual Mysteries of Gauge Theories and Gravity", IIT Madras (Online).

August 2020: "On the Complexity of Black Holes", at conference – "Quantum Information in QFT and AdS/CFT", IIT Gandhinagar (Online).

January 2020: "Renormalization Group Flows of Scalar Galilean Electrodynamics in $2+1$ Dimensions" at conference "Gauge Theories and Black Holes", Weizmann Institute, Israel.

October 2019: "Renormalization Group Flows of Scalar Galilean Electrodynamics in $2+1$ Dimensions" at conference "Beyond Lorentzian Geometry", Edinburgh, Scotland.

September 2019: "Complexity in Holography and QFT" at conference "Challenges in Theoretical High-Energy Physics", Nordita, Stockholm.

August 2019: "Complexity for Systems with Defects" at conference "Boundaries and Defects in Quantum Field Theory", Perimeter Institute, Canada.

June 2019: "Holographic Complexity for Defects Distinguishes Action from Volume" at conference "Quantum Information and String Theory 2019", at Yukawa Institute, Kyoto.

May-June 2019: Mini-course at Ben Gurion University – "Entanglement and Complexity in QFT and Holography" (3 talks).

January 2019: Guiding the focus session on complexity at conference "Qubits on the Horizon" – Aruba

August 2018: "Circuit complexity for Gaussian states in QFT" at conference "Novel Approaches to Quantum Dynamics", Kavli Institute for Theoretical Physics Santa Barbara.

June 2018: "Circuit complexity for thermofield double states" at conference "Quantum Information in Quantum Gravity 4", Galileo Galilei Institute Florence.

Other Activities

2006-2009: Military service.

Musical activities: Playing the violin; Founding the Tel-Aviv University students string ensemble (2012); Serving as concertmaster for the symphonic orchestra of the University of Waterloo (2016); Volunteering as violin tutor at the community music school of the Waterloo region (2017-2018); Playing with the UvA Orchestra J. Pzn Sweelinck (2019-2020) including performances at the Concertgebouw and Muziekgebouw, Amsterdam. Performing with the Jerusalem Baroque Orchestra (2022).

Last updated: January 24, 2023