Curriculum Vitae – Albion Lawrence

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Degrees granted

The University of Chicago	Ph.D., Physics, 1996. Advisor: Prof. Emil Martinec.
University of California, Berkeley	A.B. in Physics with highest honors and highest distinction in general scholarship, 1991.

Academic appointments

May 2017-present	Professor, Brandeis University
July 2018-June 2021	Chair, Dept. of Physics, Brandeis University
July 2009-2017	Associate Professor, Brandeis University.
2002-2009	Assistant Professor, Brandeis University.
1999-2002	Postdoctoral Research Associate, Stanford Linear Accelerator Center and Stanford University.
Fall 1999	Member, Institute for Advanced Study
1996-1999	Postdoctoral Fellow, Harvard University.

Teaching experience

August 2002-present	Brandeis University. Quantum mechanics (undergraduate and graduate), quantum field theory, cosmology (undergraduate), classical mechanics (undergraduate/graduate), general relativity (undergraduate), differential geometry and physics (graduate), fluid mechanics (undergraduate/graduate).

Awards and Honors

2004-2009	DOE Outstanding Junior Investigator award.
1991-1994	NSF Graduate Fellowship.

Grants

2021-present	Co-PI, DOE HEP QuantISED grant DE-DE-SC0020360.
2020-present	PI, DOE grant DE-SC0009986.
2019-2021	P, DOE HEP QuantISED grant DE-SC0020194.
2019-2021	Brandeis Provost Research Grant, "Nonequilbrium Statistical Mechanics of the Ocean and Atmosphere".
2013-2020	PI, DOE grant DE-SC0009987.
2013-2018	Co-PI, NSF grant NSF-OISE-1243669, "U.S.-India Advanced Studies Institute on Thermalization: From Glasses to Black Holes".
2011-2018	PI, NSF IGERT grant "Geometry and Dynamics".

Professional activities

Ongoing	Member, American Physical Society, American Geophysical Union, American Meteorological Society, American Association for the Advancement of Science.
Ongoing	Reviewer and panelist for National Science Foundation.
Ongoing	Reviewer and panelist for Department of Energy.
Ongoing	Referee for Phys. Rev. Lett.,, Phys. Rev. D, J. High Energy Phys, and J. Cosmol. and Astropart. Phys.
2020-2023	Member-at-large, Executive Committee, Topical Group on the Physics of Climate (GPC), American Physical Society.
2020-2021	Lead organizer, Aspen Summer 2021 workshop, "Transport and Mixing of Tracers in Geophysics and Astrophysics".
2019-2020	Lead organizer, Aspen Summer 2020 workshop, "Transport and Mixing of Tracers in Geophysics and Astrophysics". **Cancelled due to COVID-19**.
2011-2018	Organizer, Brandeis IGERT summer institutes.
Sept. 2016	Member, Committee of Visitors, DOE Office of High Energy Physics
2019-present	Reviewer, Canada National Sciencea and Engineering Research Council (NSERC).
2017-present	Reviewer, Austrian Science Fund.
Dec. 2016	Organizer, US-India ASI: Classical and Quantum Information, ICTS, Bangalore.

Long-term visits, 2015-present

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Oct.-Nov. 2019	Kavli Institute for Theoretical Physics (KITP) follow-on meeting, "Revisiting Conservation Constraints for Astrophysical-Geophysical Applications", UC Santa Barbara (UCSB).
May-June 2018	Member, KITP, UCSB, "Planetary Boundary Layers in Atmospheres, Oceans, and Ice on Earth and Moons" workshop.
Jan.-Aug. 2018	Visiting Scientist, Department of Earth, Atmospheric, and Planetary Sciences
Aug. 2016	Participant, NORDITA workshop on "Black Holes and Emergent Spacetime", Stockholm, Sweden.
June-July 2015	Participant, Aspen Center for Physics, "Primordial Physics" workshop.

Undergraduate Students Supervised

1. Ian Shoemaker, 2004-2005, Brandeis U. Thesis title: "Decoherence and Inflation". Assistant Professor of Physics, South Dakota U; accepted a faculty position at Virginia Tech.
2. Matthew Roberts, 2004-2005, Brandeis U. Thesis title: "PT-symmetric quantum mechanics". Postdoc at Imperial College, London.
3. Benson Way, 2007-2008, Brandeis U. Thesis title: "Axion constraints and string-wall dynamics". Postdoc at University of British Columbia.
4. Kabir Husain, 2008-2009. Thesis Title: "Semiclassical and quantum dynamics of the Coulomb potential in one dimension". Postdoc at James Franck Institute, U. Chicago.
5. Samuel McCandlish, 2011-2012. "Bending and Breaking Time Contours: A World Line Approach to Quantum Field Theory". Safety team, OpenAI.
6. Skyler Kasko, 2013-2014. "Coarse Grained Quantum Dynamics".
7. Stefan Stanojevic, 2014-2015. "The large-N $O(N)$ model on hyperbolic space". Graduate Student at Brown.
8. Aaron Fogel, 2018-2019. "Corrections to molecular dynamics in the Born-Oppenheimer Approximation". Researcher in quantum information for the military.
9. Yunfei Wang, 2021-present.

Graduate Students Supervised

1. Tobias Sander, Brandeis U. PhD, 2007. Senior Manager, Berg Lund and Company, Hamburg, Germany.
2. Nathaniel Reden, Brandeis U. PhD, 2014. Instructor in Physics and Mathematics, Bancroft School, Worcester, MA.
3. Cesar Agón, Brandeis U., PhD, 2017. Postdoc at SUNY-Stony Brook. Fall 2020: postdoc at Céntro Atómico Bariloche, Argentina.
4. Andrew Rolph, Brandeis U., PhD, 2020. Postdoc at the University of Amsterdam.
5. Harsha Hampapura, Brandeis U., 2016-present.
6. Jonathan Harper, Brandeis U., 2016-present.
7. Alastair Grant-Stuart, Brandeis U., 2016-present.

Postdocs supervised

1. Prof. Martin Kruczenski (PhD, Buenos Aires U., Argentina), 2003-2005. Professor of physics, Purdue Univ.
2. Prof. Amit Sever (PhD, Hebrew U., Israel), 2005-2008. Faculty, School of Physics and Astronomy, Tel Aviv University.
3. Prof. Marco Aldi (PhD, Northwestern U), 2010-2012. (FRG postdoc in Mathematics). Assistant professor of mathematics, Virginia Commonwealth University.
4. Prof.. Masoud Soroush (PhD, Stanford University), 2013-2015. Assistant professor of physics at Coppin State Univ.
5. Dr. Ida Zadeh (PhD, University of Toronto), 2013-2016. Postdoc at the International Center for Theoretical Physics, Trieste, Italy.
6. Dr. Bogdan Stoica (PhD, Caltech), 2016-2019. Postdoc at Northwestern.
7. Dr. Djordje Radicevic (PhD, Stanford), 2019-present.

Publications

1. Harsha Hampapura, Jonathan Harper, and Albion Lawrence, "Target Space Entanglement in Matrix Models", arxiv:2012.15683, *J. High Energy Phys.* **2021** (231) 2021.

2. Nemanja Kaloper, Morgane König, Albion Lawrence, and James Scargill, "On hybrid monodromy inflation – hic sunt dracones", arxiv:2006.13960, *J. Cosmol. and Astropart. Phys.* **03** (2021) 024.

3. Harsha Hampapura, Albion Lawrence, and Stefan Stanojevic, "On phase transitions in the Rényi entropies of 2+1-d large-N interacting vector models", arxiv:1811.04019, *Phys. Rev.* **B100** (2019) 134412.

4. Guido D'Amico, Nemanja Kaloper, and Albion Lawrence, "Strongly Coupled Quintessence", arxiv:1809.05109, *Phys. Rev.* **D100** (2019) 103504.

5. Cesar Agón and Albion Lawrence, "Divergences in Open Quantum Systems", arxiv:1709.10095, *J. High Energy Phys.* **1804** (2018) 08.

6. Guido D'Amico, Nemanja Kaloper, and Albion Lawrence, "Monodromy Inflation at Strong Coupling: 4π in the Sky", arxiv:1709.07014, *Phys. Rev. Lett.* **121** (2018) 091301.

7. Vijay Balasubramanian, Albion Lawrence, Andrew Rolph, and Simon Ross. "Entanglement Shadows in LLM Geometries", arXiv:1704.03448 (2017), *J. High Energy Phys.* **1711** (2017) 159.

8. Nemanja Kaloper and Albion Lawrence, "London Equation for Monodromy Inflation", arxiv:1607.06105. *Phys. Rev.* **D95** (2017) 063526.

9. Nemanja Kaloper, Matthew Kleban, Albion Lawrence, and Martin Sloth, "Large Field Inflation and Gravitational Entropy", arxiv:1511.05119, *Phys. Rev.* **D93** (2016) 043510.

10. Albion Lawrence and Masoud Soroush, "$N = (4, 4)$ Vector Multiplets on Curved Two-Manifolds", arxiv:1509.00890, *J. Math. Phys.* **57** (2016) 042301.

11. Cesar Agon, Vijay Balasubramanian, Skyler Kasko, and Albion Lawrence, "Coarse Grained Quantum Dynamics", arxiv:1412.3148. *Phys. Rev.* **D98** (2018) 025019.

12. Matthew Headrick, Veronika Hubeny, Albion Lawrence, and Mukund Rangamani, "Causality & Holographic Entanglement Entropy", arxiv:1408.6300, *J. High Energy Phys.* **1412** (2014) 162.

13. Nemanja Kaloper and Albion Lawrence, "Natural Chaotic Inflation and Ultraviolet Sensitivity", arXiv:1404.2912, *Phys. Rev.* **D90** (2014) 023506. Phys. Rev. D "Editor's Suggestion".

14. Matthew Kleban, Albion Lawrence, Matthew Roberts, and Stefano Storace, "Metastability and Instability in Holographic Gauge Theories", arXiv:1312.1312, *J. High Energy Phys.* **1406** (2014) 152.

15. Vijay Balasubramanian, Monica Guica, and Albion Lawrence, "Holographic Interpretations of the Renormalization Group", arxiv:1211.1729, *J. High Energy Phys.* **1301** (2013) 115.

16. Matthew Headrick, Albion Lawrence, and Matthew M. Roberts, "Bose-Fermi duality and entanglement entropies", arxiv:1209.2428, *J. Stat. Mech.* **1302** (2013) P02022.

17. Albion Lawrence, "θ-angle monodromy in two dimensions", arxiv:1203.6656, *Phys. Rev.* **D85** (2012) 105029.

18. Sergei Dubovsky, Albion Lawrence, and Matthew Roberts, "Axion monodromy in a model of holographic gluodynamics", arxiv:1105.3740, *J. High Energy Phys* **1202** (2012) 053.

19. Nemanja Kaloper, Albion Lawrence, and Lorenzo Sorbo, "An ignoble approach to large field inflation", arxiv:1101.0026, *J. Cosmol. and Astropart. Phys.* **1103** (2011) 023.

20. Allan Adams, Albion Lawrence, and Ian Swanson, "Exact null tachyons from RG flows", arxiv:0907.4651, *Phys. Rev.* **D80** (2009) 106005.

21. Gary Horowitz, Albion Lawrence, and Eva Silverstein, "Insightful D-branes", arxiv:0904.3922, *J. High Energy Phys.* **0907** (2009) 057.

22. Albion Lawrence, "F-term SUSY breaking and moduli", arxiv:0808.1126, *Phys. Rev.* **D79** (2009) 101701.

23. Albion Lawrence, Tobias Sander, Michael B. Schulz, and Brian Wecht, "Torsion and supersymmetry breaking", arxiv:0711.4787. *J. High Energy Phys.* **0807:042** (2008).

24. Albion Lawrence and Amit Sever, "Scattering of twist fields from D-branes and orientifolds", arxiv:7076.3199, *J. High Energy Phys.* **0709:094** (2007).

25. Daniel Green, Albion Lawrence, John McGreevy, David R. Morrison, and Eva Silverstein, "Dimensional Duality", arXiv:0705.0550, *Phys. Rev.* **D76** (2007) 066004.

26. Matthias Gaberdiel and Albion Lawrence, "Bulk perturbations of $N = 2$ branes", hep-th/0702036, *J. High Energy Phys.* **0705:087** (2007).

27. Albion Lawrence and Amit Sever, "Holography and renormalization in Lorentzian signature", hep-th/0606022, *J. High Energy Phys.* **0610:013** (2006).

28. Albion Lawrence, Michael B. Schulz, and Brian Wecht, "D-branes in nongeometric backgrounds", hep-th/0602025, *J. High Energy Phys.* **0607:038** (2006).

29. Daniel Z. Freedman, Matthew Headrick, and Albion Lawrence, "On closed string tachyon dynamics", hep-th/0508126 (2005), *Phys. Rev.* **D73** (2006) 066015.

30. Martin Kruczenski and Albion Lawrence, "Random walks and the Hagedorn transition", hep-th/0510126, *J. High Energy Phys.* **0607:031** (2006).

31. Albion Lawrence and John McGreevy, "D-terms and D-strings in open string models"; hep-th/0409284, *J. High Energy Phys.* **0410** (2004) 056.

32. Albion Lawrence and John McGreevy, "Remarks on branes, fluxes and soft SUSY breaking"; hep-th/0401233, published in the proceedings of the 3rd International Symposium on Quantum Theory and Symmmetries (QTS3), Cincinnati, Ohio.

33. Albion Lawrence and John McGreevy, "Local string models of soft supersymmetry breaking"; hep-th/0401034, *J. High Energy Phys.* **0406** (2004) 007.

34. Nemanja Kaloper, Matthew Kleban, Albion Lawrence, Stephen Shenker and Leonard Susskind, "Initial Conditions for Inflation", hep-th/0209231, *J. High Energy Phys.* **0211** (2002) 037.

35. Albion Lawrence, "On the stability of three-dimensional null singularities"; hep-th/0205288, *J. High. Energy Phys.* **0211** (2002) 019.

36. Nemanja Kaloper, Matthew Kleban, Albion Lawrence and Stephen Shenker, "Signatures of short distance physics in the cosmic microwave background radiation"; hep-th/0201158, *Phys. Rev.* **D66** (2002) 123510.

37. Simeon Hellerman, Shamit Kachru, Albion Lawrence and John McGreevy, "Linear sigma models for open strings"; hep-th/0109069, *J. High. Energy Phys.* **0207** (2002) 002.

38. Savas Dimopoulos, Shamit Kachru, Nemanja Kaloper, Albion Lawrence and Eva Silverstein, "Generating small numbers by tunnelling in multithroat compactifications"; hep-th/0106128, *Int. J. Mod. Phys.* **A19** (2004) 2657.

39. Savas Dimopoulos, Shamit Kachru, Nemanja Kaloper, Albion Lawrence and Eva Silverstein, "Small numbers from tunnelling between brane throats"; hep-th/0104239, *Phys. Rev.* **D64** (2001) 121702.

40. Paul S. Aspinwall and Albion Lawrence, "Derived categories and zero-brane stability"; hep-th/0104147, *J. High. Energy. Phys.* **0108** (2001) 004.

41. Matthew Kleban, Albion Lawrence and Stephen Shenker, "Closed strings from nothing"; hep-th/0012081, *Phys. Rev.* **D64** (2001) 066002.

42. Shamit Kachru, Sheldon Katz, Albion Lawrence and John McGreevy, "Mirror symmetry for open strings"; hep-th/0006047, *Phys. Rev.* **D62** (2000) 126005.

43. Shamit Kachru, Sheldon Katz, Albion Lawrence and John McGreevy, "Open string instantons and superpotentials"; hep-th/9912151, *Phys. Rev.* **D62** (2000) 026001.

44. Ilka Brunner, Michael R. Douglas, Albion Lawrence and Christian Römelsberger, "D-branes on the quintic"; hep-th/9906200, *J. High. Energy. Phys.* **0008** (2000) 015.

45. Vijay Balasubramanian, Steven B. Giddings and Albion Lawrence, "What do CFTs tell us about anti-de Sitter spacetimes?"; hep-th/9902052, *J. High. Energy Phys.* **0003** (1999) 001.

46. Vijay Balasubramanian, Per Kraus, Albion Lawrence and Sandip Trivedi, "Holographic probes of anti-de Sitter spacetimes"; hep-th/9808017, *Phys Rev.* **D59** (1999) 104021.

47. Vijay Balasubramanian, Per Kraus and Albion Lawrence, "Bulk vs. boundary dynamics in anti-de Sitter spacetimes"; hep-th/9805171, *Phys Rev.* **D59** (1999) 046003.

48. Albion Lawrence, Nikita Nekrasov and Cumrun Vafa, "On conformal field theories in four dimensions"; hep-th/9803015, *Nucl. Phys.* **B533** (1998) 199.

49. Shamit Kachru, Albion Lawrence and Eva Silverstein, "On the matrix description of Calabi-Yau compactifications"; hep-th/9712223, *Phys. Rev. Lett.* **80** (1998) 2996. See also the description in "Physical Review Focus", http://focus.aps.org/v1/st7.html.

50. Albion Lawrence and Nikita Nekrasov, "Instanton sums and five-dimensional gauge theories"; hep-th/9706025, *Nucl. Phys.* **B513** (1998) 239.

51. Albion Lawrence, "The target space geometry of N=(2,1) string theory"; hep-th/9605223, U. Chicago Ph.D. thesis, *Class. Quant. Grav.* **14** (1997) 309.

52. Albion Lawrence and Emil J. Martinec, "String field theory in curved spacetime and the resolution of spacelike singularities"; hep-th/9509149, *Class. Quant. Grav.* **13** (1996) 63.

53. Albion Lawrence and Emil J. Martinec, "Black hole evaporation along macroscopic strings"; hep-th/9312127, *Phys. Rev.* **D50** (1994) 2680.

Conference and workshop presentations, 2015-present

Feb. 2020	Ocean Sciences 2020 meeting, San Diego, CA. Poster: "Seasonality and Spatial Dependence of Meso- and Submesoscale Currents from Along-Track Satellite Altimetry".
June 2019	Atmospheric and Oceanic Fluid Dynamics (AOFD19) conference, Portland, ME. Poster: "Seasonality and Spatial Dependence of Meso- and Submesoscale Currents from Along-Track Satellite Altimetry".
April 2017	Michigan Center for Theoretical Physics Spring Symposium: "Foundations of String Cosmology". Talk: "Effective Field Theories of Axion Monodromy."
January 2017	US-India ASI, "Classical and Quantum Information", ICTS, Bangalore, India. Lecture: "Introduction to Quantum Entanglement".
October 2016	Field theory Anthropics and Naturalness in CosmologY (FANCY) workshop, CP3-Origins, Southern Denmark University, Odense. Title: "The Effective Field Theory of Axion Monodromy Inflation".
August 2016	NORDITA workshop "Black Holes and Emergent Spacetime", Stockholm, Sweden. Title: "Coarse Grained Dynamics and Holography".
April 2016	Northeast Gravity Workshop, U Mass Amherst, Amherst, MA. Talk: "Axion-driven Inflation and Quantum Gravity".

Invited Seminars, 2015-present

Oct. 2019	U. Mass Boston Physics Colloquium, Boston, MA. Title: "Inflation and Quantum Gravity".
Dec. 2018	Stanford Institute for Theoretical Physics Colloquium, Stanford, CA. Title: "Entanglement and Coarse-Grained Quantum Dynamics."
Feb. 2018	Joint Tufts/MIT Cosmology Seminar, Tufts University, Medford, MA. Title: "Effective field theory for axion monodromy inflation".
Feb. 2018	Theoretical Physics Seminar, U Mass Lowell, Lowell, MA. Title: "Entanglement and Coarse-Grained Quantum Dynamics."
April 2017	Northeastern University Physics Department Colloquium. "Cosmic Inflation and Quantum Gravity".
Jan. 2017	ICTS String Theory seminar, Bangalore, India. "Entanglement and Coarse Grained Quantum Dynamics".
Dec. 2016	TIFR High Energy Theory seminar, Mumbai, India. "A London Equation for Axion Monodromy".
Sept. 2016	Brandeis Physics Department Colloquium. "Cosmic Inflation and Quantum Gravity".
Dec. 2015	Columbia Theory Seminar. "Large Field Inflation and Gravitational Entropy".
Dec. 2015	UIUC Mathematical and Theoretical Physics Seminar, "Large Field Inflation and Gravitational Entropy".
Sept. 2015	Maryland Center for Fundamental Physics colloquium. "Entanglement and Coarse-Grained Quantum Dynamics".