



Curriculum Vitæ

Evan Berkowitz

Office: Institut für Kernphysik 7.1
Forschungszentrum Jülich
Wilhelm-Johnen-Straße
52428 Jülich, Germany

Email: evan.berkowitz@gmail.com
e.berkowitz@fz-juelich.de

Office: +49 2461 61-4356

URLs: [arXiv](#), [inspireHEP](#), [R^G](#)
[google scholar](#), [ORCID](#)
evanberkowitz.com

Education

- 2008-2013 *University of Maryland, College Park.*
Ph.D. in Physics. Awarded 19 May 2013.
- 2004-2008 *Massachusetts Institute of Technology.*
SB in Physics, GPA of 4.8/5.0.
- 1998-2004 *Hunter College High School, New York City, New York.*
Graduated with honors in mathematics and physics.

Current Position

Staff Scientist, Institut für Kernphysik, Institute for Advanced Simulation, and Jülich Supercomputing Center, Forschungszentrum Jülich

- ◇ Machine learning for sign problems in lattice field theory, computational lattice field theory and nuclear physics.

Positions Held

- 2019-2021 *Research Assistant Professor*, Maryland Center for Fundamental Physics
University of Maryland, College Park
- ◇ Lattice QCD for one- and two-nucleon systems, lattice-improved finite-volume formulae, machine learning for sign problems in the Hubbard model.
- 2016-2019 *Postdoctoral Researcher*, Institut für Kernphysik & Institute for Advanced Simulation,
Forschungszentrum Jülich
- ◇ Neutrinoless double beta decay, nucleon structure, gauge-gravity duality, Hubbard model and carbon nanosystems, client software for supercomputer users.
- 2013-2016 *Postdoctoral Researcher* — Lattice Group, Nuclear and Chemical Sciences Division, Physical and Life Sciences Directorate, Lawrence Livermore National Laboratory, Livermore CA.
- ◇ New techniques for studying few-nucleon systems via lattice QCD, including parity-odd scattering channels, lattice QCD input to axion cosmology, precision tests of gauge/gravity duality.
- 2008-2013 *Graduate Research Assistant* — Theoretical Quarks, Hadrons, and Nuclei, Maryland Center for Fundamental Physics.
- ◇ Topological solitons in CFL quark matter, unusual phases of condensed nuclei with applications for helium white dwarfs.

Grants, Honors & Awards

- 2024 6.25M CPU + 5.00M GPU core-hours as PI for *Carbon Nano-Structures with High-Performance Computing*, Jülich Supercomputing Center
- 2023 12M CPU + 2.5M GPU core-hours as PI for *Carbon Nano-Structures with High-Performance Computing*, Jülich Supercomputing Center
- 2022 14.5M CPU + 2.5M GPU core-hours as PI for *Carbon Nano-Structures with High-Performance Computing*, Jülich Supercomputing Center
- 2020 500k Summit node-hours as co-PI for *The Structure and Interactions of Nucleons from the Standard Model*, INCITE 2020
- 2019 4.5M core-hours as PI for *Hadrons in Extreme Conditions*, Jülich Supercomputing Center
- 2019 700k Summit node-hours as co-PI for *The Proton's Structure and the Search for New Physics*, INCITE 2019
- 2018 *Dr. Klaus Erkelenz Preis*, for “*Aspects of Nuclear Physics from Lattice QCD*”.
- 2018 *Gordon Bell Award Finalist* for *Simulating the weak death of the neutron in a femtoscale universe with near-Exascale computing*.
- 2018 2.1M core-hours as PI for *Hypernuclei and the Three-Neutron System from Lattice QCD*, Jülich Supercomputing Center
- 2018 65M hours as co-PI for *A Variational Determination of Two-Nucleon Elastic Scattering at $m_\pi \sim 220$ MeV from Lattice QCD*, NERSC 2018 ERCAP Allocation
- 2017 11.3M core-hours as PI for *Hypernuclei and the Three-Neutron System from Lattice QCD*, Jülich Supercomputing Center
- 2017 3M core-hours as co-PI for *Scaling Lattice QCD Calculations for Leadership Computing Facilities*, OLCF Director's Discretionary Time
- 2017 6.5M Hours as co-PI for *Implementing Improved Operators for Lattice QCD Calculations of Two-Nucleon Elastic Scattering*, NERSC 2017 ERCAP Allocation
- 2016 *Honorable Mention* in the 2016 Gravity Research Foundation Awards for Essays on Gravitation for *A Microscopic Description of Black Hole Evaporation via Holography*
- 2016 64M core-hours as co-PI for *First Lattice QCD calculation of the I=2 Two-Nucleon Parity Violating Amplitude*, INCITE 2016
- 2015 17.46M CPU-Hours as co-PI for *First Lattice QCD Calculation of the I=2 Two-Nucleon Parity Violating Amplitude*, NERSC 2015 ERCAP Allocation
- Fall 2014 10M CPU-Hours as co-PI for *Lattice QCD Investigation of Hadronic Parity Violation*, NERSC 2014 Allocation
- Spring 2013 *Ann G. Wylie Dissertation Fellowship*, University of Maryland
- 2011-2012 *JSA/Jefferson Lab Graduate Fellow*
- 2009-2013 *Research Assistanship*, Theoretical Quarks, Hadrons, and Nuclei Research Group
- 2008-2010 *Departmental Fellowship*, Physics Department, University of Maryland
- 2008 $\Sigma\Pi\Sigma$, Massachusetts Institute of Technology

Teaching

- Fall 2022 *Lecturer* — for one third of Physics 760, Computational Physics, a course for physics masters students at the University of Bonn.
- Spring 2021 *Instructor of Record* — for Physics 373, Mathematical Methods for Physics II, a course for physics majors.
- Fall 2019 *Substitute lecturer* — for Physics 270, the third semester physics course for engineers.
- Fall 2019 *Substitute lecturer* — for Graduate Classical Mechanics at the University of Maryland, College Park.
- Summer 2018 *Instructor* — for Physics 653 Seminar on Symmetries and Symmetry Breaking in Particle and Nuclear Physics, University of Bonn.
- Winter 2017 *Substitute Lecturer* — for Theoretical Hadron Physics at the University of Bonn, covering spon-

- taneous symmetry breaking, Goldstone's theorem and chiral symmetry in QCD.
- 2009-2013 *Substitute Lecturer* — prepare and deliver lectures to graduate classes in electrodynamics and quantum mechanics.
 - Spring 2009 *Mechanics and Particle Dynamics* — Teaching Assistant for one section of introductory physics for engineers.
 - Spring 2009 *Inquiry into Physics* — In-class teaching assistant for introductory physics for elementary educators, focusing on qualitative physical understanding via lab-based learning.
 - Fall 2008 *Fundamentals of Physics I* — Teaching assistant in for two peer-discussion, tutorial-style sections of introductory physics primarily for pre-med students.
 - Summer 2005 *PADI Open Water Diver Course* — Instructor and certifier of record for 31 Open Water and Junior Open Water Divers, teaching academic and practical SCUBA diving knowledge.

Citation Information

As of September 2023:

According to [inspireHEP](#) my h_{HEP} -index is 20, with a total of 1326 citations to 57 papers; [Google Scholar](#) estimates 1349 citations and $h = 19$. My most-cited paper is *A per-cent-level determination of the nucleon axial coupling from quantum chromodynamics* [34] which appeared in *Nature* in 2018 and describes a precision computation of the nucleon axial coupling g_A from the theory of quarks and gluons. Then comes *Lattice QCD Input for Axion Cosmology* [11] which was the first paper to use lattice techniques to compute the high-temperature topological susceptibility that controls the axion mass (from Yang-Mills, rather than full QCD), which kicked off a little cottage industry of papers. Both have more than 100 citations.



My next most influential papers are *Two-Nucleon Higher Partial-Wave Scattering from Lattice QCD* [12], where we first used lattice methods to compute parity-odd partial wave scattering data (at $m_\pi \simeq 800$ MeV) and *Precision lattice test of the gauge/gravity duality at large- N* [19], a numerical test of the holographic principle, comparing supergravity to matrix quantum mechanics.

I try to keep my author pages on [the arXiv](#), [Google Scholar](#), [Research Gate](#) and my [ORCID 0000-0003-1082-1374](#) current and also have some code available on [github](#). An upper bound on my [Erdős number](#) is 5.

Code

I try to follow [FAIR](#) research practices and produce free software. I have contributed to a wide variety of scientific codes; I highlight a few here where I am either the primary author and architect, a major contributor, or supervising a student. I have much more on [github](#); I would be happy to discuss my contributions to some private repositories if need be. I have experience with OpenMP, MPI, OpenACC, and CUDA though I prefer higher-level programming. I can program in C/C++, Mathematica, python, scheme, MATLAB, \LaTeX , and bash. I'm familiar with java, perl, and fortran.

Arranged (roughly) reverse-chronologically

- [supervillain](#)  — Sampling from modified Villain actions [59]. python, numpy, GPLv3.
- [tdg](#)  — Auxiliary-field quantum Monte Carlo for two-dimensional atomic and nuclear gasses [50]. python, torch, GPLv3.
- [qm-luescher-example](#) — Pedagogical introduction to Lüscher's finite-volume method for converting finite-volume spectra into scattering data. Used for instruction at Lattice Practices.
- [NSL](#) — Auxiliary-field quantum Monte Carlo for carbon nanosystems and the Hubbard model. C++, libtorch, GPLv3.

METAQ — Facilitates using large allocations for naively-parallelizable tasks. Used for many LQCD projects below. Coverage in [The Next Platform](#). bash, GPLv3.

isle — Auxiliary-field quantum Monte Carlo testbed for incorporating machine learning [41,49,57,58]. C++, python, [blaze](#), MIT.

CNS — Large-scale auxiliary-field quantum Monte Carlo carbon nanosystems [48,54,60]. C++, OpenMP+MPI; private.

bps — Easily and programmatically back up to tape archives common on some HPC systems. python, MIT. Used for a private tape-backup python package.

lalibe (*a descendant of latscat*) — Lattice QCD measurement code for one- and few-body correlation functions [33,34,35,37,38,46,47,]. C++, MPI

littlewood — visualizes roots of classes of polynomials in the complex plane; a recreational project. python, GPLv3.

Publications

- [62] Johann Ostmeyer, Lado Razmadze, Evan Berkowitz, Thomas Luu, and Ulf-G. Meißner. [Effective theory for graphene nanoribbons with junctions](#). *Phys. Rev. B*, 109(19):195135, 2024, [cond-mat.mes-hall/2401.04715](#).
- [61] Marcel Rodekamp, Evan Berkowitz, Maria Dincă, Christoph Gäntgen, Stefan Krieg, and Thomas Luu. [From Theory to Practice: Applying Neural Networks to Simulate Real Systems with Sign Problems](#). *PoS, LATTICE2023:031*, 2024, [cond-mat.str-el/2311.18312](#).
- [60] Christoph Gäntgen, Evan Berkowitz, Thomas Luu, Johann Ostmeyer, and Marcel Rodekamp. [Reducing the Sign Problem with simple Contour Deformation](#). *PoS, LATTICE2023:007*, 2024.
- [59] Evan Berkowitz, Aleksey Cherman, and Theodore Jacobson. Exact lattice chiral symmetry in 2d gauge theory. *submitted to Phys. Rev. D*, 10 2023, [hep-lat/2310.17539](#).
- [58] Christoph Gäntgen, Evan Berkowitz, Thomas Luu, Johann Ostmeyer, and Marcel Rodekamp. Fermionic Sign Problem Minimization by Constant Path Integral Contour Shifts. *under review in Phys. Rev. B*, 7 2023, [2307.06785](#).
- [57] Marcel Rodekamp, Evan Berkowitz, Christoph Gäntgen, Stefan Krieg, Thomas Luu, and Johann Ostmeyer. [Mitigating the Hubbard Sign Problem with Complex-Valued Neural Networks](#). *Phys. Rev. B*, 106(12):125139, 3 2022, [physics.comp-ph/2203.00390](#).
- [56] Amy Nicholson, Evan Berkowitz, John Bulava, Chia Cheng Chang, M.A. Clark, Andrew D. Hanlon, Ben Hörz, Dean Howarth, Christopher Körber, Wayne Taie Lee, Aaron S. Meyer, Henry Monge-Camacho, Colin Morningstar, Enrico Rinaldi, Pavlos Vranas, and André Walker-Loud. Toward a resolution of the NN controversy. 12 2021, [hep-lat/2112.04569](#).
- [55] Aaron S. Meyer, Evan Berkowitz, Chris Bouchard, Chia Cheng Chang, M.A. Clark, Ben Hörz, Dean Howarth, Christopher Körber, Henry Monge-Camacho, Amy Nicholson, Enrico Rinaldi, Pavlos Vranas, and André Walker-Loud. Nucleon Axial Form Factor from Domain Wall on HISQ. Nov 2021, [hep-lat/2111.06333](#).
- [54] Johann Ostmeyer, Evan Berkowitz, Stefan Krieg, Timo A. Lähde, Thomas Luu, and Carsten Urbach. [The Antiferromagnetic Character of the Quantum Phase Transition in the Hubbard Model on the Honeycomb Lattice](#). *Phys. Rev. B*, 104:155142, Oct 2021, [cond-mat.str-el/2105.06936](#).

- [53] Jinchun He, David A. Brantley, Chia Cheng Chang, Ivan Chernyshev, Evan Berkowitz, Dean Howarth, Christopher Körber, Aaron S. Meyer, Henry Monge-Camacho, Enrico Rinaldi, Chris Bouchard, M.A. Clark, Arjun Singh Gambhir, Christopher J. Monahan, Amy Nicholson, Pavlos Vranas, and André Walker-Loud. Detailed analysis of excited state systematics in a lattice QCD calculation of g_A . *Phys. Rev. C*, 105:065203, 2022, [hep-lat/2104.05226](#).
- [52] Nolan Miller, Logan C. Carpenter, Evan Berkowitz, Chia Cheng Chang, Ben Hörz, Dean Howarth, Henry Monge-Camacho, Enrico Rinaldi, David A. Brantley, Christopher Körber, Chris Bouchard, M.A. Clark, Arjun Singh Gambhir, Christopher J. Monahan, Amy Nicholson, Pavlos Vranas, and André Walker-Loud. Scale setting the Möbius Domain Wall Fermion on gradient-flowed HISQ action using the omega baryon mass and the gradient-flow scale w_0 . *Phys. Rev. D*, 103:054511, Mar 2021, [hep-lat/2011.12166](#).
- [51] Ben Hörz, Dean Howarth, Enrico Rinaldi, Andrew Hanlon, Chia Cheng Chang, Christopher Körber, Evan Berkowitz, John Bulava, M.A. Clark, Wayne Tai Lee, Colin Morningstar, Amy Nicholson, Pavlos Vranas, and André Walker-Loud. Two-nucleon S-wave interactions at the $SU(3)$ flavor-symmetric point with $m_{ud} \simeq m_s^{\text{phys}}$: a first lattice QCD calculation with the stochastic Laplacian Heaviside method. *Phys. Rev. C*, 103(1):014003, 2021, [hep-lat/2009.11825](#).
- [50] Andrei Alexandru, Paulo Bedaque, Evan Berkowitz, and Neill C Warrington. Structure Factors of Neutron Matter at Finite Temperature. *Phys. Rev. Lett.*, 126:132701, Apr 2020, [nucl-th/2008.02824](#).
- [49] Jan-Lukas Wynen, Evan Berkowitz, Stefan Krieg, Thomas Luu, and Johann Ostmeyer. Leveraging Machine Learning to Alleviate Hubbard Model Sign Problems. *Phys. Rev. B*, 103:125153, Mar 2021, [cond-mat.str-el/2006.11221](#).
- [48] Johann Ostmeyer, Evan Berkowitz, Stefan Krieg, Timo A. Lähde, Thomas Luu, and Carsten Urbach. The Semimetal-Mott Insulator Quantum Phase Transition of the Hubbard Model on the Honeycomb Lattice. *Phys. Rev. B*, 102:245105, Dec 2020, [cond-mat.str-el/2005.11112](#).
- [47] Nolan Miller, Henry Monge-Camacho, Chia Cheng Chang, Ben Hörz, Enrico Rinaldi, Dean Howarth, Evan Berkowitz, David A. Brantley, Arjun Singh Gambhir, Christopher Körber, Christopher J. Monahan, M.A. Clark, Bálint Joó, Thorsten Kurth, Amy Nicholson, Kostas Orginos, Pavlos Vranas, and André Walker-Loud. F_K/F_π from Möbius Domain-Wall fermions solved on gradient-flowed HISQ ensembles. *Phys. Rev. D*, 102:034507, Aug 2020, [hep-lat/2005.04795](#).
- [46] André Walker-Loud, Evan Berkowitz, David A. Brantley, Arjun Gambhir, Pavlos Vranas, Chris Bouchard, Chia Cheng Chang, M. A. Clark, Nicolas Garron, Bálint Joó, Thorsten Kurth, Henry Monge-Camacho, Amy Nicholson, Christopher J. Monahan, Kostas Orginos, and Enrico Rinaldi. Lattice QCD Determination of g_A . 2019, [hep-lat/1912.08321](#).
- [45] Christopher Körber, Evan Berkowitz, and Thomas Luu. Renormalization of a Contact Interaction on a Lattice. 2019, [hep-lat/1912.04425](#).
- [44] Johann Ostmeyer, Evan Berkowitz, Thomas Luu, Marcus Petschlies, and Ferenc Pittler. The Ising Model with Hybrid Monte Carlo. *Computer Physics Communications*, page 107978, 2019, [physics.comp-ph/1912.03278](#).
- [43] Evan Berkowitz, William Donnelly, and Sylvia Zhu. Superfluous Physics. 2019, [hep-th/1903.12201](#).

- [42] Amy Nicholson, Evan Berkowitz, Henry Monge-Camacho, David Brantley, Nicolas Garron, Chia Cheng Chang, Enrico Rinaldi, M.A. Clark, Bálint Joó, Thorsten Kurth, Brian C. Tiburzi, Pavlos Vranas, and André Walker-Loud. Symmetries and Interactions from Lattice QCD. *CIPANP2018*, 2018, [hep-lat/1812.11127](#).
- [41] Jan-Lukas Wynen, Evan Berkowitz, Christopher Körber, Timo A. Lähde, and Thomas Luu. Avoiding Ergodicity Problems in Lattice Discretizations of the Hubbard Model. *Phys. Rev. B*, B100(7):075141, 2019, [cond-mat.str-el/1812.09268](#).
- [40] Evan Berkowitz, David Brantley, Kenneth McElvain, André Walker-Loud, Chia Cheng Chang, M.A. Clark, Thorsten Kurth, Bálint Joó, Henry Monge-Camacho, Amy Nicholson, Enrico Rinaldi, and Pavlos Vranas. Progress in Multibaryon Spectroscopy. *PoS(LATTICE 2018)003*, 2018, [hep-lat/1902.09416](#).
- [39] Jan-Lukas Wynen, Evan Berkowitz, Thomas Luu, Andrea Shindler and John Bulava. Three neutrons from Lattice QCD. *PoS(LATTICE 2018)092*, 2018, [hep-lat/1810.12747](#).
- [38] Arjun Singh Gambhir, David Brantley, Pavlos Vranas, Evan Berkowitz, Chia Cheng Chang, M.A. Clark, Thorsten Kurth, André Walker-Loud, Chris Monahan, Amy Nicholson, and Enrico Rinaldi. The Stochastic Feynman-Hellman Method. *PoS(LATTICE 2018)126*, [hep-lat/1905.03355](#).
- [37] Henry Monge-Camacho, David Brantley, Amy Nicholson, Brian Tiburzi, Chia Cheng Chang, Evan Berkowitz, Thorsten Kurth, André Walker-Loud, M.A. Clark, Pavlos Vranas, Enrico Rinaldi, and Nicolas Garron. Short Range Operator Contributions to $0\nu\beta\beta$ decay from LQCD. *PoS(LATTICE 2018)263*, 2018, [hep-lat/1904.12055](#).
- [36] Evan Berkowitz, Gustav Jansen, Kenneth McElvain, and André Walker-Loud. Job Management with `mpi_jm`. In Shalf Yokota, Weiland and Alam, editors, *proceedings of the International Conference on High Performance Computing*, pages 432–439. Springer International Publishing, 2018.
- [35] Evan Berkowitz, M.A. Clark, Arjun Gambhir, Ken McElvain, Amy Nicholson, Enrico Rinaldi, Pavlos Vranas, André Walker-Loud, Chia Cheng Chang, Bálint Joó, Thorsten Kurth, Kostas Orginos. Simulating the weak death of the neutron in a femtoscale universe with near-Exascale computing. In *SC18: International Conference for High Performance Computing, Networking, Storage and Analysis*, pages 697–705, 2018, [hep-lat/1810.01609](#). 2018 Gordon Bell Finalist.
- [34] Chia Cheng Chang, Amy Nicholson, Enrico Rinaldi, Evan Berkowitz, Nicholas Garron, David A. Brantley, H. Monge-Camacho, Chris Monahan, Chris Bouchard, M.A. Clark, Bálint Joó, Thorsten Kurth, Kostas Orginos, Pavlos Vranas, and André Walker-Loud. A per-cent-level determination of the nucleon axial coupling from Quantum Chromodynamics. *Nature*, 558:91–94, 2018, [hep-lat/1805.12130](#).
- [33] Amy Nicholson, Evan Berkowitz, Henry Monge-Camacho, David Brantley, N. Garron, Chia Cheng Chang, Enrico Rinaldi, M.A. Clark, Bálint Joó, Thorsten Kurth, Brian Tiburzi, Pavlos Vranas, and André Walker-Loud. Heavy Physics Contributions to Neutrinoless Double Beta Decay from QCD. *Phys. Rev. Lett.*, 121:172501, Oct 2018, [nucl-th/1805.02634](#).
- [32] Evan Berkowitz, Masanori Hanada, Enrico Rinaldi and Pavlos Vranas. Gauged and ungauged: a nonperturbative test. *Journal of High Energy Physics*, 2018(6):124, Jun 2018, [hep-th/1802.02985](#).
- [31] Chia Cheng Chang, Amy Nicholson, Enrico Rinaldi, Evan Berkowitz, Nicolas Garron, David Brantley, Henry Monge-Camacho, Chris Monahan, Chris Bouchard, M.A. Clark,

- Bálint Joó, Thorsten Kurth, Kostas Orginos, Pavlos Vranas, and André Walker-Loud. Nucleon axial coupling from Lattice QCD. *EPJ(Lattice 2017)21*, 2017, [hep-lat/1710.06523](#).
- [30] Evan Berkowitz, Christopher Körber, Stefan Krieg, Peter Labus, Timo Lähde, and Thomas Luu. Extracting the single-particle gap in Carbon nanotubes with Lattice Quantum Monte Carlo. *EPJ(Lattice 2017)319*, 2017, [hep-lat/1710.06213](#).
- [29] Christopher Körber, Evan Berkowitz, and Thomas Luu. Hubbard-Stratonovich-like Transformations for Few-Body Interactions. *EPJ(Lattice 2017)133*, 2017, [nucl-th/1710.03126](#).
- [28] Evan Berkowitz, Amy Nicholson, Chia Cheng Chang, Enrico Rinaldi, M.A. Clark, Bálint Joó, Thorsten Kurth, Pavlos Vranas, and André Walker-Loud. Calm Multi-Baryon Operators. *EPJ(Lattice 2017)344*, 2017, [hep-lat/1710.05642](#).
- [27] Evan Berkowitz, Gustav R. Jansen, Kenneth McElvain, and André Walker-Loud. Job Management and Task Bundling. *EPJ(Lattice 2017)335*, 2017, [hep-lat/1710.01986](#).
- [26] Enrico Rinaldi, Evan Berkowitz, Masanori Hanada, Jonathan Maltz, and Pavlos Vranas. Toward Holographic Reconstruction of Bulk Geometry from Lattice Simulations. *Journal of High Energy Physics*, 2:42, 2018, [hep-th/1709.01932](#).
- [25] Christopher Körber, Evan Berkowitz, and Thomas Luu. Sampling General N-Body Interactions with Auxiliary Fields. *EPL (Europhysics Letters)*, 119(6):60006, 2017, [nucl-th/1706.06494](#).
- [24] Evan Berkowitz, David Brantley, Chris Bouchard, Chia Cheng Chang, M. A. Clark, Nicholas Garron, Bálint Joó, Thorsten Kurth, Chris Monahan, Henry Monge-Camacho, Amy Nicholson, Kostas Orginos, Enrico Rinaldi, Pavlos Vranas, and André Walker-Loud. An Accurate Calculation of the Nucleon Axial Charge with Lattice QCD. 2017, [hep-lat/1704.01114](#).
- [23] Evan Berkowitz. *METAQ: Bundle Supercomputing Tasks*. 2017, [physics.comp-ph/1702.06122](#).
- [22] Evan Berkowitz, Chris Bouchard, Chia Cheng Chang, M. A. Clark, Bálint Joó, Thorsten Kurth, Christopher Monahan, Amy Nicholson, Kostas Orginos, Enrico Rinaldi, Pavlos Vranas, and André Walker-Loud. Möbius Domain-Wall fermions on gradient-flowed dynamical HISQ ensembles. *Phys. Rev. D*, 96:054513, Sep 2017, [hep-lat/1701.07559](#).
- [21] Amy Nicholson, Evan Berkowitz, Chia Cheng Chang, M. A. Clark, Balint Joo, Thorsten Kurth, Enrico Rinaldi, Brian Tiburzi, Pavlos Vranas, Andre Walker-Loud. Neutrinoless double beta decay from lattice QCD. *PoS(LATTICE 2016)017*, 2016, [hep-lat/1608.04793](#).
- [20] Evan Berkowitz. Supergravity from Gauge Theory. *PoS(LATTICE 2016)238*, 2016, [hep-lat/1608.01951](#).
- [19] Evan Berkowitz, Enrico Rinaldi, Masanori Hanada, Goro Ishiki, Shinji Shimasaki, and Pavlos Vranas. Precision lattice test of the gauge/gravity duality at large N . *Phys. Rev. D*, 94:094501, Nov 2016, [hep-lat/1606.04951](#).
- [18] Evan Berkowitz, Enrico Rinaldi, Masanori Hanada, Goro Ishiki, Shinji Shimasaki, Pavlos Vranas. Supergravity from Do-brane Quantum Mechanics. 2016, [hep-th/1606.04948](#).
- [17] Evan Berkowitz, Masanori Hanada, and Jonathan Maltz. A Microscopic Description of Black Hole Evaporation via Holography. *International Journal of Modern Physics D*, 2016, [hep-th/1603.03055](#). Honorable Mention in Gravity Research Foundation 2016 Essay Competition.

- [16] Evan Berkowitz, Masanori Hanada, and Jonathan Maltz. [Chaos in Matrix Models and Black Hole Evaporation](#). *Phys. Rev. D*, 94:126009, Dec 2016, [hep-th/1602.10473](#).
- [15] Amy Nicholson, Evan Berkowitz, Enrico Rinaldi, Pavlos Vranas, Thorsten Kurth, Bálint Joó. [Two-nucleon scattering in multiple partial waves](#). *PoS(LATTICE 2015)083*, 2015, [hep-lat/1511.02262](#).
- [14] Thorsten Kurth, Evan Berkowitz, Enrico Rinaldi, Pavlos Vranas, Amy Nicholson, Mark Strother, and André Walker-Loud. [Nuclear Parity Violation from Lattice QCD](#). *PoS(LATTICE 2015)329*, 2015, [hep-lat/1511.02260](#).
- [13] Evan Berkowitz. [Lattice QCD and Axion Cosmology](#). *PoS(LATTICE 2015)236*, 2015, [hep-lat/1509.02976](#).
- [12] Evan Berkowitz, Thorsten Kurth, Amy Nicholson, Bálint Joó, Enrico Rinaldi, Mark Strother, Pavlos M. Vranas, and André Walker-Loud. [Two-Nucleon Higher Partial-Wave Scattering from Lattice QCD](#). *Physics Letters B*, 765:285 – 292, 2017, [hep-lat/1508.00886](#).
- [11] Evan Berkowitz, Michael I. Buchoff, and Enrico Rinaldi. [Lattice QCD Input for Axion Cosmology](#). *Phys. Rev.*, D92:034507, 2015, [hep-ph/1505.07455](#).
- [10] Appelquist *et al.* (The Lattice Strong Dynamics Collaboration). [Detecting Stealth Dark Matter Directly through Electromagnetic Polarizability](#). *Phys. Rev. Lett.*, 115:171803, Oct 2015, [hep-ph/1503.04205](#). PRL Editor’s Suggestion.
- [9] Appelquist *et al.* (The Lattice Strong Dynamics Collaboration). [Composite Bosonic Baryon Dark Matter on the Lattice: SU\(4\) Baryon Spectrum and the Effective Higgs Interaction](#). *Phys. Rev.*, D89:094508, 2014, [hep-lat/1402.6656](#).
- [8] Evan Berkowitz. [Some Novel Phenomena at High Density](#). PhD thesis, University of Maryland, College Park, April 2013. <http://drum.lib.umd.edu/handle/1903/14096>.
- [7] Evan Berkowitz, Thomas D. Cohen, and Patrick Jefferson. [Multi-channel S-Matrices From Energy Levels In Finite Boxes](#). 2012, [hep-lat/1211.2261](#).
- [6] Paulo F. Bedaque, Evan Berkowitz, and Srimoyee Sen. [Thermodynamics of Nuclear Condensates and Phase Transitions in White Dwarfs](#). *Phys. Rev.*, D89(4):045010, 2012, [astro-ph.HE/1206.1059](#).
- [5] Paulo F. Bedaque, Evan Berkowitz, and Aleksey Cherman. [Neutrino Emission from Helium White Dwarfs with Condensed Cores](#). 2012, [nucl-th/1203.0969](#).
- [4] Paulo F. Bedaque, Evan Berkowitz, Geoffrey Ji, and Nathan Ng. [Electron Shielding of Vortons in High-Density Quark Matter](#). *Phys. Rev. D*, 85:043008, Feb 2012, [nucl-th/1112.1386](#).
- [3] Paulo F. Bedaque, Evan Berkowitz, and Srimoyee Sen. [Stable Vortex Loops in Two-Species BECs](#). *Journal of Physics B: Atomic, Molecular and Optical Physics*, 45(22):225301, 2012, [cond-mat.quant-gas/1111.4507](#).
- [2] Paulo F. Bedaque, Evan Berkowitz, and Aleksey Cherman. [Nuclear Condensate and Helium White Dwarfs](#). *The Astrophysical Journal*, 749(1):5, 2012, [nucl-th/1111.1343](#).
- [1] Paulo F. Bedaque, Evan Berkowitz, and Aleksey Cherman. [Vortons in Dense Quark Matter](#). *Phys. Rev. D*, 84(2):023006, Jul 2011, [nucl-th/1102.4795](#).

Invited Talks

- October 2023 *Introduction to Scattering Amplitudes from Lattice QCD*, [Lattice Practices School](#), DESY, Berlin, Germany
- September 2023 *Fermi Gases in Two Dimensions*, Center for Computational Quantum Physics, Flatiron Institute, New York, NY
- September 2023 *Fermi Gases in Two Dimensions*, Emergent Phenomena of Strongly-Interacting Conformal Field Theories and Beyond, Aspen Center for Physics, Aspen, CO
- September 2023 *Learning about the Hubbard Model*, Machine Learning for Lattice Field Theory and Beyond, ECT*, Trento, Italy
- April 2022 *Computational Physics for Strongly-Coupled Quantum Systems*, The Cooper Union, New York
- December 2021 *The Semimetal-Mott Insulator Phase Transition of the Hubbard Model*, Center for Theory of Quantum Matter, University of Colorado, Boulder.
- November 2020 *The Semimetal-Mott Insulator Phase Transition of the Hubbard Model*, University of Liverpool Fundamental Particle Physics Virtual Seminar.
- July 2020 *Weak Decays from Lattice QCD*, New Mexico State University Virtual Seminar.
- April 2019 *Lattice QCD and Nuclear Probes of BSM Physics*, [Atomic Nuclei as Laboratories for BSM Physics](#), ECT*, Trento, Italy.
- January 2019 *Neutrinoless Double Beta Decay and Lattice QCD*, Williams College, Williamstown, Massachusetts.
- December 2018 *Hadronic Parity Violation and Lattice QCD*, [Particle Physics with Neutrons at the ESS](#), Nordita, Stockholm, Sweden.
- December 2019 *The Nucleon Axial Coupling g_A from QCD*, [Quantum Theory Seminar](#), Friedrich-Schiller-Universität Jena, Jena, Germany.
- November 2018 *The Nucleon Axial Coupling g_A from QCD*, [Dr. Klaus Erkelenz Preis Seminare](#), Helmholtz-Institut für Strahlen- und Kernphysik, Universität Bonn, Bonn, Germany.
- October 2018 *The Nucleon Axial Coupling g_A from QCD*, [Particle Physics with Cold and Ultracold Neutrons](#), Physikzentrum Bad Honnef, Bad Honnef, Germany.
- October 2018 *Multi-nucleon Systems*, [School on Lattice Practices 2018](#), Jülich Supercomputing Center, Jülich, Germany.
- August 2018 *Progress in Two-Nucleon Spectroscopy*, [XIIIth Quark Confinement and the Hadron Spectrum](#), Maynooth, Ireland.
- July 2018 *Progress in Two-Nucleon Spectroscopy*, Plenary session of the [36th Annual International Symposium on Lattice Field Theory](#), East Lansing, Michigan.
- June 2018 *Job Management and Task Bundling*, [International Workshop on OpenPOWER for HPC 2018](#), Frankfurt, Germany.
- May 2018 *Probing Do-brane Black Holes*, [Numerical Approaches to Holography, Quantum Gravity, and Cosmology](#), Higgs Centre for Theoretical Physics, The University of Edinburgh, Edinburgh, Scotland.
- February 2018 *Neutrinoless Double Beta Decay at Lattice QCD*, [Physics Colloquium](#), San Diego State University, San Diego, California.
- February 2018 *Black Holes and Supersymmetric Do-Brane Quantum Mechanics*, [Nonperturbative and Numerical Approaches to Quantum Gravity, String Theory, and Holography](#), International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, Bangalore, India.
- November 2017 *Lattice QCD Input to Axion Cosmology*, [Axions at the Crossroads: QCD, dark matter, astrophysics](#), ECT*, Trento, Italy.
- June 2017 *The Nucleon Axial Coupling from QCD*, [Seminare Institut für Theoretische Physik II](#), Ruhr-Universität Bochum, Bochum, Germany.
- June 2017 *Neutrinoless Double Beta Decay and Lattice QCD*, [Seminare Helmholtz-Institut für Strahlen- und Kernphysik](#), Universität Bonn, Bonn, Germany.
- May 2017 *The Nucleon Axial Coupling from QCD*, [OLCF Users Meeting](#), Oak Ridge National Laboratory, Oak Ridge, Tennessee.
- May 2017 *The Nucleon Axial Coupling from Lattice QCD*, [Low Energy Probes of New Physics](#), Mainz Insti-

tute for Theoretical Physics, Johannes Gutenberg Universität Mainz, Mainz, Germany.

- May 2017 *Neutrinoless Double Beta Decay and Lattice QCD, Matter over Antimatter: The Sakharov Conditions after 50 Years*, Lorentz Center, Universiteit Leiden, Leiden, The Netherlands.
- February 2017 *Neutrinoless Double Beta Decay and Lattice QCD, ACFI Seminar*, Amherst Center for Fundamental Interactions, UMass Amherst, Amherst, MA.
- August 2015 *Lattice QCD Input to Axion Cosmology, Workshop on Microwave Cavity Design for Axion Detection*, Lawrence Livermore National Laboratory, Livermore, CA.
- April 2013 *Nuclear Condensation of Dense Helium*, Triangle Nuclear Theory Colloquium, NC State, Raleigh, NC.
- December 2012 *Nuclear Condensation of Dense Helium*, Nuclear physics seminar, Stony Brook University, Stony Brook, NY.
- December 2012 *Nuclear Condensation of Dense Helium*, Nuclear & High Energy Physics Seminar, Lawrence Livermore National Laboratory, Livermore, CA.

Conferences, Programs, Meetings & Workshops

- October 2023 *Lattice Practices School*, DESY, Berlin, Germany
- September 2023 *Emergent Phenomena of Strongly-Interacting Conformal Field Theories and Beyond*, Aspen Center for Physics, Aspen, CO
- August 2023 *LATTICE 2023*, Fermilab, Batavia, IL
- June 2023 *Machine Learning for Lattice Field Theory and Beyond*, ECT*, Trento, Italy
- August 2022 *LATTICE 2022*, University of Bonn, Bonn, Germany
- June 2022 *Connections between cold atoms and nuclear matter: From low to high energies*, ECT*, Trento, Italy
- April 2019 *Atomic Nuclei as Laboratories for BSM Physics*, ECT*, Trento, Italy
- December 2018 *Particle Physics with Neutrons at the ESS*, Nordita, Stockholm, Sweden
- October 2018 *Particle Physics with Cold and Ultracold Neutrons*, Physikzentrum Bad Honnef, Bad Honnef, Germany
- October 2018 *School on Lattice Practices 2018*, Jülich Supercomputing Center, Jülich, Germany.
- September 2018 *Quantum Gravity meets Lattice QFT*, ECT*, Trento, Italy
- August 2018 *XIII Quark Confinement and the Hadron Spectrum*, Maynooth University, Maynooth, Ireland
- July 2018 *LATTICE 2018*, East Lansing, Michigan
- July 2018 *XXII International Conference on Few-Body Problems in Physics (FB22)*, Caen, France
- June 2018 *International Workshop on OpenPOWER for HPC 2018*, Frankfurt, Germany
- May 2018 *Numerical Approaches to Holography, Quantum Gravity and Cosmology*, Higgs Centre for Theoretical Physics, University of Edinburgh, Edinburgh, Scotland
- January 2018 *Nonperturbative and Numerical Approaches to Quantum Gravity, String Theory, and Holography*, International Center for Theoretical Sciences, Tata Institute of Fundamental Research, Bangalore, India
- December 2017 *Technical Advances in Lattice Field Theory*, CP3-Origins, Odense, Denmark
- November 2017 *Axions at the Crossroads: QCD, dark matter, astrophysics*, ECT*, Trento, Italy
- October 2017 *Computational Sciences and Reality*, Physikzentrum Bad Honnef, Bad Honnef, Germany
- July 2017 *Neutrinoless Double Beta Decay INT-17-2a and INT-17-67W*, Institute for Nuclear Theory, Seattle, Washington
- June 2017 *LATTICE 2017*, Granada, Spain
- Spring 2017 *OLCF Users Meeting*, Oak Ridge National Laboratory, Oak Ridge, Tennessee
- Spring 2017 *Matter over Antimatter: The Sakharov Conditions After 50 Years*, Lorentz Center, Universiteit Leiden, Leiden, The Netherlands
- Summer 2016 *Frontiers in Nuclear Physics*, Kavli Institute for Theoretical Physics, Santa Barbara, California
- July 2016 *LATTICE 2016*, University of Southampton, Southampton, United Kingdom
- Spring 2016 *Nuclear Physics from Lattice QCD INT-16-1*, Institute for Nuclear Theory, Seattle, Washington
- October 2015 *Intersections of BSM Phenomenology and QCD for New Physics Searches INT-15-3*, Institute for Nuclear Theory, Seattle, Washington

- July 2015 *Numerical Approaches to the Holographic Principle, Quantum Gravity and Cosmology*, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan
- July 2015 *LATTICE 2015*, Kobe, Japan
- April 2015 *Lattice for Beyond the Standard Model Physics*, Lawrence Livermore National Laboratory, Livermore, California
- December 2014 *USQCD QUDA Workshop*, Fermilab, Batavia IL.
- July 2014 *2014 SciDAC PI Meeting*, Office of Advanced Scientific Computing Research, Washington, DC
- June 2014 *LATTICE 2014*, Columbia University, New York NY
- December 2013 *Lattice Meets Experiment 2013: Beyond the Standard Model*, Brookhaven National Laboratory, Brookhaven, New York
- March 2013 *Nuclear Reactions From Lattice QCD INT-13-53W*, Institute for Nuclear Theory, Seattle, Washington.
- July 2010 *International Nuclear Physics Conference*, University of British Columbia, Vancouver, Canada.
- June 2010 *National Nuclear Physics Summer School and TRIUMF Summer Institute*, TRIUMF, Vancouver, Canada.
- May 2010 *Workshop on Large N Gauge Theories*, University of Maryland, College Park, Maryland.

Service

- Ongoing *Referee* — Journal of Physics B: AMO Physics, Physical Reviews B & D, Journal of High-Energy Physics, Frontiers in Nuclear Physics, Computer Physics Communications.
- Spring 2019 *Organizer, March for Science, Köln* — graphic design, social media, outreach.
- Spring 2018 *Organizer, March for Science, Köln* — graphic design, social media, outreach.
- Spring 2017 *Organizer, March for Science, Bonn* — helped with logistics, volunteers, speakers, etc.
- April 2015 *Organizer, Lattice for Beyond the Standard Model Physics Workshop, LLNL* — ran a three-day workshop for high-energy theorists, string theorists, and lattice QCD practitioners.
- November 2014 *Volunteer, Bay Area Science Festival* — helping attendees navigate and otherwise enjoy the festival.
- March 2014 *Judge and Team Leader, Contra Costa County Science and Engineering Fair* — judging awards for 7th and 8th grade student projects regarding the physical sciences.
- Spring 2013 *Judge, Northern Virginia Regional Science and Engineering Fair* — deciding awards for 11th and 12th grade students on behalf of the MIT Club of DC.
- Fall 2010 *Seminar Organizer* — planning and organizing the joint seminar for the nuclear theory and experimental groups.
- Spring 2010 *Judge, Montgomery County Science Fair* — on behalf of the MIT Alumni Association.
- 2008-2009 *Volunteer, Physics is Phun* — setting up and guiding hands-on demos before the main program of the UMD outreach program targeted at middle- and high-school students.
- 2006-2007 *Volunteer, Harvard-MIT Mathematics Tournament* — preparing classrooms, directing participants to rooms, and providing other logistical support for the joint Harvard-MIT Math Tournament for high school students.

Skills & Interests

Computer Languages — C, C++, Mathematica, Python, Scheme, MATLAB, L^AT_EX, bash, HTML/PHP. Familiar with Java, Perl, Fortran. Capable in domain specific software: QDP++, Chroma, pytorch.

Language — Hablo un poco español, und ich spreche ein bisschen Deutsch.

PADI Open Water Scuba Instructor — #192443.

Diversions — skiing, cycling, hiking, rock climbing, billiards, puzzles and games, and sailing.

Press

- *Dr. Klaus Erkelenz Preis an Herausragenden Physiker Vergeben*, an article in the *Jahresbericht Bonner Universitätsstiftung* 2018.
- Jens Kube, *Wie lange lebt ein Neutron?*, *Magazin effzett*, April 2019 [English version: *How long does a neutron live?*].
- Reinhard Breuer, *Rätselhafte Atombausteine*, *Bild der Wissenschaft*, December 2018.
- *Improved Nuclear Physics Code for Supercomputing Demonstrated by Award Finalists*, technology.org, 6 November 2018.
- Ben Cotton, *Increasing HPC Utilization with Meta-Queues*, *The Next Platform*, 20 March 2017.
- Физики описали испарение черной дыры в нульмерные объекты, Lenta.ru, 20 March 2016.
- *New Particle Born Inside Helium White Dwarf Stars, Say Physicists* *Technology Review arXiv Blog*, 11 November 2011.

