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Dr. Jesse R. Stryker

Curriculum vitae

[Updated: 2025/07/15]

Employment

2023– **Post-Doctoral Scholar**, Physics Division, Berkeley Lab (LBNL)
Supervisor: Christian Bauer

2020–2023 **Post-Doctoral Associate**, Maryland Center for Fundamental Physics, University of Maryland (UMD), College Park
Supervisor: Zohreh Davoudi

2016–2020 **US NSF Graduate Research Fellow**, Institute for Nuclear Theory (INT), University of Washington (UW), Seattle
Supervisor: David B. Kaplan

2015–2016 **Research Assistant**, Nuclear Theory Group, UW
Supervisor: Gerald A. Miller

2014–2016 **Teaching Assistant**, Dept. of Physics, UW

2012–2014 **Undergraduate Research Assistant**, Dept. of Physics, ASU
Supervisor: Ricardo Alarcón

2012–2013 **Undergraduate Teaching Assistant**, Dept. of Physics, ASU

Degrees

2020 **Physics, Ph.D.**, UW
Ph.D. advisor: David B. Kaplan, Dissertation: "Compiling quantum gauge theories for quantum computation"

2014 **Physics, B.S.**, Barrett, The Honors College at Arizona State University (ASU)
Summa cum laude. Honors thesis advisor: Ricardo Alarcón

2014 **Mathematics, B.S.**, ASU

2014 **Italian (Minor)**, ASU
Italian CEFR level C1 certification

Publications & E-Prints

See inspirehep.net/authors/1589984 or end of document.

Affiliations and Community Service

2025 **QuantHEP Conference**, *Co-organizer*, Berkeley Lab

2024 **European Physical Journal**, *Distinguished EPJ Referee 2023*

2022 **Nuclear Theory Seminar Series**, *Organizer*, Maryland Center for Fundamental Physics, UMD

2020–2021 **Women in Physics***, *Mentor*, UMD
* Now known as Physicists of Underrepresented Genders

2020 **Nature Communications**, *Referee*, Nature

2019 **Quantum Information & Computation**, *Referee*, Rinton Press

2019–2020 **Graduate Students of Color in Astronomy & Physics**, *Founding member*, UW

2015–2018 **Physics Graduate Student Council**, *Colloquium committee representative*, UW

2015–2016 **UW Science Explorers**, *Outreach volunteer*

2014–2017 **Achievement Rewards for College Scientists (ARCS) Foundation - Seattle Chapter**, *Fellow*

2013– **Phi Beta Kappa National Honor Society**, ASU

2012– **Gamma Kappa Alpha National Italian Honors Society**, ASU

2008–2009 **AVID**, *Volunteer/Tutor*, Mesa High School

Honors and Awards

2019 **Student Fellowship**, Lattice 2019 conference

2016–2020 **NSF Graduate Research Fellowship**, US National Science Foundation

2014–2018 **ARCS Scholar Award**, Achievement Rewards for College Scientists Foundation Seattle Chapter
Benefactors: Lee H. and Michael W. Brown

2013 **Travel & Lodging Award**, APS Div. of Nucl. Phys. Conference Experience for Undergraduates

2012 **Summer Study Abroad Scholarship**, Barrett, The Honors College at ASU

2011 **John C. Wheatley Undergraduate Research Scholarship**, ASU Physics

2010–2014 **President Barack Obama Scholarship**, ASU

2010–2014 **New American University Scholarship**, *President's Award*, ASU

2010 **Advanced Placement Scholar with Honor Award**, The College Board

2009 **Bausch & Lomb Honorary Science Award**, Mesa High School

Supplementary Education

2017 **MITP Summer School: Joint Challenges for Cosmology and Colliders**, Mainz Institute for Theoretical Physics, Mainz, Germany

2014 **Study Abroad: Italian Language**, *ASU/Edulingua*, San Severino Marche, Macerata, Italy

2012 **Honors Summer Study Abroad**, *ASU*, Paris, France

Presentations

Invited

2025/07/15 **Seminar**, *Berkeley Quantum P.I. meeting*, Berkeley Lab
"Progress on Hamiltonian-based calculations of quantum chromodynamics"

2024/12/03 **Workshop talk**, *High Energy Physics in the Quantum Era*, KEK Tsukuba Campus, Tsukuba, Japan
"Progress on Hamiltonian-based calculations for gauge theories"

2024/10/09 **Seminar**, InQubator for Quantum Simulation at UW Seattle
"Loop-string-hadron approach to SU(3) lattice Yang-Mills theory: Gauge invariant Hilbert space of a trivalent vertex"

2024/05/12 **Lectures**, *Advanced Lectures in Physics in Switzerland I*, SwissMAP Research Station, Les Diablerets, Switzerland
"Quantum computing and quantum simulation"

2023/11/15 **Workshop talk**, *AI and Quantum Information for Particle Physics*, Korea Advanced Institute of Science and Technology
"Expressing non-Abelian gauge-field dynamics in the quantum age"

2023/10/16 **Seminar**, *4D seminar*, University of California Berkeley
"Developing the language for gauge field dynamics in the quantum age"

2023/06/26 **Lectures**, *Quantum Computing Boot Camp 2023*, Jefferson Lab
"Introduction to lattice gauge theories and Hamiltonian formulation"

2023/06/06 **Workshop talk**, *Nuclear and particle physics on a quantum computer: Where do we stand now?*, European Center for Theoretical Studies in Nuclear Physics and Related Areas (ECT*)
"Quantum simulating non-Abelian lattice gauge theories: gauge invariance, point splitting, and magnetic interactions"

2023/05/30 **Seminar**, *Kang group meeting*, University of California Los Angeles (online)
"Quantum algorithms for Hamiltonian simulation of non-Abelian interactions"

2023/04/20 **Workshop talk**, *Toward Quantum Advantage in High-Energy Physics*, Max Planck Institute of Quantum Optics
"Formal and algorithmic developments for quantum-simulating non-Abelian and higher-dimensional gauge theories"

2023/04/05 **Seminar**, InQubator for Quantum Simulation (online)
"Loop-string-hadron formulation of an SU(3) gauge theory with dynamical quarks"

2023/03/03 **Nuclear Theory Seminar**, Brookhaven National Laboratory
"Loop-string-hadron formulation of an SU(3) gauge theory with dynamical quarks"

2023/03/01 **Nuclear Theory Seminar**, Stony Brook University
"Quantum algorithms for Hamiltonian simulation of a non-Abelian gauge theory"

2023/02/27 **Quantum Journal Club**, Brookhaven National Laboratory
"Simulating non-Abelian interactions with universal quantum computers"

2022/07/28 **Quantum Computing for High-Energy Physics Seminar**, Berkeley Lab
"Circuitizing product formulas for lattice gauge theories in electric eigenbases"

2022/06/16 **Tutorial sessions**, *EuroPLEx Summer School 2022*, Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain
Two tutorials on digital quantum simulation of lattice gauge theories

2021/11/19 **High Energy Theory, Cosmology, and Quantum Information Science Seminar**, Syracuse University
"Progress in the Trotterization of gauge-invariant field interactions"

2021/11/12 **Near-term Quantum Algorithms Seminar**, Co-design Center for Quantum Advantage (online)
"Progress in the Trotterization of gauge-invariant field interactions"

2021/07/15 **Lectures**, *Quantum Computing Internship for Physics Undergraduates*, Fermilab (online)
"Two-qubit quantum gates"

2021/04/06 **Workshop talk**, *Quantum Simulation of Strong Interactions (QuaSI) Workshop 1*, Institute for Quantum Simulation, UW (online)
"Abelian gauge invariance in wave functions and time evolution"

2021/03/10 **Special seminar**, Berkeley Lab (online)
"Gauge invariant Trotterization via shears"

2021/02/17 **Special seminar**, Iowa State Univ. (online)
"Gauge invariant Trotterization via shears"

2021/02/16 **Math, Physics, and Operator Theory Seminar**, Univ. of Iowa (online)
"Gauge invariant Trotterization via shears"

2020/11/23 **Quantum Journal Club**, Brookhaven National Laboratory (online)
"QIS-oriented primer on Hamiltonian lattice gauge theories"

2020/09/18 **Nuclear Theory Seminar**, Brookhaven National Laboratory (online)
"Loop, string, and hadron dynamics in Hamiltonian lattice gauge theories"

2020/08/06 **Lattice Group Meeting**, CERN (online)
"Loop, string, and hadron dynamics in Hamiltonian lattice gauge theories"

2019/11/19 **Triangle Nuclear Theory Seminar**, Duke University
"SU(2) gauge theory on digital quantum computers"

2019/11/14 **Special seminar**, Perimeter Institute
"SU(2) gauge theory on digital quantum computers"

2019/11/13 **Special seminar**, Institute for Quantum Computing, Univ. of Waterloo
"SU(2) gauge theory on digital quantum computers"

2019/11/05 **Special seminar**, Fermilab Theory Division
"SU(2) gauge theory on digital quantum computers"

2019/10/30 **Workshop talk**, *Quantum Computing Mini-Workshop*, Berkeley Lab
"SU(2) gauge theory on digital quantum computers"

2019/09/26 **Nuclear Theory Seminar**, *Maryland Center for Fundamental Physics*, UMD
"SU(2) gauge theory on digital quantum computers"

2019/05/02 **Workshop talk**, *Lattice for Beyond the Standard Model Physics 2019*, Syracuse University
"Quantum simulation of lattice gauge theories"

2019/03/20 **Nuclear Physics Seminar**, Lawrence Livermore National Laboratory
"Digital quantum simulation of lattice gauge theories"

2019/01/24 **Workshop talk**, *Quantum Computing and Information for Nuclear Physics Pre-Pilot Meeting*, Santa Fe, New Mexico
"Gauge theory and digital quantum simulation"

2018/09/12 **Workshop talk**, *Next Steps in Quantum Science for HEP*, Fermilab
"Gausss law and Hilbert space constructions for U(1) lattice gauge theories"

Contributed

2024/08/02 **Lattice 2024**, *Parallel session*, University of Liverpool
"Loop-string-hadron approach to the SU(3) gauge invariant Hilbert space"

2023/01/31 **Quantum Information Science for US Nuclear Physics Long Range Planning**, *Short talk*, Santa Fe, New Mexico
"Towards calculating first-principles strong interactions on universal quantum computers"

2022/08/11 **Lattice 2022**, *Parallel session*, University of Bonn
"Circuitizing product formulas for (1+1)D SU(2) lattice gauge theories: Lessons from alternative formulations"

2021/07/26 **Lattice 2021**, *Parallel session*, Massachusetts Institute of Technology (online)
"Quantum algorithm for simulation of an SU(2) lattice gauge theory with fermions"

2020/10/31 **APS Div. of Nucl. Phys. Fall Meeting**, *Parallel session*, Louisiana State Univ. (online)
"Loop, string, and hadron dynamics in Hamiltonian lattice gauge theories"

2019/06/19 **Lattice 2019**, *Parallel session*, Central China Normal University
"Tailoring nonabelian gauge theory for digital quantum simulation"

2018/07/25 **Lattice 2018**, *Parallel session*, Michigan State University
"Gausss law, duality, and the Hamiltonian framework of U(1) lattice gauge theory"

2014/04/04 **ASU Dept. of Phys. 11th Annual Undergrad. Research Symposium**, *Talk*
"Implementation of a prototype aerogel RICH detector for cosmic rays"

2013/10/24 **American Physical Society Div. of Nucl. Phys. Fall Meeting**, *Poster*
"Implementation of a prototype aerogel RICH detector"

Peer-reviewed works:

[1] S.V. Kadam, A. Naskar, I. Raychowdhury, & JRS. *Loop-string-hadron approach to SU(3) lattice Yang-Mills theory: Hilbert space of a trivalent vertex.*
[2407.19181] DOI:10.1103/PhysRevD.111.074516 | Phys.Rev.D 111 (2025) 7, 074516.

[2] Z. Davoudi, A.F. Shaw, & JRS. *General quantum algorithms for Hamiltonian simulation with applications to a non-Abelian lattice gauge theory.*
[2212.14030] DOI:10.22331/q-2023-12-20-1213 | Quantum 7 (2023) 1213.

[3] S.V. Kadam, I. Raychowdhury, & JRS. *Loop-string-hadron formulation of an SU(3) gauge theory with dynamical quarks.*
[2212.04490] DOI:10.1103/PhysRevD.107.094513 | Phys.Rev.D 107 (2023) 9, 094513.

[4] JRS. *Shearing approach to gauge-invariant Trotterization.*
[2105.11548] DOI:10.1103/bkpq-166n | Phys.Rev.D 112 (2025) 1, 014508

[5] A.F. Shaw, P. Lougovski, JRS, & N. Wiebe. *Quantum algorithms for simulating the lattice Schwinger model.*
[2002.11146] DOI:10.22331/q-2020-08-10-306 | Quantum 4 (2020) 306.

[6] I. Raychowdhury & JRS. *Loop, string, and hadron dynamics in SU(2) Hamiltonian lattice gauge theories.*
[1912.06133] DOI:10.1103/PhysRevD.101.114502 | Phys.Rev.D 101 (2020) 11, 114502.

[7] N. Klco, M.J. Savage, & JRS. *SU(2) non-Abelian gauge field theory in one dimension on digital quantum computers.*
[1908.06935] DOI:10.1103/PhysRevD.101.074512 | Phys.Rev.D 101 (2020) 7, 074512.

[8] I. Raychowdhury & JRS. *Solving Gauss's law on digital quantum computers with loop-string-hadron digitization.*
[1812.07554] DOI:10.1103/PhysRevResearch.2.033039 | Phys.Rev.Res. 2 (2020) 3, 033039.

[9] JRS. *Oracles for Gauss's law on digital quantum computers.*
[1812.01617] DOI:10.1103/PhysRevA.99.042301 | Phys.Rev.A 99 (2019) 4, 042301.

[10] D.B. Kaplan & JRS. *Gauss's law, duality, and the Hamiltonian formulation of U(1) lattice gauge theory.*
[1806.08797] DOI:10.1103/PhysRevD.102.094515 | Phys.Rev.D 102 (2020) 9, 094515.

[11] JRS & G.A. Miller. *Proton charge extensions.*
[1508.06680] DOI:10.1103/PhysRevA.93.012509 | Phys.Rev.A 93 (2016) 1, 012509.

Non-peer-reviewed works:

[12] E. Mathew, N. Gupta, Saurabh V. Kadam, A. Bapat, JRS, Z. Davoudi, & I. Raychowdhury. *Tensor-network toolbox for probing dynamics of non-Abelian gauge theories.*
[2501.18301] DOI:10.22323/1.466.0472 | PoS LATTICE2024 (2025), 472.

[13] D. Beck, J. Carlson, et al. *Quantum Information Science and Technology for Nuclear Physics. Input into U.S. Long-Range Planning, 2023.*
[2303.00113]

[14] D. Blyth, R. Alarcon, R. Begag, J. Holmes, & JRS. *Performance of new silica aerogels in a threshold Čerenkov counter.*
[1801.04047]

Full record at https://inspirehep.net/authors/1589984.