Sabin Thapa

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Summary

PhD candidate in Physics (Kent State University, exp. 2026) with hands-on C++/Python simulation work in high-energy/nuclear physics. Co-author on CPC/PRD software-driven papers (QTRAJ; quarkonium suppression). Experienced with hydrodynamics-coupled transport, Monte Carlo sampling/validation, robust binary IO, and HPC batch production on Linux. Clean, reproducible coding practices (version control, automated figure/analysis pipelines). Motivated to contribute to LHCb **Gauss/Gaussino** simulation, with growing exposure to ML/GPU acceleration and interest in Gaudi-based workflows.

Research Interests

High-Energy Physics (Heavy-Ion Collisions; QCD); transport equations; numerical simulation of open quantum systems (e.g., heavy quarkonia as QGP probes). Applications of quantum algorithms in HEP (e.g., quantum simulation of gauge theories).

Education

Kent State University, Kent, OH, USA *08/2019 – 08/2026 (expected)*
PhD in Physics (MA earned en route). Coursework: Advanced Quantum Mechanics; Quantum Field Theory & QCD; Numerical Computing; Solid State Physics; Statistical Physics; Electrodynamics (Classical & Quantum); Programming & Algorithms I; Algorithm Design & Analysis.
Advisors: Dr. Andrew Hanlon, Dr. Ramona Vogt, Prof. Michael Strickland.

Amrit Campus, Tribhuvan University, Nepal *08/2014 – 08/2018*
B.Sc. in Physics (Distinction; batch topper). Minors: Mathematics (Advanced Calculus/Algebra; Real & Complex Analysis), Chemistry. Undergraduate thesis: Molecular Dynamics Simulation using GROMACS.

Publications

1. S. Thapa, R. Vogt, M. Strickland, R. Rapp, B. Wu, J. Boyd (in preparation). *Semi-classical treatment of bottomonium suppression in p–Pb collisions.*

2. M. Strickland, **S. Thapa**, R. Vogt (2024). *Bottomonium suppression in 5.02 and 8.16 TeV p–Pb collisions.* **Phys. Rev. D** 109, 096016. doi:10.1103/PhysRevD.109.096016

3. J. Boyd, **S. Thapa**, M. Strickland (2023). *Transverse momentum dependent feed-down fractions for bottomonium production.* **Phys. Rev. D** 108, 094024. doi:10.1103/PhysRevD.108.094024

4. M. Strickland, **S. Thapa** (2023). *Bottomonium Suppression at RHIC and LHC in an Open Quantum System Approach.* **Phys. Rev. D** 108, 014031. doi:10.1103/PhysRevD.108.014031

5. H. B. Omar, M. Á. Escobedo, A. Islam, M. Strickland, **S. Thapa**, P. V. Griend, J. H. Weber (2022). *QTRAJ 1.0: A Lindblad equation solver for heavy-quarkonium dynamics.* **Computer Physics Communications** 273.

Research & Teaching (combined) — Kent State University

Graduate Research & Teaching Assistant, 08/2019 – Present

- Heavy quarkonium (charmonia, bottomonia) production/suppression and transport in high-energy collisions; comparisons with LHC/RHIC data (CMS/ALICE/HEPData).
- C++/Python development for hydrodynamic-coupled transport and trajectory sampling; robust binary IO, unit handling, uncertainty propagation, and figure pipelines.
- Exploration of lattice QCD (hadron spectroscopy) with Dr. Andrew Hanlon.
- Quantum computing: adiabatic state preparation for SU(2) lattice gauge theory; exploring variational ground-state methods; study with Prof. Xiaojun Yao (Summer 2024).
- Teaching: General Physics I/II labs and lecture support; Physics 11030 (Seven Ideas that Shook the Universe); designed rubrics/troubleshooting guides and mentored students.

Conferences, Schools & Talks

- Grad Research Symposium, Kent State (Poster, 04/09/2025) — SU(2) ground-state prep (QC for HEP)
- APS Global Physics Summit (Talk, 03/18/2025) — Semi-classical bottomonium suppression (in prep)
- APS TGH Workshop (03/18/2025) — Bottomonium suppression in p–Pb
- IPAM Winter School, UCLA (02/03–05/2025) — QEC/suppression/mediation
- CNM: LHC to EIC (Talk, 01/13–16/2025) — Bottomonium suppression
- HEFTY Summer School & Collab. Mtg (Talks, 06/24–28/2024)
- Frontiers in Nuclear & Hadronic Physics (Talk, 02/26–03/08/2024)

Certifications

IBM Certified Associate Qiskit Developer; IBM Quantum Challenge (2023–2024); QWorld Global Quantum Scholarship (2023) — advanced topics incl. quantum information, algorithms, cryptography, sensing; photonic QC; Qiskit Global Summer School 2023 (completed all labs); Introduction to Quantum Computing (The Coding School, 2022).

Volunteering & Leadership

Coordinator, QNepal (QWorld) (2023–Present). Organized week-long quantum computing training (70+ participants); built a volunteer team for recurring events.
Co-founder, ASCOL Physics Society (2014–2018). Organized talks/workshops; 150+ students/teachers trained in computational physics.

Skills

Programming: C++, Python, Bash; Mathematica.
HEP tools (familiarity/used): ROOT, Pythia, Geant4, Trento, THERMINATOR.
Methods: Numerical simulation & analysis; statistical inference; uncertainty quantification.
Workflow/Tools: GitHub/GitLab (`sabinthapa100`); Linux; Slurm job arrays; data/figure pipelines.
Operating Systems: Linux, Windows, macOS.

Awards

Graduate Student Senate Research Award ($2,000) — quantum algorithms for HEP; SU(2) LGT on a quantum computer.
Golden Jubilee Scholarship (Indian Embassy, Kathmandu) — B.Sc. studies.

References

Dr. Andrew Hanlon
Assistant Professor, Physics, Kent State
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Dr. Ramona Vogt
Staff Scientist, LBNL; Adjunct Prof., UC Davis
vogt2@llnl.gov

Dr. Qiang Guan
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