Patrick Meade

C.N. Yang Institute for Theoretical Physics
Stony Brook University
Stony Brook, New York 11794
patrick.meade@stonybrook.edu

Academic Positions

- **Professor**
  C.N. Yang Institute for Theoretical Physics
  Stony Brook University
  January 2021-Current
- **Associate Professor**
  C.N. Yang Institute for Theoretical Physics
  Stony Brook University
  September 2015-Current
- **Assistant Professor**
  C.N. Yang Institute for Theoretical Physics
  Stony Brook University
  September 2009-September 2015
- **Visiting Member**
  School of Natural Sciences
  Institute for Advanced Study
  September 2009-January 2010
- **Member (Postdoctoral Fellow)**
  School of Natural Sciences
  Institute for Advanced Study
  September 2007-August 2009
- **Postdoctoral Fellow**
  Harvard University
  August 2006-August 2007

Education

- **Cornell University**, Ithaca, NY
  2002–2006
  PhD Theoretical Physics August 2006
  Advisor: Csaba Csáki
- **College of William & Mary**, Williamsburg, VA
  1998–2002
  BS Mathematics BS Physics
  Advisor: Christopher Carone

Professional Honors

- 2024 APS Fellow
- 2010 NSF CAREER award

Grants Awarded

- Brookhaven National Lab-Stony Brook University seed grant, "Seeding a Muon Collider for the Future", 2023
- co-PI NSF grant "Theoretical Physics" PHY-2210533

- senior investigator NSF grant "Theoretical Physics" PHY-1915093
- senior investigator NSF grant "Theoretical Physics" PHY-1620628
- PI NSF CAREER grant "Developing a Theoretical Understanding of the TeV Energy Scale from the LHC and Dark Matter ", PHY-1056833
- co-PI NSF grant "Elementary particles at colliders and in astrophysics", PHY-0653354

Professional Service

- DC HEP community advocacy trip 2021, 2024
- US Muon Collider R&D Coordination Group: Physics Case Development
- Invited talk to P5 Town Hall on "Physics case for the 10 TeV scale", BNL April 2023
- Snowmass 2021 Theory Frontier Coordinator for Muon Collider Forum
- Snowmass 2021 Energy Frontier Topical Group Convener: Higgs Boson as a portal to new physics
- ILC-IDT Physics & Detectors Working Group: Topical Group Convener for Higgs Properties
- 2021 member of DPF J.J. & Noriko Sakurai theory dissertation award selection committee
- 2016 LHC-Theory Initiative Postdoctoral Fellowship selection committee member
- Member of proposed REDTOP and MATHUSLA experiments
- contributor for HE-LHC, HL-LHC, European Strategy, FCC-ee/hh, CEPC, SPPC for various white/yellow papers, CDRs, working groups
- Prior panelist for NSF theory program
- Referee for Physical Review, JHEP, NSF, EJPC

Workshops/ Conferences Organized

- SEARCH conference, CERN, October 2025
- "Exploring the energy frontier with muon beams", June-July 2025
  Galileo Galilei Institute, Florence, Italy
- International Advisory Committee, "Muon4Future, June-July 2025, Venice, May 2024
- "Inaugural US Muon Collider Community Meeting", Fermilab, August 2024
- Parallel Session Organizer, ICHEP 2024, Prague, July 2024
- Parallel Session Organizer, LCWS 2024, Tokyo, July 2024
- Organizing Committee, Princeton US Muon Collider Organizational Workshop, February 2024
- "Traversing the Particle Physics Peaks - Phenomenology to Formal", July-August 2023
  Aspen Center for Physics
  with C. Cordova, I. Garcia Garcia, and S. Shao
- "Ending Inflation and the Hot Big Bang",
  Simons Center for Geometry & Physics workshop with P. Adshead, J. Heckman, M. Loverde, and S. Watson, June 2023
- International Advisory Committee, "Muon4Future", Venice, May 2023
- Program Committee, LHCP 2023, Belgrade, May 2023
- "Anomalies",
  Simons Center for Geometry & Physics workshop with S. Dawson, B.Dev, A. El-Khadra,S.Gori, A.Soni, and G. Sterman, March 2023
- Organizer Muon Collider Physics and Detector Workshop, Fermilab, Dec 2022

- Local Organizing Commitee and Program Committee member, Higgs 2021, Stony Brook, October 2021
- "Reaching New Summits: The LHC at Full Strength ", July-August 2017
  Aspen Center for Physics
  with R. Boughezal, M. Lisanti, M. Papucci, and M. Schwartz
- "SEARCH", September 2016
  Oxford University
  with M. Papucci, I. Shipsey and R. Sundrum
- "SEARCH", August 2013
  Stony Brook University
  with M. Papucci, and R. Sundrum
- "SEARCH", March 2012
  University of Maryland
  with M. Papucci, and R. Sundrum
- "Year One of the LHC", June-July 2011
  Aspen Center for Physics
  with M. Papucci, R. Sundrum, and J. Thaler

Invited Lecture Series

- "The Frontiers of Particle Theory"
  Theoretical Advanced Studies Institute (TASI) 2024
  University of Colorado at Boulder
  - Lectures on "Accelerating into the Future""
- "Golden Opportunities: Puzzles & Surprises - Past & Future "
  2022 SLAC Summer Institute
  - Lectures on "Fermion Generations (Theory)"
- "The Higgs State Fair"
  2021 SLAC Summer Institute
  - Lectures on "Higgs and Baryogenesis"
- "International Symposium on Physics Beyond the Standard Model"
  National Centre for Physics October 2014
  Islamabad, Pakistan
  - Lectures on "Physics Beyond the Standard Model"
- "BCVSPIN-MSPF-MITCHELL Joint School"
  BCVSPIN-DPYC 2014
  Colima, Mexico
  - Lectures on "Physics Beyond the Standard Model"
- "LHC Physics"
  Prospects in Theoretical Physics (PITP) 2013
  IAS, Princeton, NJ
  - Lectures on "New Physics - Electroweak Production"
- Nordic Winter School on Particle Physics and Cosmology 2013
  Skeikampen, Norway
  - Lectures on "Higgs physics and Beyond the Standard Model"
- "Physics of the Large and the Small"
  Theoretical Advanced Studies Institute (TASI) 2009
  University of Colorado at Boulder
  - Lectures on General Gauge Mediation

Papers

1. *"How charming can the Higgs be?"*,
   with A. Giannakopoulou and M. Valli
   arXiv eprint: 2410.05236
2. *"Higgs Physics at a $\sqrt{s} = 3$ TeV Muon Collider with detailed detector simulation"*,
   with P. Andreetto et al.
   arXiv eprint: 2405.19314
3. *"Precision Higgs width and couplings with a high energy muon collider"*,
   with M. Forslund
   JHEP 01 (2024) 182
4. *"Towards a muon collider"*,
   with C. Accettura, et al
   Eur.Phys.J.C 83 (2023) 9, 864
5. *"The Future of US Particle Physics - The Snowmass 2021 Energy Frontier Report"*,
   with M. Narain, et al
   arXiv eprint: 2211.11084
6. *"Report of the Topical Group on Higgs Physics for Snowmass 2021: The Case for Precision Higgs Physics"*,
   with S. Dawson, I. Ojalvo, C. Vernieri, et al
   arXiv eprint: 2209.07510
7. *"Muon Collider Forum Report"*,
   with K. Black, S. Jindariaini, D. Li, F. Maltoni, D. Stratakis et al
   JINST 19 (2024) 02, T02015
8. *"High precision Higgs from high energy muon colliders"*,
   with M. Forslund
   JHEP 08 (2022) 185
9. *"The science case for an intermediate energy advanced and novel accelerator linear collider facility"*,
   with S. Bulanov et al
   JINST 19 (2024) 01, T01010
10. *"Strategy for Understanding the Higgs Physics: The Cool Copper Collider"*,
    with S. Dasu et al
    JINST 18 (2023) 07, P07053
11. *"The REDTOP experiment: Rare η/η' Decays to Probe New Physics"*,
    with J. Elam et al
    arXiv eprint: 2203.07651
12. *"Recent Progres and Next Steps for the MATHUSLA LLP Detector"*,
    with C. Alpigiani et al
    arXiv eprint: 2203.08126
13. *"A Muon Collider Facility for Physics Discovery"*,
    with D. Stratakis et al
    arXiv eprint: 2203.08033
14. *"Promising Technologies and R&D Directions for Future Muon Collider Detectors"*,
    with S. Jindariani et al
    arXiv eprint: 2203.07224
15. *"The physics case of a 3 TeV muon collider stage"*,
    with J. de Blas, et al
    arXiv eprint: 2203.07261
16. *"Strange quark as a probe for new physics in the Higgs sector"*,
    with A. Albert, M.Baso, et al
    arXiv eprint: 2203.07535

17. *"The International Linear Collider: Report to Snowmass 2021*,
ILC International Development Team
arXiv eprint: 2203.07622

18. *"New physics searches at kaon and hyperon factories"*,
with E. Goudzovski, D. Redigolo, K. Tobioka et al.
Rept.Prog.Phys. 86 (2023) 1, 016201

19. *"The Muon Smasher's Guide"*,
with H. Al Ali, N. Arkani-Hamed, I. Banta et al.
Rept.Prog.Phys. 85 (2022) 8, 084201

20. *"Multi-Higgs Production Probes Higgs Flavor"*,
with D. Egana-Ugrinovic, S. Homiller
Phys.Rev.D 103 (2021) 115005

21. *"Light Scalars and the KOTO anomaly"*,
with D. Egana-Ugrinovic, S. Homiller
Phys.Rev.Lett. 124 (2020) 19, 191801

22. *"Higgs bosons with large couplings to light quarks "*,
with D. Egana-Ugrinovic, S. Homiller
Phys.Rev. D100 (2019) no.11, 115041

23. *"Measurement of the Triple Higgs Coupling at a HE-LHC "*,
with S. Homiller
JHEP 1903 (2019) 055

24. *"Aligned and Spontaneous Flavor Violation "*,
with D. Egana-Ugrinovic, S. Homiller
Phys.Rev.Lett. 123 (2019) no.3, 031802

25. *"Unrestored Electroweak Symmetry "*,
with H. Ramani
Phys.Rev.Lett. 122 (2019) no.4, 041802

26. *"Long-Lived Particles at the Energy Frontier: The MATHUSLA Physics Case "*,
with D. Curtin et al (Editor)
Rept.Prog.Phys. 82 (2019) 11, 116201

27. *"Higgs-Precision Constraints on Colored Naturalness "*,
with R.Essig, H.Ramani, and Y. Zhong
JHEP 1709 (2017) 085

28. *"Thermal Resummation and Phase Transitions "*,
with D. Curtin, H. Ramani
Eur.Phys.J. C78 (2018) no.9, 787

29. *"Multiboson interactions at the LHC"*,
with D. Green, M. Pleier
Rev.Mod.Phys. 89 (2017) no.3, 035008

30. *"Singlet Scalar Resonances and the Diphoton Excess"*,
with S. McDermott, H. Ramani
Phys.Lett. B755 (2016) 353-357

31. *"Precision diboson measurements and the interplay of pT and jet-veto resummations"*,
with P. Jaiswal, H. Ramani
Phys.Rev. D93 (2016) no.9, 093007

32. *"Testing Electroweak Baryogenesis with Future Colliders"*,
with D. Curtin, C-T Yu.
JHEP 1411 (2014) 127

33. *"Transverse momentum resummation effects in W^+W^- measurements"*,
with H. Ramani, M. Zeng.
Phys.Rev. D90 (2014) 11, 114006

34. *"Natural SUSY in Plain Sight"*,
with D. Curtin, P. Tien.
Phys.Rev. D90 (2014) 11, 115012

35. *"Casting Light on BSM Physics with SM Standard Candles "*,
with D. Curtin, P. Jaiswal and P. Tien
JHEP 1308 (2013) 068

36. *"Charginos Hiding in Plain Sight"*,
with D. Curtin, and P. Jaiswal
Phys.Rev. D87 (2013) 031701

37. *"Excluding Electroweak Baryogenesis in the MSSM"*,
with D. Curtin, and P. Jaiswal
JHEP 1208 (2012) 005

38. *"Implications of a 125 GeV Higgs for the MSSM and Low-Scale SUSY Breaking"*,
with P. Draper, M. Reece, D. Shih
Phys.Rev. D85 (2012) 095007

39. *"The Status of GMSB After 1/fb at the LHC"*,
with Y. Kats, M. Reece, D. Shih
JHEP 1202 (2012) 115.

40. *"Simplified Models for LHC New Physics Searches"*,
with D. Alves et al.
arXiv:1105.2838

41. *"Odd Tracks at Hadron Colliders"*,
with M. Papucci and T. Volansky
Phys. Rev. Lett. 109, 031801

42. *"Long-Lived Neutralino NLSPs"*,
with M. Reece, and D. Shih
JHEP 1010 (2010) 067

43. *"Prompt Decays of General Neutralino NLSPs at the Tevatron"*,
with M. Reece, and D. Shih
JHEP 1005 (2010) 105

44. *"Dark Matter Interpretations of the $e^{\pm}$ Excesses after FERMI"*,
with S. Nussinov, M. Papucci, and T. Volansky
JHEP 1006 (2010) 029

45. *"Searches for Long Lived Neutral Particles"*,
with M. Papucci, A. Strumia and T. Volansky
Nucl.Phys. B831 (2010) 178-203

46. *"Dark Matter Sees The Light"*,
with M. Papucci and T. Volansky
JHEP 0912 (2009) 052

47. *"Exploring General Gauge Mediation"*,
with M. Buican, N. Seiberg and D. Shih
JHEP 0903 (2009) 016

48. *"General Gauge Mediation"*,
with N. Seiberg and D. Shih
Prog.Theor.Phys.Suppl. 177 (2009) 143-158

49. *"Black Holes and Quantum Gravity at the LHC"*,
with L. Randall.
JHEP 0805, 003 (2008)
50. *"BRIDGE: Branching Ratio Inquiry/Decay Generated Events"*,
with M. Reece.
hep-ph/0703031
51. *"Top Partners at the LHC: Spin and Mass Measurement"*,
with M. Reece.
Phys.Rev.D74:015010,2006
52. *"TASI Lectures on Electroweak Symmetry Breaking from Extra Dimensions"*,
with C. Csáki and J. Hubisz.
Proceedings of TASI 2004.
hep-ph/0510275
53. *"Electroweak Precision Constraints on the Littlest Higgs with T-parity"*,
with J. Hubisz, A. Noble, M. Perelstein.
JHEP 0601:135,2006
54. *"Phenomenology of the Littlest Higgs with T-parity"*,
with J. Hubisz.
Phys.Rev.D71:035016,2005
55. *"A Mixed Phase of SUSY Gauge Theories from a-maximization"*,
with C. Csáki and J. Terning.
JHEP 0404:040,2004
56. *"Electroweak Constraints on Little Higgs Models"*,
To appear in the Proceedings of SUSY 2003, held at the University of Arizona, Tucson, AZ, 5-10 June 2003.
hep-ph/0402036
57. *"Variations of little Higgs models and their electroweak constraints"*,
with C. Csáki, J. Hubisz, G. D. Kribs, and J. Terning.
Phys.Rev.D68:035009,2003
58. *"Big corrections from a little Higgs"*,
with C. Csáki, J. Hubisz, G. D. Kribs, and J. Terning.
Phys.Rev.D67:115002,2003
59. *"Neutrino Oscillations through Extra Dimensions and Symmetries"*,
Senior Honors Thesis, College of William and Mary, May 2002.
60. *"Shells of Matrices in Indefinite Inner Products"*,
with V. Bolotnikov, C.Li, C. Mehl, L.Rodman.
Electronic Journal of Linear Algebra, 9(2002), 67-92
61. *"U(2)-like Flavor Symmetries and Approximate Bimaximal Neutrino Mixing"*,
with A. Aranda, C. Carone.
Phys.Rev.D65:013011, 2002
62. *"Research Problem: Indefinite Inner Product Normal Matrices"*,
with B.Lins, C. Mehl, L. Rodman.
Linear and Multilinear Algebra, 49(2001) no.3, 261-268
63. *"Polar Decompositions of indecomposable normal matrices in indefinite inner products: Explicit formulas and open problems"*,
with B.Lins, C. Mehl, and L.Rodman.
Preprint 2000-9
Fakultat fur Matematik, Technichse Universitat Chemnitz, Germany, August 2000
64. *"Normal Matrices and Polar decompositions in Indefinite Inner Products"*,
with B.Lins, C. Mehl, L.Rodman.
Linear and Multilinear Algebra, 49(2001) no.1, 345-89