JACK COLLINS

SLAC National Accelerator Laboratory, 2575 Sand Hill Road, MS 81, Menlo Park, CA, 94025
jcollins@slac.stanford.edu · Nationality – UK

RESEARCH INTERESTS

Physics beyond the Standard Model, LHC and collider physics, machine learning applications in physics.

EMPLOYMENT

2019 – … **SLAC National Accelerator Laboratory, Stanford University**
Research Associate

2016 – 2019 **University of Maryland, College Park & Johns Hopkins University**
Postdoctoral Researcher (joint position)

EDUCATION

2011 – 2016 **Cornell University**
Doctor of Philosophy (Ph.D.) in Physics
Thesis: "*Top (s)partners and the Higgs mass*"
Adviser: Prof. Csaba Csáki

2007 – 2011 **University of Cambridge (Peterhouse)**
B.A./M.Sci. Natural Sciences (Experimental and Theoretical Physics)
Part III (Masters) Project: "*Heavy, Weakly Coupled Higgs Bosons at CLIC*"

2000 – 2007 **Secondary Education (High School) – Altrincham Grammar School for Boys**

PUBLICATIONS

[1] J.H. Collins, K. Howe, B. Nachman, "*Extending the search for new resonances with machine learning*", Phys. Rev. D 99 (2019), 014038, [arXiv:1902.02634]

[2] J.H. Collins, P.S.B. Dev, Y. Sui, "*R-Parity Violating Supersymmetric Explanation of the Anomalous Events at ANITA*", Phys .Rev. D99 (2019), 043009, [arXiv:1810.08479].

[3] K. Agashe, J.H. Collins, P. Du, S. Hong, D. Kim, R.K. Mishra, "*Detecting a Boosted Diboson Resonance*", JHEP 11 (2018) 027, [arXiv:1809.07334].

[4] J.H. Collins, K. Howe, B. Nachman, "*Anomaly Detection for Resonant New Physics with Machine Learning*", Phys. Rev. Lett. (2018) 24, 241803, [arXiv:1805.02664].

[5] K. Agashe, J.H. Collins, P. Du, S. Hong, D. Kim, R.K. Mishra, "*Dedicated Strategies for Triboson Signals from Cascade Decays of Vector Resonances*", Phys. Rev. D99 (2019) 075016, [arXiv:1711.09920].

[6] J.A. Aguilar-Saavedra, J.H. Collins, R.K. Mishra, "*A Generic Anti-QCD Jet Tagger*", JHEP 1711 (2017) 163, [arXiv:1709.01087].

[7] K. Agashe, J.H. Collins, P. Du, S. Hong, D. Kim, R.K. Mishra, "*LHC Signals from Cascade Decays of Warped Vector Resonances*", JHEP 1705 (2017) 078, [arXiv:1612.00047].

[8] J.A. Aguilar-Saavedra, J.H. Collins, S. Lombardo, "*Traces of a Triboson Resonance*", JHEP 1609 (2016) 050, [arXiv:1607.08911].

[9] J.H. Collins, C. Csáki, J.A. Dror, S. Lombardo, "*Novel Kinematics from a Custodially Protected Diphoton Resonance*", Phys. Rev. D93 (2016) 115001, [arXiv:1603.09350].

[10] J.H. Collins, W. Ng, "A 2 TeV W_R, Supersymmetry, and the Higgs mass", JHEP 1601 (2016) 159 [arXiv:1510.08083].

[11] J.H. Collins, J.A. Dror, M. Farina, "Mixed Stops and the ATLAS on-Z Excess", Phys. Rev. D92 (2015) 095022, [arXiv:1508.02419].

[12] A. Anandakrishnan, J.H. Collins, M. Farina, E. Kuflik, M. Perelstein, "Odd Top Partners at the LHC", Phys. Rev. D93 (2016) 075009, [arXiv:1506.05130].

[13] J.H. Collins, B. Jain, M. Perelstein, N. Rey-Le Lorier, "Spin-One Top Partner: Phenomenology", JHEP 1408 (2014) 022, [arXiv:1406.1221].
[14] J.H. Collins, J.D. Wells, "Heavy, Weakly Coupled Higgs Bosons at CLIC", LCD-NOTE-2012-011, [arXiv:1210.0205].
[15] S. Ask, J.H. Collins, J.R. Forshaw, K. Joshi, A.D. Pilkington, "Identifying the colour of TeV-scale resonances", JHEP 1201 (2012) 018, [arXiv:1108.2396].

Honors and Awards

2014 **Boochever Fellowship**
Cornell Award for best High Energy or Astrophysics theory graduate student.

2011 **Cornell Graduate Fellowship**
For promising incoming graduate students to the Cornell Physics Department.

2011 **Hugo de Balsham Award**
Award for exceptional academic distinction at Peterhouse, Cambridge.

2011 **Tait Prize for Physics**
For distinction in Part III Physics.

2011 **Peterhouse College Prize**
Peterhouse award for academic excellence.

2009 **Henry Cavendish Scholar in Natural Sciences**
Award for performance in Part IB of the Natural Sciences Tripos.

2008 **Senior Scholarship**
Awarded for distinction in Part IA exams.

2007 **Norweb Prize for Physics**
For academic performance in Physics at Altrincham Grammar School for Boys.

Conference Talks and Invited Seminars

May 2020 "*Representation Learning of Collider Events*", University of California at Davis, invited particle physics seminar.

May 2020 "*Representation Learning of Collider Events*", University of California, Berkeley, invited machine learning seminar.

Feb 2020 "*Representation Learning of Collider Events*", Lawrence Berkeley National Laboratory, invited particle physics seminar.

Feb 2020 "*Representation Learning of Collider Events*", SLAC National Accelerator Laboratory, internal particle physics seminar.

Jan 2020 "*Representation Learning of Collider Events*", New York University, "Machine Learning for Jet Physics" conference.

Aug 2019 "*CWoLa Hunting: Extending the Bump Hunt with Machine Learning*", Aspen Center for Physics, invited workshop talk.

Oct 2018 "*CWoLa Hunting: Extending the Bump Hunt with Machine Learning*", University of Washington at St Louis, invited particle physics seminar.

Sep 2018 "*CWoLa Hunting: Extending the Bump Hunt with Machine Learning*", Harvard University, invited particle physics seminar.

July 2018 "*CWoLa Hunting: Extending the Bump Hunt with Machine Learning*", Jussieu Campus, Paris, France, talk for BOOST 2018 conference.

May 2018 "*CWoLa Hunting: Extending the Bump Hunt with Machine Learning*", University of Pittsburgh, talk for PHENO 2018 conference.

Feb 2018 "*Learning to Find New Physics in Jets*", Lawrence Berkeley National Laboratory, invited particle physics seminar.

Feb 2018 "*Learning to Find New Physics in Jets*", University of California at Davis, invited particle physics seminar.

Dec 2017 "*An Anti-QCD Tagger*", Lawrence Berkeley National Laboratory, invited talk for "Machine Learning for Jet Physics" conference.
Dec 2017 "*Boosted Resonance Cascades*", Princeton University, invited particle physics seminar.
Nov 2017 "*Resonance Cascades*", ATLAS DBL, invited group meeting theory talk.
Oct 2017 "*Searching for New Physics in Jets*", University of Oregon, invited particle physics seminar.
Oct 2017 "*Recasting the LHC Diboson Searches (for diboson*ish *resonances)*", Fermilab National Laboratory, invited talk for "Reinterpreting LHC new physics search results" conference.
Sep 2017 "*Searching for New Physics in Jets*", University of Maryland, College Park, particle theory seminar.
Sep 2017 "*Diboson-ish Resonances*", CMS DAZSLE, invited group meeting theory talk.
Jun 2017 "*New Directions for Boosted Object Searches*", Fermilab national laboratory, Illinois; invited particle physics seminar.
Oct 2016 "*Triboson Signatures at the LHC*", Boston University, invited particle physics seminar.
Sep 2016 "*Triboson Signatures at the LHC*", DESY, Hamburg, Germany; invited workshop talk.
May 2016 "*Dibosons, Tribosons, and the SUSY Higgs Mass*", University of Granada, Spain; invited particle physics seminar.
Apr 2016 "*Dibosons, Tribosons, and the SUSY Higgs Mass*", University of Maryland, College Park; invited particle physics seminar.
Oct 2015 "*Mixed Stops and the ATLAS on-Z Excess*", Brookhaven Forum 2015.
May 2015 "*Odd Top Partners at the LHC*", Phenomenology Symposium (PHENO), University of Pittsburgh.

Workshops and Conferences

Jan 2020 Machine Learning for Jet Physics, Lawrence Berkeley National Laboratory.
Aug 2019 Aspen Center for Physics; "*The Energy Frontier Beyond LHC Run 2*".
Jul 2018 10th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2018); Jussieu Campus, Paris, France.
May 2018 Phenomenology Symposium (PHENO), University of Pittsburgh.
Dec 2017 Machine Learning for Jet Physics, Lawrence Berkeley National Laboratory.
Oct 2017 Reinterpreting LHC new physics search results: tools and methods; Fermilab National Laboratory.
Aug 2017 Aspen Center for Physics; "*Reaching New Summits: The LHC at Full Strength*".
Jul 2017 Mainz Institute for Theoretical Physics; "*The TeV scale: a threshold to new physics?*".
May 2017 Phenomenology Symposium (PHENO), University of Pittsburgh.
Sep 2016 DESY, Hamburg; "*BSM faces LHC run-2 realities*".
Jun 2016 Theoretical Advanced Study Institute in Elementary Particle Physics (TASI), University of Colorado Boulder; "*Anticipating the Next Discoveries in Particle Physics*".
May 2016 Phenomenology Symposium (PHENO), University of Pittsburgh.
Oct 2015 Brookhaven Forum 2015: "*Great Expectations, a New Chapter*".
May 2015 Phenomenology Symposium (PHENO), University of Pittsburgh.
July 2013 Prospects in Theoretical Physics (PITP), Institute of Advanced Studies, Princeton.
July 2014 SUSY 2014, Manchester, UK.
May 2013 Phenomenology Symposium (PHENO), University of Pittsburgh.
Jan 2012 School on Strongly Coupled Physics Beyond the Standard Model, ICTP, Trieste.

Teaching

Cornell University

Fall 2015 TA, PHYS 2207: Fundamentals of Physics 1. Instructor and grader for discussion sections and labs.

Spring 2015	Grader, PHYS 4444: Introduction to Particle Physics
Spring 2014	TA, PHYS 2217: Electricity and Magnetism. Instructor and grader for discussion sections and labs.
Fall 2013	Grader, PHYS 7651: Relativistic Quantum Field Theory 1.
Spring 2013	TA, PHYS 2217: Electricity and Magnetism. Instructor and grader for discussion sections and labs.
Fall 2012	TA, PHYS 1116: Introductory Mechanics. Instructor and grader for discussion sections and labs.
Spring 2012	TA, PHYS 2214: Oscillations, Waves and Quantum Physics. Instructor and grader for discussion sections and labs.
Fall 2011	TA, PHYS 2213: Introductory E&M. Instructor and grader for discussion sections and labs.