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# Samuel D. Homiller

## Curriculum Vitae

Last Updated: March 28, 2021

### Academic Positions

- **Post-Doctoral Fellow**, Harvard University  
September 2020 - Present
- **Research Assistant**, C. N. Yang Institute for Theoretical Physics, Stony Brook University  
May 2017 - August 2020
- **DOE Graduate Research Fellow**, Brookhaven National Laboratory  
August 2018 - August 2019
- **Undergraduate Research Asst.**, Nuclear Experimental Group, University of Illinois  
August 2012 - August 2015
- **Undergraduate Research Asst.**, Inst. for Condensed Matter Theory, University of Illinois  
May 2015 - August 2015

### Education

- **Stony Brook University – Dept. of Physics and Astronomy**  
Ph.D. in Physics, August 2020      Advisor: Prof. Patrick Meade  
Thesis: Higgs Couplings as a Gateway to New Fundamental Physics
- **University of Illinois at Urbana-Champaign – Dept. of Physics**  
B.S., Physics – Magna cum Laude, Highest Distinction, May 2015      Advisor: Prof. Liang Yang  
Thesis: Search for Nucleon Decays into Invisible Channels in Xe-136  
B.S., Mathematics – Magna cum Laude, Highest Distinction, May 2015
- **North Carolina School of Science and Math**  
High School Diploma

### Notable Awards and Honors

- J. J. and Noriko Sakurai Dissertation Award in Theoretical Particle Physics, 2021
- DOE Office of Science Graduate Research Fellowship, 2018 - 2019.
- Ernest M. Lyman Prize (Outstanding Graduating Senior in Physics) University of Illinois, 2015.

## Publications

Notes: Following high-energy physics convention, order of authorship was determined alphabetically unless otherwise noted.  
An up-to-date list of my publications can be found at the [Inspire-HEP database](#)

### Peer Reviewed Journal Articles

11. *Uncovering the High Scale Higgs Singlet Model*,  
with P. P. Giardino and S. Dawson, [arXiv:2102.02823], accepted in PRD.
10. *Putting Standard Model EFT Fits to Work*,  
with S. Dawson and S. Lane, Phys. Rev. D **102**, 055012 (2020) [arXiv:2007.01296].
9. *Validity of Standard Model EFT Studies of VH and VV Production at NLO*,  
with J. Baglio, S. Dawson, S. Lane and I. Lewis, Phys. Rev. D **101**, 115004 (2020) [arXiv:2003.07862].
8. *Light scalars and the KOTO anomaly*,  
with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. Lett **124**, 191801 (2020) [arXiv:1911.10203].
7. *QCD Corrections in SMEFT Fits to WZ and WW Production*,  
with J. Baglio and S. Dawson, Phys. Rev. D **100**, 113010 (2019) [arXiv:1909.11576].
6. *Higgs bosons with large couplings to light quarks*,  
with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. D **100**, 115041 (2019) [arXiv:1908.11376].
5. *Benchmarking simplified template cross sections in WH production*,  
with J. Brehmer, S. Dawson, F. Kling and T. Plehn, JHEP **11**, 034 (2019) [arXiv:1908.06980].
4. *Aligned and Spontaneous Flavor Violation*,  
with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. Lett **123**, 031802 (2019) [arXiv:1811.00017].
3. *Measurement of the Triple Higgs Coupling at a HE-LHC*,  
with P. Meade, JHEP **03**, 055 (2019) [arXiv:1811.02572].
2. *Search for nucleon decays with EXO-200*,  
J. B. Albert et al. (EXO-200 Collaboration), Phys. Rev. D **97**, 072007 (2018). [arXiv:1710.07670].
1. *First search for Lorentz and CPT violation in double beta decay with EXO-200*,  
J. B. Albert et al. (EXO-200 Collaboration), Phys. Rev. D **93**, 072001 (2016). [arXiv:1601.07266].

### Recent Preprints (Awaiting Peer Review)

- *Multi-Higgs Production Probes Higgs Flavor*,  
with D. Egaña-Ugrinovic and P. Meade, [arXiv:2101.04119], submitted to PRD.

### White Papers & Working Group Reports

- *The Muon Smasher's Guide*,  
[arXiv:2103.14043].
- *Higgs Physics at the HL-LHC and HE-LHC*,  
[arXiv:1902.00134].

## Talks Given

- *Physics at a High-Energy Muon Collider*,  
QCD-DM-BSM-LHC Meeting, MIT Center for Theoretical Physics, March 12, 2021.
- *Higgs Flavor and Multi-Higgs Production*,  
Particle Physics on the Plains Theory Seminar, University of Kansas, March 9, 2021.

- *Higgs Flavor and Multi-Higgs Production*,  
Particle Physics Seminar, Carleton University, March 8, 2021.
- *Putting SMEFT Fits to Work*,  
LHC EFT Working Group Area 5 Meeting: Benchmark Scenarios from UV Models, February 8, 2021.
- *Complementary Probers of Lepton Flavor at a Muon Collider*,  
PITT PACC Workshop: Muon Collider Physics, November 30, 2020.
- *Higgs and Flavor: Theories of Enhanced Light Yukawas*,  
Higgs 2020, October 29, 2020.
- *Putting SMEFT Fits to Work*,  
Higgs 2020, October 28, 2020.
- *Introduction to the Theory Frontier*,  
Snowmass Early Career Frontier Introductory Series, August 21, 2020.
- *Theories of Enhanced Light Yukawa Couplings*,  
Snowmass EF02 Meeting: Higgs and Flavor, August 7, 2020.
- *SMEFT Fits and the Higgs Inverse Problem*,  
Preparatory Joint Sessions, Snowmass Energy Frontier Meeting, July 7, 2020.
- *Light Scalars and the KOTO Anomaly*,  
Phenomenology Symposium 2020, University of Pittsburgh, May 4, 2020.
- *Flavorful Higgs Physics from the MeV to TeV scale*,  
High Energy Theory Lunch Seminar, Brookhaven National Laboratory, May 1, 2020.
- *Light Scalars and the KOTO Anomaly*,  
APS April Meeting 2020, Washington D.C., April 21, 2020.
- *The Higgs and New Physics with Flavor*,  
LHC/BSM Journal Club, MIT Center for Theoretical Physics, April 10, 2020.
- *The Higgs and New Physics with Flavor*,  
YITP Seminar, Stony Brook University, April 9, 2020.
- *Higgs bosons with large couplings to light quarks*,  
Brookhaven Forum 2019, Brookhaven National Laboratory, September 26, 2019.
- *Unearthing Kinematic Information in WH Production*,  
APS DPF Meeting 2019, Northeastern University, August 01, 2019.
- *Spontaneous Flavor Violation and the 2HDM*,  
Phenomenology Symposium 2019, University of Pittsburgh, May 07, 2019.
- *Spontaneous Flavor Violation and the 2HDM*,  
High Energy Theory Lunch Seminar, Brookhaven National Laboratory, April 19, 2019.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*,  
High Energy Theory Lunch Seminar, Brookhaven National Laboratory, October 19, 2018.
- *Exploring the Higgs Sector*,  
TASI 2018 Student Talk, University of Colorado, Boulder, June 22, 2018.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*,  
Phenomenology Symposium 2018, University of Pittsburgh, May 8, 2018.

- *The Higgs Self-Coupling and Future Colliders*,  
Hang Yuan Physics Lecture (No. 109), Shaanxi Normal University, Xi'an, China, April 16, 2018.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*,  
HL/HE-LHC Meeting, Fermi National Accelerator Laboratory, April 5, 2018.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*,  
Brookhaven Forum 2017, Brookhaven National Laboratory, October 12, 2017.
- *Search for Nucleon Decays in  $^{136}\text{Xe}$  with EXO-200*,  
Physics Undergraduate Research Symposium, University of Illinois, January 30, 2015.

## Professional Service

- Snowmass 2021 Early Career (SEC) Leadership:
  - Theory Frontier SEC Liaison
  - Survey Team Member (Co-Leader from Oct. 2020 - Apr. 2021)
  - Energy Frontier Topical Group 2 SEC Liason
- Referee for *Physical Review Letters*, *Physical Review D*, *Nuclear Physics B*
- Member of Working Group 2 (Higgs Physics) on the Physics of the HL-LHC, and Perspectives at the HE-LHC Program

## Workshops, Programs & Schools Attended

- PITT PACC Workshop: Muon collider physics,  
November 30 - December 2, 2020, University of Pittsburgh, PA.
- Lighting new Lampposts for Dark Matter and Beyond the Standard Model,  
February 23 - April 8, 2020, Simons Center for Geometry and Physics, Stony Brook, NY.
- ICTP Summer School on Particle Physics, June 2019,  
Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- Theoretical Advanced Study Institute (TASI), *Theory in an Era of Data*,  
June 2018, University of Colorado, Boulder, CO.
- Prospects in Theoretical Physics (PiTP), *Particle Physics at the LHC and Beyond*,  
July 2017, Institute for Advanced Study, Princeton, NJ.
- Workshop: Beyond WIMPs: From Theory to Detection, March 2017.  
Simons Center for Geometry and Physics, Stony Brook, NY.

## Experimental Collaborations

- REDTOP Collaboration, *Member*.
- EXO-200 Collaboration, *Undergraduate Researcher (Data Analysis)*.

## Awards and Fellowships

- J. J. and Noriko Sakurai Dissertation Award in Theoretical Particle Physics, 2021
- DOE Office of Science Graduate Research Fellowship, 2018 - 2019.
- Rosaline and Milton Serman Travel Award, 2019.

- American Physical Society Division of Particles and Fields (DPF) Meeting Travel Award, 2019.
- Silsbee Prize (Travel Award), 2017.
- Phi Beta Kappa, 2015.
- Ernest M. Lyman Prize (Outstanding Graduating Senior in Physics), 2015.
- Robert E. Hetrick Outstanding Senior Thesis Award, 2015.
- Lorella M. Jones Summer Research Award, 2014.
- James Scholar, University of Illinois at Urbana-Champaign, 2011 - 2015.
- Dean's List, University of Illinois at Urbana-Champaign, Fall 2011 - Spring 2015.
- University Achievement Scholar, University of Illinois at Urbana-Champaign, 2011 - 2015.

## Teaching Experience

- **Teaching Assistant, Dept. of Physics, Stony Brook University**  
August 2015 - May 2018  
**Courses Taught or Graded For:**
  - PHY 524: Graduate Cosmology (Grader), Spring 2020
  - PHY 610: Quantum Field Theory I (Grader), Spring 2018
  - PHY 252: Modern Physics Laboratory, Fall 2016, Spring 2017
  - PHY 123: Classical Physics A (Laboratory), Summer 2016
  - PHY 134: Classical Physics Laboratory II, Spring 2016
  - PHY 133: Classical Physics Laboratory I, Fall 2015