Andrew Kobach

Curriculum Vitae

Degrees

Northwestern University, Ph.D., theoretical particle physics, 2015.
Advisor: Prof. André de Gouvêa. Thesis: *The Inverse Puzzle in Particle Physics*

Northwestern University, M.S., experimental high-energy physics, 2011.
Advisor: Prof. Heidi Schellman

University of Notre Dame, B.S., physics, 2009.

Industry Experience

Manager of Data Science, Omnitracs/Solera – 2023 - present

Lead Data Scientist, Omnitracs/Solera (acquired SmartDrive System in Oct. 2020) – 2020 - 2023

Senior Data Scientist, SmartDrive Systems, Inc. – 2019 - 2020

Academic Experience

University of California, San Diego, Visiting Research Scholar – 2019 - present
Research in quantum information theory and quantum field theory (Sponsor: Prof. John McGreevy)

Los Alamos National Laboratory, Theoretical Division, Director's Fellow – 2018 - 2019
Full-time research in theoretical physics (Supervisor: Dr. Vincenzo Cirigliano)

University of California, San Diego, Postdoctoral Scholar – 2015 - 2018
Full-time research in theoretical particle physics (Supervisor: Prof. Aneesh Manohar)

Northwestern University, Graduate Research – 2009 - 2015
Research in theoretical particle physics and experimental analysis at the DØ experiment at Fermilab

Honors and Awards

Director's Fellowship, Los Alamos National Laboratory – 2018 - 2019
Acceptance percentage: $\sim 5\%$ ($15 / \sim 300$). Two years of fully-supported salary and travel/research grant for collaboration with scientists and engineers at Los Alamos National Laboratory.

Department of Energy Office of Science Graduate Fellowship – 2010 - 2013
Acceptance percentage: $\sim 4\%$ ($150 / \sim 3750$). Three years of fully-supported tuition, stipend, and research grant.

62nd Meeting of the Nobel Laureates and Students at Lindau, Germany – 2012
Acceptance percentage: $\sim 0.1\%$ ($600 / \sim 60,000$). Selected by the Department of Energy as an American delegate to attend the Lindau Nobel Laureate Meeting on Physics in 2012.

Weinberg College of Arts and Sciences Outstanding Teaching Award Finalist – 2011 - 2015
Multiple nominations by Northwestern University's Weinberg College of Arts and Sciences Student Advisory Board.

Patents

- *Highly-Accurate and Self-Adjusting Image Sensor Auto-Calibration for In-Vehicle Driver Monitoring System or Other System.* Granted March 7, 2023. **US Patent Number: 11,600,083.**
  Inventor: Andrew C. Kobach.
- (Pending) *Highly-Accurate and Self-Adjusting Image Sensor Auto-Calibration for In-Vehicle Advanced Driver Assistance System (ADAS) or Other System.* Submitted to USPO in Oct. 2021.
  Inventor: Andrew C. Kobach.
- (Pending) *Conversion of Computer Vision Data into Measurements for In-Vehicle Advanced Driver Assistance Systems (ADAS) or Other System.* Submitted to USPO in Apr. 2023.
  Inventor: Andrew C. Kobach.

Papers and Articles

Note: publications in high-energy physics list authors alphabetically, not by relative contribution.

- **"Continuity and Semileptonic $B_{(s)} \to D_{(s)}$ Form Factors."** A. Kobach. Phys. Lett. B **809** 135708 (2020). arXiv/hep-ph: 1910.13024.
- **"Baryon Number, Lepton Number, and Operator Dimension in the SMEFT with Flavor Symmetries."** A. Helset, A. Kobach. Phys. Lett. B **800** 135132 (2020). arXiv/hep-ph: 1909.05853.
- **"Reparameterization Invariant Operator Basis for NRQED and HQET."** A. Kobach, S. Pal. JHEP **1911** 012 (2019). arXiv/hep-ph: 1810.02356.
- **"Conformal Structure of the Heavy Particle EFT Operator Basis."** A. Kobach, S. Pal. Phys. Lett. B **783** 311 (2018). arXiv/hep-ph: 1804.01534.
- **"Neutrino Oscillation Measurements Computed in Quantum Field Theory."** A. Kobach, A.V. Manohar, J. McGreevy. Phys. Lett. B **783** 59 (2018). arXiv/hep-ph: 1711.07491.
- **"Hilbert Series and Operator Basis for NRQED and NRQCD/HQET."** A. Kobach, S. Pal. Phys. Lett. B **772** 225 (2017). arXiv/hep-ph: 1704.00008.
- **"Model Independent Extraction of $|V_{cb}|$ from $\overline{B} \to D^* l \overline{\nu}$."** B. Grinstein, A. Kobach. Phys. Lett. B **771** 359 (2017). arXiv/hep-ph: 1703.08170.
- **"On Lepton-Number-Violating Searches for Muon to Positron Conversion."** J.M. Berryman, A. de Gouvêa, K.J. Kelly, A. Kobach. Phys. Rev. D **95**, 115010 (2017). arXiv/hep-ph: 1611.00032.
- **"Baryon Number, Lepton Number, and Operator Dimension in the Standard Model."** A. Kobach. Phys. Lett. **758** 455 (2016). arXiv/hep-ph: 1604.05726.
- **"Gravitational Effects on Measurements of the Muon Dipole Moments."** A. Kobach. Nucl. Phys. B **911** 206 (2016). arXiv/hep-ph: 1603.00127.
- **"New Physics in the Kinematic Distributions of $\bar{B} \to D^{(*)} \tau^- (\to l^- \overline{\nu}_l \nu_\tau) \overline{\nu}_\tau$."** R. Alonso, A. Kobach, J.M. Camalich. Phys. Rev. D **92**, 094021 (2016). arXiv/hep-ph: 1602.07671.
- **"Global Constraints on a Heavy Neutrino."** A. de Gouvêa, A. Kobach. Phys. Rev. D **93**, 033005 (2016). arXiv/hep-ph: 1511.00683.
- **"A Sterile Neutrino at the Deep Underground Neutrino Experiment."** J.M. Berryman, A. de Gouvêa, K.J. Kelly, A. Kobach. Phys. Rev. D **92**, 073012 (2015). arXiv/hep-ph: 1507.03986.
- **"Heavy Neutrinos and the Kinematics of Tau Decays."** A. Kobach and S. Dobbs. Phys. Rev. D **91**, 053006 (2015). arXiv/hep-ph: 1412.4785.
- **"CP-Invariance Violation at Short-Baseline Experiments in $3+1$ Scenarios."** A. de Gouvêa, K.J. Kelly, A. Kobach. Phys. Rev. D **91**, 053005 (2015). arXiv/hep-ph: 1412.1479.

- **"Lepton-Flavored Dark Matter."** J. Kile, A. Kobach, A. Soni. Phys. Lett. B **744** 330 (2015). arXiv/hep-ph: 1411.1407.
- **"Neutrino Masses, Grand Unification, and Baryon Number Violation."** A. de Gouvêa, Juan Herrero-García, A. Kobach. Phys. Rev. D **90**, 016011 (2014). arXiv/hep-ph: 1404.4057.
- **"Measuring the Mass of Dark Matter at the LHC."** A.C. Kobach. Phys. Rev. D **88**, 116001 (2013). arXiv/hep-ph: 1308.5671.
- **"The Lightest Massive Invisible Particles at the LHC."** A. de Gouvêa, A.C. Kobach. Nucl. Phys. B **874**, 399 (2013). arXiv/hep-ph: 1209.6627.
- **"$Z\gamma$ Production and Limits on Anomalous $ZZ\gamma$ and $Z\gamma\gamma$ Couplings in $p\overline{p}$ Collisions at $\sqrt{s} = 1.96$ TeV."** (Primary analyzer with Xuebing Bu and Heidi Schellman) V.M. Abazov *et al.* (DØ Collaboration). Phys. Rev. D **85**, 052001 (2012). arXiv/hep-ex: 1111.3684. Featured as "Result of the Week" in *Fermilab Today* on 20 Dec. 2011.

Other Papers

"Snowmass 2013 Young Physicists Science and Career Survey Report." J. Anderson et al. FERMILAB-CONF-13-673-T (2013). arXiv/physics.soc-ph: 1307.8080.

Invited Seminar and Conference Talks

SCET 2019. San Diego, CA. Mar. 2019.

Los Alamos National Laboratory. T-2 Seminar. Jan. 2019.

Los Alamos National Laboratory. T-2 Seminar. July 2018.

Phenomenology Symposium. Pittsburgh, PA. May 2018.

Northwestern University. High-energy physics seminar. Sept. 2017.

International Center of Advanced Studies. Buenos Aires, Argentina. Seminar. July 2016.

Phenomenology Symposium. Pittsburgh, PA. May 2016.

UC San Diego. High-energy theory seminar. Mar. 2016.

UC Irvine. Joint particle seminar. Feb. 2016.

UC San Diego. High-energy theory seminar. Aug. 2015.

Fermilab. Theory seminar. Aug. 2015.

TRIUMF. Theory seminar. Jan. 2015.

University of Illinois at Chicago. Particle-physics seminar. Nov. 2014.

University of Notre Dame. Particle-physics seminar. Sept. 2013.

DOE Office of Science Graduate Fellowship Annual Meeting. Brookhaven National Laboratory. Aug. 2012.

DOE Office of Science Graduate Fellowship Annual Meeting. Oak Ridge National Laboratory. July 2011.

DOE Office of Science Graduate Fellowship Annual Meeting. Argon National Laboratory. July 2010.

High Energy Phenomenology Symposium. Madison, WI. May 2011.

APS April Meeting. Washington D.C. Feb. 2010.

Professional and Educational Activities

Theoretical Advanced Study Institute in Elementary Particle Physics (TASI). June 2014.

Co-convener of Snowmass Young Physicist Movement theory subgroup. Feb. 2013 - Feb. 2014.

Community Summer Study (Snowmass on the Mississippi). University of Minnesota. July 2013.

SLAC Summer Institute. July 2013.

Intensity Frontier Workshop. Argonne National Lab. Apr. 2013.

62nd Meeting of the Nobel Laureates and Students at Lindau, Germany. July 2012.

Brown Bag Lunch Seminars coordinator, Department of Physics and Astronomy. Northwestern University. Sept. 2010 - June 2012.

Department of Energy Intensity Frontier Workshop. Washington D.C. Dec. 2011.

Pre-SUSY Summer School. University of Chicago. Aug. 2011.

DOE Office of Science Graduate Fellowship Annual Meeting. Oak Ridge National Lab. July 2011.

CTEQ Summer School on QCD Analysis and Phenomenology. Madison, WI. July 2011.

Judge at the Chicago Area Undergraduate Research Symposium. Apr. 2011.

DOE Office of Science Graduate Fellowship Annual Meeting. Argonne National Lab. Aug. 2010.

Academic References

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