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Work

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Employment

- Assistant Professor, New York University, Physics Department. 2007-current
Currently working on the ATLAS experiment at CERN in Genève, Switzerland.
 - Goldhaber Fellow, Brookhaven National Laboratory, Omega Group. 2005-2007
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Education

- University of Wisconsin - Madison, Ph.D., Physics - January 2005
Thesis: "Searching for New Physics: Contributions to LEP and the LHC"
Advisor: Sau Lan Wu, Enrico Fermi and Vilas Professor of Physics
 - University of Wisconsin - Madison, Master of Arts, Physics - 2002
 - Rice University, Houston, TX, Bachelor of Arts, Physics & Mathematics - 1999
Thesis: "Variational Methods in $\lambda\phi^4$ Quantum Field Theory"
 - Arkansas School of Mathematics and Sciences, Hot Springs, AR - 1995
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Awards & Honors

- Presidential Early Career Award for Science and Engineers, DOE Office of Science. 2007
- Goldhaber Distinguished Fellowship, Brookhaven National Lab 2005-2008
- MIT Visiting Graduate Student Fellow 2004
- National Science Foundation Graduate Research Fellowship 2000-2003
- Van Vleck Prize (University of Wisconsin-Madison) 2000
- Heaps Prize for Most Outstanding Undergraduate Physics Thesis 1999
- Envision Grant for Development of WinPDE and RootPDE 1998
- Arkansas Neuroscience Award 1995
- Charter Class President Arkansas School for Mathematics and Science 1994

Appointed Positions & Responsibilities

- Co-Coordinator of US-ATLAS Higgs & Standard Model Forum
- Co-convenor of ATLAS Missing ET High-Level Trigger Algorithms group
- Member of ATLAS Software Architecture group ("A-Team")
- Member of ATLAS Event Management Board (adjudicates content of ATLAS data)
- Member PhyStat.org Steering Committee
- Member of Brookhaven National Lab Particle Physics Seminar Committee
- Referee for various physics journals, computer science journals, and DOE SBIR grants

List of Publications

Primary Author

- [1] K. Cranmer, "Statistics for the LHC: Progress, Challenges, and Future", CERN yellow report CERN-2008-001, 2008
- [2] K. Cranmer, "The ATLAS Analysis Architecture", Nucl. Phys. **B** P12266, 2007
- [3] K. Cranmer and T. Plehn, "Maximum significance at the LHC and Higgs decays to muons," Eur. Phys. J. C **51**, 415 (2007). [arXiv:hep-ph/0605268].
- [4] K. S. Cranmer, "Potential for Higgs Physics at the LHC and Super-LHC" *Proceedings of Snowmass2005* ALCPG0602 (2005) [arXiv:physics/0512154].
- [5] K. S. Cranmer, "Statistical Challenges for Searches for New Physics at the LHC" *Proceedings of PhyStat2005* Imperial College Press (2005) [arXiv:physics/0511028].
- [6] K. S. Cranmer, "Predicting Bias on Masses Due to Resolution Effects" ATL-COM-PHYS-2005-055 (2005)
- [7] K. S. Cranmer and Paganis, S, "Coverage Studies for Higgs to $\gamma\gamma$ " ATL-COM-PHYS-2005-006 (2005)
- [8] K. S. Cranmer and B. Knuteson, "Quaero@Aleph" Aleph Note 2004-009 (2004).
- [9] K. S. Cranmer and R. S. Bowman, "PhysicsGP: A Genetic Programming Approach to Event Selection" *Comput. Phys. Commun.* **167**, 165 (2005). [arXiv:physics/0402030]

- [10] K. S. Cranmer *et al.* “Combined Sensitivity of the ATLAS Detector to the Higgs Boson in the Standard Model” ATL-COM-PHYS-2004-021 (2004).
- [11] K. S. Cranmer, “Multivariate analysis and the search for new particles” *Acta Phys. Polon.* **B34**, 6049 (2003).
- [12] K. S. Cranmer, “Multivariate analysis from a statistical point of view,” Proceedings of PhyStat2004, SLAC, eConf **C030908**, WEJT002 (2003) [arXiv:physics/0310110].
- [13] K. S. Cranmer, “Frequentist hypothesis testing with background uncertainty,” Proceedings of PhyStat2004, SLAC, eConf **C030908**, WEMT004 (2003) [arXiv:physics/0310108].
- [14] K. S. Cranmer, B. Mellado, W. Quayle and S. L. Wu, “Challenges in moving the LEP Higgs statistics to the LHC,” Proceedings of PhyStat2004, SLAC, eConf **C030908**, MODT004 (2003) [arXiv:physics/0312050].
- [15] K. S. Cranmer *et al.* “Confidence Level Calculations for $H \rightarrow WW \rightarrow ll\nu\nu$ for $115 < M_H < 130$ GeV Using Vector Boson Fusion” ATL-PHYS-2003-008 (2002).
- [16] K. S. Cranmer *et al.* “Neural Network Based Search for Higgs Boson Produced via VBF with $H \rightarrow WW \rightarrow ll\nu\nu$ for $115 < M_H < 130$ GeV” ATL-PHYS-2003-007 (2002).
- [17] ¹ K. S. Cranmer, “Kernel estimation in high-energy physics,” *Comput. Phys. Commun.* **136**, 198 (2001) [arXiv:hep-ex/0011057].
- [18] K. S. Cranmer, “Kernel Estimation for Parameterizing Distributions of Discriminating Variables.” (1999) ALEPH Note 99-144.
- [19] K. S. Cranmer, “Variational Methods in ϕ^4 Quantum Field Theory. *Journal of Young Investigators.* **3** (2001). *Undergraduate Thesis, Rice University - Awarded Heaps Prize for Most Outstanding Undergraduate Thesis in Physics.*
- [20] K. S. Cranmer, “Communication with Brain Waves”. Proceedings of 1995 Sakharov’s Readings. Pg. 139. St. Petersburg (1995).
- [21] K. S. Cranmer, “Communication with Brain Waves.” *NCSSMST Journal* (1995).

Significant Contribution

- [22] B. C. Allanach, K. Cranmer, C. G. Lester and A. M. Weber, “Natural Priors, CMSSM Fits and LHC Weather Forecasts,” *JHEP* **0708**, 023 (2007) [arXiv:0705.0487 [hep-ph]].
- [23] The ATLAS Collaboration, “The ATLAS Detector Paper”, *Journal of Instrumentation*, 2007.

¹This paper has been cited 45 times by numerous published analyses by BaBar and Belle, as well as the final standard model Higgs result by the LEP Higgs WG (see Ref. [34]).

- [24] K. Cranmer, A. Farbin, A. Shibata, "EventView - The Design Behind an Analysis Framework" ATL-SOFT-PUB-2007-008; ATL-COM-SOFT-2007-012, 2007.
- [25] P. Conde-Muo, I. Aracena, B. Brelrier, K. Cranmer, P-A. Delsart, M-A. Dufour, S. Eckweiler, J. Ferland, J. Idarraga, K. Johns "Implementation and Performance of the ATLAS Second Level Jet Trigger" ATL-DAQ-CONF-2007-025; ATL-COM-DAQ-2007-028, 2007.
- [26] S. Asai *et al.* "Physics Analysis Tools 2006 Workshop Summary Report" ATL-SOFT-PUB-2006-005; ATL-COM-SOFT-2006-009 (2006).
- [27] K. Assamagan *et al.* "Report of the Event Tag Review and Recommendation Group" ATL-SOFT-PUB-2006-002; ATL-COM-SOFT-2006-003 (2006).
- [28] P. Akesson *et al.* "Physics Analysis Tools Workshop Summary Report" ATL-SOFT-INT-2005-005; ATL-COM-SOFT-2005-006; CERN-ATL-SOFT-INT-2005-005 (2005).
- [29] K. S. Cranmer *et al.* "Analysis of VBF $H \rightarrow WW \rightarrow l\nu l\nu$ " ATL-COM-PHYS-2004-020 (2004).
- [30] ² K. A. Assamagan *et al.*, "The Higgs working group: Summary report 2003," 3rd Les Houches Workshop [arXiv:hep-ph/0406152].
- [31] S. Asai *et al.*, "Prospects for the search for a standard model Higgs boson in ATLAS using vector boson fusion," Eur. Phys. J. C, SN-ATLAS-2003-024, arXiv:hep-ph/0402254.
- [32] K. Cranmer, Y. Q. Fang, B. Mellado, S. Paganis, W. Quayle and S. L. Wu, "Prospects for Higgs searches via VBF at the LHC with the ATLAS detector," arXiv:hep-ph/0401148.
- [33] K. Cranmer, B. Mellado, W. Quayle and S. L. Wu, "Search for Higgs bosons decay $H \rightarrow \gamma\gamma$ using vector boson fusion," arXiv:hep-ph/0401088.
- [34] ^{3,4} R. Barate *et al.* [ALEPH, DELPHI, OPAL, and L3 Collaborations], "Search for the standard model Higgs boson at LEP," Phys. Lett. B **565**, 61 (2003) [arXiv:hep-ex/0306033].
- [35] K. S. Cranmer *et al.* "Search for Higgs Bosons Decay $H \rightarrow WW \rightarrow l\nu qq$ with $150 < M_H < 300$ GeV Using Vector Boson Fusion" ATL-COM-PHYS-2003-050 (2003).
- [36] K. S. Cranmer *et al.* "Parton Shower and Matrix Element Matching in QCD Z + 2 jets production" ATL-COM-PHYS-2003-042 (2003).
- [37] K. S. Cranmer *et al.* "Search for Higgs Bosons Decay $H \rightarrow ZZ \rightarrow l + l - qq$ with $2M_Z < M_H < 500$ GeV Using Vector Boson Fusion" ATL-COM-PHYS-2003-035 (2003).
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³Final LEP Higgs Result. This paper directly cites my work with Kernel Estimation (see Ref. [17]).

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- [39] K. S. Cranmer *et al.* “An update of the VBF $H \rightarrow \tau\tau$ and $\tau \rightarrow e(\mu)\nu_{e(\mu)}\nu_\tau$ Cut Analysis” ATL-COM-PHYS-2003-002 (2003).
- [40] K. S. Cranmer *et al.* “Search for Higgs Boson Decay $H \rightarrow WW \rightarrow ll\nu\nu$ for $115 < M_H < 130$ GeV Using Vector Boson Fusion” ATL-PHYS-2003-002 (2003).
- [41] K. Cranmer, B. Mellado, W. Quayle and S. L. Wu, “Application of K factors in the $H \rightarrow Z Z^* \rightarrow 4l$ analysis at the LHC,” arXiv:hep-ph/0307242.
- [42] A. Heister *et al.* [ALEPH Collaboration], “Search for charged Higgs bosons in e^+e^- collisions at energies up to $\sqrt{s} = 209$ -GeV,” Phys. Lett. B **543**, 1 (2002) [arXiv:hep-ex/0207054].
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Publications in Other Fields

- [49] Cranmer KS, Dalsoren D, Souza C “Evaluation of the Hough Transform for Identification of Logging Roads in the Amazon Rain Forest” *Submitted to: International Journal of Remote Sensing.*

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⁶This is a SPIRES top-cite article.

- [50] Cranmer MF, Louie SL, Cranmer KS, Cranmer JM “Association of Impaired Insulin Sensitivity and Blood Lipid Levels of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)” Proceedings of the Fifteenth International Neurotoxicology Conference, Little Rock, AR October 1997.
- [51] Cranmer MF, Cranmer KS, Louie SL “Total Toxicity Equivalents as an Indicator of Exposure to Dioxin-Like Compounds” Proceedings of the Fourteenth International Neurotoxicology Conference, Hot Springs, AR, October 1996.
- [52] Cranmer MF, Louie SL, Cranmer KS” “The Relationship Between Insulin Response to an Oral Glucose Challenge and Levels of Dioxin-Like Compounds in Blood Sera Lipid. 1997 Meeting of the South Central Chapter of the Society of Toxicology, National Center for Toxicological Research, Jefferson, AR, November 1997”
- [53] Cranmer MF, Amler RW, Senner J, Cranmer KS, Burge P, McChesney T, Robinette, R “Residential Health Impact of Large-Scale, On-Site Incineration of Dioxin-Like Compounds” *International Congress on Hazardous Waste: Impact on Human and Ecological Health*. Atlanta, GA, June 1995.
- [54] Cranmer MF, Senner J, Cranmer KS, Amler RW “Total Toxicity Equivalence as an Indicator of Exposure at a 2,4D/2,4,5T Production Facility: The Vertac/Hercules Superfund Site, Jacksonville, Arkansas” *International Congress on Hazardous Waste: Impact on Human and Ecological Health*. Atlanta, GA, June 1995.
- [55] Cranmer MF, Louie SC, Cranmer KS, Amler RW, Senner J, Burge P “Evaluation of Potential Adverse Health Outcomes to Nearby Residents from Operation of a Hazardous Waste Incinerator at the Vertac/Hercules Superfund Site” *International Congress on Hazardous Waste: Impact on Human and Ecological Health*. Atlanta, GA, June 1995.
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Other Publications

- [57] Maris Abolins *et al.*, “The ATLAS trigger: Commissioning with cosmic rays”?CERN-ATL-COM-DAQ-2007-029, CERN-ATL-DAQ-CONF-2007-024, 2007. 12pp.
- [58] K. Kordas *et. al.* “The ATLAS Data Acquisition and Trigger: Concept, design and status” Nucl. Phys. Proc. Suppl. **172**:178-182, 2007.
- [59] The ALEPH Collaboration, “Measurement of the Cross Section for open b-Quark Production in Two-Photon Interactions at LEP”. JHEP **0709**:102,2007. [arXiv:0706.3150]

- [60] S. Schael *et al.* [ALEPH Collaboration], "Measurement of the W boson mass and width in $e^+ e^-$ collisions at LEP," *Eur. Phys. J. C* **47**, 309 (2006) [arXiv:hep-ex/0605011].
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- [62] S. Schael *et al.* [ALEPH Collaboration], "Deuteron and anti-deuteron production in $e^+ e^-$ collisions at the Z resonance," *Phys. Lett. B* **639**, 192 [hep-ex/0604023].
- [63] S. Schael *et al.* [ALEPH Collaboration], "Branching ratios and spectral functions of tau decays: Final ALEPH measurements and physics implications," [arXiv:hep-ex/0506072].
- [64] S. Schael *et al.* [ALEPH Collaboration], "Improved measurement of the triple gauge-boson couplings $\gamma W W$ and $Z W W$ in $e^+ e^-$ collisions," *Phys. Lett. B* **614** (2005).
- [65] S. Schael *et al.* [ALEPH Collaboration], "Bose-Einstein correlations in W-pair decays with an event-mixing technique," CERN-PH-EP-2004-053
- [66] S. Schael *et al.* [ALEPH Collaboration], "Two-particle correlations in $p p$, anti- p anti- p and $K_0(S) K_0(S)$ pairs from hadronic Z decays," CERN-PH-EP-2004-033
- [67] S. Schael *et al.* [ALEPH Collaboration], "Search for pentaquark states in Z decays," CERN-PH-EP-2004-038
- [68] S. Schael *et al.* [ALEPH Collaboration], "Single vector boson production in $e^+ e^-$ collisions at centre-of-mass energies from 183-GeV to 209-GeV," CERN-PH-EP-2004-034
- [69] A. Heister *et al.* [ALEPH Collaboration], "Measurement of W pair production in $e^+ e^-$ collisions at centre-of-mass energies from 183-GeV to 209-GeV," CERN-PH-EP-2004-012
- [70] A. Heister *et al.* [ALEPH Collaboration], "Constraints on anomalous QGC's in $e^+ e^-$ interactions from 183-GeV to 209-GeV," CERN-PH-EP-2004-001
- [71] A. Heister *et al.* [ALEPH Collaboration], "Studies of QCD at $e^+ e^-$ centre-of-mass energies between 91-GeV and 209-GeV," CERN-EP-2003-084
- [72] A. Heister *et al.* [ALEPH Collaboration], "Two-dimensional analysis of Bose-Einstein correlations in hadronic Z decays at LEP," CERN-EP-2003-079
- [73] A. Heister *et al.* [ALEPH Collaboration], "Absolute mass lower limit for the lightest neutralino of the MSSM from $e^+ e^-$ data at \sqrt{s} up to 209-GeV," *Phys. Lett. B* **583**, 247 (2004).
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- [77] A. Heister *et al.* [ALEPH Collaboration], “Study of hadronic final states from double tagged gamma gamma events at LEP,” arXiv:hep-ex/0305107.
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- [114] R. Barate *et al.* [ALEPH Collaboration], “Measurement of the W mass and width in e^+e^- collisions at 189-GeV,” *Eur. Phys. J. C* **17**, 241 (2000).

Colloquia & Seminars

- [115] “Searching for New Physics at the LHC: Strategies, Tools, and Techniques”, HEP Seminar, University of Michigan–Ann Arbor, January, 2008
- [116] “Searching for New Physics at the LHC: Strategies, Tools, and Techniques”, HEP Seminar, Institute for Advanced Study, October, 2007

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- [117] “Searching for New Physics at the LHC: Strategies, Tools, and Techniques”, HEP Seminar, University of Cambridge, England, June, 2007
- [118] “Maximum Significance and Matrix Element Methods” Seminar, University of Wisconsin–Madison, May, 2007.
- [119] “Searching for New Physics at the LHC: Strategies, Tools, and Techniques”, HEP Seminar, Harvard University, March, 2007
- [120] “Frequentist Approaches to High-Dimensional Problems”, HEP Seminar, University of Edinburgh, March, 2007
- [121] “Statistical Aspects to Searches for New Physics” Seminar, CCPP, New York University, March, 2007.
- [122] “Higgs Searches at the LHC: Challenges, Prospects, and Developments” Seminar, SUNY Stony Brook, February, 2007.
- [123] “Progress on Higgs Searches and Thoughts for New Physics” BNL Theory/Experiment Seminar, Brookhaven, January, 2007.
- [124] “Challenges and Prospects for New Searches Physics at the LHC” Colloquium, New York University, October, 2006.
- [125] “Higgs Searches at the LHC: Challenges, Prospects, and Developments” Seminar, University of Rochester, September 2006.
- [126] “Higgs Searches at the LHC: Challenges, Prospects, and Developments” Seminar, University of Pennsylvania, March 2006.
- [127] “New Experimental Techniques for Higgs Searches at the LHC” Colloquium, Max-Planck Institute, Munich, Germany, October, 2005.
- [128] “The ATLAS Analysis Model” Seminar, Institute for Nuclear Physics, Cracow, Poland, July, 2005.
- [129] “Modern Techniques in High Energy Physics” Seminar, Enrico Fermi Institute, University of Chicago, USA, April, 2005.
- [130] “Potential for Higgs Analysis with New Event Data Model” Seminar, LAPP ATLAS Seminar, Annecy, France June, 2004.

Presentations at Conferences

- [131] “Triggering on the Unexpected”, Detecting the Unexpected, University of California-Irvine, December, 2007

- [132] "Impact of an early Higgs observation at the LHC on the ILC", LHC-ILC Workshop, Fermilab, April, 2007
- [133] "Progress, Challenges, and Future of Statistics for the LHC", Plenary, PhyStat2007, Geneva, Switzerland, June, 2007
- [134] "Extracting the Central Jet Veto Probability from Data", Les Houches, France, June, 2007
- [135] "The ATLAS Analysis Architecture", Hadron Collider Physics, Elba, Italy, May, 2007
- [136] "Trigger Rates & Menus in the Early Days of ATLAS" ATLAS Calibration Workshop, Costa Brava, Spain September, 2006.
- [137] "Trigger-Aware Analysis" Third North American ATLAS Physics Workshop, Boston, July 2006.
- [138] "Claiming Discovery in the Presence of Large Systematic Errors" Banff International Research Station, Banff, Canada, July 2006.
- [139] "Update on Trigger Slices", ATLAS Overview Week, CERN, February, 2006.
- [140] "Statistical Challenges of LHC Searches for New Physics" Invited Plenary speaker at *PhyStat2005* Oxford, UK, September, 2005.
- [141] "Higgs at the LHC and SuperLHC" ILC Workshop, Snowmass, CO, August, 2005.
- [142] "Triggering on the Hadronic Final State" The Second North American ATLAS Physics Workshop, Toronto, Canada, August, 2005.
- [143] "Higgs to Tau Leptons" ATLAS Physics Workshop, Rome, Italy, June, 2005.
- [144] "Overview of Higgs Activities" The First North American ATLAS Physics Workshop Tucson, AZ, USA December, 2004.
- [145] "Automated Analysis Procedure for High-Dimensional Models" Beyond the Standard Model Workshop, Columbia University, NY, USA, May, 2005.
- [146] Developments in the ATLAS Analysis Architecture, ATLAS Overview Week, October, 2004.
- [147] "Multivariate Analysis from a Statistical Point of View" PhyStat2003 SLAC, USA September, 2003.
- [148] "Investigation of Higgs Bosons in the Low Mass Region with ATLAS" American Physical Society-DPF Meeting, Denver, USA May, 2004.
- [149] "Multivariate Analysis from a Statistical Point of View" PhyStat2003 SLAC, USA September, 2003.

- [150] "Frequentist Hypothesis Testing with Background Uncertainty" PhyStat2003 SLAC, USA September, 2003.
- [151] "Generalizing Multivariate Analysis" Cracow School of Theoretical Physics June, 2003.
- [152] "Prospects for Neural Network Application in the LHC Data Analysis Cracow School of Theoretical Physics" June, 2003.
- [153] "Investigation of Higgs Bosons in the Low Mass Region with ATLAS" American Physical Society-DPF Meeting, Philadelphia, USA April, 2003.
- [154] K. S. Cranmer "Searches for the Higgs Bosons of the MSSM at LEP with the ALEPH Detector." American Physical Society Meeting. Long Beach, California. April, 2000.
- [155] "Kernel Estimation in High-Energy Physics." American Physical Society Meeting. Long Beach, California. April, 2000.

Internal Presentations

- 280 presentations to the ATLAS collaboration, 2002-2008.
- 3 presentations to the ALEPH collaboration, 1999-2000.
- 1 presentation to the BaBar collaboration, 2000.
- 2 presentations to the LEP Higgs working group, 1999.
- 1 presentation to the D-0 collaboration, 1997.