

# CURRICULUM VITAE - January 2026

## Sergey A. Uzunyan

Senior Research Scientist

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## Employment

- 2012-current, Senior Research Scientist; since 2021, Director of Science and Engineering, NIU Center for Research Computing and Data.
- 2007-2012, Research Scientist, NIU.
- 2002-2007, Research Assistant; since 2006, Research Associate, NIU.
- 1993-2002, Engineer-Physicist; since 1996, Physicist, Institute for Theoretical and Experimental Physics (ITEP), Moscow, Russia.

## Education

- Northern Illinois University, DeKalb, IL: Physics, Ph.D. (2006)
- Moscow Engineering Phys. Inst., Moscow, Russia: Physics, M.S. (1993)

## Professional Interests

Data analyst and Data Acquisition Systems (DAQ) developer for High Energy Physics (HEP) and medical research (proton tomography). Expert in high performance linux (Red Hat Linux based distributions) clusters design, system and application management. Experienced developer of computer simulations (GEANT4) for complex particle detectors. Have been working in HEP international collaborations in the US and Europe, co-author of 438 publications in major physics journals.

## Work history

- 2021-present Director of Science and Engineering for the NIU Center for Research Computing and Data (CRCDD). Supervised the purchase and installation (2023) of a hybrid CPU/GPU cluster equipped with a fast 1 PB parallel storage system and supported its operation and research applications. By 2025, CRCDD supported 78 scholarly and research projects. The system is used for large-scale, high-fidelity simulations of complex systems, text mining, data analysis and visualization, molecular dynamics, genomics, weather and climate modeling, and many other types of workloads.
- 2015-2021 Joined the Mu2e experiment at Fermilab to work on the scintillation Counters for the Cosmic Ray Veto (CRV) system. Conducted studies (calibration and radiation damage evaluation) of the SiPM detectors for the CRV. Since 2016 worked with the CMS experiment on the hadron calorimeter upgrade, created a linux friendly interface to operate a data acquisition system for 2017-2019 beam tests at Fermilab. In 2017 prepared and implemented the operating system upgrade of the High Performance Computing facility at NIU.

- 2010-2015 Designed and supported computing clusters at NIU and California State University (Fresno) for data analysis of the ATLAS experiment at CERN. In 2011-2014 developed the linux-based Back-End DAQ system (2500 data channels, S. A. Uzunyan *et al.*, arXiv:1312.3977) for a proton computed tomography scanner developed at NIU. The results of the scanner test runs can be found in e-Print: arXiv:1601.00249.
- 2007-2010 In 2007-2008 coordinator of the NIU/Delhi University group for a search of new particles using D0 data (including standard model Higgs boson in ZH channel). With the D0 New Phenomena and Higgs groups conducted (2008-2010) "Search for scalar bottom quarks and third-generation leptoquarks" using 5.2 fb<sup>-1</sup> dataset, published in Phys. Lett. B 693:95-101 (2010). Participated in the development of the data acquisition framework (beam tests) for the detector prototype for future electron-positron International Linear Collider (2007).
- 2002-2007 Analyzed the D0 data: "A Search for Charge 1/3 Third Generation Leptoquarks In Muon Channels" (Ph.D., NIU, 2006). The results of this analysis summarized in the paper "Search for the third generation leptoquarks", published in Phys. Rev. Lett. 99:061801 (2007). Since 2002 work for Northern Illinois Center for Accelerator and Detector Development (NICADD). Designed, installed and supported computational and desktop linux clusters for the center.
- 1999-2002 Joined the D0 experiment at Fermilab. Developed and implemented fast track-finding algorithms for the D0 Level 2 (L2) muon trigger (a parallel online data processing system running on Texas Instruments DSP processors), published in IEEE Trans. Nucl. Sci. 49, 1589 (2002). Administering the D0 desktop linux cluster. On-call Expert for the L2 trigger system.
- 1996-1999 Member of CMS collaboration at the European Laboratory for Particle Physics (CERN), Switzerland. Participated in testing the experimental module of the Hadron Forward (HF) Quartz-Fiber Calorimeter for CMS experiment at CERN. Worked out a number of technical drawings for HF documentation. Conducted optimization of the HF design using the detailed simulations of the HF response.
- 1993-1996 Participated in constructing (calibrating system), commissioning and monitoring of the 256 channel sampling electromagnetic calorimeter for the MIS ITEP experiment at the U-70 accelerator, Institute for High Energy Physics, Protvino, Russia. Worked out the algorithm for the analysis of calorimeter data. Created GEANT based simulation of the MIS detector. Supported laboratory computing (linux systems). Results were included in papers on studies  $K_L K_S$  system produced in  $\pi^- p$  interactions at 40 GeV. Developed the framework (GARFIELD based software) for calculations of the new drift tubes parameters for the spark spectrometer upgrade.

## Selected publications

- A. Belloni *et al.*, "Test beam study of SiPM-on-tile configurations", JINST 16 (2021) 07, P07022
- G. Blazey *et al.*, "Radiation tests of Hamamatsu multi-pixel photon counters", ISSN 0168-9002, <https://doi.org/10.1016/j.nima.2018.12.050> (2018).
- Mu2e Collaboration (A. Artikov *et al.*) "Photoelectron Yields of Scintillation Counters with Embedded Wavelength-Shifting Fibers Read Out With Silicon Photomultipliers", Nucl. Inst. and Meth. A, 890, 84-95 (2018).

- S. A. Uzunyan *et al.*, "Calibration and GEANT4 Simulations of the Phase II Proton Compute Tomography (pCT) Range Stack Detector", FERMILAB-TM-2617-AD-CD-E (2016)
- D0 Collaboration (V. M. Abazov *et al.*), "Muon reconstruction and identification with the Run II D0 detector", Nucl. Inst. and Meth. A, 737C (2014).
- S. A. Uzunyan *et al.*, "Development of a proton Computed Tomography (pCT) Scanner at NIU", Proceedings of the XIII New Trends in High-Energy Physics, p. 152-157, Alushta, Crimea, Ukraine, ISBN 978-966-02-7015-2 (2013).
- D0 Collaboration (V. M. Abazov *et al.*), "Search for scalar bottom quarks and 3rd-generation leptoquarks in ppbar collisions at  $\sqrt{s} = 1.96$  TeV", Phys. Lett. B693 95-101 (2010).
- D0 Collaboration (V. M. Abazov *et al.*), "Search for third generation leptoquarks in ppbar collisions at 1.96 TeV", Phys. Rev. Lett. 99, 061801 (2007).
- D0 Collaboration (V. M. Abazov *et al.*), "The Upgraded D0 Detector", Nucl. Inst. And Methods A565:463-537, (2006).
- M. Fortner, A. Maciel, H. Evans, B. Kothari and S. Uzunian, "The Level-2 Muon Trigger At D0", IEEE Trans. Nucl. Sci. 49, 1589 (2002).

## Selected presentations

- S. A. Uzunyan, "High Performance Computing at NIU", NIU Physics Colloquim, Nov 03, 2023, DeKalb, IL
- S. A. Uzunyan, Mu2e collaboration, "Studies of Radiation Damage to Silicon Photomultipliers", DPF/APS conference, Aug 1, 2017, Fermilab, Batavia, IL
- S. A. Uzunyan, pCT collaboration, "Calibration and GEANT4 Simulations of the Phase II Proton Compute Tomography (pCT) Range Stack Detector", 24rd International Conference on the Application of Accelerators in Research and Industry, Nov 1, 2016, Fort Worth, TX.
- S. A. Uzunyan, pCT collaboration, "Progress in the development of the pCT Phase II scanner at NIU", 23rd International Conference on the Application of Accelerators in Research and Industry, May 27, 2014, San Antonio, TX.
- S. A. Uzunyan, D0 and CDF Collaborations, "BSM searches at the Tevatron", New Trends in High Energy Physics conference, Sep 06, 2011, Alushta, Ukraine.
- S. A. Uzunyan, D0 and CDF Collaborations, "SUSY and BSM Tevatron overview", LHC Days in Split conference, Oct 07, 2010, Split, Croatia.
- S. A. Uzunyan, D0 Collaboration, "Search for Squarks and Gluinos with the D0 detector", DPF conference, July 27, 2009, Detroit, MI.
- S. A. Uzunyan, D0 Collaboration, "Search for leptoquarks with the D0 detector", DPF/APS conference, November 1, 2006, Honolulu, Hawaii (Oahu).
- S. A. Uzunyan (NIU, ITEP Moscow), D0 Collaboration "The D0 L2 Muon Trigger Algorithms", APS conference, Albuquerque, New Mexico, April 20, 2002.