

## Trevor P. Stewart

### Contact Information

Until Dec. 26th 2017

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### RESEARCH INTERESTS

My research has chiefly focused on high- $Q^2$  neutral and charged current deep inelastic scattering and charm production. However, I am interested in a wide range of topics in high energy experimental particle physics, especially those that can be studied at the LHC: Higgs and new physics beyond the standard model (BSM) searches and precision QCD and electroweak measurements.

At ZEUS, my main experience with detector hardware has been the calorimeter and the trigger. While both of these are of great interest to me, I would also like to gain experience with the operation of other detector components such as muon or tracking detectors.

### EDUCATION

**University of Toronto**, Toronto, Ontario, Canada

PhD, Physics

July 2012

- Thesis topic: *Measurement of High- $Q^2$  Neutral Current cross-sections with longitudinally polarised positrons with the ZEUS Detector*
- Supervisor: Prof. John Martin
- Area of Study: Experimental Particle Physics

MSc, Physics

August 2007

- Thesis topic: *Charm production in High- $Q^2$  Charged Current Deep Inelastic Scattering*
- Supervisor: Prof. John Martin
- Area of Study: Experimental Particle Physics

**University of New Brunswick (UNB)**, Fredericton, New Brunswick, Canada

I was enrolled in a joint program for science and computer science and received two separate undergraduate degrees.

BSc, Physics

December 2005

- Graduated with Honours

BCS, Computer Science

December 2005

- Graduated with First Division

### CONFERENCES, WORKSHOPS AND PROCEEDINGS

Trevor Stewart, speaker at The Europhysics Conference of High-Energy Physics, Grenoble, France, July 21-27, 2011. *Measurement of High- $Q^2$  Charged and Neutral Current Deep Inelastic  $e^+p$  Scattering Cross Sections with a Longitudinally Polarised Positron Beam at HERA*. Proceedings in PoS EPS-HEP2011:367.

Trevor Stewart, speaker at The XIX International Workshop on Deep-Inelastic Scatter-

ing and Related Subjects, Newport News, VA, USA, April 11-15, 2011. *Measurement of High- $Q^2$  Neutral and Charged Current Deep Inelastic  $e^+p$  Scattering Cross Sections with a Longitudinally Polarised Positron Beam at HERA.*

Trevor Stewart, speaker at the 5th International Conference on New Frontiers in Physics, Crete, Greece, July 6-14, 2016. *Overview of neutrino physics: Neutrino oscillation measurements and future prospects*

Trevor Stewart, GPU Hackathon 2017, Brookhaven National Laboratory, 5-9 June 2017 The goal of this Hackathon is for scientists using large hybrid CPU-GPU systems to send teams of developers along with either a potentially scalable application that could benefit from GPU accelerators, or an application running on accelerators that need optimization. Our team “The fasted trigger in the east” brought a fast vertexing trigger for the Hyper-Kamiokande detector, already ported to CUDA, for optimisation. Result was a 5.5x speed gain.

## AWARDS

### Major Awards

- Ontario Graduate Scholarship (OGS), 2007-2008
- Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award, Summer 2004

### University of New Brunswick (UNB)

- Dr. A. Wilmer Duff Memorial Prize, 2005-2006
- Frank and Isa Pridham Memorial Scholarship, 2001-2002
- UNB Fredericton Scholarship Guarantee, 2000-2001

## RESEARCH EXPERIENCE

Postdoctoral Research Associate

June 2013 to present

### T2K

- Highly involved in the operation and maintenance of the T2K data acquisition system.
- Involved in the T2K run coordination. Run coordinators are in charge of the day to day running of the T2K near detector complex, ensuring quality data taking, safety of the detectors, and liaison between the beamline and far detector, Super-Kamiokande.
- In charge of data distribution, ensuring that data taken by the near detector complex is distributed to GRID sites around the world. In charge of maintaining and upgrading data distribution software as necessary.
- Developed a selection for charged current anti-neutrino  $\pi^-$  events in an anti-neutrino beam at T2K.

### Hyper-Kamiokande

- Studies to understand the requirements needed for a data acquisition system for the planned Hyper-Kamiokande detector.
- Development of various trigger algorithms for the Hyper-Kamiokande detector, concentrating on triggers to lower the low energy threshold of the detector. Best performing of developed triggers is a fast vertexing trigger than has been ported

to GPUs using CUDA. Attended GPU hackathon in June 2017 to further develop and optimise the CUDA implementation.

- Software development work on WCSim, a water cherenkov detector simulation package, to allow more flexible implementation of digitisation of analogue signals and trigger systems. This work has been incorporated into the publically available release of the software.

Graduate Student

March 2006 to present

## ZEUS

- Developed an analysis for charm production in charged current deep inelastic scattering analysis using reconstructed secondary vertices and impact parameter techniques. This analysis was the first observation of charm production in charged current deep inelastic scattering at ZEUS by this technique.
- Developed an analysis for high- $Q^2$  neutral current  $e^+p$  deep inelastic scattering using the HERA polarised positron beam. This analysis measured the single differential cross-sections, the reduced cross-sections, observed parity violation at high- $Q^2$  and in combination with the previously published HERA-II  $e^-p$  analysis, made the most precise determination of  $x F_3^{\gamma Z}$ .
- Measured the shape of the  $Z_{vtx}$  distribution for the 2006-2007 positron running period at ZEUS. Showed the need for multiple  $Z_{vtx}$  measurements within the running period. Implemented a correction based on this measurement.
- Worked on validating the common ntuple (CN) project at ZEUS using both the charm production in charged current analysis and the neutral current analysis. The goal of the CN project is to provide ntuples suitable for a wide range of analysis and long term storage of ZEUS data.
- Contributed to the running, maintenance and calibration of the ZEUS calorimeter and high level Third Level Trigger.

Summer Research Assistant

May 2005 to August 2005

- Continuation of work on the ZEUS Third Level Trigger.
- Studied the effects of backplash from the ZEUS calorimeter on the measurement of the kinematic variables using jets. Implemented this correction for use in high- $Q^2$  neutral current deep inelastic scattering.

Summer Research Assistant

May 2004 to August 2004

- Assisted with the maintenance, operation, debugging and updating of the ZEUS Third Level Trigger (TLT).

## TEACHING EXPERIENCE

University of Toronto

Teaching Assistant

September 2008 to April 2010

- Instructor for PHY 224 - Practical Physics I (Laboratory)
  - 4 semesters
  - Responsible for the supervision of a 3 hour lab where first year physics and engineering science students are introduced to basic laboratory and data analysis skills through the study of historical experiments from a variety of

fields in physics. Special attention was paid to error analysis, data collection techniques and experimental design.

- Responsible for evaluation of weekly laboratory reports, formal experiment write-ups and oral presentations.

Teaching Assistant

September 2007 to April 2008

- Instructor for PHY 151/152 - Foundations of Physics (Laboratory)
  - 2 semesters
  - Responsible for the supervision of a 3 hour lab where first year physics students are introduced to the fundamentals of mechanics using micro-computer based data collection and analysis.
  - Responsible for evaluation of weekly laboratory reports and formal experiment write-ups.

### University of New Brunswick

Teaching Assistant

September 2005 to December 2005

- Instructor for PHYS 1081 - Foundations of Physics for Engineers (Laboratory)
  - 1 semester
  - Responsible for the supervision of a 3 hour lab where first year engineering students are introduced to the fundamentals of mechanics through hands-on laboratory work.
  - Responsible for evaluation of weekly laboratory reports and formal experiment write-ups.

**PUBLICATIONS** To see all publications, see  
<http://inspirehep.net/author/profile/T.P.Stewart.1> for reference.

Participated in the analysis of the following papers:

- S. Chekanov *et al.* [ZEUS Collaboration], *Measurement of high- $Q^2$  neutral current deep inelastic  $e^-p$  scattering cross sections with a longitudinally polarised electron beam at HERA* Eur. Phys. J. C **62**, 625 (2009)
- H. Abramowicz *et al.* [ZEUS Collaboration], *Measurement of positron-proton neutral current cross sections at high Bjorken- $x$  with the ZEUS detector at HERA*. Phys. Rev. D **89**, 072007 (2014)

Primary author on:

- H. Abramowicz *et al.* [ZEUS Collaboration], *Measurement of high- $Q^2$  neutral current deep inelastic  $e^+p$  scattering cross sections with a longitudinally polarised electron beam at HERA* Phys.Rev. D **87**, 052014 (2013)

### COMPUTER SKILLS

**Operating systems:** Linux, Unix, Mac OS X and Windows.

**Programming languages:** Good knowledge of C, C++, FORTRAN, perl, python, and UNIX shell scripting. Some knowledge of 8086 and 68HC11 assembler CUDA, R and JAVA.

**High energy physics programs:** Batch computing, GRID Computing, PAW/HBOOK, ROOT. Some familiarity with event generators and simulations (GEANT/GEANT4).

### LANGUAGES

Fluent in English and basic knowledge of French and Japanese.

## REFERENCES

- Prof. Alfons Weber (alfons.weber@stfc.ac.uk), University of Oxford/STFC, Line Manager.
- Prof. Giles Barr (Giles.Barr@physics.ox.ac.uk), University of Oxford.
- Dr. Helen O’Keeffe (h.okeeffe@lancaster.ac.uk), Lancaster University.