



**TRIUMF Senior Scientist and Adjunct Professor of Physics  
at UBC**

*Experimental High Energy Physics*

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## **Brief CV**

Senior Scientist (2018-present), TRIUMF, Canada

Adjunct Professor of Physics (2012-present), University of British Columbia, Canada

Scientist (2013-2018), TRIUMF, Canada

Research Scientist (2008-2013), TRIUMF, Canada

Marie Curie Fellow (2005-2008), University of Oxford, United Kingdom

Ph.D. (2005), University of Toronto, Canada

Diplom in Physics (2000), University of Heidelberg, Germany

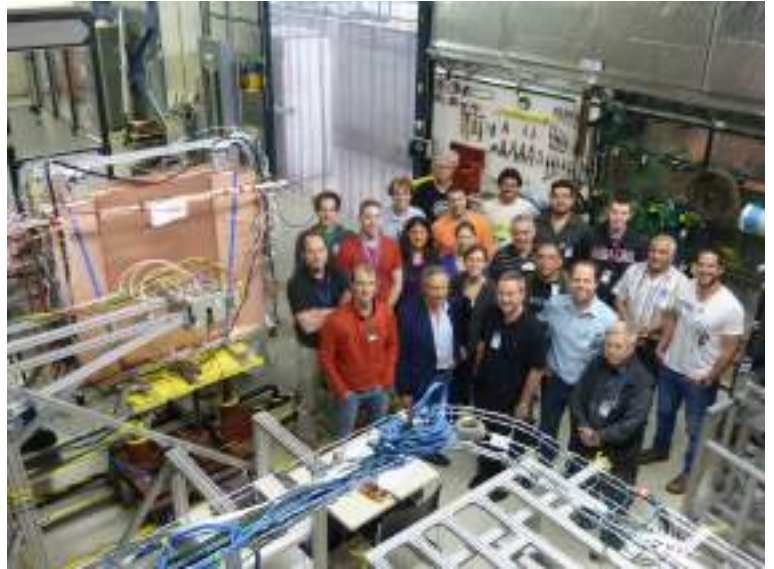
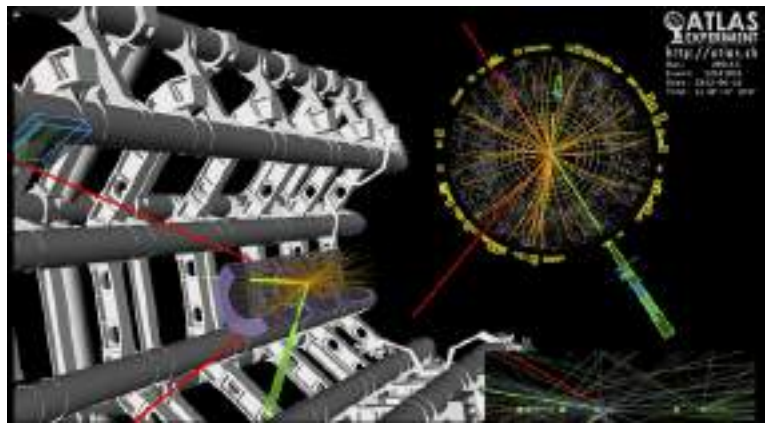
B.Sc. Honours (1998), University of Cape Town, South Africa

## **Research Interests**

My primary interest is the study of elementary particle physics. My current physics emphasis are searches for new particles beyond the Standard Model and studying the newly discovered Higgs boson. With its discovery at the LHC by ATLAS and CMS, there are many questions we are trying to answer with more measurements. Have we observed the Higgs that is predicted in the Standard Model, or are the results pointing towards new physics that goes beyond the Standard Model? We have studied the Higgs boson in various ways, including the consistency with the spin-0 and even parity characteristics following the discovery. We continued our studies by finding evidence for the order of magnitude suppressed vector boson fusion production mode in Higgs decays to WW decays which allows the most precise determination of the Higgs to vector boson coupling. More recently in Run 2, we contributed to the observation of the third Higgs boson production mode in association with top quarks that is suppressed by another order of magnitude. This allowed for the first time a direct measurement of the Higgs-top Yukawa coupling. We are also intensely searching for other new particles which appear in many theories that go beyond the Standard Model. We just recently completed a search for new gauge bosons  $Z'$  in the leptonic final state. I am currently one of the two

[ATLAS Exotics Group](#) conveners.

I am a member of the ATLAS Muon group and am active in the phase-1 upgrades of the ATLAS detector. A Canadian consortium around clusters at TRIUMF, Carleton University and McGill University will build 25% of novel high precision thin gap chambers for the ATLAS New Small Wheel (NSW) to be installed in 2019-2020. We have setup laboratory space at TRIUMF to produce detector half gaps for these chambers with a dedicated team. The basic sTGC structure consists of a grid of gold-plated tungsten wires sandwiched between two resistive cathode planes at a small distance from the wire plane. The precision cathode plane has strips with a 3.2mm pitch for precision readout and the cathode plane on the other side has pads for triggering. The pads are used to produce a 3-out-of-4 coincidence to identify muon tracks in an sTGC quadruplet. A full size sTGC quadruplet has been constructed and equipped with the first prototype of dedicated front end electronics. The performance of an sTGC quadruplet has been studied at various testbeams, including at Fermilab, where we measured spacial resolutions of 45 microns. NSW performance plots can be found [here](#). We are currently producing sTGC detectors at TRIUMF and across Canada and detector integration at CERN is ongoing.



Past involvements: I worked on the ATLAS Level-1 Calorimeter Trigger for my Diplom in Germany and for my PhD I became a member of CDF and made major contributions to the world's most precise measurement of the W boson mass, which improved the indirect constraint on the Higgs boson mass and was consistent with the discovery in 2012.

## Recent Talks

[Searches for Heavy Resonances with the ATLAS detector](#), Mitchell Institute for Fundamental Physics and Astronomy, Texas A&M University, May 2019

[Emergence of Signals out of Background](#), Leaning Out of Windows, TRIUMF and Emily Carr University, September 2018

[ATLAS Highlights](#), 7th International Conference on High Energy Physics in the LHC Era, Valparaiso, Chile, January 8th - 12th, 2018

[ATLAS at the LHC - Latest Results from Run 2](#), XXXIX Symposium on Nuclear Physics, Cocoyoc, Mexico, 2016

[Searches for contact interactions and extra dimensions with non-resonant excesses at the TeV scale](#), LHCP, St. Petersburg, August 30th - September 6, 2015

[W Boson Mass](#), LHCP, St. Petersburg, August 30th - September 6, 2015

[W/Z Boson Production and Mass](#), HCP, Kyoto, November 12th - 16, 2012

[Update on the Search for the Higgs Boson at the LHC](#), TRIUMF Seminar, July 5th, 2012

[W Mass Measurement from CDF](#), PLHC, Vancouver, June 4th - 9th, 2012

[Review of the High Energy Frontier Parallel Sessions](#), CIPANP, St. Petersburg, Florida, May 28th - June 3rd, 2012

[Searches for Dilepton Resonances at ATLAS](#), BSMLHC, Trieste, Italy, Sep 19th - 23rd, 2011  
[Beyond the Standard Model with ATLAS at the LHC](#), CAP, St. John's, Newfoundland, Jun 13th - 17th, 2011

## Committees & Service

[TRIUMF Particle Physics](#), Department Head  
[TRIUMF Academic Committee](#), Chair  
[ATLAS Muon Speakers Committee](#), Member, Chair  
[TRIUMF Student Program](#), Director  
[Institute of Particle Physics](#), Scientific Council  
[Canadian National IUPAP Liaison Committee](#), Subatomic Physics and Astrophysics  
[CAP](#), Regional Councilor for British Columbia and the Yukon  
[TRISEP](#), Founding Member Tri-Institute Summer School on Elementary Particles

## Teaching

Spring 2012: [PHYS 485](#) - Particle Physics, Simon Fraser University  
Summer 2012-2019: [PHYS 250](#) - Introduction to Modern Physics, University of British Columbia

## Postdocs

Kalliopi Iordanidou (based at CERN)  
Jelena Jovicevic (now CERN Fellow)  
Noam Tal Hod (now scientist at Weizmann Institute of Science)  
Doug Schouten (now Research and Innovation Associate, Cosmic Ray Muon GeoTomography Technologies Inc.)  
Dominique Fortin (now Medical Physicist at Saskatchewan Cancer Agency)

## Graduate Students

Chris Gubbles, *ITK QC and test beam, ttH*  
Robin Hays, *muon trigger efficiencies, H->WW*  
Alexander Held, *Higgs Boson production in association with top quarks (now postdoctoral fellow at New York University)*  
[Sebastien Rettie](#), *search for dilepton resonances, sTGC test beams, muon performance (now postdoctoral fellow at University College London)*  
[Simon Viel](#), *search for dilepton resonances and VBF Higgs to WW (now Assistant Professor at Carleton University)*  
Stephen Swedish, *search for ttbar resonances (now Data Scientist at Facebook)*

## Undergraduate Students

Damian Sheppard (Waterloo), *sTGC QC, wedge integration at CERN*  
Pranav Prasad (Waterloo), *sTGC half gap assembly*  
Fred Huang (UBC), *sTGC half gap assembly*  
Bryan Dury (UBC), *sTGC QC*  
Callum McCracken (Waterloo), *sTGC QC*  
Jeff Krupa (UBC), *search for ttH production (now grad student at MIT)*  
Cornelius Grunwald (TU Dortmund), *search for dilepton resonances (now grad student at TU Dortmund)*  
Sushobhan Gosh (Indian Institute of Technology), *transfer functions for b-jets in tt-bar events (now grad student at Northwestern University)*  
Sebastian Murk (University of Erlangen), *search for dilepton resonances (now grad student at Macquarie University)*  
[Kelsey Allen \(4th year thesis UBC\)](#), *search for dilepton resonances (now grad student at MIT)*  
Elise Devoie (U of Waterloo), *ATLAS muon detector upgrade (now grad student at U of Waterloo)*  
Carl Pigeon (Carleton U), *ATLAS muon detector upgrade (now grad student at U of Toronto)*  
Kayla McLean (U of Victoria), *VBF Higgs to WW (now grad student at U of Victoria)*  
Lohrasp Seify (U of Calgary), *search for excited leptons (now grad student at U of Calgary)*

## Selected Publications

*Search for high-mass dilepton resonances using 139/fb of pp collision data collected at  $\sqrt{s}=13$  TeV with the ATLAS detector*

*M. Aaboud et. al. [ATLAS Collaboration]  
Submitted to PLB*

*Observation of Higgs boson production in association with a top quark pair at the LHC with the ATLAS detector  
M. Aaboud et. al. [ATLAS Collaboration]*

*Phys. Lett. B* 784 (2018)

*Search for the Standard Model Higgs boson produced in association with top quarks and decaying into a  $b\bar{b}$  pair in  $pp$  collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector*

*M. Aaboud et. al. [ATLAS Collaboration]*

*Physics Review D.* 97, 072016 (2018)

*Search for new high-mass phenomena in the dilepton final state using 36/fb of proton-proton collision data at  $\sqrt{s} = 13$  TeV with the ATLAS detector*

*M. Aaboud et. al. [ATLAS Collaboration]*

*JHEP* 10, (2017), 182

*Search for high-mass new phenomena in the dilepton final state using proton--proton collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector*

*M. Aaboud et. al. [ATLAS Collaboration]*

*Phys. Lett. B* 761:372-392 (2016)

*Performance of a full-size small-strip thin gap chamber prototype for the ATLAS New Small Wheel Muon Upgrade*  
*A. Abusleme et. al.*

*Nuclear Instruments and Methods in Physics*, 817, 85-92 (2016)

*Observation and measurement of Higgs boson decays to  $WW^*$  with ATLAS at the LHC*

*Georges Aad et. al. [ATLAS Collaboration]*

*Phys. Rev. D* 92, 012006 (2015)

*Search for high-mass dilepton resonances in  $pp$  collisions at  $\sqrt{s} = 8$  TeV with the ATLAS detector*

*Georges Aad et. al. [ATLAS Collaboration]*

*Phys. Rev. D* 90, 052005 (2014)

*Search for high-mass resonances decaying to dilepton final states in  $pp$  collisions at  $\sqrt{s} = 7$  TeV with the ATLAS detector*

*Georges Aad et. al. [ATLAS Collaboration]*

*JHEP* 11(2012)138

*Search for resonances decaying into top quark pairs using fully hadronic decays in  $pp$  collisions with ATLAS at  $\sqrt{s} = 7$  TeV*

*Georges Aad et. al. [ATLAS Collaboration]*

*JHEP* 01, (2013), 116

*Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC*

*Georges Aad et. al. [ATLAS Collaboration]*

*Phys. Lett. B* 716:1-29, (2012)

*Precise measurement of the  $W$  boson mass with the CDF II detector*

*T. Aaltonen et. al. [CDF Collaboration]*

*Phys. Rev. Lett.* 108:151803, (2012)

*Search for the Standard Model Higgs boson in the  $H \rightarrow WW \rightarrow l\nu l\nu$  decay mode using Multivariate Techniques with 4.7/fb of ATLAS data at  $\sqrt{s} = 7$  TeV*

*ATLAS-CONF-2012-060*, (2012)

*Search for dilepton resonances in  $pp$  collisions at  $\sqrt{s} = 7$  TeV with the ATLAS detector*

*Georges Aad et. al. [ATLAS Collaboration]*

*Phys. Rev. Lett.* 107:272002, (2011)

*A Search for  $t\bar{t}$  Resonances in the Dilepton Channel in 1.04/fb of  $pp$  Collisions at  $\sqrt{s} = 7$  TeV,*

*ATLAS-CONF-2011-123*, (2011)

*Search for dilepton resonances in  $pp$  collisions at  $\sqrt{s} = 7$  TeV with the ATLAS detector*

*Georges Aad et al. [ATLAS Collaboration]*

*Phys. Lett. B* 700:163-180, (2011)

*Search for high-mass states with one lepton plus missing transverse momentum in pp collisions at  $\sqrt{s} = 7$  TeV with the ATLAS detector*

*Georges Aad et al. [ATLAS Collaboration]*

*Phys. Lett. B701:50-69, (2011)*

*New Techniques in the Search for Z' Bosons and Other Neutral Resonances*

*C. Hays, A. Kotwal, O. Stelzer-Chilton*

*Mod. Phys. Lett. A24, 2387-2403 (2009)*

*A Search for high-mass resonances decaying to dimuons at CDF*

*T. Aaltonen et. al. [CDF Collaboration]*

*Phys. Rev. Lett. 102, 091805 (2009)*

*First Measurement of the W Boson Mass in Run II of the Tevatron*

*T. Aaltonen et. al. [CDF Collaboration]*

*Phys. Rev. Lett. 99, 151801 (2007)*

*Last updated October, 2019 by [Oliver Stelzer-Chilton](#)*

*Here is a picture of my [family](#).*

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