

Academic CV Writing

TRIUMF Science Week

Max Swiatlowski

TRIUMF



About Me



I am a research scientist at TRIUMF since 2019, working on ATLAS since ~2010

Did my undergrad at Harvard, PhD at Stanford/SLAC, and postdoc at UChicago

Regularly hire undergrads, grad students, and postdocs, and serve on committees that evaluate faculty, etc.

What Goes in a CV



- Academic history
- Research experience (Briefly describe projects, skills, accomplishments)
- Work experience (Briefly describe (relevant) skills, etc.)
- Funding, awards, fellowships, etc.
- Leadership experience
- Talks (conferences, seminars, colloquia)
- Publications

How Long?



- Depends on your audience...
- Applying for a co-op or grad school? 1 page, 2 pages at most
- Applying for a postdoc? 2-3 pages
- Applying for faculty? 3+ pages is OK (but make it readable with section headings, etc.)



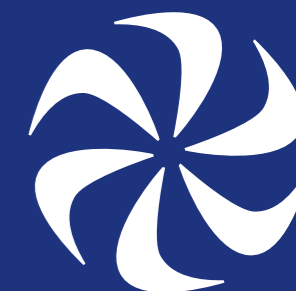
- https://mswiatlo.web.cern.ch/mswiatlo/media/swiatlow_cv.pdf
- https://mswiatlo.web.cern.ch/mswiatlo/media/swiatlow_publications.pdf
 - NB: publications list can be just as important as CV, will spend time on this today!
- (A little out of date, oops)

Themes Today



- Be (mostly) shameless
- Know your audience/goal
- Help people remember you: know your elevator pitch
- Explain explain explain (but know your elevator pitch)

Walkthrough



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EDUCATION AND WORK HISTORY

TRIUMF, Vancouver, British Columbia
Associate Research Scientist, Particle Physics Department
Tenure-track scientist position at TRIUMF, Canada's particle accelerator laboratory. Research focus is on the ATLAS experiment at the LHC. Ongoing supervision of 2 PhD students, 2 undergraduate students, and 3 postdocs.

University of Chicago, Chicago, Illinois
Robert McCormick Fellow, Enrico Fermi Institute
Postdoctoral research fellowship at the University of Chicago, focused on research at the ATLAS experiment; also involved in the MilliQan experiment.

Stanford University, Stanford, California
Ph.D. in Physics, September 2015
Dissertation Title: Measuring the Standard Model and Searching for New Physics with Jet Substructure Using the ATLAS Detector

Harvard University, Cambridge, Massachusetts
A.B. **Physics** with Honors, Secondary in Mathematical Sciences, *cum laude*, May 2010

Section
headings

Brief
description

Less detail for things longer ago

Walkthrough



More on this later

RESEARCH



Section
headings!



ATLAS Collaboration

2010-present

Measurements of the Higgs potential and rare couplings using di-Higgs final states
Searches for new physics with high top, b , and quark multiplicity
Deep learning for particle reconstruction and triggering using FPGA acceleration
Jet and missing energy performance and reconstruction
Novel measurements of QCD properties using jet substructure
Commissioning and simulation of the Fast Track Trigger (FTK)
Hadronic boson and top tagging
Light quark/gluon jet discrimination
Silicon pixel and strip test beam measurements, telescope operation

MilliQan Collaboration

2016-2018

Installation and commissioning, data analysis
HV power supply and fanout design

CDMS Collaboration, SLAC/Stanford

2011

SPS Accelerator Upgrades, SLAC

2010

Brief
description



Less detail for things longer ago

(I don't report on undergrad research anymore 😭)

(Should probably remove CDMS & SPS too...)

Walkthrough



More on this later

FUNDING



Section
headings!



FELLOWSHIPS &
AWARDS



Brief
description

NRC Applied Quantum Challenge: “Quantum Variational Autoencoders for Particle Simulation at the Large Hadron Collider” Awarded \$400k for 2 years, \approx 2 PIs.

NSERC Project Grant: “The ATLAS Detector at the Large Hadron Collider.” Awarded \$18.3m for 3 years, 35 PIs.

NSERC Discovery Grant: “ATLAS Bridging Application: DiHiggs Processes as a Window to the Standard Model and Beyond.” Awarded \$200k for 2 years, sole PI.

Robert McCormick Fellowship, University of Chicago *2015-2019*

U.S. ATLAS Outstanding Graduate Student Award *2015*

U.S. LHC Users Association Lightning Round Award Winner *2015, 2016*

NSF Graduate Research Fellowship *2011-2014*

Best Poster, LHCP 2014 Conference *2014*

Best Undergraduate Poster, APS Division of Plasma Physics *2009*



Less detail for things longer ago

(Should probably remove undergrad poster 🤨)

Walkthrough



LEADERSHIP & SERVICE

Chair, Canadian Association of Physics, Particle Physics Division *2022-2023*

- Coordinate one of the largest divisions of the CAP
- Organize sessions and symposia of the CAP Congress
- Organize PhD thesis competition

Jet/ E_T^{miss} Group Convener *2020-2022*

- Coordinate full ATLAS Jet/ E_T^{miss} group dedicated to hadronic reconstruction
- Organize ≈ 200 individuals, in reconstruction, calibration, and R&D for new techniques
- Member *ex officio* of ATLAS Physics Coordination group

Analysis Contact and Paper/Note Editor *2015-present*

- Organizer or paper editor of several analyses:
 - Combination of ATLAS and CMS searches for di-Higgs production using the full Run2 dataset *2022-present*
 - Exotic searches for di-Higgs resonances and SM production using the full Run2 dataset (VBF and ggF production modes), *2018-present*
 - Electroweakly produced SUSY decaying to di-Higgs final states, *2017-2020*
 - Strongly produced SUSY decaying to many b -jets, *2016-2020*
 - Studies of strongly produced SUSY in the RPC-RPV transition, *2017-2018*
 - Performance evaluation of various jet substructure algorithms, *2013, 2014*
- Worked closely with students, postdocs, and faculty from many institutions, organizing large teams and producing timely results
 - Directly supervised 5 PhD theses and 4 undergraduate theses, ongoing supervision of 2 PhD theses, 2 undergraduate theses, and 3 postdocs

Journal Referee *2021-present*

- Paper reviewer for *Physical Review Letters*, *Physics Letters B*, *Physical Review D*, and *Frontiers in Artificial Intelligence*

Local Organizing Committee, TRISEP Physics School *2021-present*

- Organized the 2022 international summer school
- Invited and coordinated with lecturers, organized practical sessions

Section headings!

Brief description

Ordered mostly by date/importance

Walkthrough



Just a list when things are clear

TEACHING &
OUTREACH



Teaching Fellow for Physics Classes

- Applied Physics 207: *Laboratory Electronics*, Stanford University 2011, 2012
- Physics 41: *Introductory Electromagnetism*, Stanford University 2011
- Physics E-6/W: *Physics Made Simple* (Extension School), Harvard University 2010
- Physics 15b: *Introductory Electromagnetism* (lab component), Harvard University 2009
- Physics 11b: *Introductory Electromagnetism* (lab component), Harvard University 2008
- Physics 11a: *Introductory Mechanics* (lab component), Harvard University 2007

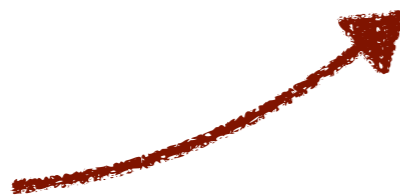


Stanford Educational Studies Program

- *Logistics Coordinator*: Scheduled and organized 300+ weekend classes for 1500+ middle and high school students twice a year 2010-2013
- *Teacher*: Designed & taught classes on experimental particle physics 2010-2012

Section
headings!

Brief
description
if needed



Walkthrough



TALKS AT
CONFERENCES

“Applications and Opportunities for Fast Machine Learning at the Large Hadron Collider”, Fast Machine Learning for Science Workshop, Dallas, USA, October 2022

“Physics in the High Luminosity Era with the ATLAS Detector”, CAP Congress Particle Physics Symposium, Hamilton, Canada, June 2022

“Probing the nature of electroweak symmetry breaking with Higgs boson pair-production at ATLAS”, Lake Louise Winter Institute, Lake Louise, Canada, February 2022

Lists of talks can be quite long— put at end

3 of 5

Can also condense related talks to one line

**Students can include “internal” talks, especially if “big deal”;
otherwise public talks (conference, seminar, etc.) only**

“Re-interpretable results for di-Higgs”, Higgs Pairs Mini-Workshop, *online only*, September 2021

INVITED SEMINARS
AND COLLOQUIA

“The LHC’s Next Frontier: Searching for Pairs of Higgs Bosons to Understand the Standard Model and Beyond”, Carleton University Physics Colloquium, Ottawa, Ontario, December 2021

“The LHC’s Next Frontier: Searching for Pairs of Higgs Bosons to Understand the Standard Model and Beyond”, Brandeis University Physics Colloquium, Waltham, Massachusetts, March 2021

“Searching With di-Higgs Final States at ATLAS”, University of Geneva DPNC Seminar, Geneva, Switzerland, November 2020



**Section
headings!**

Publications



Explanation
for non-HEP
readers



Primary Publications

I am an author on more than 800 publications, listed [here on ORCID](#). Below is a list of significant papers where I have made substantial contributions. Some are preliminary results released by ATLAS, referred to as Conference or Public Notes, and not published in a journal. In ATLAS, papers are developed by teams ranging from a few to more than 50 contributors; papers which I personally wrote or where I led the analysis team are indicated by *Editor*.

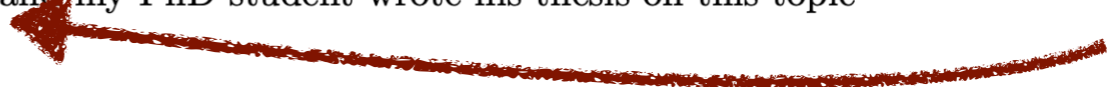
Brief summary
of paper,
impact, personal
role



ATLAS Collaboration, “Search for nonresonant pair production of Higgs bosons in the $b\bar{b}b\bar{b}$ final state in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”, [arXiv:2301.03212](#) (*Editor*)

- We presented the full run 2 search for non-resonant di-Higgs production via ggF and VBF production in the $b\bar{b}b\bar{b}$ final state
- We significantly improved our neural-network background modeling technique from the resonant publication
- We set first limits on SMEFT, and in ATLAS, on HEFT interpretations of our search
- We significantly improved upon past ATLAS iterations of the analysis
- I led the analysis, and my PhD student wrote his thesis on this topic
- Accepted by PRD

No shame!



ATLAS Collaboration, “HL-LHC prospects for the measurement of Higgs boson pair production in the $b\bar{b}b\bar{b}$ final state and combination with the $b\bar{b}\gamma\gamma$ and $b\bar{b}\tau^+\tau^-$ final states at the ATLAS experiment”, [ATL-PHYS-PUB-2022-053](#)

- We presented updated projects of the sensitivity of the $b\bar{b}b\bar{b}$ channel for di-Higgs production at the HL-LHC
- We presented several different background uncertainty scenarios, and quantified the sensitivity with different levels of analysis improvements
- We combined the results with the other most sensitive channels, leading to the most sensitive projections at the HL-LHC to date
- I supervised the MSc student and postdoc who performed the analysis and wrote the note

Being Shameless



- This is hard
- But you really have to advocate for yourself and be **direct** to get people's attention
- **“I did X”** needs to be your mantra
 - Even if you were part of a team, take credit for your contributions
- Will give two example slides from my TRIUMF job talk to demonstrate!

Jets are a Tool for Discovery



Jets are everywhere at the LHC

Many of the most interesting new physics scenarios involve final states with predominantly jets

... but jets are complicated

This is an **opportunity!**

When something is challenging, there's lots of room to improve!

Performance

New Techniques

Physics

Measurements

Jet Calibrations at 13 TeV:
Phys Rev D 96 072002 2017

Quark Gluon Tagging:
Eur. Phys. J. C (2014) 74

Color Flow Observation:
Physics Letters B (2015) 475-493

Jet Reclustering Performance:
ATLAS-CONF-2017-062

Jet Reclustering Technique:
JHEP 02 (2015) 075

Soft Drop Mass:
Phys. Rev. Lett. 121 (2018) 092001

Pileup Corrections:
Eur. Phys. J. C (2016) 76:581

Q-jets Studies:
ATLAS-CONF-2013-087

Large-R Performance:
JHEP09 (2013) 076

Sherpa Authors

Editor

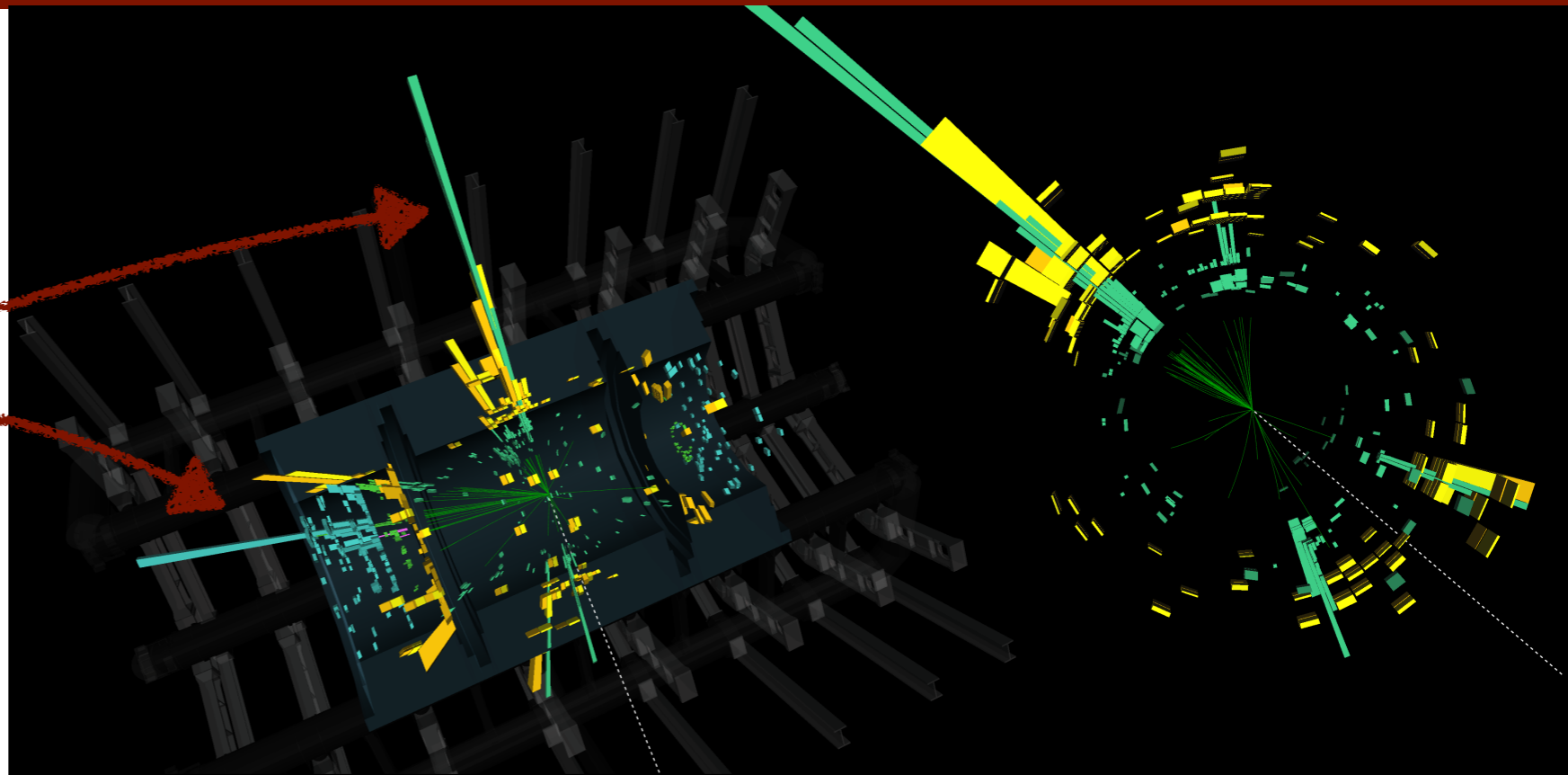
Editor

SUSY: A Rich Landscape



Huge number of things
to search for!

Many jets:
perfect place
for the toolkit!



Editor

Prompt to Long-lived Scan:
ATLAS-CONF-2018-003

Editor

2017 Search for Multi-b
ATLAS-CONF-2018-041

Editor

2016 Search for Multi-b
JHEP 06 (2018) 107

Lead Analyst

2015 Search for Multi-b
Phys Rev D 94 032003 (2016)

Lead Analyst

2012 Search for RPV Multijets
Phys. Rev. D 91, 112016 (2015)

Convener

2016 Search for 7-11 Jets:
JHEP12 (2017) 034

Convener

2016 Search for 1-lepton and Jets:
Phys. Rev. D 96 (2017) 112010

Convener

2016 Search for 2-3 Leptons:
JHEP 09 (2017) 084

Convener

2016 Search for 2-6 Jets:
Phys. Rev. D 97 (2018) 112001

Being Shameless



- Be direct, use “I” when appropriate
- Consider adding a slide like the ones I had in your job talks/ seminars
 - Helps you be “to the point” and memorable!

Know Your Audience/Goal



- **The goal:** get hired
- So what gets you hired?
 - Depends on the job you're going after!
- To be hired as a graduate student:
 - Passion, some skills in something, experience with science
- To be hired as a postdoc:
 - Passion, leadership, project completion (or progress), demonstrated skills, competence, potential for independence
- To be hired as faculty:
 - Passion, independence, direction, vision, expertise, recognition

Know Your Audience/Goal



- Examples:
 - Applying to be a student: summarize your research projects and what you did. Software, toolkits, analysis, statistics: show off what you learned!
 - Applying to be a postdoc: summarize the science of your projects, and highlight particular skills and areas of expertise you developed. Emphasize independent work when available.
 - Applying for faculty: Emphasize vision, connection between projects, areas of expertise and relationship to vision

Know Your Elevator Pitch



- Generally people will read (most) of your CV
- But it helps to have a summary for them so they remember you
- People often present this as a “mission statement” or “personal objective”
- Highlight the same things I mentioned before: skills+interest when young, vision+expertise+passion when older

Add Context



- If your format allows it, always feel free to add a sentence of context/explanation
 - (Sometimes italics or some other font can help make it clear what you're doing)
- Generally you'll be able to explain the full impact in your research statement/cover letter, but having a bite-size summary in your CV can also help
- Use this to reinforce the elevator pitch



- Should you include non-research related work experience?
 - For student applications: yes, especially if demonstrates responsibility, planning, leadership, “sends a message”, etc.
 - For postdoc/faculty applications: yes, if relevant. Internship/co-ops, few years in industry, etc., great. Unrelated jobs, probably remove at this point.
- Should you include hobbies? (As a two-line item at the end)
 - You can, but think about the message. Dedicated athletics, music, art, writing can demonstrate commitment, responsibility, etc.

Summary



- Be (mostly) shameless
- Know your audience/goal
- Help people remember you: know your elevator pitch
- Explain explain explain (but know your elevator pitch)