# William K. DiClemente

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**CURRENT ADDRESS**
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## EDUCATION

*University of Pennsylvania, Philadelphia, PA*
Doctor of Philosophy, Physics (Experimental Particle Physics), May 2019
Masters of Science, Physics, May 2015

*Duke University, Durham, NC*
Bachelor of Science, Physics (High Distinction), May 2013
Minors, Mathematics, May 2013

## TECHNICAL SKILLS

**Proficient:** C++, Python, ROOT/PyROOT (Data analyis framework)
**Familiar:** Unix-based OS, LaTeX, Git, Java, MySQL, Matlab, Fortran

## RESEARCH EXPERIENCE

***W* Boson Analysis and Detector Alignment with the CERN ATLAS Experiment**
University of Pennsylvania (2014-2019)/Duke University (2010-2013)
*Particle physics researcher*

ATLAS's first observation of same-sign $W$ boson scattering using 2015-2016 data:

- Modified existing method for modeling background contribution from fake leptons to achieve better data-simulation agreement
- Developed new method using 2D cuts to reduce 3-lepton backgrounds, tests showed up to 20% additional background rejection

Prospects for same-sign $W$ boson scattering at future HL-LHC collider:

- Increased signal significance by nearly 60% by optimizing selection using a random grid search algorithm
- Corrected overprediction of top quark backgrounds by implementing an analogue for a particle isolation requirement missing from the simulation

Corrected for misaligned detector sensors by applying corrections during data reconstruction derived using a global $\chi^2$ minimization of track-hit residuals from millions of particle tracks

## SELECTED PUBLICATIONS

DiClemente, William K., *Measurement of Electroweak Production of Same-Sign W Boson Pairs with ATLAS*. PhD thesis. `http://cds.cern.ch/record/2674035`. Presented 21 Feb, 2019.

ATLAS Collaboration, *Observation of electroweak production of a same-sign WW boson pair in association with two jets in pp collisions at* $\sqrt{s} = 13$ *TeV with the ATLAS detector*. Submitted to Phys. Rev. Lett. June 2019. `arXiv`:1906.03203 [hep-ex].