James Saxon

CONTACT

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WHAT I DO

Data engineering & analysis; geospatial data, HW, ML, & statistics.

Background in particle physics and urban research; > 15 years on the grid/cloud.

Proficient with python, AWS ecosystem & architectures, Spark/EMR/Airflow, SQL, & unix. Expert in statistics and data bias. Experienced with electronics, computer networking, computer vision, general ML, and c++. Some familiarity with R, VHDL, & digital fabrication.

ENGINEERING ROLES

Mapbox

Senior Software Engineer (Traffic & Location Telemetry), 2022-present

- ▷ Developed and delivered classification models for identifying cars in live & historical telemetry data, plus pipelines to generate labels for training.
- ▷ Rewrote the core logic for estimating "typical" traffic speeds from raw locations. Halved errors on estimated speeds, using less than 1/100 the compute (savings > $1M).
- ▷ Engaged with Michelin Mobility to create a data product for transporation safety, and single-handedly delivered the data for a $1M contract.
- ▷ Operations (on-call), maintenance, and security of the traffic pipelines.
- ▷ Significant cross-team engagement on data quality and privacy.

RESEARCH ROLES

University of Chicago

Postdoctoral Researcher, 2014-2022

- ▷ As my interests evolved from particle physics towards geospatial problems and urban resources, I joined four academic departments in turn:
  - Enrico Fermi Institute (Particle Physics), 2014-2016: firmware & electronics integration for high-speed pattern recognition system; led an international analysis of "invisible" decays of the Higgs boson.
  - Harris School of Public Policy, 2016-2020: studied gerrymandering (computational geography) and public health access (travel matrices at scale), both on AWS.
  - Center for Spatial Data Science, 2018-2020: human mobility and neighborhood dynamics using large GPS data on AWS + OpenScienceGrid.
  - Department of Computer Science & Data Science Institute, 2020-2022: measurement of Internet performance, computer vision systems for validating GPS data, and statistical methods for convenience samples.
- ▷ I published peer-reviewed work (listed below) in physics, CS, statistics, urban planning, political science, and geography.
- ▷ Taught the core statistics curriculum for graduate students in public policy.

Education

University of Pennsylvania

Ph.D., Experimental Particle Physics, August 2014

- ▷ Advisor: H. H. Williams. Dissertation: *Observation of the Higgs Boson, Measurements of its Production, and a Search for Higgs Boson Pair Production.*
- ▷ Contributed to the discovery and early measurements of the Higgs Boson:
  - ML methods for selecting Higgs candidate events.
  - Conceptualization and leadership of several early analyses of Higgs properties.
- ▷ Starting in high school and continuing through my graduate studies, I worked to prototype, install, commission, and operate a major part of the ATLAS Detector, the Transition Radiation Tracker.
- ▷ Work recognized with the ATLAS Thesis Award (2014) and US ATLAS Outstanding Graduate Student Award (2014).

M.S., Physics, May 2012

Swarthmore College

B.A., Physics and Political Science, May 2010

Goldwater Scholar, April 2008

Certificates

AWS Solutions Architect Associate, 2024

Publications Post-Physics

Local Mobility in Urban Neighborhoods

The Local Structures of Human Mobility in Chicago. James Saxon. *Environment and Planning B*, 2020.

Empirical Measures of Park Use in American Cities, and the Demographic Biases of Spatial Models. James Saxon. *Geographical Analysis*, 2020.

Neighborhood Street Activity and Greenspace Usage Uniquely Contribute to Predicting Crime. Kathryn E. Schertz, *James Saxon*, Carlos Cardenas-Iniguez, Luís M.A. Bettencourt, Yi Ding, Henry Hoffman, Marc Berman. *npj Urban Sustainability*, 2021.

Gerrymandering and Regionalization

Reviving Legislative Avenues for Gerrymandering Reform with a Flexible, Automated Tool. James Saxon. *Political Analysis*, 2020.

Data Bias

What we can learn from selected, unmatched data: Measuring internet inequality in Chicago. James Saxon, Dan Black. *Computers, Environment and Urban Systems*, 2022.

Internet Performance and Equity

Measuring the Performance and Network Utilization of Popular Video Conferencing Applications. Kyle MacMillan, Tarun Mangla, *James Saxon*, Nick Feamster. *ACM SIGCOMM Internet Measurement Conference*, 2021.

GPS-Based Geolocation of Consumer IP Addresses. James Saxon, Nick Feamster. *PAM 2022: Passive and Active Measurement*, 2022

The Geography of Healthcare Accessibility

A Rational Agent Model for the Spatial Accessibility of Primary Health Care. James Saxon, Dan Snow. *Annals of the American Association of Geographers*, 2019.

An Open Software Environment to Make Spatial Access Metrics More Accessible. James Saxon, Julia Koschinsky, Karina Acosta, Vidal Anguiano, Luc Anselin, Sergio Rey. *Journal of Computational Social Science*, 2021.

Publications in Physics

As a member of the ATLAS Collaboration at CERN between January 2012 and December 2017, I am included in the "author list" of some 575 papers published while I was qualified as an author. My personal contributions garnered several awards, noted under "Education."

Below is a selection of papers and conference notes to which I made meaningful contributions – including the discovery of the Higgs boson. I co-wrote the text for the two starred publications ($\star$), almost uniquely for a student in a 3000-person collaboration.

Physics Analysis – ATLAS Collaboration

($\star$) Search for Higgs Boson Pair Production in the $\gamma\gamma b\bar{b}$ Final State at $\sqrt{s} = 8$ TeV from the ATLAS Detector, PRL 114 (Feb, 2015) 081802.

Measurements of fiducial and differential cross sections for Higgs boson production in the diphoton decay channel at $\sqrt{s} = 8$ TeV with ATLAS, JHEP 1409 (2014) 112.

($\star$) Differential cross sections of the Higgs boson measured in the diphoton decay channel using 8 TeV *pp* collisions, ATLAS-CONF-2013-072, CERN, Geneva, Jul, 2013.

Measurements of the properties of the Higgs-like boson in the two photon decay channel with the ATLAS detector using 25 fb^{-1} of proton-proton collision data, ATLAS-CONF-2013-012, CERN, Geneva, Mar, 2013.

Observation and study of the Higgs boson candidate in the two photon decay channel with the ATLAS detector at the LHC, ATLAS-CONF-2012-168, CERN,

Geneva, Dec, 2012.

Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC, Phys.Lett.B716 (2012) 1–29.

Search for the Standard Model Higgs boson in the diphoton decay channel with 4.9 fb^{-1} of pp collisions at $\sqrt{s} = 7$ TeV with ATLAS, Phys.Rev.Lett.108 (2012) 111803.

Measurements of the photon identification efficiency with the ATLAS detector using 4.9 fb^{-1} of pp collision data collected in 2011, ATLAS-CONF-2012-123, CERN, Geneva, Aug, 2012.

Search for the Standard Model Higgs boson in the two photon decay channel with the ATLAS detector at the LHC, Phys.Lett.B705 (2011) 452–470.

Search for the Higgs Boson in the Diphoton Channel with the ATLAS Detector using 209 pb^{-1} of 7 TeV Data taken in 2011, ATLAS-CONF-2011-085, CERN, Geneva, Jun, 2011.

Measurement of the inclusive isolated prompt photon cross section in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector, Phys.Rev.D83 (2011) 052005.

Instrumentation and Engineering – ATLAS TRT Collaboration

The ATLAS TRT electronics, JINST 3 (2008) P06007.

The ATLAS TRT barrel detector, JINST 3 (2008) P02014.

The ATLAS TRT end-cap detectors, JINST 3 (2008) P10003.