LUC LE POTTIER CV

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EDUCATION

The University of Michigan – Ann Arbor — Honors Physics B.S., Computer Science Minor, Residential College French Language Program — Sept. 2016 – Present, Expected Graduation April. 2021

Overall GPA: 3.962/4.000
Physics GPA: 3.981/4.000

WORK EXPERIENCE

SULI Student Researcher – *Lawrence Berkeley National Lab*; Berkeley, CA — May 2020 – Present

- Working for **Dr. Benjamin Nachman** in the LBNL ATLAS group, with funding from the DOE SULI program.
- Developing, validating, and extending weakly supervised machine learning techniques for new physics searches at the Large Hadron Collider. No publicly available codebase.
- Scheduled to present this work at machine learning conference NeurIPS in December 2020
- Few author paper detailing a newly developed machine learning technique is currently under review
- In the preliminary stages of carrying out a full-scale analysis on ATLAS detector data
- A bulk of the work

Data Science Fellow – *University of Michigan*; Ann Arbor — Oct 2019 – Present

- Chosen by the University of Michigan's Center for Academic Innovation (CAI) as their data science fellow.
- Creating visualizations of usage logs, demographics trends, and student feedback information on various academic reporting/ assisted learning tools.
- Working in collaboration with sociology researchers to analyze how the correlations between student academic performance and demographics are impacted by online learning tools
- Work involves sensitive/proprietary information; no code is publicly available.

Student Researcher – *University of Michigan*; Ann Arbor — Sept 2019 – Present

- Working for University of Michigan professor **Christine Aidala's** research group
- Helping other group members with conceptualizing & implementing machine learning in for physics research
- Contributed to the testing process of silicon photomultipliers for the (upcoming) sPhenix experiment
- In the process of completing an **honors thesis** supervised by Prof. Aidala on my work at the interface of ML and physics research.

Student Researcher – *University of Zurich*; Zurich/Geneva, CH — May 2019 – Present

- Working under the University of Zurich (UZH) professor **Florencia Canelli** in the UZH Compact Muon Solenoid (CMS) group, based at CERN.
- Implementing unsupervised machine learning algorithms to identify rare events in unlabeled CMS data at the Large Hadron Collider (LHC)
- Working with Prof. **Annapaola De Cosa** (CERN/ETH Zurich) and **Maurizio Pierini** (CERN) to target specific dark matter signals with this analysis, providing a robust algorithm for identifying possible dark matter particles.
- Publication currently in progress using a neural autoencoder for anomaly detection, with possible future publications using more advanced algorithms
- Publicly available codebase: https://github.com/luclepot/autoencodeSVJ

REU Student Researcher – *CERN*; Geneva, CH — Jan 2019 – May 2019

- Working under CERN's Dr. **Tancredi Carli**, in CERN's ATLAS group.
- Implementing and improving recently developed deep learning routines (using Python and Pytorch) for data sets from the Large Hadron Collider's ATLAS detector to determine feasible architectures for physics beyond the standard model.

- Authored a python module to wrap Johannes Brehmmer's *MadMiner* deep learning package, which provides specialized data visualizations and formatting aimed at a non-technical audience.
- Publicly available codebase: https://github.com/luclepot/mm_scripting_util

Student Researcher – *University of Michigan;* Ann Arbor Jan 2017 – Jan 2019

- Worked under Michigan's Prof. **Wolfgang Lorenzon**, within the MUSE group. Lead developer and architect for a computer-vision target positioning system, which monitors real-time the 3-dimensional position of a liquid hydrogen target within a sealed vacuum chamber to ~100-micron precisions (using Python and C). Author of a fully functional Windows-native GUI in Python capable of displaying simplified visualizations of target positioning data in real-time, with no technical expertise required for usage.
- Aided with the design, testing, and optimization of the liquid hydrogen target cells and target ladder apparatus, including designing parts in CAD and machining copper components by hand.
- Co-authored a publication on the target and materials, published December 2019
- Presented on behalf of the group at the October 2017 APS Nuclear Physics Conference.
- Publicly available codebase: https://bitbucket.org/luclepot/muse_camera_system

Software Engineering Intern – *W.W. Grainger Inc.*; Chicago May 2018 – Aug 2018

- Worked on the data monitoring team for Grainger's online website.
- Used several commercial monitoring tools to create real-time data visualization feeds, to monitor company-wide web system performances and analyze user data.
- Developed a visualization and data processing framework for arbitrarily formatted process logs within the company, which allows for simple visualization updating upon codebase changes. This framework is now being implemented in company-wide monitoring.
- Created several algorithms for maximizing search efficiency, specialized for parsing company-specific searches.
- Work is proprietary, no publicly available code

Publications

- L. Le Pottier, K. Bekendorfer, B. Nachman. "Simulation-Assisted Decorrelation for Resonant Anomaly Detection." arXiv:2009.02205 Submitted to PRD; **Under review**
- P. Roy, et al. "A Liquid Hydrogen Target for the MUSE Experiment at PSI." Nucl. Instrum. Meth. A 949, 162874 (2020)
- 2017 Café Shapiro Anthology (collection of outstanding undergraduate creative writing works)
- In Progress: A. De Cosa, L. Le Pottier, M. Pierini. "Deep Autoencoders for Semi-Visible Jet Detection."

PRESENTATIONS

- L. Le Pottier, K. Bekendorfer, B. Nachman. "Simulation-Assisted Decorrelation for Resonant Anomaly Detection." Presentation at 2020 NeurIPS Conference, Machine Learning for Physical Sciences Subdomain.
- L. Le Pottier, A. de Cosa. (2020). "Unsupervised Machine Learning for Rare Signal Detection in CMS Detector Data." Presentation at 2020 APS March Meeting (canceled due to COVID)
- Le Pottier, L. et al. (2017). "LH2 Target Design & Position Survey Techniques for the MUSE experiment for Precise Proton Radius Measurement." Presentation 2017 APS DNP Pittsburg Meeting.

HONORS

- 2020 DOE SULI Program Grant Recipient
- 2019 ThinkSwiss Research Scholarship (Swiss government research grant)
- 2019 University of Michigan International Institute Individual Fellowship
- 2019 University of Michigan Weiser Institute Fellowship
- 2019 University of Michigan CERN REU Student

SKILLS

- Very strong: C++ (OpenCV), Python (OpenCV, Keras/TensorFlow, PyTorch, Pandas, Matplotlib/Seaborn), C, BASH, ROOT, MadGraph, Pythia, Delphes, Splunk/SPL, deep learning research/tuning methods (Jupyter/scripting based), LaTeX wiring, Markdown writing, precision machining, precision electronics soldering & blowtorch welding, CAD
- Familiar: Java, HTML/CSS, Javascript, SQL, Javascript, Windows bash, dynamic programming/heuristic methods, LSTM networks, Boosted Decision Trees, Datadog, Dynatrace, Microsoft Office