Henry E. Clausen

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Personal profile

I am a PhD-graduate who is specialised in the application of data science and machine learning methods to cyber-security. My background lies in data science, and during my PhD and subsequent research consultation project, I dealt with the challenges of intrusion detection and the corresponding data and developed efficient and adaptable problem-solving skills.

Education

University of Edinburgh — **Edinburgh, UK**
Ph.D. in Computer Science — *4/2018 – 9/2021*
'Traffic microstructures and network anomaly detection'
- Designed and trained deep-learning models for successful detection of access attacks
- Generated datasets for ground truth network and host log information
- Identified decrease of machine learning performance during rare network events and evasive methods
- Published six papers on traffic data structures and intrusion detection

Imperial College — **London, UK**
M.Sc. in Statistics, high Distinction (81/100) — *10/2016 – 9/2017*
Thesis: 'Modelling human behaviour in computer networks' (86/100)
- Developed an unsupervised model that classifies user activity levels
- Worked with 100GB network log dataset using Spark
- Published paper and released implementation in R-package

ETH Zurich — **Zurich, Switzerland**
M.Sc. in Physics, GPA – 5.5 (Distinction) — *2/2014 – 2/2016*
Thesis: 'Tri-Criteria Optimisation for Scenario-Based Risk Measures'

ETH Zurich — **Zurich, Switzerland**
B.Sc. in Physics, GPA – 4.9 (Merit) — *9/2010 – 9/2013*
Presentation: 'Cross-sections, decay rates and Feynman rules'

Work Experience

Alan Turing Institute — **London, UK**
Research consultant — *10/2021 – 12/2021*
- Applied anonymisation techniques to windows process logs
- Evaluated the effect of anonymisation techniques on machine learning intrusion detection systems
- Processed and administered anonymised real-world windows log dataset for release

BT Group — **Ipswich, UK**
Internship at Cyber Defence group — *07/2019 – 10/2019*
- Implemented relay attacks and generated large-scale attack data
- Designed deep-learning model for relay attack detection
- Planned strategy and implemented a robust model for video relay detection

OLZ & Partners/ETH Zurich — **Zurich, Switzerland**
Technical consultant — *2/2016 – 9/2016*
- Designed financial optimisation algorithms for large datasets with complex constraints
- Compared performance of computational solvers for specific risk requirements
- Communicated results as a presentation in front of the entire company

Relevant Skills

Programming Skills

Working knowledge: Python, R, PyTorch, Tensorflow, C++, Spark, Hadoop MapReduce, Regex
Basic knowledge: Scala, Java, MySQL, PostgreSQL

Other IT Skills

Working knowledge: Unix shell, computer exploits, networking protocols, Metasploit, Docker, Mininet, Slurm, AWS, MS Office

Languages

German: Mother tongue
English: Fluent
Spanish: Good command

Publications

First author:

- Controlling network traffic microstructures for machine learning model probing, *EAI SecureComm 2021*.
- CBAM: A contextual model for network anomaly detection, *Computers 10.6, 2021*.
- Examining traffic micro-structures to improve model development, *IEEE Security&Privacy workshops 2021*.
- Evading stepping-stone detection with enough chaff, *Network and System Security conference, 2020*.
- Better anomaly detection for access attacks using deep bidirectional LSTMs, *Conference on Machine Learning for Networking 2020*.
- Traffic generation using containerization for machine learning, *Annual Computer Security Applications Conference Workshops 2019*.
- A Bayesian approach to modelling human behaviour in computer networks, *Data Science for Cyber-Security 2018*

Co-Author:

- A containerised approach to labelled C&C traffic, *Norwegian Information Security Conference 2021*.

Interests

Greenpeace **Zurich/Edinburgh**
Local group leader *from 2011*

- Lead decision-making and coordinated campaign activities for local group
- Communicated campaign goals/achievements between local group and Greenpeace London headquarter
- Campaigned for political campaigns on renewable energies, plastic pollution, and deforestation
- Developed leadership skills and improved responsible and co-operative work ethics

Students' Music Association **Zurich, Switzerland**
Tutor and artist *2/2014 – 6/2017*

- Extensive engagement in harmonic theory, piano, and music production
- Taught younger students first steps in music production
- Performed on multiple live concerts in front of large audiences

References

Prof. David Aspinall	*Ph.D. supervisor*	david.aspinall@ed.ac.uk
Dr. Michael Gibson	*Project supervisor at BT Group*	michael.s.gibson@bt.co.uk