

# Henry E. Clausen

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## Education

### University of Edinburgh

*Ph.D. in Computer Science*

Contextual Anomaly Detection in Computer Networks

Edinburgh, UK

4/2018 – 2021

### Imperial College

*M.S. in Statistics, high Distinction (81/100)*

Thesis: 'Modelling human behaviour in computer networks' (86/100)

London, UK

10/2016 – 9/2017

### Swiss Fed. Institute of Technology

*M.S. in Physics, GPA – 5.5 (excellent)*

Thesis: 'Tri-Criteria Optimization for Scenario-Based Risk Measures'

Zurich, Switzerland

2/2014 – 2/2016

### Swiss Fed. Institute of Technology

*B.S. in Physics, GPA – 4.9 (good)*

Presentation: 'Cross-sections, decay rates and Feynman rules'

Zurich, Switzerland

9/2010 – 9/2013

## Work Experience

### BT Group

*Student placement*

- Attack implementation and data generation
- Design of *convolutional neural networks* for attack detection
- Strategy planning for large-scale data capture

Ipswich, UK

08/2019 – 10/2019

### OLZ & Partners

*Technical consultant*

- Implementation of optimization algorithms for complex constraints
- Advice and comparison of computational solvers
- Technical talk in front of entire company

Zurich, Switzerland

6/2016 – 9/2016

### Swiss Fed. Institute of Technology

*Research Assistant*

- Designing and testing of optimization algorithms for mixed-integer problems
- Numerical algorithms for large-scale financial optimization
- Cooperations with Stoxx Index Provider

Zurich, Switzerland

2/2016 – 6/2016

## Relevant Technical Projects

### Contextual Anomaly Detection in computer networks

*Ph.D thesis*

- Data-driven anomaly detection for enterprise cyber-security
- Development of *LSTM-encoder* language models to identify contextual structures in TCP connections
- Automatised dataset creation for ground truth network and system data
- Industry cooperation with BT Research

University of Edinburgh

4/2018 – 2021

### Modeling human behaviour in computer networks

*Master thesis (86/100)*

- Development of sequential *Unsupervised learning* methods for enterprise network logs
- Extensive usage of *Spark* for data assessment and model fitting
- Publication of results in *World Scientific*

Imperial College

5/2017 – 9/2017

## Relevant Skills

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### Programming Skills.....

**Working knowledge:** Python, R, PyTorch, Tensorflow, C++, Spark, Hadoop MapReduce

**Basic knowledge:** Scala, Java, MySQL, PostgreSQL

### Other IT Skills.....

**Working knowledge:** Unix shell, Networking protocols, Docker, AMPL

### Languages.....

**German:** Mother tongue

**English:** Fluent, TOEFL: 104/120

**Spanish:** Good command

## Publications

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- **Clausen, H.**, Aspinall, D. (2021): 'Examining traffic micro-structures to improve model development', (*under review*)
- **Clausen, H.**, Gibson, M., Aspinall, D. (2020): 'Evading stepping-stone detection with enough chaff', In "Proceedings of the International Conference on Network and System Security (NSS)", Melbourne, Australia, November 25-27, 2020
- **Clausen, H.**, Sabate, M., Grov, G., Aspinall, D. (2020): 'Better anomaly detection for access attacks using deep bidirectional LSTMs', In "Proceedings of the 3rd International Conference on Machine Learning for Networking (MLN'2020)", Paris, France, November 24-26, 2020
- **Clausen, H.**, Flood, R., Aspinall, D. (2019): 'Traffic generation using Containerization for Machine Learning', In "Proceedings of the Dynamic and Novel Advances in Machine Learning and Intelligent Cyber-Security Workshop", San Juan, PR, USA, December 9-10, 2019
- **Clausen, H.**, Adams, N.M., Briers, M. (2018): 'A Bayesian Approach to Modelling Human Behaviour in Computer Networks', In Heard, N.A., Adams N.M., Rubin-Delanchy, P.G.T, and Turcotte, M.J.M (eds), Data Science for Cyber-Security, *World Scientific*

## Additional Experience

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### Greenpeace

*Activist and group leader*

- Planning and coordination of campaign activities for local group
- Communication of campaign goals/achievements between local group and Greenpeace London headquarter
- Campaigning for political campaigns on renewable energies, plastic pollution, and deforestation

**Zurich/Edinburgh**

*from 2011*

### Swiss Fed. Institute of Technology

*Member of the Students' Music Association*

- Extensive engagement in harmonic theory, the piano, and music production
- Teaching younger students first steps in music production
- Multiple live performances in front of larger audiences

**Zurich, Switzerland**

*from 2/2014*

## References

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Prof. David Aspinall

*Ph.D. supervisor*

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Prof. Niall Adams

*Thesis supervisor*

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Dr. Michael Gibson

*Project supervisor at BT Group*

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