

# BEN LONNQVIST

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## EDUCATION

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- 2020- Ph.D. Candidate, COMPUTATIONAL NEUROSCIENCE  
**EPFL (Swiss Federal Institute of Technology in Lausanne)** | Lausanne, Switzerland
- Advisors: Prof. Michael H. Herzog, Prof. Martin Schrimpf
  - Primary interests: neural network modelling of vision; computational neuroscience, psychophysics
- 2016-2020 M.A. Hons, ECONOMICS and FINANCE  
**University of Aberdeen** | Aberdeen, Scotland
- First-class Honours degree; thesis: Optimal search in multi-armed bandit problems
  - Relevant coursework: Econometrics, Mathematical and Statistical Methods in Economics, Stochastic processes, Understanding Statistics, Proof-based Microeconomics

## RESEARCH

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### Publications

- 2024 **Lonnqvist, B.\***, Wu, Z.\*, Herzog, M. H. (2024). Latent Noise Segmentation: How Neural Noise Leads to The Emergence of Segmentation and Grouping. *International Conference on Machine Learning (ICML)*.  
<https://proceedings.mlr.press/v235/lonnqvist24a.html>.
- 2021 **Lonnqvist, B.**, Bornet, A., Doerig, A., Herzog, M. H. (2021). A comparative biology approach to DNN modeling of vision: A focus on differences, not similarities. Publisher: *Journal of Vision*. DOI:  
<https://doi.org/10.1167/jov.21.10.17>
- 2020 **Lonnqvist, B.**, Clarke, A. D. F., Chakravarthi, R. (2019). Crowding in humans is unlike that in convolutional neural networks. Publisher: *Neural Networks*. DOI: <https://doi.org/10.1016/j.neunet.2020.03.021>

### Pre-prints

- 2022 **Lonnqvist, B.**, Machiraju, H., Herzog, M. H. (2022). A comment on Guo et al. (2022). arXiv preprint.  
DOI: <https://doi.org/10.48550/arXiv.2208.01456>.
- 2020 **Lonnqvist, B.**, Elsner, M., Hunt, A. R., Clarke, A. D. F. (2020). Modeling individual variation in visual search with reinforcement learning. PsyArXiv. DOI: <https://doi.org/10.31234/osf.io/suj28>.

### Conference oral presentations

- 2024 **Lonnqvist, B.**, Wu, Z., Herzog, M. H. (2024). Perceptual Grouping with Latent Noise. Oral presentation at the *24th Annual Meeting of the Vision Sciences Society (VSS)*.
- 2024 **Lonnqvist, B.**, Wu, Z., Herzog, M. H. (2024). Perceptual Grouping with Latent Noise. Oral presentation at the MODVIS Workshop of the *24th Annual Meeting of the Vision Sciences Society (VSS)*.
- 2023 **Lonnqvist, B.**, Wu, Z., Herzog, M. H. (2023). How object segmentation and perceptual grouping emerge in noisy variational autoencoders. Oral presentation at the *MODVIS Workshop of the 23rd Annual Meeting of the Vision Sciences Society (VSS)*.
- 2022 **Lonnqvist, B.**, Bornet, A., Doerig, A., Herzog, M. H. (2022). Global Information Processing in Feedforward Deep Networks. Oral presentation at the *22nd Annual Meeting of the Vision Sciences Society (VSS)*.
- 2019 **Lonnqvist, B.**, Clarke, A. D. F., Chakravarthi, R. (2019). Object Recognition in Deep Convolutional Neural Networks is Fundamentally Different to That in Humans. Oral presentation at the *18th annual meeting of the Scottish Vision Group (SVG)*.

### Conference poster presentations

- 2024 **Lonnqvist, B.**, Scialom, E., Merchant, Z., Herzog, M. H., Schrimpf, M. (2024). Current DNNs are Unable to Integrate Visual Information Across Object Discontinuities. Poster presentation at the *7th Annual Conference on Cognitive Computational Neuroscience (CCN)*.

- 2024 **Lonnqvist, B.\***, Wu, Z.\*, Herzog, M. H. (2024). Latent Noise Segmentation: How Neural Noise Leads to The Emergence of Segmentation and Grouping. *International Conference on Machine Learning (ICML)*. <https://proceedings.mlr.press/v235/lonnqvist24a.html>.
- 2024 Scialom, E.\*, **Lonnqvist, B.\***, Merchant, Z., Schrimpf, M., Herzog, M. H. (2024). Psychophysics Reveals a Failure of Grouping in Current Deep Neural Networks. Poster presentation at the *46th Annual European Conference on Visual Perception (ECPV)*.
- 2024 Scialom, E., Merchant, Z., Ernst, U. A., Rotermund, D., **Lonnqvist, B.**, Herzog, M. H. (2024). Categorical object properties outweigh local visual information in object recognition. Poster presentation at the *24th Annual Meeting of the Vision Sciences Society (VSS)*.
- 2023 **Lonnqvist, B.**, Wu, Z., Herzog, M. H. (2023). How object segmentation and perceptual grouping emerge in noisy variational autoencoders. Poster presentation at the *23rd Annual Meeting of the Vision Sciences Society (VSS)*.
- 2021 **Lonnqvist, B.**, Doerig, A., Bornet, A., Francis, G., Schmittwilken, L., Herzog, M. H. (2021). How crowding challenges (feedforward) convolutional neural networks. Poster presented at the *21st Annual Meeting of the Vision Sciences Society (VSS)*. DOI: <https://doi.org/10.1167/jov.21.9.2039>.

### Invited talks

- 2024 Scene Grammar Lab, Goethe Universität Frankfurt
- 2023 INCC, Université Paris Cité & CNRS Vision Group Symposium, Paris, France
- 2019 Psychology & Computer Science Research Groups, University of Essex, Britain, UK

## RESEARCH WORK EXPERIENCE

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- Aug - 2020* EPFL (SWISS FEDERAL INSTITUTE OF TECHNOLOGY IN LAUSANNE) | Doctoral Assistant
- Doctoral Research Assistant in the NeuroAI Laboratory, and the Laboratory of Psychophysics
  - Core contributor to the open-source Python project Brain-Score: <https://github.com/brain-score>
  - Focus on deep learning and psychophysics
- Mar - May 2018 - 2020* ABERDEEN SCHOOL OF PSYCHOLOGY | Undergraduate Research Assistant
- Voluntary research assistant in the Consciousness, Attention, and Perception Lab
  - First-authored a paper that has now been published in *Neural Networks*
  - Using Python, Keras and NumPy, programmed several architectures of Deep Neural Networks and wrote testing environments to produce novel research on visual crowding in convolutional NNs
  - Used SSH tunneling to access a Linux high-power computing cluster
- May - Aug 2019 - 2019* ABERDEEN SCHOOL OF PSYCHOLOGY | Research Intern
- Summer research intern at the Eye Movements and Attention Lab
  - Using Python, modeled Bayes-optimal eye movements parameterized by human visual search data
  - Using MATLAB and PsychToolbox, wrote a visual search psychophysical experiment
  - Ran 65 participant-hours of eye tracking experiments using EyeLink hardware

## SELECTED AWARDS AND FUNDING

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- 2019 Rank Prize Foundation Optoelectronics Studentship

## TEACHING AND STUDENTS

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|-----------|--------------------------|---|
| 2023-2024 | Understanding Statistics | Teaching assistant ( <i>MSc course on statistics</i> )  |
| 2021      | Real Analysis            | Teaching assistant ( <i>BSc course on mathematics</i> ) |
| 2020      | Real Analysis            | Teaching assistant                                      |

2024	Emily Nurden	EPFL Summer Research Program
2023-2024	Maya van Holk	MSc thesis ( <i>co-advised with Michael Herzog &amp; Elsa Scialom</i> )
2023-2024	Maisa Ben Salah	MSc thesis ( <i>co-advised with Martin Schrimpf</i> )
2023	Clémentine Lévy-Fidel	MSc thesis ( <i>co-advised with Michael Herzog</i> )
2023	Ismail Sahbane	ML4Science project ( <i>MSc CS course project</i> )
2023	Jad Tala	ML4Science project
2023	Olena Zavertiaiva	ML4Science project
2023	Pauline Verchinine	ML4Science project
2023	Jennifer Ayer	ML4Science project
2023	Laurent Brock	ML4Science project
2022-2023	Zhengqing Wu	MSc Computational Neuroscience Minor Thesis ( <i>co-advised with Michael Herzog</i> )
2022-2023	Merkourios Simos	MSc Semester Project

## ACADEMIC SERVICE

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### Reviewing

JOURNALS	<i>Neural Networks, Neural Computation, PLOS One, Vision Research</i>
CONFERENCES	<i>ICML Workshop on LLMs and Cognition, NeurIPS Workshop on Behavioral ML, CCN</i>