



Christoph Aurnhammer

Postdoctoral Researcher in Psycholinguistics

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RESEARCH EXPERIENCE

Postdoctoral Researcher (Remote)

Jan 2024 - Present

Department of Language Science and Technology, Saarland University (CRC 1102)

- Building a corpus of naturalistic language comprehension.
 - Application of large language models (LLMs) to quantify word processing effort.
 - Planning of large scale statistical analysis.
 - Planning of behavioural and neural experiments.
- Supervision of Master Students (Benedict Schneider, Eva Richter).

Doctoral Researcher

Dec 2018 - Jan 2024

Department of Language Science and Technology, Saarland University (CRC 1102)

- Research Project: Neurobehavioural Correlates of Surprisal in Online Comprehension.
 - Advanced statistical analysis using regression-based ERP / RT estimation, implemented in Julia.
 - Experimental design and data collection using electroencephalography and reading times.
 - Publications in three top venues (PLOS ONE, Psychophysiology, Cognitive Neurodynamics).

Research Intern

Sep 2017 - Aug 2018

Centre for Language Studies, Radboud University, Nijmegen

- Master's Thesis: Next-word Entropy as a Formalisation of Prediction in Sentence Processing.
 - Application of RNN language models to study prediction in human language processing through next-word entropy and surprisal.
 - Statistical analyses of EEG, fMRI, and reading time data using R, Matlab, and Julia.
 - Basis of publication in *Neuropsychologia*.
- Lab Rotation: Gated Cells in Recurrent Neural Networks as Models of Human Reading
 - Deployment of recurrent neural network (SRN, LSTM, GRU) language models (Pytorch / Python) to study human reading (self-paced reading, eye-tracking, EEG).
 - Statistical analyses using linear mixed effects models (R, Julia).
 - Publication in CogSci 2019 proceedings.
 - Supervised by **Stefan L. Frank**.

Research Trainee

Feb 2017 - Feb 2018

Tilburg School of Humanities, Tilburg University

- Research Project: Analysing reading strategies: Bridging the gap between close and distant reading.
 - Topic models (LDA in Python) for online discussion forums. Implementation of new overlap measures to compare manual annotations and computationally generated labels.
 - Publication in *Digital Humanities Quarterly*.
 - Supervised by **Menno van Zaanen** and **Inge van de Ven**.

Research Intern

Feb 2017 - June 2017

Centre for Language and Speech Technology, Radboud University, Nijmegen

- Lab Rotation: Readability prediction for LIN (Dutch Readability index)
 - Investigation of the influence of text genre and text topic on readability and readability prediction.
 - Developing computational topic models (LDA) for a labeled readability corpus.
 - Supervised by **Florian Kunneman**.

Research Intern

Aug 2015 - October 2015

Psycholinguistics Research Group, University of Essex

- Retrieval of Repetitive Patterns from Child Language Corpora
 - Development of tools for automated retrieval of repetitive patterns from corpora of child-directed speech.
 - Annotation and transcription work for child language corpora.
 - Funded through ERASMUS+ scholarship awarded by the European Union.
 - Supervised by **Sonja Eisenbeiss**.

TEACHING EXPERIENCE

Seminars

Oct 2020 - Present

Saarland University, Saarbrücken

- Co-teaching [Experimental Methods in Psycholinguistic Research](#). (2023, **Torsten Jachmann**).
- Assistant for [Connectionist Language Processing](#). (2020-2022, **Harm Brouwer**).
- Assistant for [Computational Psycholinguistics](#). (2019-2023, **Matthew W. Crocker**)

Guest Lecture

Summer 2021 - Summer 2022

Saarland University, Saarbrücken

- Connectionist Language Processing (**Matthew W. Crocker, Harm Brouwer**).
 - Guest Lecture: Comparing Gated and Simple Recurrent Neural Network Architectures as Models of Human Sentence Processing.

Graduate Teaching Assistant

Sept 2017 - April 2018

Radboud University, Nijmegen

- Course Text and Multimedia Mining (**Martha Larson**).
 - Guiding student research projects during walk-in hours.
 - Presenting feedback to students during lectures.
 - Course planning. Grading assignments, term papers, final exams.

EDUCATION

Ph.D. Psycholinguistics 2018 - 2024
Saarland University, Germany

Final grade: Summa cum laude (highest possible distinction).

Thesis topic: *Expectation-Based Retrieval and Integration in Language Comprehension* (Graded *opus eximium*.)

Thesis supervisors **Matthew W. Crocker, Harm Brouwer**.

M.A. (Research) Language and Communication 2016 - 2018
Radboud University, Nijmegen and Tilburg University, the Netherlands

Final Grade: 8.12 (*Cum Laude*).

Thesis topic: *Next-word Entropy as a Formalisation of Prediction in Sentence Processing*. (Graded 8.0).

Thesis supervisors: **Stefan L. Frank, Alessandro Lopopolo**.

B.A. European Studies 2012 - 2016
University of Passau, Germany

Final Grade: 1.4 (*Very Good*)

Thesis topic: *Quantitative Discourse Linguistics Enquiry into the 2016 EU Referendum in the UK as Discussed on Reddit* (Graded 1.0, *Very Good*).

Thesis supervisors: **Malte Rehbein, Oliver Gondring**.

Extracurricular programs:

Certificate in Digital Humanities (35 ECTS)

Certificate in Philosophy (30 ECTS)

PUBLICATIONS

7. [Aurnhammer C.](#) (in press). Expectation-Based Retrieval and Integration in Language Comprehension. Ph.D. Thesis.
6. [Aurnhammer C.](#), Brouwer H., Crocker M. W. (2023). [Single-trial Neurodynamics Reveal N400 and P600 Coupling in Language Comprehension](#). *Cognitive Neurodynamics*.
5. [Aurnhammer C.](#), Delogu F., Brouwer H., Crocker M. W. (2023). [The P600 as a continuous index of integration effort](#). *Psychophysiology*. 60 (9), e014302.
4. [Aurnhammer C.](#), Delogu F., Schulz M., Brouwer H., Crocker M. W. (2021). [Retrieval \(N400\) and Integration \(P600\) in Expectation-based Comprehension](#). *PLOS ONE*, 16 (9), e0257430.
3. [Aurnhammer C.](#), Frank S. L. (2019). [Evaluating information-theoretic measures of word prediction in naturalistic sentence reading](#). *Neuropsychologia*, 134, 107198.
2. [Aurnhammer C.](#), Frank S. L. (2019). [Comparing gated and simple RNN architectures as models of human sentence processing](#). In *Proceedings of the 41st Annual Conference of the Cognitive Science Society*. (pp. 112-118). Austin, Texas: Cognitive Science Society.
1. [Aurnhammer C.](#), Cuppen I. van de Ven I., van Zaanen M. (2019). [Manual Annotation of Unsupervised Models: Close and Distant Reading of Politics on Reddit](#). *Digital Humanities Quarterly*, 13 (3).

TALKS AND POSTERS

13. Doctoral Defense, Saarland University, 01/2024. Talk. Expectation-Based Retrieval and Integration in Language Comprehension. Aurnhammer C.
12. Mecklinger Lab, Saarland University, 12/2023. Talk. Unpacking ERPs with linear models - Regression-based ERP estimation (rERPs). Aurnhammer C.
11. SNL 2022, Philadelphia, USA, 10/2022. Poster. The P600 as a graded index of integration difficulty. Aurnhammer C., Delogu F., Brouwer H., Crocker M. W.
10. AMLaP 2022, University of York, UK, 09/2022. Talk. The P600 as a graded index of integration difficulty. Aurnhammer C., Delogu F., Brouwer H., Crocker M. W.
9. AMLaP 2021, Université de Paris, France, 09/2021. Short Talk. Retrieval (N400) and Integration (P600) in Expectation-based Comprehension. Aurnhammer C., Delogu F., Brouwer H., Crocker M. W.
8. PiF 2021, TU Kaiserslautern, Germany, 05/2021 (originally 05/2020). Talk. Does the N400, or rather the P600, index surprisal? Aurnhammer C., Delogu F., Brouwer H., Crocker M. W.
7. NLP in CogSci, Interacting Minds Centre, Aarhus University, Denmark, 11/2019. **Invited talk.** Studying predictive language processing with information theory and language modeling. Aurnhammer C., Frank, S. L.
6. RAILS 2019, Saarland University, Germany, 10/2019. Talk. Evaluating information-theoretic measures of word prediction in naturalistic sentence reading. Aurnhammer C., Frank, S. L.
5. CogSci 2019, Montréal, Canada, 07/2019. Talk. Comparing gated and simple RNN architectures as models of human sentence processing. Aurnhammer C., Frank, S. L.
4. IMPRS Conference, Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands, 07/2018. Poster. Comparing gated and simple RNN architectures as models of human sentence processing. Aurnhammer C., Frank, S. L.
3. CLIN28, De Vereniging, Nijmegen, the Netherlands, 01/2018. Talk. Memory Based Modelling of Dutch Past Tense Regularity. Aurnhammer C.
2. DHBenelux, University of Utrecht, the Netherlands, 07/2017. Talk. Bridging the Gap between Close and Distant Reading. Aurnhammer C., Cuppen I., van de Ven I., van Zaanen M.
1. Language and Computation Day, University of Essex, United Kingdom, 09/2015. Talk. Repetition and variation in child-language corpora. Aurnhammer C., Eisenbeiss, S., Poesio, M.

REVIEWING SERVICE

Numbers in brackets indicate repeated reviewing service for independent submissions.

- NeuroImage: Clinical [1]
- Cortex [1]
- Journal of Cognitive Neuroscience [2]

- International Journal of Psychophysiology [1]
- Language, Cognition and Neuroscience [2]
- Brain and Language [1]
- Language and Cognition [1]
- Neurobiology of Language [1]
- Conference on Computational Natural Language Learning (CoNLL) [6]
- Ph.D. proposal North-West University Potchefstroom, South Africa

ACADEMIC EVENTS

- Computational Linguistics in the Netherlands (CLIN28) conference: Social media management and student assistant coordination, 2018.
- StuTs 62 student conference: Social event organisation, 2017.

COMPUTER SKILLS

- Advanced programming skills in Python, Julia, R, Matlab.
- Basic programming skills in C, Bash.
- Skilled in GIT, L^AT_EX, HTML, SQL, Prolog, C, SPSS.
- Proficient use of MacOS, Linux, Windows operating systems.
- Proficient use of Linux servers.

LANGUAGE SKILLS

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|-------------------------------|-------------------|
| • German (Native) | • French (A2) |
| • English (C2, CAE certified) | • Swedish (A1) |
| • Spanish (B2) | • Latin (Latinum) |
| • Dutch (B1) | |