TORREY SNYDER

torrey.snyder@gmail.com

Neuro-AI and Computational Cognitive Science researcher with overall research interests at the intersection of biological and artificial intelligence. Experience and focus areas span Artificial Intelligence, Natural Language Processing (NLP), Multimodal Transformers & Mechanistic Interpretability.

EDUCATION

SEP. 2025 – 2028
UNIVERSITY OF EDINBURGH
Ph.D., Psychology
Research Project: *Alignment of causal reasoning in humans and LLMs*

AUG. 2022 – AUG. 2024
UNIVERSITY OF AMSTERDAM
Master of Science, Brain & Cognitive Sciences

AUG. 2018 – MAY 2022
UNIVERSITY OF SOUTHERN CALIFORNIA
Bachelor of Science, Computational Neuroscience

RESEARCH EXPERIENCE

MSc Research Intern – Cognitive AI & Vision Amsterdam Lab Nov. 2023 – Nov. 2024

- Advisors: Dr. Iris Groen & Dr. Giacomo Aldegheri
  - **Image Caption Manipulation:** Generate semantically underspecified versions of captions from MS COCO dataset using *nltk* & *spaCy* libraries
  - **Natural Language Processing**: Implement PyTorch framework to extract sentence embeddings for modified captions generated by BERT-based models within *sentence_transformers* library
  - **Cross-Modal Data Analysis**: Implement brain encoding models using *scikit-learn* & *fMRIPrepl* libraries to investigate cross-modal representational alignment between text embeddings of modified image captions and corresponding neural activations in the brain's vision network, as collected in the Natural Scenes Dataset

MSc Research Intern – Institute for Logic, Language & Computation Feb. – Aug. 2023

- Advisors: Dr. Raquel Fernández & Dr. Sandro Pezzelle
  - **Multimodal NLP**: Apply multimodal transformer models, such as CLIP and VisualBERT, to generate embeddings for abstract & concrete concepts
  - **Data Analysis**: Implement ridge regression-based brain encoding models using *scikit-learn* to investigate representational alignment between multimodal transformer-generated embeddings of concrete & abstract words and corresponding cortical activations, as measured via fMRI

Undergraduate Research Assistant – Department of Linguistics Spring 2021 – 2022

- Advisor: Dr. Khalil Iskarous
  - **Data Analysis**: Apply interpretability tool exBERT to visualize and analyze BERT's learned

attention weights for garden-path sentences
- **Neural Network Models**: Apply neural simulation software *emergent* to train a simple recurrent network on analogy completion task via implementation of biologically plausible *Leabra* algorithm

PRESENTATIONS & POSTERS

Snyder, T. (2023). Multimodality of Meaning: Evaluating Alignment Between Transformer & Cortical Representations of Abstract & Concrete Concepts. *Computational Cognition Conference*, Osnabrück, Germany. October 10, 2023.

Snyder, T. (2024). Encoding Abstract & Concrete Words: Multimodal Representational Alignment Between DNNs and the Brain. *Synapsium*, Nijmegen, Netherlands. April 20, 2024.

Snyder, T. (2024). Encoding Semantic Scene Descriptions: Cross-Modal Representational Alignment from Language to Vision. *Using ANNs for Studying Human Language Learning and Processing*. Amsterdam, Netherlands. June 10, 2024.

RELEVANT COURSEWORK & SKILLS

Courses

University of Amsterdam (2022 – 2024)

Introduction to Computational Cognitive Neuroscience, Higher Cognitive Functions, Special Topics in Cognitive Science (AI & Consciousness), Foundations of Neural & Cognitive Modeling, Neuroeconomics

University of Southern California (2018 – 2022)

Natural Language Processing, Neural Network Models of Social & Cognitive Processes, Human Language as Computation, Applied Python, Introduction to Computer Science, Fundamentals of Computation, Introduction to Python, Introduction to Linguistics, Introduction to Cognitive Neuroscience, Neurobiology, Brain Architecture, Systems Neuroscience: From Synapses to Perception

Programming Languages and Skills

Python, MATLAB, C++, R, SQL, Java, Julia, Machine Learning, Deep Learning, Reinforcement Learning, Multimodal Transformers, Data Analytics & Visualization

HONORS & AWARDS

FALL 2018 – 2022 - U.S.C. PRESIDENTIAL SCHOLARSHIP

FALL 2018 – 2022 - NATIONAL MERIT FINALIST SCHOLARSHIP

SUMMER 2021 - SUMMER UNDERGRADUATE RESEARCH FUNDING

SUMMER 2019, 2021 - U.S.C. PRESIDENTIAL SCHOLARSHIP EXCEPTIONAL FUNDING