

DENIS JERED MCINERNEY

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Ph.D. Candidate in machine learning and natural language processing graduating in Spring 2024 with five years of research experience in machine learning and natural language processing. Research Interests include providing tools to efficiently discover information needed for decision-making, and working in settings rich with unstructured data but scarce in structured data and labels.

EDUCATION

Northeastern University, Boston

September 2018 - Present

PhD in Computer Science, GPA: 3.75/4.0

Khoury College of Computer Science

Johns Hopkins University, Baltimore

Fall 2014 - Spring 2018

Bachelor of Science, GPA: 3.6/4.0, Dean's List 2014-2018

Majors: Physics and Computer Science, Minor: Mathematics

PUBLICATIONS

Preprints

1. Denis Jered McInerney, Geoffrey Young, Jan-Willem van de Meent, and Byron C. Wallace. Chill: Zero-shot custom interpretable feature extraction from clinical notes with large language models. *Under review at the Proceedings of the Conference on Empirical Methods in Natural Language Processing. Conference on Empirical Methods in Natural Language Processing*, 2023

Peer-reviewed Conferences

1. Sanjana Ramprasad, Iain J Marshall, Denis Jered McInerney, and Byron C Wallace. Automatically summarizing evidence from clinical trials: A prototype highlighting current challenges. In *Proceedings of the conference. Association for Computational Linguistics. Meeting*, volume 2023, page 236. NIH Public Access, 2023
2. Denis Jered McInerney, Geoffrey Young, Jan-Willem van de Meent, and Byron C Wallace. That's the wrong lung! evaluating and improving the interpretability of unsupervised multimodal encoders for medical data. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing. Conference on Empirical Methods in Natural Language Processing*, volume 2022, page 3626. NIH Public Access, 2022
3. Denis Jered McInerney, Bornha Dabiri, Anne-Sophie Touret, Geoffrey Young, Jan-Willem Meent, and Byron C. Wallace. Query-focused ehr summarization to aid imaging diagnosis. In *Machine Learning for Healthcare Conference*, pages 632–659. PMLR, 2020

Workshops

1. Denis Jered McInerney, Luyang Kong, Kristjan Arumae, Byron C. Wallace, and Parminder Bhatia. Kronecker factorization for preventing catastrophic forgetting in large-scale medical entity linking. In *NeurIPS Workshop on Machine Learning for Public Health*, 2021

EXPERIENCE

Northeastern University

Fall 2018 - Present

Ph.D. Research advised by Professor Byron C. Wallace and Professor Jan-Willem van de Meent

- Currently working on a pipeline for presenting evidence to clinicians to help prevent diagnostic errors.
- Developed an inherently interpretable method for classification with electronic health records through using LLMs to extract high-level interpretable features posed by clinicians without supervision.
- Studied the fine-grained alignments between image and text in multimodal pre-trained models in the clinical domain.
- Worked on incorporating loss based on latent variables into generative modeling to bridge the gap between generative and contrastive losses for representation learning.
- Created an extractive summarization model for medical documents using ICD codes as distant supervision.
- Adapted the pointer-generator model for summarization to use a Transformer instead of an LSTM.

Amazon Comprehend Medical

Spring 2023

Internship Chris Kong, Xuanqing Liu, and Adit Krishnan

Adapting Large Language Models: Developed methods for adapting Large Language Models to a target domain without needing to update the weights of the LLM.

Salesforce Research

Summer 2021

Internship with Nazneen Rajani and Wojciech Kryściński

Multi-document Summarization: Worked on techniques to summarize multiple news documents while extracting facts and determining which ones were corroborated by different sources and which facts conflicted.

Amazon Comprehend Medical

Summer 2020

Internship with Parminder Bhatia, Chris Kong, and Kristjan Arumae

Continuous Learning in Medical Entity Linking: Developed techniques that mitigate catastrophic forgetting when training sequentially on a diverse set of clinical datasets for entity linking.

John's Hopkins University Center for Language and Speech Processing

Summer 2017 - Spring 2018

Undergraduate Research with Professor Benjamin Van Durme

Information Retrieval: Developed a pipeline to create a topic classifier for documents in a corpus for any given topic. It can be given a topic specified in natural language and will create a document classifier for that topic on-the-fly.

John's Hopkins University Center for Language and Speech Processing

Spring 2017

Undergraduate Research with Professor Mark Dredze

Sentiment Analysis of Social Media for Healthcare: Helped to develop machine learning classification algorithms to identify twitter users that have the flu.

Compact Muon Solenoid (CMS) Alignment group at CERN

Summer 2015 - Summer 2016

Undergraduate Research with Professor Andrei Gritsan

Particle Physics: Developed a 3D visualization for the movement of individual modules in the CMS detector and worked on implementing an addition to the alignment algorithm for the CMS detector that takes into account curvature of individual modules in the detector. Awarded *Provost's Undergraduate Research Award* to travel to CERN to analyze Monte-Carlo data in order to reduce noise in Higgs Boson experiments.

PRESENTATIONS**New England Natural Language Processing Day**, Poster, Contributed Talk

Spring 2022

CHiLL: Crafting High-Level Latents

Brigham and Women's Hospital/Boston University, Data Driven Speaker Series, Invited Talk

Fall 2022

Natural Language Processing in Radiology

Empirical Methods in Natural Language Processing, Poster, Contributed Talk

Fall 2022

[That's the Wrong Lung!](#)**New England Natural Language Processing Day**, Contributed Talk

Spring 2022

That's the Wrong Lung!

NeurIPS Workshop on Machine Learning in Public Health, Contributed Talk

Fall 2021

[Kronecker Factorization for Preventing Catastrophic Forgetting](#)**Machine Learning for Healthcare**, Poster, Contributed Talk

Summer 2020

[Query-focused EHR Summarization to Aid Imaging Diagnosis](#)**SKILLS AND COURSEWORK**

Coursework: Natural Language Processing, Computer Vision, Probabilistic Modeling, Advanced Machine Learning, Advanced Algorithms, Dynamical Systems, Reinforcement Learning, Information Visualization, Programming Languages

Programming Experience: Python (including Pytorch, Scikit-learn, Streamlit, Flask, Gymnasium, Mxnet/Gluon), Linux, Docker, Slurm, AWS EC2 instances, Google Cloud Compute Engine, L^AT_EX

Machine Learning Experience: Extractive and abstractive summarization, Multimodal contrastive Learning, ML for healthcare with EHRs, Generative modeling with images, Proximal Policy Optimization with an actor and critic, Collecting annotations (directly and with MTurk)

SERVICE

Reviewer Conferences: NAACL-HLT (2021), ACL-IJCNLP (2021), Trustworthy AI for Healthcare (2022), ACM SIGKDD (2022), ACL ARR (November 2021, January 2022, April 2022, July 2022), EMNLP (2022, 2023)

Workshops: EMNLP Workshop on New Frontiers in Summarization (2019), ICLR Workshop on Machine Learning for Preventing and Combating Pandemics (2021), NeurIPS Workshop on Robustness in Sequence Modeling (2022)

Guest Lecturer

Machine Learning 2, Multimodal Models
Practical Neural Networks, Summarization Models

Spring 2022

Fall 2020

Teaching Assistant, Machine Learning 2

Spring 2022

Teacher, O'Bryant High School Machine Learning Outreach Program

Spring 2022

Mentor, Charlie Denhart, Undergraduate Research

Spring 2021

REFERENCES

Byron C. Wallace, Ph.D., *Advisor*

Associate Professor, Computer Science, Northeastern University
b.wallace@northeastern.edu

Jan-Willem van de Meent, Ph.D., *Advisor*

Associate Professor, Computer Science, University of Amsterdam
j.w.vandemeent@uva.nl

Geoffrey S. Young, M.D., *Clinical Collaborator*

Associate Professor, Harvard Medical School
Radiologist, Brigham and Women's Hospital
gsyoung@bwh.harvard.edu

Chris (Luyang) Kong, *Internship Manager*

Senior Applied Scientist, Amazon Web Services
luyankon@amazon.com