

# 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 with little-to-no supervision.

## EDUCATION

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### 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

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### 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, Borna 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

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### Northeastern University

Fall 2018 - Present

Professor Byron C. Wallace and Professor Jan-Willem van de Meent

PhD Research:

- 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

Chris Kong, Xuanqing Liu, and Adit Krishnan

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

<b>Salesforce Research</b> <i>Nazneen Rajani and Wojciech Kryściński</i> 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.	Summer 2021
<b>Amazon Comprehend Medical</b> <i>Parminder Bhatia, Chris Kong, and Kristjan Arumae</i> 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.	Summer 2020
<b>John's Hopkins University Center for Language and Speech Processing</b> <i>Professor Benjamin Van Durme</i> 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.	Summer 2017 - Spring 2018
<b>John's Hopkins University Center for Language and Speech Processing</b> <i>Professor Mark Dredze</i> Sentiment Analysis of Social Media for Healthcare: Helped to develop machine learning classification algorithms to identify twitter users that have the flu.	Spring 2017
<b>Compact Muon Solenoid (CMS) Alignment group at CERN</b> <i>Professor Andrei Gritsan</i> 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 <i>Provost's Undergraduate Research Award</i> to travel to CERN to analyze Monte-Carlo data in order to reduce noise in Higgs Boson experiments.	Summer 2015 - Summer 2016

## PRESENTATIONS

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<b>New England Natural Language Processing Day</b> , Poster, Contributed Talk CHiLL: Crafting High-Level Latents	Spring 2022
<b>Brigham and Women's Hospital/Boston University, Data Driven Speaker Series</b> , Invited Talk Natural Language Processing in Radiology	Fall 2022
<b>Empirical Methods in Natural Language Processing</b> , Poster, Contributed Talk <a href="#">That's the Wrong Lung!</a>	Fall 2022
<b>New England Natural Language Processing Day</b> , Contributed Talk That's the Wrong Lung!	Spring 2022
<b>NeurIPS Workshop on Machine Learning in Public Health</b> , Contributed Talk <a href="#">Kronecker Factorization for Preventing Catastrophic Forgetting</a>	Fall 2021
<b>Machine Learning for Healthcare</b> , Poster, Contributed Talk <a href="#">Query-focused EHR Summarization to Aid Imaging Diagnosis</a>	Summer 2020

## SKILLS AND COURSEWORK

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**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<sup>A</sup>T<sub>E</sub>X

## SERVICE

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**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	Spring 2022
Practical Neural Networks, Summarization Models	Fall 2020

<b>Teaching Assistant</b> , Machine Learning 2	Spring 2022
<b>Teacher</b> , O'Bryant High School Machine Learning Outreach Program	Spring 2022
<b>Mentor</b> , Charlie Denhart, Undergraduate Research	Spring 2021

## REFERENCES

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

Associate Professor, Computer Science, Northeastern University  
[b.wallace@northeastern.edu](mailto:b.wallace@northeastern.edu)

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

Associate Professor, Computer Science, University of Amsterdam  
[j.w.vandemeent@uva.nl](mailto:j.w.vandemeent@uva.nl)

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

Associate Professor, Harvard Medical School  
 Radiologist, Brigham and Women's Hospital  
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**Chris (Luyang) Kong**

Senior Applied Scientist, Amazon Web Services  
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