

# Jack Hessel

Research Scientist @ The Allen Institute for AI

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## Education

### Ph.D., Computer Science

Cornell University

August 2014 - August 2020

*Advised by Professor Lillian Lee*

*Natural Language Processing and Machine Learning*

*Thesis: Learning from Multimodal Web Data*

### B.A., Computer Science and Math/Statistics

Carleton College

September 2010 - June 2014

*Magna Cum Laude*

*Honors in Computer Science*

## Publications

### Refereed Publications

**Jack Hessel**, Ana Marasović, Jena D. Hwang, Lillian Lee, Jeff Da, Rowan Zellers, Robert Mankoff, Yejin Choi. "Do Androids Laugh at Electric Sheep? Humor 'Understanding' Benchmarks from The New Yorker Caption Contest." ACL 2023.

Liunian Harold Li, **Jack Hessel**, Youngjae Yu, Xiang Ren, Kai-Wei Chang and Yejin Choi. "Symbolic Chain-of-Thought Distillation: Small Models Can Also 'Think' Step-by-Step." ACL 2023.

Youngjae Yu, Jiwan Chung, Heeseung Yun, **Jack Hessel**, JaeSung Park, Ximing Lu, Prithviraj Ammanabrolu, Rowan Zellers, Ronan Le Bras, Gunhee Kim, Yejin Choi. "Multimodal Knowledge Alignment with Reinforcement Learning." CVPR 2023.

Rajkumar Ramamurthy, Prithviraj Ammanabrolu, Kianté Brantley, **Jack Hessel**, Rafet Sifa, Christian Bauckhage, Hannaneh Hajishirzi, and Yejin Choi. "Is Reinforcement Learning (Not) for Natural Language Processing?: Benchmarks, Baselines, and Building Blocks for Natural Language Policy Optimization." ICLR 2023 (spotlight).

Ximing Lu, Sean Welleck, Liwei Jiang, **Jack Hessel**, Lianhui Qin, Peter West, Prithviraj Ammanabrolu, and Yejin Choi. "Quark: Controllable Text Generation with Reinforced Unlearning." NeurIPS 2022 (Oral; top 1% of submissions).

**Jack Hessel\***, Jena D. Hwang\*, Jae Sung Park, Rowan Zellers, Chandra Bhagavatula, Anna Rohrbach, Kate Saenko, and Yejin Choi. "The Abduction of Sherlock Holmes: A Dataset for Visual Abductive Reasoning." ECCV 2022 (oral).

Sarah Wiegrefe, **Jack Hessel**, Swabha Swayamdipta, Mark Riedl, and Yejin Choi. "Reframing Human-AI Collaboration for Generating Free-Text Explanations." NAACL 2022.

Yanpeng Zhao, **Jack Hessel**, Youngjae Yu, Ximing Lu, Rowan Zellers, and Yejin Choi. "Connecting the Dots between Audio and Text without Parallel Data through Visual Knowledge Transfer." NAACL 2022.

Peter West, Chandra Bhagavatula, **Jack Hessel**, Jena D. Hwang, Liwei Jiang, Ronan Le Bras, Ximing Lu, Sean Welleck, and Yejin Choi. "Symbolic Knowledge Distillation: from General Language Models to Commonsense Models." NAACL 2022.

Rowan Zellers, Jiasen Lu, Ximing Lu, Youngjae Yu, Yanpeng Zhao, Mohammadreza Salehi, Aditya Kusupati, **Jack Hessel**, Ali Farhadi, and Yejin Choi. "MERLOT Reserve: Neural Script Knowledge through Sound, Language, and Vision." CVPR 2022.

Rowan Zellers\*, Ximing Lu\*, **Jack Hessel**\*, Youngjae Yu, Jae Sung Park, Jize Cao, Ali Farhadi, and Yejin Choi. "MERLOT: Multimodal Neural Script Knowledge Models." NeurIPS 2021 (Oral; top 1% of submissions).

**Jack Hessel**, Ari Holtzman, Maxwell Forbes, Ronan Le Bras, and Yejin Choi. "CLIPScore: A Reference-free Evaluation Metric for Image Captioning." EMNLP 2021.

**Jack Hessel** and Alexandra Schofield. "How effective is BERT without word ordering? Implications for language understanding and data privacy." ACL 2021.

**Jack Hessel** and Lillian Lee. "Does my multimodal model learn cross-modal interactions? It's harder to tell than you might think!" EMNLP 2020.

**Jack Hessel**, Zhenhai Zhu, Bo Pang, and Radu Soricut. "Beyond Instructional Videos: Probing for More Diverse Visual-Textual Grounding on YouTube." EMNLP 2020.

Gregory Yauney, **Jack Hessel**, and David Mimno. "Domain-Specific Lexical Grounding in Noisy Visual-Textual Documents." EMNLP 2020.

**Jack Hessel**, Lillian Lee, and David Mimno. "Unsupervised Discovery of Multimodal Links in Multi-image, Multi-sentence Documents." EMNLP 2019.

**Jack Hessel**, Bo Pang, Zhenhai Zhu, and Radu Soricut. "A Case Study on Combining ASR and Visual Features for Generating Instructional Video Captions" CoNLL 2019.

**Jack Hessel** and Lillian Lee. "Something's Brewing! Early Prediction of Controversy-causing Posts from Discussion Features." NAACL 2019.

**Jack Hessel**, David Mimno, and Lillian Lee. "Quantifying the Visual Concreteness of Words and Topics in Multimodal Datasets." NAACL 2018.

**Jack Hessel**, Lillian Lee, and David Mimno. "Cats and Captions vs. Creators and the Clock: Comparing Multimodal Content to Context in Predicting Relative Popularity" WWW 2017.

**Jack Hessel**, Chenhao Tan and Lillian Lee. "Science, AskScience and BadScience: On the Coexistence of Highly Related Communities." ICWSM 2016.

**Jack Hessel**, and Sherri Goings. "Using Reproductive Altruism to Evolve Multicellularity in Digital Organisms." ECAL 2013.

### *Refereed Workshop Publications*

**Jack Hessel**, and David Mimno. "Aligning Images and Text in a Digital Library." Computer Vision in Digital Humanities Workshop @ DH 2017.

**Jack Hessel**, Alexandra Schofield, Lillian Lee, and David Mimno. "What do Vegans do in their Spare Time? Latent Interest Detection in Multi-Community Networks." Networks Workshop @ NeurIPS 2015.

**Jack Hessel**, Nicolas Savva, and Kimberly J Wilber. "Image Representations and New Domains in Neural Image Captioning." Vision/Language Workshop @ EMNLP 2015.

Albright, Evan, **Jack Hessel**, Nao Hiranuma, Cody Wang, and Sherri Goings. "A Comparative Analysis of Popular Phylogenetic Reconstruction Algorithms." MICS 2014.

# Employment

## Research

<b>Research Scientist</b> , <i>Allen Institute for Artificial Intelligence</i>	July 2021 – present
<b>Postdoctoral Young Investigator</b> , <i>Allen Institute for Artificial Intelligence</i> Host: Yejin Choi. Working on commonsense reasoning, vision and language, etc.	Oct 2020 – July 2021
<b>Research Intern</b> , <i>Google Research</i> Hosts: Bo Pang and Zhenhai Zhu. Worked with the natural language understanding team on video language joint learning; this work was published at <i>CoNLL, 2019</i> and <i>EMNLP 2020</i> .	Summer 2019, Summer 2018
<b>Research Intern</b> , <i>Facebook, Inc.</i> Host: Amit Bahl. Worked with the Core Data Science team on personalized language modeling, and cross-modal retrieval.	Summer 2017
<b>Research Intern</b> , <i>Twitter, Inc.</i> Host: Clément Farabet. Worked with the Cortex Team as their first intern on large-scale/multimodal node embeddings in graphs, language modeling, and engagement prediction.	Summer 2016
<b>Research Intern</b> , <i>Washington University, St. Louis REU</i> Host: Kilian Weinberger. Contributed to a GPU support vector machine package that accompanies Tyree et al.'s "Parallel Support Vector Machines in Practice." 2014.	Summer 2013

## Teaching

<b>Invited Visiting Instructor</b> , <i>Computer Science Dept., Carleton College</i> Lead instructor of Natural Language Processing and Mathematics of Computer Science; 30+ students in each class	Spring 2019
<b>Teaching Assistant</b> , <i>Cornell University</i> Language and Information, 2016; Machine Learning for Data Science, 2015; Intro to Computer Graphics, 2014	Various

## Invited Talks, Academic Service, Honors, etc.

### Invited Talks

<i>The AI Talks (NUS/NTU Singapore): "The Case for Reasoning Beyond Recognition"</i>	2023
<i>Procter &amp; Gamble: "The Case for Reasoning Beyond Recognition"</i>	2022
<i>Seoul National University: "The Case for Reasoning Beyond Recognition"</i>	2022
<i>Adobe Research: "The Case for Reasoning Beyond Recognition"</i>	2022
<i>University of Washington: Two Lectures (Linguistics, Honors Col.) "New Frontiers in Multimodal Grounding"</i>	2022
<i>University of Pittsburgh: "(at least) Two Conceptions of Visual-Textual Grounding"</i>	2020
<i>Allen Institute for AI: "The Promise and Perils of Learning Grounding from Visual-Textual Web Data."</i>	2020
<i>UNC Chapel Hill: "The Promise and Perils of Learning Grounding from Visual-Textual Web Data."</i>	2020
<i>Rutgers University: "Multimodal Grounding from User-generated Web Content."</i>	2019
<i>SRI International: "Multimodal Grounding from User-generated Web Content."</i>	2019
<i>Cornell University: PhD Colloquium, "Unsupervised Learning From Multimodal Documents."</i>	2019
<i>University of Pittsburgh: "Grounding Images from a Digital Library in their Textual Contexts."</i>	2018
<i>Cornell University: Two Guest Lectures for CS4300, "Practical Unsupervised Learning"</i>	2015
<i>Carleton College: "The Role of Altruism on Kickstarter"</i>	2014

### Program Committees/Reviewing/Area Chairing

## Conference/Journal Review Committees

ACL 2016, 2017, 2018, 2019, 2020, 2021  
EMNLP 2017, 2018, 2019, 2020, 2021, 2022  
NAACL 2018, 2019, 2021  
ACL Rolling review: every cycle since its inception!  
ICML 2020, 2021  
NeurIPS 2021, 2022  
ICLR 2021, 2022  
AAACL 2020  
CoNLL 2019, 2020, 2021, 2022 (publicity chair)  
JAIR 2020  
PLOS One 2020  
ICWSM 2018  
EACL 2017, 2021  
AAAI 2017, 2022 (Area chair)

EAAMO 2021, 2022 (Area chair)

## Workshop/Grant Reviewer

Black in AI @ NeurIPS: 2017, 2018, 2019, 2020  
Student Research Workshop @ NAACL: 2018  
Student Research Workshop @ ACL: 2020, 2021  
Student Research Workshop @ EACL: 2021  
Noisy User-generated Text @ EMNLP, COLING: 2018, 2019, 2020, 2021, 2022  
Practical ML 4 the Developing World @ ICLR: 2020  
BlackAIR 2021

## Honors

Top Reviewer Recognition	Various
ACL 2018+2020+2021, NAACL 2019, EMNLP 2018+2019, CoNLL 2019, ICML 2020	
Pitt Digital Humanities graduate speaker series speaker	2018
MICS Conference Best Paper Award	2014
Phi Beta Kappa, Beta of Minnesota	2014
Sigma Xi Inductee	2014

## Volunteer Service

**Lesson Planner and Volunteer**, *Expand Your Horizons @ Cornell* Spring 2015, 2014  
Planned for and taught at a one-day conference for 7th-9th grade girls to encourage interest in math and science.  
**Volunteer Elementary School Teacher**, Fall 2014  
Volunteered once per week teaching 2-5th grade students how to code using code.org

## Development Experience

### Open Source Contributions

Developed a TreeLSTM in TensorFlow2: this neural network dynamically changes its topology on a per-example basis ([https://github.com/jmhessel/recursive\\_nn\\_tf2](https://github.com/jmhessel/recursive_nn_tf2))  
Developed fmpytorch in 2017 (150+ stars on GitHub): a cythonized implementation of second order factorization machines in pytorch (<https://github.com/jmhessel/fmpytorch>)  
Developed fightingwords in 2015 for comparing word usage rate differences between corpora; used in several refereed publications (<https://github.com/jmhessel/FightingWords>)  
Pull requests merged to Keras, and Gensim, and tensorflow

### Technical Skills

*Machine Learning Skills*: Various machine learning/statistical toolkits/languages (e.g. sklearn, Tensorflow, PyTorch, R, etc.). Experience working with large, multi-faceted datasets.

*Development Skills:* Object-oriented programming (Python, Java, C++), parallel programming experience on CPUs + GPUs + TPUs, experience with various languages, development environments, version control systems, operating systems.

## References

Available upon request