

# Meng Cao

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## EDUCATION

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**McGill University / Mila - Québec AI Institute** Sept. 2019 – Present  
Ph.D. in Computer Science GPA: 4.0/4.0  
Advisor: Jackie Chi Kit Cheung

**Northeastern University (China)** Sept. 2015 – June 2019  
Major in Software Engineering GPA: 3.96/4.0  
Ranking: 1/59

## RESEARCH INTERESTS

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Natural Language Processing, Text Summarization, Text Generation, Reinforcement Learning

## PUBLICATIONS

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- [1] Enhancing Reinforcement Learning with Dense Rewards from Language Model Critic  
**Meng Cao**, Lei Shu, Lei Yu, Yun Zhu, Nevan Wichers, Yinxiao Liu, Lei Meng  
*EMNLP 2024*
- [2] Mechanisms of Non-Factual Hallucination in Language Models  
Lei Yu\*, **Meng Cao\***, Jackie CK Cheung, Yue Dong  
*Findings of EMNLP 2024*
- [3] Successor Features for Efficient Multi-Subject Controlled Text Generation  
**Meng Cao**, Mehdi Fatemi, Jackie CK Cheung and Samira Shabanian  
*ICML 2024*
- [4] Systematic Rectification of Language Models via Dead-end Analysis  
**Meng Cao**, Mehdi Fatemi, Jackie CK Cheung and Samira Shabanian  
*ICLR 2023*
- [5] Responsible AI Considerations in Text Summarization Research: A Review of Current Practices  
Yu Lu Liu, **Meng Cao**, Su Lin Blodgett, Jackie Chi Kit Cheung, Alexandra Olteanu and Adam Trischler  
*Findings of EMNLP 2023*
- [6] Hallucinated but Factual! Inspecting the Factuality of Hallucinations in Abstractive Summarization  
**Meng Cao**, Yue Dong and Jackie C. K. Cheung.  
*ACL 2022*
- [7] Learning with Rejection for Abstractive Text Summarization  
**Meng Cao**, Yue Dong, Jingyi He and Jackie C. K. Cheung  
*EMNLP 2022*
- [8] Factual Error Correction for Abstractive Summarization Models  
**Meng Cao**, Yue Dong, Jiapeng Wu and Jackie C. K. Cheung  
*EMNLP 2020*
- [9] TeMP: Temporal Message Passing for Temporal Knowledge Graph Completion  
Jiapeng Wu, **Meng Cao**, Jackie Chi Kit Cheung, William L. Hamilton  
*EMNLP 2020*
- [10] Referring Expression Generation Using Entity Profiles  
**Meng Cao** and Jackie Chi Kit Cheung  
*EMNLP-IJCNLP 2019*

## INDUSTRY EXPERIENCES

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### Google Research – Mountain View

Research Intern

Aug. 2023 – Nov. 2023

Advisor: Lei Meng, Shu Lei

- Investigated the challenge of reward sparsity in RLHF
- Leverage the critique ability of LLMs for generating dense intrinsic rewards
- Demonstrated that combining extrinsic and intrinsic rewards substantially enhances the sample efficiency

### Microsoft Research – Montréal

Machine Learning Research Intern

Apr. 2022 – Mar. 2023

Advisor: Samira Shabanian & Mehdi Fatemi

- Work on detoxification of large language models like GPT-3
- Our approach, *rectification*, utilizes a separate but significantly smaller value function for LM detoxification
- Paper accepted by ICLR 2023

### Huawei Noah's Ark Lab – Montréal

Applied Machine Learning Research Intern

May 2021 – Mar. 2022

Advisor: Mehdi Rezagholizadeh

- Knowledge distillation for text generation tasks
- Data augmentation for knowledge distillation using cluster labels

### Borealis AI – Toronto

Research Intern, Alan Team

May 2020 – Aug. 2020

Advisor: Yanshuai Cao

- Build a distributed data-parallel Text-to-SQL system
- Applied meta-learning algorithms (MAML, Reptile, MetaReg) in cross-database semantic parsing task
- Achieved promising results in the zero-shot domain transfer setting

### IBM Research – Beijing

Research Assistant Intern, Information Analytics Team

Sept. 2018 – June 2019

Advisor: Shiwan Zhao

- Chinese word segmentation: responsible for training Chinese word segmentation model. Proposed a novel segmentation model based on n-gram and information entropy to segment the input sentences
- Neural Architecture Search: PyTorch implementation of Google's ENAS neural architecture algorithm
- Migrated a neural network model which is implemented in Keras into Java environment using Deeplearning4j

## SCHOLARSHIPS

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### Mitacs Globalink Fellowship Award

2020

### China National Scholarship

2015-2016, 2017-2018

The Chinese Government, among top-0.2% all undergraduates in China

### The Bao Gang Education Scholarship

Sept. 2018

China BAOWU Steel Group, selected rate: 4/20000 in NEU

### The First-Class Scholarship in Northeastern University

2015-2016, 2016-2017, 2017-2018

Northeastern University, among top-3% undergraduates in NEU

## AWARDS

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### "Top Ten Undergraduates" in Northeastern University

May 2018

Northeastern University, among top-0.2% undergraduates in NEU

### The Excellent Performance Award for IBM Undergraduate Innovation Lab Program

Apr. 2017

IBM Research China, Beijing

### The First Prize in the 8th National College Students Mathematics Competition

Oct. 2016

Chinese Mathematical Society

### The First Prize in the 9th National College Students Mathematics Competition

Oct. 2017

Chinese Mathematical Society

### The Meritorious Winner for the Mathematical Contest in Modeling (MCM/ICM), 2018

Feb. 2018

COMAP, the Consortium for Mathematics and Its Applications (USA)

**The Honorable Mention for the Mathematical Contest in Modeling (MCM/ICM), 2017**

Feb. 2017

COMAP, the Consortium for Mathematics and Its Applications (USA)

## **RESEARCH FUNDING**

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**Mitacs Globalink Research Internship (\$19,500)**

June 2018 – Sept. 2018

Mitacs Globalink summer research internship program (\$4,500) & Mitacs graduate student funding (\$15,000)

## **SKILLS**

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**Programming Languages:** skilled in: Java, Python (especially NumPy, PyTorch); familiar with: Tensorflow, JavaScript, SQL

**Extensive knowledge of:** Natural Language Processing, Text Summarization, Deep Learning, Reinforcement Learning