Maria Ryskina

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Education

Carnegie Mellon University — Pittsburgh, PA, USA
Ph.D., Language and Information Technologies — Aug 2016–Sep 2022

Skolkovo Institute of Science and Technology — Moscow, Russia
M.Sc., Information Technology, with honors — Aug 2014–Jul 2016

Moscow Institute of Physics and Technology — Moscow, Russia
M.Sc., Applied Mathematics and Physics, with honors — Sep 2014–Jun 2016
B.Sc., Applied Mathematics and Physics, with honors — Sep 2010–Jun 2014

Research Experience

Vector Institute for Artificial Intelligence — Toronto, ON, Canada
CIFAR AI Safety Postdoctoral Fellow — Jun 2025–present

- My current project aims to develop multi-agent RL training procedures that can enhance normative reasoning in LLMs, building on theories of how human societies create social norms.
- Advisor: Dr. Gillian K. Hadfield

Massachusetts Institute of Technology — Cambridge, MA, USA
Postdoctoral Associate, McGovern Institute for Brain Research — Oct 2022–Oct 2024

- Localized brain networks that represent modality-independent conceptual meaning using neuroimaging data and used LLM representations to predict brain responses in these networks [C7]
- Advisors: Dr. Evelina Fedorenko, Dr. Kyle Mahowald

Carnegie Mellon University — Pittsburgh, PA, USA
Graduate Research Assistant, Language Technologies Institute — Aug 2016–Sep 2022

- Developed structured unsupervised probabilistic models for character-level transduction problems [C3, W4] and for applications in digital humanities [C1]
- Modeled how new words have emerged in historical corpora [C2] and on social media, and how morphological inflection models adapt to new words
- Thesis: "Learning Computational Models of Non-Standard Language" [T1]
- Advisors: Dr. Matthew R. Gormley, Dr. Eduard Hovy, Dr. Taylor Berg-Kirkpatrick

DiDi Labs — Remote
Reseacrch Intern — May 2020–Aug 2020

- Learned embeddings of number tokens from mathematical sequences and probed them for number-theoretic knowledge [W5, P2]
- Trained task-oriented reinforcement learning agents in a self-play setting [X1, P1]
- Mentor: Dr. Kevin Knight

Massachusetts Institute of Technology — Cambridge, MA, USA
Visiting Graduate Student, CSAIL Infolab — Sep 2015–Jan 2016

- Used visual representations of text (sampled from a video captioning model) to detect entailment.
- Mentors: Dr. Boris Katz, Dr. Andrei Barbu

Moscow Institute of Physics and Technology & Dorodnicyn Computing Centre of RAS Moscow, Russia
Undergraduate Student, Dept. of Control and Applied Mathematics Sep 2012–Jun 2014

- Designed regularizers for topic models towards stable convergence to an interpretable solution.
- Advisor: Dr. Konstantin Vorontsov

Awards and Fellowships

CIFAR AI Safety Postdoctoral Fellowship 2025–2026

Outstanding Reviewer Award, Annual Meeting of the ACL 2023

Best Paper Award, ACM Conference on Fairness, Accountability, and Transparency 2023
Awarded for "Queer In AI: A Case Study in Community-Led Participatory AI"

Diverse Intelligences Summer Institute Fellowship 2021
Templeton World Charity Foundation

Skoltech Academic Excellence Award, Russia 2016

State Academic Scholarship, Russia 2013–2014

Foundation for the Development of Innovative Education Scholarship, Russia 2010–2012

Publications

* denotes equal contrubution

Journal Articles

[J2] **Elements of World Knowledge (EWoK): A Cognition-Inspired Framework for Evaluating Basic World Knowledge in Language Models**
A. A. Ivanova*, A. Sathe*, B. Lipkin* *et al.*, including **M. Ryskina**
Accepted to the Transactions of the Association for Computational Linguistics (TACL), 2025.

[J1] **A taxonomy and review of generalization research in NLP**
D. Hupkes *et al.*, including **M. Ryskina**
Nature Machine Intelligence 5(10), 2023.

Conference Proceedings

[C7] **Language models align with brain regions that represent concepts across modalities**
M. Ryskina, G. Tuckute, A. Fung, A. Malkin, E. Fedorenko
Accepted to the Conference on Language Modeling (COLM), 2025.

[C6] **Queer In AI: A Case Study in Community-Led Participatory AI**
Organizers of Queer in AI, including **M. Ryskina**
ACM Conference on Fairness, Accountability, and Transparency (FAccT), 2023.

[C5] **UniMorph 4.0: Universal Morphology**
K. Batsuren*, O. Goldman* *et al.*, including **M. Ryskina**
Language Resources and Evaluation Conference (LREC), 2022.

[C4] **NoiseQA: Challenge Set Evaluation for User-Centric Question Answering**
A. Ravichander, S. Dalmia, **M. Ryskina**, F. Metze, E. Hovy, A. W. Black
Conference of the European Chapter of the Association for Computational Linguistics (EACL), 2021.

[C3] **Phonetic and Visual Priors for Decipherment of Informal Romanization**
M. Ryskina, M. R. Gormley, T. Berg-Kirkpatrick
Annual Meeting of the Association for Computational Linguistics (ACL), 2020.

[C2] **Where New Words Are Born: Distributional Semantic Analysis of Neologisms and Their Semantic Neighborhoods**
M. Ryskina, E. Rabinovich, T. Berg-Kirkpatrick, D. R. Mortensen, Y. Tsvetkov
Annual Meeting of the Society for Computation in Linguistics (SCiL), 2020.

[C1] **Automatic Compositor Attribution in the First Folio of Shakespeare**
M. Ryskina, H. Alpert-Abrams, D. Garrette, T. Berg-Kirkpatrick
Annual Meeting of the Association for Computational Linguistics (ACL), 2017.

Workshop Proceedings

[W5] **Learning Mathematical Properties of Integers**
M. Ryskina, K. Knight
BlackboxNLP Workshop on Analyzing and Interpreting Neural Networks for NLP, 2021.

[W4] **Comparative Error Analysis in Neural and Finite-state Models for Unsupervised Character-level Transduction**
M. Ryskina, E. Hovy, T. Berg-Kirkpatrick, M. R. Gormley
SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, 2021.

[W3] **SIGMORPHON 2021 Shared Task on Morphological Reinflection: Generalization Across Languages**
T. Pimentel*, **M. Ryskina*** *et al.*
SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, 2021.

[W2] **OPERA: Operations-oriented Probabilistic Extraction, Reasoning, and Analysis (2019)**
E. Hovy *et al.*, including **M. Ryskina**
Text Analysis Conference (TAC), 2019.

[W1] **OPERA: Operations-oriented Probabilistic Extraction, Reasoning, and Analysis (2018)**
E. Hovy *et al.*, including **M. Ryskina**
Text Analysis Conference (TAC), 2018.

Theses

[T1] **Learning Computational Models of Non-Standard Language**
M. Ryskina
Ph.D. dissertation, Carnegie Mellon University, 2022.

Patents

[P2] US Patent 11460982, **Number embedding application system**
K. Knight, **M. Ryskina**
Oct 4, 2022

[P1] US Patent 12026544, **Self-play to improve task-oriented dialog systems and methods**
K. Knight, **M. Ryskina**, A. Arkhangorodsky, A. Nagesh, S. Fang
Jul 2, 2024

Magazine Articles

[M1] **Queer in AI**
Organizers of Queer in AI, including **M. Ryskina**
XRDS: Crossroads, The ACM Magazine for Students, 28(4), 2022.

Preprints

[X1] **Two Approaches to Building Collaborative, Task-Oriented Dialog Agents through Self-Play**
A. Arkhangorodsky, S. Fang, V. Knight, A. Nagesh, **M. Ryskina**, K. Knight
Preprint, 2021.

Invited Talks

Untangling Language: Representation Levels and the Long Tail Challenge in NLP Apr 2025
Visitor Talk Series, Vector Institute for Artificial Intelligence

Learning Computational Models of Non-Standard Language Feb–Mar 2022
LCC Lab, Department of Computer Science, University of Toronto
EvLab, Department of Brain and Cognitive Sciences, MIT
CLunch Seminar Series, Department of Computer and Information Science, University of Pennsylvania
MCQLL Lab, Department of Linguistics, McGill University

Romanization with Friends: Deciphering Informally Romanized Text Nov 2021
NLP With Friends Seminar Series

Unsupervised Decipherment of Informal Romanization Jun 2021
NLPhD Speaker Series, Department of Language Science and Technology, Saarland University

Informal Romanization across Languages and Scripts Jun 2021
SIGTYP Lecture Series

Teaching & Mentoring

Courses:

- TA and Guest lecturer for CMU 11-711: Algorithms for NLP. Instructor: Prof. Yulia Tsvetkov — Fall 2018
- TA for CMU 11-711: Algorithms for NLP. Instructor: Prof. Taylor Berg-Kirkpatrick. — Fall 2017

Students mentored:

- Ashley Malkin, high school intern, MIT — Jul–Aug 2023 & Jun–Jul 2024
- Sahal Ahmed, undergraduate student, MIT — Sep 2023–May 2024

Service

Professional service:

- Treasurer, Toronto Professional ACM-W chapter, 2025–present
- Diversity & Inclusion Chair, Annual Meeting of the Association for Computational Linguistics (ACL) 2025

- Core organizer at Queer in AI, 2022–present
- Mentor for MIT Research Science Institute, Summer 2024
- Co-organizer for the Queer in AI workshops at NAACL 2022, ACL 2023
- Co-organizer for SIGMORPHON Shared Task 0: Generalization in Morphological Inflection Generation, 2021
- Co-host for SIGTYP Lecture Series, 2021

Area chairing:

- Action Editor for ACL Rolling Review / Area Chair, Interpretability and Analysis of Models for NLP: ACL 2024, NAACL 2024, EACL 2024, NAACL 2025
- Area Chair, Conference on Language Modeling (COLM 2025)

Reviewing (journal articles):

- Cognitive Science (2021)
- Review of General Psychology (2021)

Reviewing (conference proceedings):

- Conference on Language Modeling (COLM 2024)
- Annual Meeting of the Cognitive Science Society (CogSci 2024, 2025)
- Annual Meeting of the Association for Computational Linguistics (ACL 2021, 2023)
- Conference of the European Chapter of the Association for Computational Linguistics (EACL 2021, 2023)
- SIGNLL Conference on Computational Natural Language Learning (CoNLL 2020, 2021, 2023, 2025)
- Conference on Empirical Methods in Natural Language Processing (EMNLP 2018, 2020, 2021, 2022)
- ACL Rolling Review (ARR 2021, 2022)

Reviewing (workshop proceedings):

- GenBench Workshop on Generalisation (Benchmarking) in NLP (EMNLP 2023)
- SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology (ACL 2023)
- CAWL Workshop on Computation and Written Language (ACL 2023)
- Queer in AI (ACL 2023, NAACL 2022)
- Student Research Workshop (ACL 2020, ACL 2021, NAACL 2021, AACL 2020)
- Human And Model in the Loop Evaluation and Training Strategies (NeurIPS 2020)

Volunteering and community service:

- Co-organizer for oSTEM/Queer in AI Graduate School Application Review and Fee Aid Programs, 2021–2025
- Student reviewer for CMU LTI Graduate Admissions, 2021
- Mentor for CMU SCS Graduate Application Support Program, 2020–2021
- Mentor for CMU LTI Peer Mentoring Program for new graduate students, 2021
- Mentor for CMU AI Mentoring Program for undergraduates from underrepresented groups, 2020