

# Taylor Olson

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Research Interests	Exploring philosophical moral theories, deontic logics, and machine learning techniques in hopes to instill AI systems with social and moral competence.
Education	<p><b>Northwestern University, Evanston, IL</b></p> <p>PhD Computer Science, Anticipated Summer 2024 Thesis Title: <i>A Formal Theory of Norms</i> Advisor: Professor Ken Forbus Honors: IBM PhD Fellowship, 2023-24; Northwestern Cognitive Science Fellowship, 2018-19</p> <p>Cognitive Science Certificate, 2023</p> <p><b>University of Northern Iowa, Cedar Falls, IA</b></p> <p>B.S., Computer Science, 2018 B.A., Mathematics, 2018 Minor in Philosophy</p> <p><b>Kirkwood Community College, Cedar Rapids, IA</b></p> <p>Mechanical Engineering Transfer Program, 2014</p>
Research Experience	<p><b>Thesis Research</b>, Computer Science, Northwestern University, Evanston, IL, 2018-Present Advisor: Professor Ken Forbus Project: <i>A Formal Theory of Norms</i></p> <ul style="list-style-type: none"><li>Investigating the theoretical possibility of creating an artificial moral agent</li><li>Developing predicate calculus knowledge representation and reasoning schemes for norms</li><li>Developing machine learning models of norm learning and grounding them in reasoning</li><li>Exploring defeasible logics for resolving normative conflicts</li></ul> <p><b>Research Assistant (with Prof. Ken Forbus)</b>, Computer Science, Qualitative Reasoning Group, Northwestern University, Evanston, IL, 2018-Present Project: <i>Social Reasoning for AI Systems</i></p> <ul style="list-style-type: none"><li>Implementing normative reasoning into a cognitive architecture to govern its behavior</li><li>Extending semantic parsing to handle norm learning via natural language</li></ul> <p><b>Undergraduate Research Intern</b>, School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, Summer 2017 Advisors: Professor Dustin Tingley, Dr. Margot Levine Project: <i>Clustering and Recommending Course Offerings from Syllabi</i></p> <ul style="list-style-type: none"><li>Built and tested an academic course recommender model using a dataset of natural language syllabi</li><li>Developed a pipeline and interface for rapid development of ensemble machine learning models including LSA, LDA, K-nearest neighbors, and Doc2Vec/Word2Vec</li></ul> <p><b>Research Assistant</b>, Computer Science, University of Northern Iowa, Cedar Falls, IA, 2016-17 Advisor: Professor Aleksandar Poleksić Project: <i>Prediction of Adverse Drug Reactions via Unified Medical Language System (UMLS)</i></p> <ul style="list-style-type: none"><li>Automated the translation of compound IDs to their standard IDs</li><li>Analyzed coverage of compound IDs and their adverse reactions for prediction</li></ul>

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**Publications**

- Olson, T. (Under review 2024). Normative Testimony and Belief Functions: A Formal Theory of Norm Learning.
- Olson, T. (2024). Towards Unifying the Descriptive and Prescriptive for Machine Ethics. In P. Wu, M. Salpukas, H. Wu, S. Ellsworth (Eds.), *Trolley Crash: Approaching Key Metrics for Ethical AI Practitioners, Researchers, and Policy Makers*, (Chapter 5). Cambridge: Academic Press.
- Olson, T., & Forbus, K. D. (2023). Mitigating Adversarial Norm Training with Moral Axioms. In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 37, No. 10, pp. 11882-11889).
- Olson, T. (2022). Towards Unifying the Descriptive and Prescriptive for Machine Ethics. In *Proceedings of the AAAI 2022 Spring Symposium on "Approaches to Ethical Computing Metrics for Measuring AI's Proficiency and Competency for Ethical Reasoning"*.
- Olson, T. & Forbus, K. (2021). Learning Norms via Natural Language Teachings. In *Proceedings of the 9th Annual Conference on Advances in Cognitive Systems 2021*.
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**Invited Talks**

- Mitigating Adversarial Norm Training with Moral Axioms*, Second International Workshop on Computational Machine Ethics, 20th International Conference on Principles of Knowledge Representation and Reasoning (KR2023), 2023. (Virtual).
- Mitigating Adversarial Norm Training with Moral Axioms*, AAAI-23, 2023.
- Towards Unifying the Prescriptive and Descriptive for Machine Ethics*, AAAI-22 Spring Symposium on "Approaches to Ethical Computing Metrics for Measuring AI's Proficiency and Competency for Ethical Reasoning", Spring 2022.
- Learning Norms via Natural Language Teachings*, The Ninth Advances in Cognitive Systems (ACS) Conference, 2021.
- Artificial Intelligence in Curriculum Design*, National Conference for McNair Scholars and Undergraduate Research, University of Maryland, March 2018
- Artificial Intelligence and Recommender Systems*, McNair Seminar Series, University of Northern Iowa, September 2017.
- Recommendation System Developer*, Joint Research Experience for Undergraduates Summer Symposium, Harvard University, August 2017.
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**Honors & Awards**

- IBM PhD Fellowship, Northwestern University, 2023-2024
- Cognitive Science Travel Grant, Northwestern University, 2023
- Cognitive Science Fellowship, Northwestern University, 2018-2019
- 4th Place, Midwest Instruction and Computing Symposium Programming Contest, 2017
- 1st Place at site, ACM Programming Contest, 2016
- Ronald E. McNair Postbaccalaureate Achievement Program, 2016
- Student of the Month, Kirkwood Community College, 2014
- NSF Engineering Scholarship, Kirkwood Community College, 2012-2014
- Engineering project featured in local newspaper, 2012
- All-Region Basketball, Kirkwood Community College, 2012-2014

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<b>Teaching</b>	<p>Guest lecturer, <i>Deontic Logic</i>, Knowledge Representation and Reasoning (KRR), Northwestern University, Winter 2024</p> <p>TA, Introduction to Cognitive Modeling, Northwestern University, Fall 2020 – 2023</p> <p>Guest lecturer, <i>Knowledge Representation</i>, Introduction to Cognitive Modeling, Northwestern University, Fall 2023</p> <p>Guest lecturer, <i>Intelligent Tutoring Systems</i>, Introduction to Cognitive Modeling, Northwestern University, Fall 2022</p> <p>Guest lecturer, <i>Deontic Logic</i>, Knowledge Representation and Reasoning (KRR), Northwestern University, Winter 2022</p> <p>Guest lecturer, <i>Intelligent Tutoring Systems</i>, Introduction to Cognitive Modeling, Northwestern University, Fall 2021</p> <p>Guest lecturer, <i>Philosophy and KRR - Deontic Logic</i>, Knowledge Representation and Reasoning (KRR), Northwestern University, Winter 2021</p> <p>Guest lecturer, <i>Statistical Modeling - Introduction to Neural Networks</i>, Introduction to Cognitive Modeling, Northwestern University, Fall 2020</p> <p>TA, AI and Experimental Narrative, Northwestern University, Spring 2020</p> <p>Guest lecturer, <i>Philosophy and KRR</i>, Knowledge Representation and Reasoning (KRR), Northwestern University, Winter 2020</p> <p>Guest lecturer, <i>Philosophy and KRR</i>, Knowledge Representation and Reasoning (KRR), Northwestern University, Winter 2019</p> <p>URM Stem Tutor, University of Northern Iowa, 2016-2018</p>
<b>Service &amp; Outreach</b>	<p>Mentor, Machine Ethics Undergraduate Independent Student, Northwestern University, 2022</p> <p>Grad Cohort for URMD, CRA-WP, Austin, TX, 2020</p> <p>STEM Mentor, Morning Mentors, Nichols Middle School, Evanston, IL, 2019-2020</p> <p>Reading Mentor, America Reads, Lincoln Elementary School, Cedar Falls, IA, 2016-2018</p>
<b>Software</b>	<p><b>Norms Reasoner</b></p> <p><a href="https://github.com/TeeOhh/Norms-Reasoner">https://github.com/TeeOhh/Norms-Reasoner</a></p> <p>An application and web interface for running our model of Moral Intuition and Construction on the Moral Conventional Transgression (MCT) Task experiment.</p> <p><b>tRECS</b></p> <p><a href="https://github.com/TeeOhh/tRECS">https://github.com/TeeOhh/tRECS</a></p> <p>Python NLP package and graphical interface capable of cleaning text data, building various statistical and vector space models, and creating recommender systems. With Janie Neal, Christiana Prater-Lee, and Eshita Nandini.</p> <p><b>UMLS-Similarity-Viewer</b></p> <p>Python package for graphical user interface to UMLS-Similarity, a similarity querying package built on top of the UMLS database of medicines, chemical compounds, and adverse drug reactions.</p>

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