# Daniel Quigley

Linguistics and Artificial Intelligence PhD Candidate | Genius Technician
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**EDUCATION**

### *PhD, Linguistics and Artificial Intelligence* — 2025
University of Wisconsin-Milwaukee, Milwaukee, WI
— PhD Minor, Computer Science
- Interdisciplinary PhD research across linguistics, computer science, logic, and mathematics
- **Advisors**: Nicholas Fleisher (Linguistics); Susan McRoy (Computer Science)

### *MA, Linguistics* — 2023
University of Wisconsin-Milwaukee, Milwaukee, WI
- Interdisciplinary MA research across linguistics, computer science, logic, and mathematics
- **Advisors**: Nicholas Fleisher and Hamid Ouali (Linguistics); Susan McRoy (Computer Science)

### *MSc Certificate, Theoretical Physics* — 2019
Universiteit Utrecht, Utrecht, The Netherlands
— Honors, Graduate Student Interdisciplinary Seminar
- Interdisciplinary Graduate Honors recipient
- Completed Master's coursework in Theoretical Physics and Mathematics

### *BSc, Anthropology, Astronomy, Linguistics, Mathematics, Physics* — 2018
University of Wisconsin-Madison, Madison, WI
— Certificate in Archaeology
- Record holder for number of majors
- **Advisors**: Stefan Westerhoff (Physics; Astronomy; Mathematics); Monica Macaulay (Linguistics); J. Mark Kenoyer (Anthropology)

**PhD RESEARCH**

### *Theoretical Linguistics; Mathematics; Artificial Intelligence; Natural Language Processing*
University of Wisconsin-Milwaukee — *2020–present*
- Conducting research in artificial intelligence and natural language processing on problems in natural language understanding and semantic representations.
- Proved category theoretic morphisms between formal semantics and vector space semantics; derived tensor forms of high-level linguistic phrases.
- Developing first- and second-order logic representations for intensional semantics in the context of category theoretic morphisms.
- Researching linguistic and mathematical foundations and methods in context of Geometric Neural Networks and Category Theory for neural networks and natural language understanding.

**MSc RESEARCH**

### *Theoretical Physics: Graduate Interdisciplinary Honors*
Universiteit Utrecht — *2018–2019*
- Completed coursework in Theoretical Physics, with a focus on high energy physics, cosmology, and gravitational physics.

- Completed coursework in Mathematics, with a focus on differential geometry, geometric partial differential equations, and geometric flows.
- Applied scientific expertise to interdisciplinary applications across multiple departments, including presenting independent research on geography and climate science to colleagues in the honors seminar.

**BSc RESEARCH**   *Indus Civilization Research*
University of Wisconsin-Madison                                    *2015–2018*
- Reconstructed broken strings of written data from the Indus Valley Script using n-gram Markov chains and conditional entropy, and applied statistical analysis techniques to analyze the data using Python.
- Collaborated with international colleagues to analyze the Indus Valley Script data, resulting in the creation of sign frequency scores that showed the context in which different symbols were used.
- Presented results at an international academic conference.

*Wisconsin Baldwin Idea Grant*
University of Wisconsin-Madison                                    *2014–2018*
- Worked with Menominee elders and coordinated with team of undergraduate students, graduate students, and academic advisor.
- Recorded, documented, and prepared teaching materials for language preservation and revitalization efforts.
- Results of work integrated into Menominee reference grammar (to be published).

*High Energy Astroparticle Physics*
Wisconsin IceCube Particle Astrophysics Center                    *2014–2018*
- Designed and implemented simulations, data acquisition systems, and visualizations for HAWC (High-Altitude Water Cherenkov) gamma-ray detector.
- Resolved discrepancies in gamma-ray results across four international experiments; wrote GPS data system using ZeroMQ in C++;
- Communicated results of simulations and technical developments with international teams, demonstrating strong collaboration and communication skills.

**PUBLICATIONS**   Quigley, Daniel (2023). Exploring Category-Theoretic Morphisms for Model-Theoretic Semantics. Manuscript submitted for review.

Quigley, Daniel (2023). Decoding Authorial Style, Tone, and Mood in Poetic Translations through Natural Language Processing: An Analysis of *Beowulf*. In Proceedings: Working Papers in Linguistics.

**PRESENTATIONS**   "Tensor Space and Category-Theoretic Semantics for Resolving Long-Distance Linguistic Expressions in Natural Language Processing"
- PhD preliminary paper and presentation          *UW-Milwaukee, May 2023*

"Decoding Authorial Style, Tone, and Mood in Poetic Translations through Natural Language Processing: An Analysis of *Beowulf*"
- Workshop in General Linguistics          *UW-Madison, April 2023*

"Machine Learning: Basics, Examples, Talking Points"
- Store Education          *Apple, May 2022*

"LaTeX for Linguists"
- Summer Workshop          *UW-Milwaukee, August 2022*

"Transitivity Mismatches in Menominee"

- Course Project · · · · · · · · · · · · · · · · · · · · · · · · · *UW-Milwaukee, April 2022*

**PROJECT EXPERIENCE**

*LaTeX Developer*

University of Wisconsin-Milwaukee, Milwaukee, WI · · · · · · · · · · · · · · *2020–present*

- Designed LaTeX document templates, accepted by university as official resources for graduate school.
- Created document tagging and readability methods to improve designs of accessible PDF documents.
- Developing intelligent UIs for improved accessibility of PDF documents, improving usability for users with accessibility needs and machine readability.

*Data Visualization and Sentiment Analysis of Movie Reviews across Four Neural Network Models*

University of Wisconsin-Milwaukee, Milwaukee, WI · · · · · · · · · · · · · · · · · · *2021*

- Conducted a comprehensive comparison of performance metrics for polarity sentiment analysis of movie reviews using deep learning techniques, including the design of four different machine learning architectures (CNN, RNN, RCNN, LSTM).
- Compared the performance of the different model architectures across ten epochs, with a cutoff for validation loss, and achieved an accuracy rate of greater than 83% for each model.
- Demonstrated expertise in the application of deep learning techniques to natural language processing tasks through the successful execution and analysis of this research project.

*ML Optimization: No Free Lunch*

University of Wisconsin-Milwaukee, Milwaukee, WI · · · · · · · · · · · · · · · · · · *2021*

- Optimized, evaluated, and compared performance scores for classification machine learning tasks: Decision Tree Classifier; K-Nearest Neighbor; Multinomial Naive Bayes; Logistic Regression; SVC; Dummy Classifier; Neural Network.
- Optimized, evaluated, and compared performance scores for regression machine learning tasks: Decision Tree Regressor; Linear Regression; SVR; Dummy Regressor; Neural Network.
- Evaluated CNN architectures of image classification task using the Fashion-MNIST dataset.

*Linux from Scratch*

University of Wisconsin-Milwaukee, Milwaukee, WI · · · · · · · · · · · · · · · · · · *2020*

- Completed *Linux from Scratch* project, building a fully functional Linux distribution from scratch using source code and following project documentation, demonstrating strong problem-solving and troubleshooting skills to resolve issues during build process.
- Developed deep understanding of Linux operating system, including kernel, system libraries, and userland utilities, and improved skills in working with source code and building software from ground up.
- Created a customized Linux distribution that met specific needs and preferences, showcasing ability to tailor a system to meet unique requirements.

**WORK EXPERIENCE**

*Apple Career Experience: Production Engineer*

Apple, Cupertino, CA · · · · · · · · · · · · · · · · · · · · · · · · · · · · *2023–present*

- Testing and deploying demo content to channel stores across iOS, tvOS, watchOS, and macOS platforms from development to production.
- Developing, maintaining, and documenting sophisticated automation frame-

works, using Python scripting to enhance operational efficiency.
- Validating content in twenty-one languages across twenty-five locales sensitive to local content and language requirements while crafting comprehensive test plans and technical documentation for new features and internal tools.

### Genius Technician
Apple, Glendale, WI                                                                *2021–present*
- Demonstrated leadership while also mentoring Technical Specialists and Technical Experts; developed and implemented new processes to improve efficiency and effectiveness of Genius Bar team.
- Exceeding expectations for customer satisfaction: attained performance review scores of 88 TMS and 74 NPS, excelling in metrics for technical expertise (89) and empathy (80).
- Certified for iPhone and Mac repair, maintaining 95% repair rate on devices.

### Product Zone Specialist
Apple Mayfair, Wauwatosa, WI                                                        *2019–2021*
- Store leader in business introductions and connected business sales.
- Exceeded expectations for customer satisfaction: attained performance review scores of 91 TMS and 83 NPS, excelling in metrics for knowledgable (87), ability to connect (92), and understanding needs (92).

### Instructor of Record
University of Wisconsin-Milwaukee, Milwaukee, WI                                    *2020–present*
- Responsible for class sizes of 20-30 students per semester, providing comprehensive support and guidance.
- Designed course content to include topics in natural language processing, such as introductory concepts and artificial intelligence ethics.
- Providing effective feedback and communication to improve performance, demonstrating commitment to student success and learning.

**SKILLS**

*Programming Languages and Development Tools*
Python (NumPy, Keras, Scikit-Learn, Gensim, Stanza, NLTK, PyTorch, Pandas, IDLE), LaTeX, VIM

*Machine Learning, Language Processing, Data Analysis, and Development Tools*
TensorFlow, Excel, Mathematica, Keras, Scikit-Learn, PyTorch, PRAAT, Stanza, NLTK

*Operating Systems and Software*
Linux, Windows, MacOS, Conda, CUDA (GPU Programming), MS Office Suite

**HONORS AND AWARDS**

*Graduate Teaching Assistantship*
University of Wisconsin-Milwaukee                                                   2020–present

*Chancellor's Graduate Student Award*
University of Wisconsin-Milwaukee                                                   2020, 2023

*Graduate Honors*
Universiteit Utrecht                                                               2019

*Record - Number of Majors (5)*
University of Wisconsin-Madison                                                     2018

**PROFESSIONAL INTERESTS**

*Linguistics*
ellipsis; double object constructions; transitivity mismatches; case stacking; construc-

tion grammar; scope; binding; degree and comparison; typology; language change; formal logic; mathematical models; model theory;

**Language processing**
formal logic; mathematical models; model theory; ellipsis, anaphora, coreference resolution; machine learning methods for language processing; human language technologies; human-computer interaction

**Artificial Intelligence**
neural networks; natural language processing; explainable artificial intelligence; geometric neural networks; graph neural networks

**Physics**
gravitational physics; black hole physics; early universe physics; topological defects; quantum field theory in curved spacetime

**Mathematics**
differential geometry; geometric PDEs; geometric flows; Ricci flow; operator theory; formal logic; model theory

**Anthropology**
writing; calendrical systems; power and social relations; gender; ethnoarchaeology; archaeoastronomy

**PROFESSIONAL AFFILIATIONS**

**American Mathematical Society (AMS)**

**American Physical Society (APS)**

**Association for Computational Linguistics (ACL)**

**Association for the Advancement of Artificial Intelligence (AAAI)**

**Language Creation Society (LCS)**

**Linguistic Society of America (LSA)**

**GRADUATE COURSEWORK**

**Linguistics**
Phonetics; Phonology; Morphology; Syntax; Semantics; 2nd Language Acquisition; Seminar: Ellipsis; Typology and Universals; Historical and Comparative Linguistics; Seminar: Research Methods; Seminar: Double Object Constructions; Advanced Phonetics; Advanced Phonology; Advanced Syntax; Advanced Semantics; Foundations of Formal Logic

**Computer Science**
Machine Learning and Applications; Introduction to Natural Language Processing; Introduction to Artificial Intelligence; Artificial Intelligence in Business; Advanced Machine Learning

**Physics**
Quantum Field Theory; Statistical Field Theory; General Relativity; String Theory; Field Theory in Particle Physics; Cosmology; Radiative Processes; High Energy Astrophysics

**Mathematics**
Differential Geometry; Geometric Partial Differential Equations; Mathematical Methods in Theoretical Physics

**LANGUAGES**   *Conversational:* German
*Elementary:* Dutch; Finnish
*Some Study:* Menominee; Arabic (MSA); Sanskrit; Georgian