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: Workshop in General 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

Production Engineer
Apple, Cupertino, CA *2023–present*
- Tested and deployed iOS, tvOS, watchOS, and macOS demo content to production.
- Validated content and apps in multiple languages prior to deployment to demo

devices.
- Created test plans and validated new features and internal tools while writing and maintaining internal technical documentation.

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
formal logic; mathematical models; model theory; ellipsis; double object constructions;

transitivity mismatches; case stacking; construction grammar; scope; binding; degree and comparison; typology; language change

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 systems; calendrical systems; archaeoastronomy; power and social relations; gender; ethnoarchaeology

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 of Curves and Surfaces; Differential Geometry; Geometric Partial Differential Equations; Mathematical Methods in Theoretical Physics

LANGUAGES

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