DANIEL QUIGLEY

Curriculum Vitæ ◇ May 17, 2022

CONTACT INFORMATION

University of Wisconsin-Milwaukee	Department of Linguistics
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EDUCATION

University of Wisconsin-Milwaukee **2020 - 2026 (expected)**
PhD: Linguistics; PhD Minor: Computer Science; Physics

Advisor	Nicholas Fleisher
Dissertation Title	*Ellipsis Resolution in Natural Language Processing*

Universiteit Utrecht **2018 - 2019**
Master's Certificate: Theoretical Physics

University of Wisconsin-Madison **2013 - 2018**
BSc: Anthropology; Astronomy; Linguistics; Mathematics; Physics

Advisor	J. Mark Kenoyer; Monica Macaulay; Stefan Westerhoff

PHD RESEARCH

Theoretical Linguistics; Artificial Intelligence; Natural Language Processing **2020 - Present**
University of Wisconsin-Milwaukee

- Description of transformational grammar and construction grammar approaches to ellipsis resolution
- Developing NLP methods for ellipsis, anaphora, and coreference resolution using neural network architectures
- Implementation of anaphora resolution, reformulation methods, and frameworks in construction grammar to optimize ellipsis resolution relative to accuracy, time, and computing power

PROFESSIONAL INTERESTS

Linguistics	ellipsis; double object constructions; transitivity mismatches; grammaticalization; case stacking; construction grammar; scope; binding; degree and comparison; typology; language change
Natural language processing	ellipsis, anaphora, coreference resolution; question answering; machine learning methods for language processing; human language technologies; human-computer interaction; computer vision for anaphora resolution
Physics/Mathematics	gravitational physics; black hole physics; early universe physics; topological defects; differential geometry; geometric PDEs; geometric flows; Ricci flow
Anthropology/Archaeology	Bronze Age world; evolution of writing; Indus Valley civilization; calendrical systems; archaeoastronomy; evolution of architecture; power and social relations; gender; ethnoarchaeology

TEACHING

Instructor of Record and Teaching Assistant **2020 - Present**
University of Wisconsin-Milwaukee

Linguistics 210	Power of Words	Fall 2020
Linguistics 210	Power of Words	Spring 2021
Linguistics 210	Power of Words	Fall 2021
Linguistics 210	Power of Words	Spring 2022

Physics Department Undergraduate Drop-in Tutor **2014 - 2018**
University of Wisconsin-Madison

Freelance Math and Science Tutor **2013 - Present**

PAST RESEARCH

Indus Valley Textual Analysis **2015 - 2018**
University of Wisconsin-Madison

- Reconstructed broken strings of written data of the Indus Valley Script via n-gram Markov chains and conditional entropy using Python
- Collaborated with international colleagues on statistical analyses of Indus Valley Script data which resulted in sign frequency scores showing what kinds of symbols are used on what kinds of contexts
- Results of Zipf-Mandelbrot distributions of texts as measured using Python presented at international academic conference

Wisconsin IceCube Particle Astrophysics Center **2014 - 2018**
University of Wisconsin-Madison

- Undergraduate research assistant: simulations, data acquisition and analysis, and visualization of the HAWC (High-Altitude Water Cherenkov) gamma-ray detector
- Modeled and solved gamma ray source discrepancies between four international experiments using Python
- Designed and built: temperature gauge and alarm using Arduino Uno; GPS and data trigger system in C++ using ZeroMQ; grounding cable network to transform site into Faraday "net"
- Communicated results of physical simulations and technical developments with international teams

Wisconsin Baldwin Idea Grant **2014 - 2018**
University of Wisconsin-Madison

- 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

PRESENTATIONS

Quigley, Daniel. *Machine Learning: Basics, Examples, Talking Points*. Apple. May 2022.

Quigley, Daniel. *Transitivity Mismatches in Menominee*. University Talks. April 2021.

Quigley, Daniel. *Arabic Verb Constructions*. University Lightning Talks. April 2018.

Quigley, Daniel and J. Mark Kenoyer. *The Indus Valley Script: A Corpus Compilation and Statistical Analysis of Pottery Inscriptions*. Undergraduate Research Symposium. April 2018.

Quigley, Daniel and J. Mark Kenoyer. *The Indus Valley Script: a Corpus Compilation and Statistical Analysis of Pottery Inscriptions Found in the Indus and Adjacent Regions*. 46th Annual Conference on South Asia. October 2017.

AWARDS AND SCHOLARSHIPS

Graduate Teaching Assistantship **2020 - Present**
University of Wisconsin-Milwaukee

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

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

ACADEMIC PROJECTS

NLP Sentiment Analysis of Movie Reviews: Comparison of Optimized NLP Architectures **2022**
University of Wisconsin-Milwaukee Course Project

- Comparison of test and prediction accuracy scores for polarity sentiment analysis of movie reviews
- Built three architectures for comparison with hyperparameter tuning across ten neural network epochs with cutoff for validation loss: BERT; RNN; CNN
- Documentation included description of architectures for instruction and learning purposes

NLP POS Tagging and Similarity Scores **2022**
University of Wisconsin-Milwaukee Course Project

- Generated POS-tags on pre-tokenized sentences using Stanza and evaluated relative to Brown corpus
- Measured similarity scores using word2vec and GloVe embeddings on word-pair datasets using Gensim
- Polarity sentiment analysis of IMDB movie reviews scored for test and prediction accuracy, cutoff for validation loss, and optimized for number of epochs and nodes

ML Optimization Project **2021**
University of Wisconsin-Milwaukee Course Project

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

PROFESSIONAL LICENSES/CERTIFICATES

IBM Data Science Certification **(in progress)**
IBM

IRB-Social Behavioral Researchers **2020**
CITI Program

Theoretical Physics: Honours Interdisciplinary **2019**
Universiteit Utrecht

INTERNATIONAL EXPERIENCE

Utrecht, The Netherlands **2018–2019**
Universiteit Utrecht Master's Program

Louny, Czech Republic **Summer 2011**
High School Experience

LEADERSHIP INVOLVEMENT

Genius Technician **2021–present**
Apple

- Promoted to Genius for technical proficiency, demonstrable knowledge, and interpersonal skills with customers and teammates
- Resolve mobile device and Mac computer hardware and software issues via research and diagnostics
- De-escalate elevated customers using interpersonal skills; mentor teammates in navigating interactions
- Connected with customers in one-to-one and one-to-many settings in an educating and engaging fashion while managing customer expectations, resulting in high ratings

Linguistics Student Organization (Linguistics Club) **2015–2018**
University of Wisconsin-Madison

- Elected president for the 2015–2016 and 2017–2018 school years
- Organized Workshop in General Linguistics (WiGL) for the spring semesters of 2016 and 2018
- Successfully appealed for university funding for conference travel
- Reorganized Linguistics Student Organization and club archiving to help facilitate longevity, including combining resources with academically-adjacent student organizations

University Physical Society (Physics Club) **2013–2018**
University of Wisconsin-Madison

- General membership included advising to elected board of officers on social and organizational matters
- Drop-in tutor for introductory level courses in physics and mathematics
- coordinated with peers to facilitate social events and outreach

CURRENT PROJECTS

Visualizing Curvature in $\mathbb{R}^3$ and $\mathbb{R}^{3+1}$

- Visualization and description of objects encountered in General Relativity and (pseudo-)Riemannian geometry
- Visual representations of various curvatures
- Status: concatenating course notes; relevant papers cited and compiled together

Lagrangian Formulation and Inverse Problem for Lagrangians

- Description of Lagrangians in non-relativistic and relativistic physics
- Approaches to formulations of Lagrangians following Inverse Problem for Lagrangians
- Status: catalogue of Lagrangians in physics in progress, with appropriate derivations

NLP Sentiment Analysis of CHILDES Database

- Exploration of sentiment, including scoring, emotion, and mood of CHILDES dataset
- Expand upon techniques of sentiment analysis learned in coursework
- Status: practice with sentiment analysis for coursework under way; exploration of CHILDES dataset in progress

ML Optimization for Classification and Regression

- Learning and exploration of machine learning architectures and algorithms for optimization of classification and regression tasks
- Datasets extracted from OpenML: phoneme classification; multidimensional gamma-ray event classification; Seattle house price regression; far-infrared-laser in a chaotic state regression
- Status: documentation for classification tasks in progress; optimizing regression architectures

Linux from Scratch

- Built own Linux subsystem
- Used EndeavourOS as host system
- Status: complete

Billiards in Curved n-Dimensional Space using Python and Mathematica APIs

- Classical collision physics subject to curved surfaces in $\mathbb{R}^n$
- Custom-built Mathematica calculations to integrate with Python code
- Status: Mathematica files for useful objects in differential geometry complete; exploration of collision physics using python in progress; writing custom APIs in progress

Calendrical Calculations and Conversions from Arbitrary Epochs

- Reformulation of Reingold and Dershowitz (2018) Lisp into Python
- Attempting derivation from scratch modular arithmetic representations of various world calendars
- Status: Python scripts for calendrical conversions with Balinese and Mayan calendars in progress; appropriate modular arithmetic implemented

***Calendarium Egregium*: a Description of Calendars, Naked-eye Astronomy, and Calculations**

- Introductory mechanics of world calendars, naked-eye astronomy, and basic calendrical modular arithmetic
- Description of three invented calendrical systems
- Status: basic descriptions of naked-eye astronomy and modular arithmetic complete; descriptions of select calendars in progress

***Ahāmatya*: a Reference Grammar of a Constructed Language**

- Description of invented language as introductory-style textbook to linguistics
- Textbook-style targeted to undergraduate-level linguistics students
- Status: descriptions of major grammatical features complete; syntactic typology and pragmatics in progress

***Eḥeithymme*: a Reference Grammar of a Constructed Language**

- Description of invented language as introductory-style textbook to linguistics
- Textbook-style targeted to undergraduate-level linguistics students
- Status: grammatical sketch complete; paper published on *Fiat Lingua* aboiut construct state

***Pselwō*: a Reference Grammar of a Constructed Language**

- Description of invented language as introductory-style textbook to linguistics
- Textbook-style targeted to undergraduate-level linguistics students
- Status: grammatical sketch in progress

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)

RELEVANT SKILLS

Python	IDLE; Jupyter Notebook; VIM; Anaconda; NumPy; Pandas; Keras; Scikit Learn; Natural Language Toolkit; Gensim; Stanza; Tensorflow
C/C++	Arduino; ZeroMQ
Computational and Statistical analysis software	Mathematica; MATLAB; R; SPSS
Speech analysis tools	PRAAT; Audacity; TANDEM-STRAIGHT
Web design and formatting	HTML/CSS; Jekyll
Operating Systems	Windows 7, 8, 10; Linux (Ubuntu, CentOS, Arch, EndeavourOS); macOS (OS X El Capitan through macOS Monterey)
Typesetting, presentation, and spreadsheet software	LaTeX; Office 365; LibreOffice; iWork

LANGUAGES

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

GRADUATE COURSEWORK

Linguistics	Phonetics; Phonology; Morphology; Syntax; Semantics; 2nd Language Acquisition; Seminar: Ellipsis; Typology and Universals; Historical and Comparative Linguistics; Seminar: Research Methods
Computer Science	Machine Learning and Applications; Introduction to Natural Language Processing
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

REFERENCES

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