

I wish to pursue a Ph. D. in Natural Language Processing (NLP), a quickly growing field of Computer Science. We live in an age where users generate data on an unprecedented scale: every day, 2 million blog posts are published on the Internet, and 500 million tweets are posted to Twitter. With this much textual data, there is a pressing need for algorithms to make sense of it. NLP allows us to classify the writer's mood using sentiment analysis, extract the summary of a news article, or automatically detect and filter out spam. Yet despite its numerous applications in the industry, NLP is still an emerging field, with much progress to be made.

For me, NLP is interesting because I have always been fascinated by languages and linguistics, and how computers interact with them. My major is computer science, but I've always enjoyed learning foreign languages for fun. I decided to do a French minor as a part of my degree, focusing on linguistics courses and gaining fluency in French in the process. Because of my passions in computer science and linguistics, I am naturally drawn towards NLP, an interdisciplinary field that combines the two.

My goal is to conduct research in NLP, using statistical and corpus-based methods to extract meaning from text. Recently, statistical approaches to NLP such as Hidden Markov Models have proven to be superior to knowledge-based approaches. For my hobby projects, I have worked with Python's Natural Language Toolkit (NLTK), using its part-of-speech tagging and sentiment analysis modules that implement these algorithms. Currently, I'm studying how machine learning methods like SVMs and Bayesian classifiers can be applied to NLP problems; eventually, I hope to improve on these techniques.

During my undergraduate years at Waterloo, I chose courses that build a strong foundation in mathematics, computer science, and statistics; I've excelled in both theoretical and practical, programming courses. I expect to graduate with distinction on the Dean's Honors List, which is awarded to the top undergraduates in my department.

As a student in Waterloo's Co-op program, I completed five software engineering internships, each four months in length. During each of these internships, I worked as a backend or full-stack software engineer and developed real-world features for production. My experience at five different companies gave me a broad exposure to software engineering methodology and practices across the industry, and vastly improved my programming skills in general.

My final internship at Yelp made me realize how academia and industry are interconnected. Projects at Yelp utilize a lot of academic results from NLP, machine learning, and distributed systems. I often had discussions with co-workers on the data science team, who used NLP techniques to filter spam and highlight important parts of restaurant reviews. Many of my co-workers have doctorate degrees, and a Ph. D. in NLP would be extremely useful if I were to pursue this career path.

During my third and fourth years as an undergrad, I completed two separate part-time Undergraduate Research Assistantships, both in theoretical computer science. My first research

project was with professor Eric Blais, with whom I studied a theoretical model of sublinear query complexity with advice, and how it connects to other models in sublinear complexity theory. My second (and still ongoing) project is with professors Lila Kari and John Brzozowski, with whom I studied “overlap assembly”, a formal language operation arising from bioinformatics. We managed to prove some key results about state complexity of overlap assembly, an important characteristic of regular languages. The two projects gave me a hint of the exciting world of academic research. Although progress was not easy, I found immense satisfaction in solving research problems, which is why I’m eager to seek further research opportunities.

I believe that [UNIVERSITY] is a good fit for me because of its strong NLP department and its distinguished faculty members. Additionally, [UNIVERSITY] has excellent Artificial Intelligence and Machine Learning departments: fields closely related to NLP. In particular, professors [PROFESSOR1] and [PROFESSOR2] align most closely with my interests. I have studied their work on extracting information from natural language text, and I would be honored to work with either one of them.