

Dear Admission Committee of the University of Bergen:

I am writing to apply for the master's degree in mathematics, track topology/algebra at the University of Bergen. I graduated from Tulane University, a top 50 University in the U.S.A., in 2020 with a double major in mathematics and philosophy. I believe my education and my unique experience would make me a strong candidate for the program.

I am most interested in the field of topology, particularly homotopy type theory/univalent foundations. However, I am also eager to learn about the other areas of mathematics, such as K-theory. There is no better explanation for my passion than a quote from Professor Emily Riehl, one of the most prominent figures in homotopy type theory today, "I like the style of proof the best. It is the way I like to think about mathematics."

It might seem like love at first sight kind of situation, but the journey which led me to mathematics and eventually homotopy type theory is by no means an easy one. What leads me to homotopy type theory is an existential crisis regarding the definition of a point. A point, by definition, is infinitely small. Yet when we use it, we always give it a concrete embodiment, a dot. I found myself unable to get over the contradiction, which gave me a full-blown panic attack as I started to question the reality of mathematics.

I gradually realized that the properties of a mathematical object depend heavily on its relationship with the other mathematical objects and that we should understand everything within a specific context. The definitions for the most basic mathematical objects that we take for granted are not enough to define themselves. Just like Eugenie Cheng, a renowned category theorist, said in the Lambda Conference, "if you are going to write a biography of someone, the character's relations with the others around them." In addition to looking at things for their intrinsic characteristics, we should also focus on their relationships with others. Therefore, we should study a mathematical object in relation to the others closely related to it, not in isolation.

After I graduated from Tulane, I have since learned commutative algebra, Galois theory, algebraic topology, homological algebra, and introduction to manifolds. I still have plenty of time till I start the program, and I am sure I will be more than prepared for the program.

I have chosen the University of Bergen to continue my graduate study because few places could provide a better environment for studying homotopy type theory. For instance, professor Bjørn Ian Dundas is working with homotopy type theory/univalent foundations. Given my background and experience, I think I would be able to contribute to his work.