

Dr. Alexander Bertoloni Meli:

I am an undergraduate student at [A. University], intending to major in mathematics. I am interested in participating in the REU at the University of Michigan this summer, particularly with Dr. Alexander Bertoloni Meli working on Galois gerbes. A large part of why I am applying to REUs is to see how I like doing research. I aspire to go to graduate school and pursue a career in academia, so I want to be maximally sure I enjoy this activity which is so central to my dream.

Speaking broadly, I am excited to be at the University of Michigan because of the large number theory group. After watching a talk given by Professor Lea Beneish on arithmetic statistics, the topic really piqued my interest, so I'm hopeful to be able to interact with Dr. Yuan Liu or Dr. Nick Rome. Additionally, there are not so many undergraduates here at [A. University] who have number-theoretic interests, so I'm hopeful to be able to meet the other students at the REU working on such problems.

More specifically, my first-choice project this summer would be working with Galois gerbes over number fields with Dr. Alexander Bertoloni Meli. I have built a lot of background towards the project which I would be ecstatic to see made concrete when applied to a research problem. Formally, I have taken a graduate course in algebra, which filled in my foundations in Galois theory. Various places, such as the last chapter from Murty's *Problems in Analytic Number Theory*, have given me background with p -adics.

To round out, I spent the winter break fulfilling a long-time goal of mine, reading up on group cohomology and local class field theory via Tate's theorem, following Milne's notes and Dr. Andrew Sutherland's MIT OpenCourseWare 18.786 notes; I am currently studying local class field theory via Lubin–Tate theory. I have overall found local class field theory upsettingly non-explicit in cases (though Lubin–Tate does provide a construction), so it would be delightful to work through concrete computations using these ideas over the summer. Indeed, my primary motivation for reading local class field theory was to prepare myself for Dr. Alexander Bertoloni Meli's project.

This opportunity at the University of Michigan makes the program my first choice, and I would readily accept any offer. I hope to continue my mathematical journey working on your REU project this summer. Thank you for your time and consideration.

Thank you,
[A. Student]