

STATEMENT OF PURPOSE

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I want to get trained to become a research mathematician. I wish to prove new theorems and contribute to Mathematics. That is the reason for my undertaking a graduate program in Mathematics and I believe UC Santa Barbara is the perfect place for my training.

I love Mathematics. I was just one year away from graduating with a Mechanical Engineering bachelor's degree, when I decided to switch to pure math. That shows how much I love Mathematics and how committed I am to it.

My background training is in Analysis, as is evident in my coursework. Recently, my research is focused on Analytic Combinatorics. Specifically, it is on lattice path enumerations using tools and techniques from Analytic Combinatorics such as the kernel method and singularity analysis as developed by the late mathematician Phillipe Flajolet and others. I presented some preliminary results on counting lattice paths joint with my advisor, Professor Alan Krinik, at a local sectional meeting of the American Mathematical Society in Riverside in June 2013. Most recently, I had the great opportunity and pleasure to participate and present our new results at the 8th International Lattice Path Combinatorics and Application Conference held at Cal Poly Pomona in August 2015. It was such a wonderful experience. For instance, it sparked new collaborations and research directions for me.

I am currently writing up our results in an article titled 'Explicit formulas for enumeration of lattice paths: the miraculous kernel method' joint with Cyril Banderier (LIP13 Paris Nord), Christian Krattenthaler (University Vienna), Michael Wallner (TU Vienna) and my advisor, Alan Krinik. We are putting final touches on it and will be submitting it for publication consideration in a refereed, research monograph on lattice path combinatorics published by the Springer Publishing Company in their Developments in Mathematics Series. This rare and fantastic experience taught me not only mathematics, but also taught me technical tools such as SVN for $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ collaborations and Maple for computation programming.

In addition to traditional coursework, I have taken several independent study projects. One project was in the mathematical foundation of Mechanics; another is on complex algebraic curves. The most recent one is in Analytic Combinatorics.

Prior to doing research in Analytic Combinatorics, I had some special training in Algebraic Number Theory. In the summer of 2013, I was among a special group of six international students to participate in a special selective school called 'Algebraic Curves' organized and taught by Professor Ngo Bao Chau at the Vietnamese Institute for Advanced Study in Mathematics in Hanoi, Vietnam. It was really exciting to me because Professor Ngo Bao Chau is the first Vietnamese to receive the prestigious Fields Medal in 2010.

I was really nervous to meet him but he is actually very nice and incredibly humble. I was impressed with how Professor Ngo treated our student group with encouragement and respect. He showed us many wonderful things, such as the Langlands program and how it relates to rest of Mathematics. It was such an eye-opener for me. I could not believe that I was seeing the edge of current knowledge. I never felt so connected to Mathematics ever before. This is the first time I realized that all the subjects we give names to, such as Analysis, Algebra, Topology, etc., are not separated at all and they are pretty much the same thing. That was where my love for Number Theory began.

I hope to learn from and do research with Professor Yitang Zhang at the University of California, Santa Barbara campus. I am inspired by his persistence and recent breakthrough work in Number Theory. I believe that my coursework training, my independent study projects, my research in Analytic Combinatorics, and my summer school in Algebraic Number Theory gave me a strong foundation to be successful in graduate study in Mathematics at UC Santa Barbara. I think that Analytic Number Theory is a perfect fit for me, given my background training and interests. I am ready for research and cannot wait to do some more.

My future plan is to become a research mathematician. In addition to research, I also enjoy teaching. Not only that does teaching solidify one's content knowledge, but I also love helping people figure out their mathematical stumbling blocks and spreading the wonderful spirits of Mathematics. I look forward to communicating my real interest and enthusiasm for mathematics to students. This is why I am now a Graduate Teaching Associate at Cal Poly Pomona. This teaching position has provided me the training and opportunity to teach elementary mathematics classes at the collegiate level. It builds upon my continuing interest in tutoring. In summary, given my passion for mathematical research and teaching, my future professional plan is to become a Mathematics professor at a research institution. I believe the University of California, Santa Barbara is the best place for me to develop my professional research and teaching skills and help others along the way.