

## Personal History Statement

Ten years ago, I could never have imagined living in a different country, speaking a foreign language, and studying subjects beyond my reach. My parents experienced rapid socio-economic changes in their lifetimes, rising out of poverty in material terms but remaining rooted in traditional values. By the time I reached secondary school, they found the books I read increasingly alien to them, a disconnect that made me aware of broader issues of uneven development in China. Seeking answers, I analyzed a national dataset, replicating Alan Krueger's Great Gatsby Curve, which revealed a rapid decline in the intergenerational mobility of educational resources in China. My findings were later published in IEEE MSIEID, marking my first experience using rigorous mathematics to validate societal observations.

This led me to pursue a joint major in Economics and Computer Science at WUSTL, with Mathematics as a second major. My advisor, Prof. John E. McCarthy, encouraged me to take an exploratory approach to learning, guiding me toward topological data analysis and information geometry. These fields provided new ways to structure and interpret complex data and gave me an appreciation for geometry's ability to frame abstract concepts visually and provide clarity in recognizing patterns. The beauty of geometry lies not just in calculation, but in how it shapes our interpretation of the world.

A pivotal experience in my journey was the MIT Summer Geometry Initiative (SGI) last summer, where I deepened my understanding of geometry and explored both my identity and commitment to teaching. In high school, I struggled with self-identity, navigating societal pressures, my parents' expectations, and limited support for mental health and sex education in my Chinese school. These struggles led me to take a year off before junior year, during which regular sessions with a psychotherapist helped me clarify my experiences and gain a better understanding of my sexuality. At SGI, I met Prof. Silvia Sellán at Columbia, whose work on inclusivity in academia resonated deeply with me. Her paper, "Sex and Gender in the Computer Graphics Research Literature," addresses the challenges faced by underrepresented groups in academia. Conversations with her and others at SGI created an environment where I felt solidarity and acceptance, reinforcing my desire to contribute to an inclusive academic space. I am reassured that UC Berkeley offers resources, like the LGBTQIA+ support services at University Health Services (UHS), and I look forward to fostering a similarly supportive atmosphere for others who may be navigating questions of identity.

During SGI, I also gained hands-on experience in geometric visualization and problem-solving, equipping me with further tools to practice Feynman's philosophy of "teaching as a method of learning." In college, I embraced various instructional roles, from serving as a TA for a Differential Topology course to mentoring peers at CMU in Fourier analysis for signal processing. SGI introduced me to programs like Polyscope, Blender, and Adobe Illustrator, enabling me to create explanatory visuals and educational animations on platforms like YouTube and Bilibili. By conveying complex mathematical ideas in an accessible way, I hope to inspire others to appreciate the beauty of mathematics and its underlying structures. This aligns with the teaching opportunities at UC Berkeley, such as SURF SMART and the Directed Reading Program (DRP), which foster an inclusive, collaborative learning environment. I look forward to participating in these programs, mentoring undergraduates, and building a community where students can explore and develop a genuine interest in mathematics.

Reflecting on my journey, I see that geometry has become more than a set of tools for me; it is a rhetorical lens that frames and contextualizes knowledge. A "geodesic" on a graph is actually combinatorial; a "metric" or "volume" for a space is analytical; and we often refer to topology when discussing "shapes". Geometry is algebraic by Kleinian definition and computational in SGI projects. Geometry is a rendering program, a filter, a metaphor, a suggestion—guiding the imagination and creating vision.

Plato once said, "let no one ignorant of geometry enter." While these words resonate, I aspire to something different: to invite everyone into the world of geometry. I want to help others appreciate its beauty, to make its mysteries accessible, and to propagate this knowledge widely. I hope that through teaching, outreach, and research, I can inspire others to see geometry not as an exclusive realm, but as an inviting and transformative one.