This is an example personal statement written by a student who was accepted and enrolled in the MIT EECS PhD program.

Briefly introduce your research interests and background

hroughout my life, have been compelled by a desire to understand what fundamentally drives seemingly comple systems. In high school, I took a class that dissected the ideas in Hofstadter's Godel Escher Bach. One idea that resonated strongly with me is that large observable phenomena are usually made of smaller, elusive yet simple components. This idea was reinforced by my time at XXX when discovered the applications of discrete differential geometry (DDG) in computer graphics. The DDG framework beautifully constructs fundamental building bloc s in discrete geometry, leading to simple and intuitive descriptions of the comple behaviors of hair, cloth, water, and more. In addition to helping me discover my primary interest, my past research experience has given me a large, eclectic background. I have also held several teaching assistant (TA) positions, and have experience creating course materials and assignments. I want to continue studying simulation and geometry processing as a university professor. Earning a Ph.D. in Computer Science at MIT would allow me to pursue my research interests and give me new opportunities to contribute to the field.

For each experience, clearly describe your research problems, specific contributions and quantifiable outcomes to demonstrate your skills

My past research experiences have helped me discover new ways of thinking and pinpoint my interests. In Spring and Fall of 2014, I joined Prof. XXX and Dr. XXX in studying the control of decision making. An earlier paper by the XXX lab provided compelling evidence that the inferior lateral prefrontal and frontopolar cortex act as a hub of arbitration. We sought to further validate this result by studying the arbitration between model based (MB) and model free (MF) learning using fMRI data and Dynamic Causal Modeling (DCM). Understanding this arbitration would enlighten us to how decisions and learning occurs in the brain. I computed the exceedance probability for hypothetical biological networks and used similarity scores with known brain networks to determine the most likely models. We then perturbed the remaining models and iterated DCM analysis to obtain the best model. I learned how it is possible to incrementally gain insight into the behavior of something as complicated as the human brain. While I greatly enjoyed learning the background, and performing the analysis to obtain results, ultimately I did not have the necessary background in neurobiology to continue.

In the summer after my junior year, I participated in the XX Program (XXX). I had the honor of studying quantum secret sharing (QSS) with Professor XXX. The classical (n, k, L) secret sharing scheme encodes L symbols (the secret) into n symbols (shares) such that any k of the shares can be used to recreate the original secret. Varying degrees of security allow for partial leakage of the secret by fewer than k shares. We expanded QSS by defining quantum strong security, a far more nuanced condition than its classical analog. Furthermore, I created a QSS protocol and proved that it holds the integrity of quantum strong security. Strong quantum security is critical to the eventual use and safety of quantum computation. This work was published in XXX. During the weekly lab meetings and discussions with my mentor, I gained an international perspective of higher education and was exposed to many exciting mysteries in quantum information. During the weekly lab meetings and discussions with my mentor, I gained an international perspective of higher education and was exposed to many exciting mysteries in quantum information.

I was able to present my research, within and across disciplines, to XXX participants, at lab meetings and at the XXX Workshop of XXX. I am privileged to have participated in XXX . Studying quantum information was an exciting experience, however, the lag in practical application ultimately diverted my focus.

My interests too a turn in senior year during Professor XXX s class on discrete differential geometry (DDG). The class involved reproducing theoretical results from differential geometry and placing differential forms on mesh locations in order to create mesmeri ing displays of heat-flow, mesh fairing parametri ation and vector field design. I was immediately enthralled by the simple, and efficient algorithms that could be created to model complex behaviors through the theoretical elegance of DDG. I sought to dive deeper and was fortunate to have XXX advise me for the next two terms on preserving vortical structures in fluid simulation. With his guidance, I surveyed a large range of fluid simulation techniques such as Steinhoff s vorticity confinement, Mullen s energy preserving method, and lcott s circulation preserving algorithm. I then derived a unique method as an extension to Dupont's back and forth error compensation and correction (BFECC). BFECC observes that a simulation moving back and forth should result in the original state. I observed that VFECC has a recursive structure and implemented this idea using circulation preserving, semi-lagrangian advection. To evaluate the benefits of this exension, compared change in vorticity and inetic energy over varying recursion depth. Simulations were initialited to a bounded domain with concentrated vorticity at the center. I presented my results at the XXX undergraduate research Seminar, indicating that increasing recursion depth preserves vorticity and inetic energy more than BFECC. It was an enlightening experience to see the eclectic set of considerations when tackling the same problem of fluid simulation.

In addition to research, I strive to be a reliable source of knowledge in any field I can. To this end I have held many teaching and tutoring roles. I served as a TA for XXX's "Algorithms" and "Decidability and Tractability" courses, which are both early major requirements with over a hundred students from diverse backgrounds. Additionally, I was invited to help redesign and TA for XXX s computer graphics class which heavily influences whether a student pursues graphics or not. I created course notes and an assignment on bump mapping and mesh data structures. Outside of XXX, I was a lead developer on a XXX protect adding accessibility features to Minecraft. While Minecraft has had large successes as an educational tool, legal accessibility requirements limit its use. My team and added 3D acoustics, text to speech and eyboard shortcuts to allow Minecraft to be used for a much broader audience. Our protect won 2nd place in XXX. It is extremely important to me that knowledge is made easily available to those who seek it and that lack of clarity does not impede society s pursuit of STEM careers. My past experiences teaching and presenting my research have made me strong at communicating complete topics to a variety of backgrounds and levels.

Demonstrate enthusiasm and commitment to outreach efforts in STEM, through concrete examples

Outside of my academic and professional life, I am a devoted consumer of animated films and video games. The use of CG modeling in previously hand-drawn animation has increased drastically, with sometimes disastrous results. Saved time in animation is often paid for by a loss of quality in special effects, something tragic to me and the future of hand-drawn animation. The loss of quality

by use of CG from less experienced animators can be fixed by the creation of more effective CG tools. When CG is used effectively as in “FFXV”, “Kingsglaive: FFXV”, and the new “Fantastic Beasts and Where to Find Them”, the results are stunning. They can greatly enhance the base content, or provide hyper-realistic visuals whose only difference from reality is that they are too beautiful to be real. It would be my privilege to contribute to the advancement of computer animation.

Addresses question in prompt about the applicant's particular interests and how MIT programs support those interests

Obtaining a Ph.D in computer graphics at MIT will allow me to pursue my interest XXX in at the highest level. While my research background is closer to the simulation applications of geometry processing, I am eager to explore a larger breadth of topics. I am particularly interested in Prof. XXX and his recent work on XXX. His work provides fundamental solutions to a wide range of problems in graphics and computer vision. As a large consumer of computer animated content, I am personally invested in the tools that are available. I am confident that I can not only contribute to the advancement of these techniques but also broadly spread a deeper understanding of the world.