**Please describe why you chose this particular laboratory and what you believe you would learn in the laboratory. 5k Ch.**

I chose the professor Takashi Sagawa’s laboratory because of its reputation as a good research institution in the field of Light-emitting materials, Photocatalysts, Photovoltaic laboratory, with a focus on the development of new and innovative materials. The laboratory's expertise in the development and optimization of light-emitting materials, photocatalysts, and photovoltaics makes it the ideal place for me to learn about these areas of research and to make meaningful contributions to the field.

In this laboratory, I believe I would learn a great deal about the synthesis and characterization of photo-materials, as well as the principles and applications of photo-physics and photochemistry. I would also have the opportunity to gain hands-on experience in the use of various analytical techniques and equipment’s.

In terms of my qualifications, I have a solid background in chemistry and biology, where my scores among the highest in the class, as well as computer science, which I believe will be useful in the analysis and interpretation of data collected during the research project. Additionally, I have taken several online courses in chemistry, biology and psychology, which have provided me with a strong foundation in the biological and physiological concepts that are fundamental to photovoltaics research. My experience as teaching assistant in chemistry and Intern at startup has provided me with strong work experience and ethics which will further aid me in this.

I am confident that the experience I gain in this laboratory will be invaluable in helping me to achieve my career goals to become a researcher as well as my academic goals of getting a PhD in chemistry. By working with leading experts in the field and being exposed to cutting-edge research, I am confident that I will develop a deep understanding of the key concepts and techniques that are critical to success in this field.

Finally, I would like to mention that my current university does not have a strong research environment in the field of biology and chemistry. Being a small university from third world country, the laboratory runs on a small tight budget with low support and the lab users including interns have to fund themselves. This is why I am particularly eager to participate in the Kyoto Amgen Scholars Program, as it will provide me with the opportunity to work in a top-level research environment and gain valuable hands-on experience.

Overall, I believe that this laboratory provides the perfect environment for me to grow as a researcher and to make meaningful contributions to the field of light-emitting materials, photocatalysts, and photovoltaics. I am eager to begin this exciting journey and am confident that it will be a rewarding experience that will shape the direction of my career for many years to come.

**Please propose a research project which you plan to do in the laboratory you chose. The outline consists of background, purpose of your research, experimental methods, and expected results. 5k Ch.**

Title: Improving the Efficiency of Light-emitting Materials for Energy Conversion Applications

Background: The use of light-emitting materials has gained much interest in recent years for their potential applications in energy conversion devices, such as photocatalysts, photovoltaics, and photoelectrochemical cells. However, the current efficiency of these devices is probably limited by the properties of the light-emitting materials used. Improving the efficiency of these materials is crucial for the development of more efficient energy conversion devices.

Purpose of the Research: The purpose of this research project is to investigate new methods for improving the efficiency of light-emitting materials for use in energy conversion devices. By increasing the efficiency of these materials, we can increase the amount of energy that can be converted into electrical energy, reducing the reliance on non-renewable energy sources and contributing to a more sustainable future.

Experimental Methods: To achieve this goal, I plan to study the physical and chemical properties of different light-emitting materials, including their electronic and optical properties. I will use various spectroscopic techniques, such as photoluminescence and absorption spectroscopy, to determine the efficiency of light emission from these materials. I will also perform device characterization experiments, such as current-voltage and capacitance-voltage measurements, to quantify the electrical performance of photovoltaic cells and LEDs.

The research will involve a combination of experimental and computational techniques, including material synthesis, optical spectroscopy, and electronic structure calculations. The material synthesis aspect of the project will focus on developing new light-emitting materials with improved properties for energy conversion applications. The optical spectroscopy and electronic structure calculations will be used to characterize the properties of the newly synthesized materials and determine their potential for energy conversion applications.

Expected Results: The expected outcome of this research project is the deeper understanding of light-emitting materials with enhanced efficiency for use in energy conversion devices. This research will provide valuable insights into the mechanism of light emission from light-emitting materials, as well as the optimization of their electrical performance in energy conversion applications. I expect to identify materials with improved light-emitting efficiency and to develop new techniques for improving the performance of existing materials. This research has the potential to make a significant contribution to the development of renewable energy sources and contribute to a more sustainable future.