On deciding to pursue a career in photonics: “[Photonics] completely engrossed me . . . . Give it a real chance, and look at some applications and real-life scenarios where optics has changed the world.”

Ra’ef Mikhail became interested in the physics of light during high school: for a science project, he attempted to measure the speed of light. His interests vacillated between chemical, mechanical, and aeronautical engineering, so upon graduating from high school, he decided to keep his engineering studies general by pursuing an applied engineering degree at Camden County College (CCC). During a physics class at CCC, his professor, Dr. Leonid Khazan, introduced a small section in photonics. Ra’ef recalls being “completely engrossed” by this brief exposure to photonics. Within five minutes of that class, he knew exactly what he wanted to do. “From that point on,” he says, “I strictly pursued a path in optics and photonics.”

So, from 2005 until 2008, Ra’ef worked to complete three of CCC’s photonics programs. He earned associate degrees in both fiber optics technology and laser/electro-optic technology. He also completed CCC’s fiber optic technical specialist program. In 2008, Ra’ef transferred to University of Rochester, where he pursued a bachelor of science in optics. He wanted to finish his degree in two years, and recalls, “I was overloading each semester.” He successfully completed his degree, and believes that the dedication, time, and effort that he put into each assignment were crucial to his success.

Ra’ef continued to pursue photonics as a career, and he now works with groundbreaking applications every day. He enjoys being able to use optics and photonics to push past the boundaries of present-day science. Though Ra’ef considers his job exciting and fun, he admits that a career in photonics is not necessarily easy. He and his colleagues have the privilege of handling cutting-edge tools, but because there is always the risk of breaking expensive equipment, they must follow important precautions. Ra’ef explains that problems and processes become complicated quickly, so those working in photonics have to think outside of the box.

Ra’ef says that photonics is not the easiest education path, and recommends that students interested in photonics devote a great deal of effort, diligence, and consistency to their studies. He finds the field exciting, though, and advises interested students to “give it a real chance,” and specifically, to “look at some applications and real-life scenarios where optics has changed the world.” Ra’ef describes optics as an enabling tool that can be used to solve a variety of things that affect people personally. He suggests that by pursuing a career in optics, students may eventually help advance the field even beyond the current state of the art.

Ra’ef only began his career in photonics three years ago, but he has already achieved a great deal. He has worked on a variety of sophisticated problems, “from sending a radiometer to space with NASA to protecting our troops with standard-issue sights and night-vision goggles.” He and his coworkers have also succeeded in developing an optical metrology test bench “to measure lateral chromatic aberration of imaging systems at nanometer spatial resolution.” Out of all of Ra’ef’s achievements in photonics, he is most proud of this one.
Ra'ef is enjoying his job, and has not planned to make any changes: as he puts it, “My life is in God’s hands.” He says that as long as he continues to learn new things every day and keeps developing his engineering abilities, he will be happy. He explains that if he ever feels that he no longer learning, he will search for a new calling. But for now, the research and development group at Edmund Optics still challenges him every day.

Ra'ef Mikhail lives in Barrington, New Jersey. He spends his spare time with family and friends and is very active in his community and his church. He often plays the piano at his church, and he participates in its youth programs. He is also extremely active, especially when traveling. He enjoys skydiving, scuba diving, rock climbing, and mountain biking. He loves to be in the outdoors during any season of the year and in any part of the world. He explains, “I work to support my travel.”