

SINGLE-MOLECULE BIOPHYSICS RESEARCH AND THE NUANCE OF NIH GRANT FUNDING

CUSTOMER SUCCESS STORY

The University of Texas
Rio Grande Valley



"Not only did iMERS cover how to write a grant, but they also talk about how to manage grants and how to mentor students and postdocs. Everything from ABC to XYZ"

HyeongJun Kim, PhD
*Assistant Professor, University of Texas
Rio Grande Valley (UTRGV)*

INSTITUTION

University of Texas Rio Grande Valley

AT A GLANCE

- Hispanic-Serving Institution (HSI)
- 32,419 Enrolled Students Fall 2021
- 87% Hispanic; 59% First Generation

FUNDING SUCCESS

- \$1.8 Million NIH R35 Grant in 2021

iMERS

INTERACTIVE MENTORING TO ENHANCE RESEARCH SKILLS

BRINGING RESEARCH TO A HISPANIC-SERVING INSTITUTION

In fall 2021, Dr. HyeongJun Kim, assistant professor in the department of physics and astronomy at the University of Texas Rio Grande Valley (UTRGV), celebrated a triumph that brought national attention to the youngest of Texas's state university campuses. With the support of the University of Kentucky's [iMERS](#) program, Dr. Kim was awarded a five-year \$1.8 million National Institute of Health (NIH) R35 grant to support his work in single-molecule biophysics research. The Maximizing Investigators' Research Award (MIRA), as it is known, provides the most promising faculty in the nation the stability to focus more on research and less on grant-writing.



Photography ©UTRGV

The premier Hispanic-serving institution in Texas, [UTRGV](#) is a fully bilingual, bicultural, and biliterate university. The first twenty-first-century campus in the Texas system, established in 2013, UTRGV is the second largest university in the United States with a Hispanic-majority student body. Recently classified as a [High Research Activity \(R2\)](#) university, the elevated classification reflects an institution-wide dedication to science.

Following this trajectory is Dr. Kim's interdisciplinary work in experimental biophysics. In addition to serving on the physics and astronomy department faculty, he mentors students in biochemistry and the molecular biology program. His research offers a deeper understanding of DNA-binding proteins, including processes related to chromosome abnormalities and cancer. Most research involves large batches of DNA or proteins, and results depend on averaging. In contrast, Dr. Kim's technique is sharply focused on each molecule. He explains the difference with an analogy.

"Say you're studying temperature in San Francisco and Washington, DC. The yearly average of each city is the same, but the summers are hot, and the winters are cold in DC, while the weather in San Francisco is relatively stable. We know this by tracking the temperatures day by day. Likewise, using the single-molecule biophysics techniques that I study, we can gather information about molecules of interest one by one." Dr. Kim explains that if DNA regulatory proteins, for example, are not working correctly, they can be associated with diseases. Therefore, the single-molecule data can provide clues that could ultimately be clinically relevant and "that is very powerful."

ACCELERATING THE GRANT WRITING LEARNING CURVE

Shortly after arriving at UTRGV, Dr. Kim secured a STARs grant for young faculty. "You're not able to hire students or purchase chemicals with the award," he explains, "but it does cover acquisition of equipment and lab renovations." An investment in total internal reflection fluorescence (TIRF) microscopes was the first step toward students acquiring single-molecule research experience under his direction — and the ability to collect preliminary data over the next 18 months.



At this point, Dr. Kim knew he needed an NIH grant to fund his research. But that is a challenge for an early-stage investigator. "When I was a postdoc, my principal investigator applied for NIH grants, and so I was used to that," he explains. "But now it was time for me to write one myself. It was overwhelming in the beginning. I didn't know where to start."

Just then, Dr. Kim received an email from UTRGV's College of Sciences announcing a free online grant writing workshop to be offered by iMERS, an NIH-funded program designed to support research faculty at minority-serving institutions. "It started in two hours. I needed a grant, and I wanted to learn something new. I wanted to learn how to start. So, without any hesitation, I signed up."

The timing was fortuitous. "Not only did iMERS cover how to write a grant, but they also talked about how to manage grants and how to mentor students and postdocs. Everything from ABC to XYZ." Dr. Kim remembers the confidence he gained from attending the workshop. "I thought, 'now if I have questions, I can ask them.' It gave me peace of mind."



"It's important to be able to explain why your approach is interesting and how it will make a sustained impact on research or practice."

- Dr. Paul Murphy, iMERS Mentor

Following the workshop, Dr. Kim submitted NIH applications for R01 and R35 grants, both highly competitive awards. When he heard back from the Scientific Review Officer (SRO) requesting a post-submission preliminary data document, he decided to call on iMERS for assistance. At this critical juncture, he needed someone with experience to advise him on how to proceed.

FACULTY MENTORING AS TEAMWORK

Dr. Kim's iMERS mentors at UK were Dr. Paul Murphy, professor of molecular and cellular biochemistry, and Dr. Kevin Pearson, professor of pharmacology and nutritional sciences. Their collaborative effort guided Dr. Kim through the nuances of the NIH grant application process, supporting him in responding to the SRO's request, and even pulling in a third colleague to advise on budget justifications.

"A lot happens between submission and getting the award," explains Dr. Pearson. "You don't know about it until you've gone through it. And only a relatively small percentage of applications are successful. So, you have to be ready to revise and try again." The "continual drive to persevere and keep applying," Dr. Pearson says, "that's what's necessary for success."



From his mentors, Dr. Kim learned about strategies for making a case for the grant with reviewers. Dr. Murphy remembers stressing to Dr. Kim that “it’s important to be able to explain why your approach is interesting and how it will make a sustained impact on research or practice.” “The reviewers probably are not in your field,” Dr. Murphy points out. “So, you should play up the innovation of the project.”

PERSEVERANCE, REFINEMENT, SUCCESS

With iMERS support and guidance, Dr. Kim’s second grant application was successful. In keeping with the advice of his mentors, “I focused more on the ‘big picture,’” he says, “and it was much stronger.” As a result, Dr. Kim secured the prestigious [R35 grant](#), which offers special flexibility and enables faculty to maximize their research time rather than keep applying for grants funding.

Dr. Kim’s mentors were delighted with his success. “We all enjoy when someone we work with gets the grant,” says Dr. Pearson. “That’s positive reinforcement for us, too. We’ve all gone through it.”

Dr. Kim is now at work in the lab with his graduate students, and postdocs are soon starting their research journeys in his lab. Moving forward, he plans to take time to speak to his colleagues at UTRGV about his experience with iMERS. “When I had questions, I knew they would answer them. I’m grateful for their help.”

His advice is to persevere in grant writing and to look to iMERS for the help of experienced mentors. “I think it is important to talk to someone with expertise in the NIH grant process,” he says. “Attending an [iMERS workshop](#) is an excellent opportunity because you can talk with the faculty mentors. It’s an opportunity to learn the process. I want other faculty members, my colleagues, to know about it.”

For faculty at minority-serving institutions (MSIs) challenged to find the time, staff, or expertise to pursue NIH funding for their scientific research, [iMERS](#) offers a path toward grant writing success. Our free program shortens the learning curve by sharing best practices through presentations, workshops, and faculty mentoring that guide participants step-by-step through the complex NIH funding process. Encouraging faculty to actively engage in research enriches the curriculum and motivates minority students to pursue careers in science for a more diversified biomedical workforce.

Located at the [University of Kentucky](#), iMERS is NIH-funded and supported by a team of industry experts who have served underrepresented students and institutions nationwide since 1998.

