

Student Profile: Sangbaek Lee

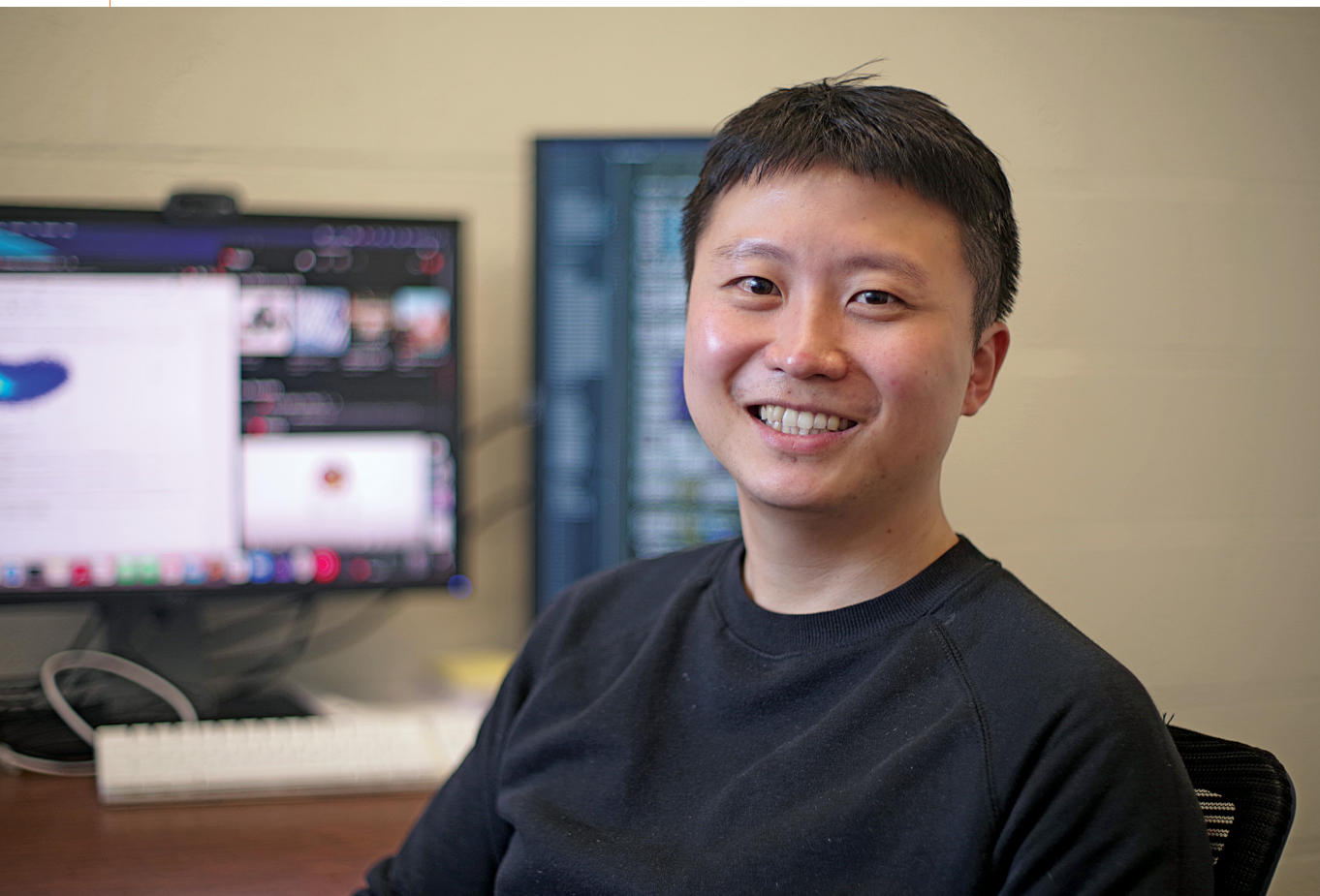
by Sandi Miller

PhD Candidate,
Experimental Nuclear Physics
(Milner Group)

Sangbaek Lee is a sixth-year PhD student in Professor Richard Milner's group within the Hadronic Physics Group, in the Laboratory for Nuclear Science (LNS). He is working on the three-dimensional imaging of the proton at subatomic particle scale through the electron-proton scattering at CLAS12 detector at Jefferson Lab. He has participated in other MIT-led experiments including the DarkLight

Experiment that searches a new force-carrier and the Two-Photon Exchange Experiment (TPEX) at DESY that measures the two-photon exchange contribution.

Sangbaek, tell us about how you came to study physics at MIT and your experience working at the LNS with Professor Richard Milner's group.



When I seriously planned my career path during my teenage years, I tried to find something that I enjoyed, that I considered meaningful, and at the same time I was good at. The “Goldilocks zone” was physics for me.

I often thought my undergraduate experience wasn’t enough to make me feel I belonged here to study experimental nuclear and particle physics. But the MIT Laboratory for Nuclear Science (LNS) is a very unique place in the world. It served as an educational institute where I could learn about the details of physics, and as a frontier research center where I could perform my research. The most exciting moment during my graduate study was when my first instrumentation article, on the DarkLight experiment, was published.

I have also been excited by my interactions with great people, including my fellow graduate students, postdocs and faculty.

Finally, I feel I’ve built an academic career where I can proudly call myself a physicist. I got the 2020–2021 JSA/J-Lab Graduate Fellowship and DNP Travel Award for the 2022 APS April Meeting. I will finalize my dissertation research so that it can be published in peer-reviewed journals. Without the great people and the great physics program at MIT, I would have never been able to feel like I am supposed to be here.

I believe becoming a good researcher is about handling challenges, which are inevitable and unavoidable. We still can control our mindset regarding the challenge; we don’t have to be panicked and paralyzed. I can guarantee almost everyone at MIT will or already has encountered such challenges well beyond one’s capability.

I feel like it is similar to climbing a mountain. In the beginning, I was not short on breath, and was even running to the halfway point. Now it’s getting much steeper, and I’ve begun to realize my limit. The thing is that it’s still myself who needs to move my body to climb the mountain, but this time I can

find someone to rely on. So, maybe the first step is to acknowledge that it is tough. And there will be people who can listen to the struggle, and share their thoughts. The MIT LNS community has a great tradition of helping one another with general exam preparation, for example.

I was lucky to meet my research advisor, Prof. **Richard Milner**, whose advising style was to patiently wait for me to achieve the right mindset. He has advised me on many things besides research projects. In Prof. Milner’s office, there is a Richard Feynman quote in a frame: “Study hard what interests you the most in the most undisciplined, irreverent and original manner possible.” I was delighted because that’s the exact thing that I’ve been doing. But one thing has changed during my PhD studies: I replaced the word ‘undisciplined’ with ‘disciplined.’ Unfortunately, there was not enough time for me to work in an undisciplined way.

Can you share any of your future plans?

I am aiming to graduate this year, and pursue postdoctoral research in experimental nuclear physics. After that, I hope to become a faculty member. Well, I don’t even know what I will eat at tomorrow’s dinner so I can’t guarantee the details. But, I look forward to leading research projects that are central to fundamental physics. I believe the right place to perform such research projects will be the Electron-Ion Collider, to be constructed at Brookhaven National Laboratory. I am excited to have a chance to contribute to building the machine and conduct my own project.

One non-physics observation: since coming to Cambridge, after living in Seoul, I find that my daily life is still full of culture shocks. I gradually got used to MIT culture while I had a great time with my LNS friends and my research group. But the only thing I still don’t get is that people do not pause to say an English equivalent of ‘Bon Appetit’ when eating together; the counterpart in Korean is something like a ritual before eating.