Charting the future of fire

Jinhyuk “Jin” Kim, Ph.D. in Earth System Science
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UC Irvine Physical Sciences Communications

Jinhyuk “Jin” Kim came to UC Irvine in 2019, and has become an expert in how wildfires alter ecosystems.

Picture Credit:
Lucas Van Wyk Joel / UC Irvine

SoPS: Tell us your name, what you study and where you’re from.

JK: My name’s Jin Kim, I study the impact of wildfires on terrestrial ecosystems with Professor Jim Randerson, and I’m originally from eastern Washington state.

SoPS: Tell us a bit about what you did for your doctoral research with Professor Randerson.

JK: I study the immediate and long term impacts of fire on ecosystems. More specifically, how fire-driven changes in vegetation communities shape seasonal patterns of photosynthesis. The goal of this research is to better understand the impact of fires on the Earth system beyond the immediate and striking effects that we see in the headlines. This research is important for gaining insights into how the increasing rate of fires will impact our environment.

SoPS: What was it about UCI that made you decide it was the best place for your studies?

JK: It was a new area – very different from where I'm from in Washington. The graduate student housing options were pretty nice, and the ESS department seemed really interesting because of its interdisciplinary nature. There're a lot of connections from different aspects of the Earth system, and understanding how all these pieces connect to one another is an aspect of the department I really liked.

SoPS: How did you come to work with Professor Randerson?

JK: I spent my first couple years working on quantifying how quickly ice sheets are melting. While this was an interesting experience and I learned a lot about the topic, including the impact the melting of the ice sheets had on sea level rise, I wanted to focus more on terrestrial ecosystems. During my undergraduate years, I studied a lot of land-atmosphere interactions driven by changes in ecosystems and was like, OK, I miss doing research on terrestrial ecosystems. I reached out to Jim and started conducting research with him on how fires affect Arctic-boreal ecosystems.

SoPS: Any results from your wildfire research you can tell us about?

JK: One of the major results is that there's this counter-intuitive response of ecosystems to fires. After fires you see this immediate decline in productivity, or photosynthesis, in the ecosystem, but after a few years you get this enhanced photosynthesis signal that lasts for multiple decades. Ecosystems are more productive, and you realize fires have significant multi-decadal impacts on a region.

SoPS: What were some of the challenges in the work you did?

JK: The technical aspects of it were pretty hard. It’s a lot of managing satellite data, and learning how to use large computing systems to process and analyze these datasets was a challenge. I think the biggest challenge for me was trying to better understand the ecological processes at work, and how do you interpret those using remote sensing. Without the core understanding of the underlying systems you’re observing, it's particularly challenging to interpret the images. You have to have a really good understanding of what’s actually happening on the ground, and that requires a significant amount of reading past studies as well as some experience in the field. Processing the data and analyzing it are important, but to ask the right questions so you can advance the science and knowledge is the most difficult part of the whole process.

SoPS: Looking back at your time at UCI, what achievement are you most proud of?

JK: There are a couple of accomplishments that I’m proud of. Winning the NSF Graduate Research Fellowship was pretty great to get, and it allowed me to primarily focus on research during my time here. But I’m most proud of meeting many different colleagues and friends over the years and publishing research with them. It’s great to see the work we dedicated so much of our time and effort toward be out there in the world where it’s contributing to a bettering our understanding of the Earth system.

SoPS: How have your activities outside the classroom, like clubs or volunteering, helped you grow personally and academically while at UCI?

JK: I volunteered for CLEAN, which is the climate education group in ESS that volunteers to give short lessons at MacArthur Fundamental Intermediate School in nearby Santa Ana. That was a super nice experience because you’re getting to teach really young children how the natural world works. I was also part of the ESS inclusive excellence committee, as well as the ESS the mentorship program. Both of these challenged me to better understand how to support people in the department outside of research, and the work helped me to be a better community member by supporting others in reaching their goals. There were two first year grad students I mentored, and they would come to me with questions and I would try to support them through their first year, which is often a difficult year for students. I was a grad rep for a year during the pandemic, and it was tough trying to make sure the ESS community was still connected even though we were all working remotely. I was also

the very first science communication fellow for my department. I learned it's super hard to communicate all the work that's being done constantly through ESS. It's not what I imagined it would be. Science communication is really important, and it's just as important as doing the research itself.

SoPS: Can you share a standout moment or experience at UCI that has really shaped your personal growth or career goals?

JK: I got to interact with people from NASA and a bunch of other institutions. It was being able to establish these connections outside the department itself to work on projects that really stood out. UCI gives you a platform to then reach out to these other institutions to work on cool projects. I got to go to the tundra, which was a collaboration through the University of Notre Dame. That sort of networking was really formative.

SoPS: Was there a class or professor that had a major impact on your academic journey? Tell us how they influenced you.

JK: Jim Randerson, for sure. He's the one that trained me to be a scientist. I think what's really nice about Jim is he didn't hand-hold me all the time. He treated me like a colleague – but obviously he was also guiding me when I needed it. When he gave me general advice and feedback on my work, he showed me how he thought, and that really shaped how I approach things and conduct myself with colleagues.

SoPS: As graduation approaches, what are your immediate and longer-term plans for the future?

JK: I'll be doing a temporary postdoc here for the summer, then I'll be moving to Ann Arbor, Michigan to start a postdoc with Professor Gretchen Keppel-Aleks at the University of Michigan. I think it would be cool to one day be a professor. Definitely a researcher of some sort, but a professorship would be ideal.

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