INTRODUCING

# SOOK HA

- › Joined ECE August 2020
- › Assistant professor, Virginia Military Institute, 2016-2020
- › Postdoctoral researcher, Biocomplexity Institute of Virginia Tech, 2013-2015
- › Adjunct instructor, Virginia Tech, 2013
- › Ph.D., computer engineering, Virginia Tech, 2012
- › M.S. information technology, Virginia Tech, 2015
- › B.S. computer science, Virginia Tech, 1994

NEW FACULTY MEMBER

# Architect of hidden infrastructure

Every time you use an online tool that makes your work more convenient, you can thank a software engineer like Sook Ha. A software developer and computer engineer, Ha builds software tools that can spur connections, solve problems, and simplify tasks for people in many industries.

Ha joined the ECE department as an assistant collegiate professor in August 2020. After four and a half years as an assistant professor in the computer and information science department at the Virginia Military Institute, she returned to Virginia Tech, her alma mater.

"When there was a chance to come back to Blacksburg, I jumped at it," said Ha. "My family is here, and I missed the research opportunities and collaborations."

### INTEGRATING SOFTWARE AND BIOINFORMATICS

As a Ph.D. student at Virginia Tech, Ha leveraged her software engineering skills to analyze gene expression data and crack codes within biological pathways. She applied machine learning and statistical analysis to visualize and analyze the data and identify subcategories of certain diseases.

Ha joined the Virginia Bioinformatics Institute as a postdoctoral researcher and was the main developer for Plantsimlab, a free, publicly accessible scientific modeling tool for plant biologists. The tool allows researchers to simulate a wet lab and model results of an experiment without having to incur the cost of lab resources. Her web tool let them see initial results without needing to master complex mathematical modeling techniques or software knowledge.

"Building this tool allowed me to integrate my software skills with my bioinformatics background," said Ha "It was an ideal way for me to contribute."

For Ha, the experience of conceiving and developing Plantsimlab triggered ideas for new applications of this kind of tech. Back at Virginia Tech once again, she is putting them in motion.

### A CALL TOOL FOR LOST IDEAS

"There are so many excellent principles, theories, and creative ideas generated and published every second in every field that they tend to pile up," said Ha. "Few of these ideas—even some really brilliant ones—get much attention, and so they sink into obscurity."

But Ha believes a web tool similar to the Plantsimlab could call up those publications and get them in front of non-technical types, granting more ideas more traction.

"Until we analyze and visualize the data, we won't know what's inside it," explained Ha. "An easily accessible, web-based tool can allow any data—biological, agricultural, medical, personal—to be analyzed with machine learning approaches, statistical approaches, or AI."
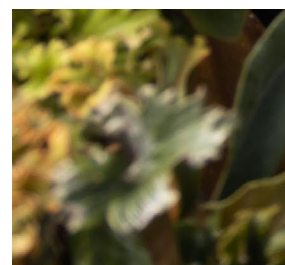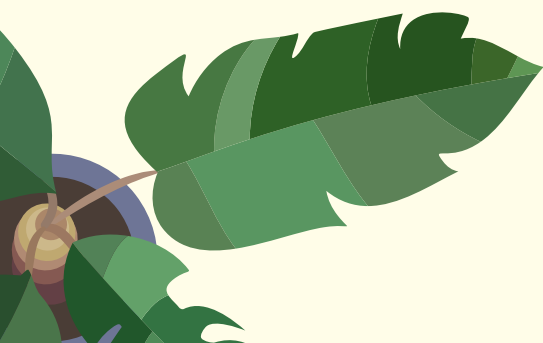
## APPLICATIONS IN EDUCATION

Ha applies her diverse skillset in the classroom. This is her second semester teaching Applied Software Design (ECE 3574).

"It's an advanced course for computer engineering students who don't have a background in software," said Ha. "But they need to know this information to lay the groundwork for embedded programming in the coming courses."

The course familiarizes students not only with software development but with design principles for efficiently scaling and speeding up software.

In ECE 2524, Ha introduces students to the Unix environment. "Unix is a powerful operating system, and it's pervasive throughout engineering," said Ha.

Ha is also mentoring and advising for the MDE program where students develop and design a project for a client and gain multi-layer communication skills.

"They have to successfully interact with clients, stakeholders, and subject matter experts," said Ha. "But from what I've seen, they enjoy it—experiencing a real-life job, not just a classroom size miniature."

In her teaching, research and developing, Ha continues to find new applications for her skillset and new ways software can serve.