Inner Workings: Coding on the big screen

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It wasn't exactly sneaking in. Matthew Turk and Jeff Oishi were authorized to use the visualization laboratory at the Kavli Institute for Particle Astrophysics and Cosmology (KIPAC) in Stanford, California, but that's how Turk remembers it: "We snuck in after hours and repurposed it."

Typically, researchers use KIPAC's visualization laboratory to analyze two- and three-dimensional simulations of the cosmos. Turk's work, for example, includes creating simulations of how the universe's first stars may have formed. There was no cross-platform visualization and analysis toolkit,

however. So researchers—including Turk—had to reinvent tools that were specific to their datasets and data formats.

That frustrated Turk, who talked about it with his thesis advisor, Tom Abel. Turk says Abel hit upon the idea that inspired Turk to start a coding project to, Turk says, "build building blocks of analysis" and allow researchers to focus on the problem of understanding their data rather than the problem of how to visualize it. That night in 2008, Turk collaborated for the first time on his code with Oishi, tweaking his code so it would work with both his own data and Oishi's data too.

Researchers still regularly reinvent visualization tools, but many no longer have to thanks to the dozens of additional collaborators who joined Turk on the yt project (yt-project.org), whimsically named "yt" after Yours Truly, a protagonist in the Neal Stephenson novel *Snow Crash*. Today, with funding from the National Science Foundation, the yt project also fosters collaborations between researchers using different simulation platforms in a variety of scientific disciplines, including nuclear engineering and medical imaging.

Now a research scientist at the National Center for Supercomputing Applications at the University of Illinois, Turk continues to work with Abel, Oishi, and the several dozen other collaborators to improve the yt project code. Occasionally, they meet in person. Sometimes, it's even at KIPAC. However, it's no longer after hours.

After hours at the KIPAC visualization laboratory, Jeff Oishi points at test results from running Turk's code on Oishi's new data format. Image courtesy of Matthew Turk.