

More Than A Magnifying Glass

TACC, UTSW pair electron microscopes with Ranger and Spur to open door to biological insights

“When using an electron microscope, a single two-dimensional slice through an object can be incredibly misleading about what the three-dimensional shape of that object is,” said Chris Gilpin, assistant professor of cell biology and director of the Molecular and Cellular Imaging Facility at UT Southwestern Medical Center at Dallas. He wanted to use newly-available 3D data to create fuller, more telling images of biological structures. But the data created by these technologies was unwieldy and difficult to analyze, and the 3D possibilities that Gilpin hoped to tap were unrealized.

That is, until Gilpin met Kelly Gaither, associate director of the Data and Information Analysis group at the Texas Advanced Computing Center (TACC). Gaither was also interested in interpreting 3D images, and finding ways for computers to intelligently detect structures in complex data.

Gaither talked with Gilpin about TACC’s massive computational capacity and specialized visualization services, which

“Not every campus is going to have a Ranger. Yet through TACC and the TeraGrid, I have access to Ranger and can do valuable research. I think that’s really the great community service that TACC and the TeraGrid are providing.”

Chris Gilpin, Assistant professor of Cell Biology and Director of the Molecular and Cellular Imaging Facility at UT Southwestern Medical Center at Dallas



Chris Gilpin, assistant professor of cell biology and director of the Molecular and Cellular Imaging Facility at UT Southwestern Medical Center at Dallas. Image courtesy of UT Southwestern Medical Center.

help researchers to make sense of large data sets by transforming numbers into interpretable images. A natural connection was made, and the two began working together.

“It’s the ideal type of collaboration,” Gilpin said. “TACC has the tools and expertise, and I have data sets that could benefit from them. They’re interested in pushing the capabilities on their side, and I have biological questions that need to be answered, and that are helped enormously by having access to TACC’s staff and their skills.”

Over the past few years, Gilpin and Gaither, as well as other TACC visualization experts, have tackled increasingly challenging biomedical imaging questions. From autism to tumor detection, their collaborative research is expanding the capabilities of microscopes and supercomputers in significant ways.

For more information, please contact: Faith Singer-Villalobos, Public Relations, faith@tacc.utexas.edu, 512.232.5771

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