BIG IDEAS

Complicated analyses, like the ones necessary for Martin Schiller's HIV and Alzheimer's research, once took years. They now can be completed in days, advancing fields such as genomics and bioinformatics, medical and climate research, molecular modeling, and data analytics. Thanks to its placement at the Switch SUPERNAP, Intel Supercomputer Cherry Creek will allow UNLV researchers to share data with collaborators across the globe.

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MARTIN SCHILLER UNLV SCIENTIST

He's helping win the fight against HIV with an unlikely weapon: data

Five-year-old Martin Schiller wanted to finally beat his dad at backgammon. So, while dad was at work, the young Schiller thought about it. A lot. He analyzed the game. He tested out styles of play on his younger brother. He studied, honed and perfected a new strategy.

"I figured out if you hit someone in the backboard aggressively and got a couple rolls to cover, they may never get back in the game again," he says. That's backgammon-speak for a nuke-warfare, no-prisoners style of play that involves constantly knocking out your opponent's pieces and blockading them from re-entering the board.

When dad got home from work, the game was on. With his new strategy, young Martin won three games before his very frustrated father threw up his hands. "I couldn't believe that me, a little kid, could create such a reaction in an adult — especially when it arose from pure intellect. That really stuck with me. I really got into solving puzzles, and right now, I'm working on the world's biggest puzzle."

That puzzle is HIV. It's a fierce, wily shapeshifter. When it attacks white blood cells and duplicates itself, the virus mutates — which means it quickly becomes resistant to treatment. Little wonder there are more than two dozen drugs to treat for HIV. Genetic sequencing can ID particular strains of HIV, but there's a problem.

"There are 40 million infected people in the world, and only a few hundred thousand get sequenced," says Schiller, a UNLV Life Sciences professor and executive director of the newly formed Nevada Institute of Personalized Medicine. "We need a secondary tool that's based on population-based prediction so at least we have a better chance of choosing the correct medications."

Schiller and his team at UNLV developed their own global drug resistance database that uses computer modeling to get a better grasp on which HIV strains are resistant to which HIV drugs — to save money and lives around the world. It's called Geogenomic Mutational Atlas of Pathogens, or GoMap. It's not the first or only HIV drug resistance database out there, but Schiller contends it's the most accurate — thanks to a much stronger foundation of data. Released in May, it's free to use worldwide for doctors and other public health officials to use to make sure people are getting the most effective drugs for whatever strain of HIV they're suffering from.

That's just one of Schiller's strategies in the long game of fighting HIV. He and his team have also developed HIV Toolbox, an interactive web tool that details the sequence, structure and function of HIV proteins to help better identify potential drug targets. Think of it as an incredibly detailed castle map that scientists and drug makers can study to better lay siege to the deadly virus. "Solving this puzzle can save lives," says Schiller. Game on. — *Andrew Kiraly*