

Schmidt Futures Gives \$50M for Life Science Research Including Single-Cell Proteomics Institute

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NEW YORK – Philanthropic organization Schmidt Futures and Ken Griffin, founder and CEO of hedge fund Citadel, are funding a new research facility focused on the development of single-cell proteomics technologies and their application to conditions including Alzheimer's disease.

Called the Parallel Squared Technology Institute (PTI) and based in Watertown, Massachusetts, the facility is led by Nikolai Slavov, associate professor of bioengineering at Northeastern University and a pioneer of single-cell proteomics. The institute, which launched operations at the beginning of this year, is separate from Northeastern, and Slavov will continue at the university while also leading PTI.

The institute is one of two organizations launched this month with \$50 million in funding from Griffin and Schmidt Futures, a philanthropy backed by former Google CEO Eric Schmidt and his wife Wendy. The parties provided the funds through Schmidt Futures' Convergent Research program, which supports what it terms Focused Research Organizations (FROs), organizations that it says are designed to "solve gaps in the R&D ecosystem by identifying high-impact scientific or technological research and development opportunities ... that cannot be efficiently addressed by the existing organizational structures of academia, industry, or government."

In 2021, Convergent Research launched its first two FROs: E11 Bio, which is focused on brain mapping, and Cultivarium, which is focused on synthetic biology in non-model organisms. This year, in addition to PTI, the organization launched an FRO called EvE Bio, which plans to generate the largest public database of small molecule-protein interactions.

James Donovan, a partner and head of incubation at Convergent Research, declined to say how much of the announced \$50 million in funding would go to PTI but said that the award was meant to support the institute for five to seven years.

Slavov said that the institute also has support from other philanthropic institutions. He said PTI will have between 25 and 50 employees in its initial phase and could potentially grow beyond that as it develops.

With regard to technology development, PTI will focus on further refining single-cell proteomic approaches developed in Slavov's lab with a major goal being to increase the throughput and robustness of these methods while also driving down costs, he said.

Slavov and his colleagues will be "focusing on getting [the technology] to the point where analyzing hundreds of thousands of samples is something that is quite practical and doable," he said.

Slavov has been involved in the development of several single-cell proteomics technologies, starting with the [SCOPE-MS](#) (Single Cell Proteomics by Mass Spectrometry) method he and his colleagues

introduced in 2017. The technique uses isobaric labeling to boost the signal of low-abundance peptides, making mass spec-based single-cell measurements feasible. It was one of the first single-cell proteomic approaches to gain significant traction and was key to the development of this still nascent field.

In 2021, Slavov's lab published on an enhanced version of the SCOPE-MS approach called [SCOPE2](#), a more accurate and higher-throughput assay with automated sample preparation. In 2022, the lab published on a method called [plexDIA](#), which combines sample multiplexing with data-independent acquisition mass spec analysis.

One of PTI's initial aims will be to increase the multiplexing afforded by the plexDIA approach, Slavov said. In the original paper detailing the method, the researchers were able to multiplex three samples per mass spec run. Now, he said, they are working to develop mass tags capable of multiplexing more than three samples.

He said his group is exploring several versions of these tags and are "very confident that we can push [multiplexing] to much higher than three."

Increased multiplexing will require improved data analyses tools to interpret the results of the experiments, Slavov said, noting that this will also be a major focus for the institute.

"The other very important aspect of what we do will be developing algorithms for data interpretation," he said. "We know at the moment that the data [generated] is not being fully interpreted. We are not identifying and quantifying all peptides for which we have strong spectra in the data, and so we will be working on approaches to do this more robustly."

Slavov said that a key goal of the center will also be to disseminate the methods and tools developed there, noting that PTI plans to organize workshops for outside researchers interested in using these technologies.

"The reason we are doing this as a nonprofit is because we want all of it to be made accessible to the research community, to biotechs, to everybody," he said.

Slavov said that PTI is, in theory, technology agnostic and noted that the institute is collaborating with researchers using nanopores for protein sequencing work. However, he said, in practice, mass spec is currently the only technology capable of measuring thousands of proteins in complex samples and is therefore the primary tool he and his colleagues will use for their work.

PTI has purchased "quite a few" mass spec instruments, he said, noting that the institute currently has instruments from most major vendors serving the proteomics market including Bruker, Thermo Fisher Scientific, and Sciex. Slavov said the institute is still in the process of purchasing instruments and plans to have around 12 mass specs in its initial phase.

He said that, moving forward, the institute aims to work with instrument manufacturers "to help them develop and optimize their instruments for the technologies that we develop. It is ultimately an ecosystem with many interacting pieces, and we want to facilitate those interactions so that they develop together in a synergistic way."

PTI plans to leverage the technologies it develops primarily for studying Alzheimer's disease. It is collaborating on this work with Bradley Hyman, who directs the Alzheimer's disease research unit at the MassGeneral Institute for Neurodegenerative Disease. Slavov said PTI also plans to study immune aging.