



NEWS RELEASE

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ACM Gordon Bell Special Prize for HPC-Based COVID-19 Research Awarded to Team for Modelling How Pandemic-Causing Viruses, Especially SARS-CoV-2, are Identified and Classified

New Method May Help With Public Health Interventions and Vaccine Development for Emerging Variants

New York, NY, November 17, 2022 – ACM, the Association for Computing Machinery, awarded the 2022 [ACM Gordon Bell Special Prize for High Performance Computing-Based COVID-19 Research](#) to an international team for their project “[GenSLMs: Genome-Scale Language Models Reveal SARS-CoV-2 Evolutionary Dynamics](#).” The Prize recognizes outstanding research achievement toward the understanding of the COVID-19 pandemic through the use of high-performance computing.

The winning team members are Maxim Zvyagin, Alexander Brace, Kyle Hippe, Yuntian Deng, Bin Zhang, Cindy Orozco Bohorquez, Austin Clyde, Bharat Kale, Danilo Perez-Rivera, Heng Ma, Carla M. Mann, Michael Irvin, J. Gregory Pauloski, Logan Ward, Valerie Hayot, Murali Emani, Sam Foreman, Zhen Xie, Diangen Lin, Maulik Shukla, Weili Nie, Josh Romero, Christian Dallago, Arash Vahdat, Chaowei Xiao, Thomas Gibbs, Ian Foster, James J. Davis, Michael E. Papka, Thomas Brettin, Rick Stevens, Anima Anandkumar, Venkatram Vishwanath, and Arvind Ramanathan.

The prize-winning team developed the GenSLMs model by adapting large language models (LLM’s) for genomic data. By pre-training on over 110 million prokaryotic gene sequences, and then finetuning a SARS-CoV-2 specific model on 1.5 million genomes, the researchers show that GenSLMs can accurately and rapidly identify variants of concern.

In keeping with the Prize’s requirement that models must be able to scale accurately and efficiently on the world’s most powerful supercomputers, the team demonstrated the scaling of GenSLM’s on both GPU-based supercomputers and AI-hardware accelerators, achieving over 1.54 zetaflops in training runs.

Importantly, in the abstract of their paper, the prize-winning team underscores that their model may have applications far beyond tracing the evolutionary dynamics of Covid. They write, “We present initial

scientific insights gleaned from examining GenSLMs in tracking the evolutionary dynamics of SARS-CoV-2, noting that its full potential on large biological data is yet to be realized.”

The winning team was recognized today at the [International Conference for High Performance Computing, Networking, Storage, and Analysis](#) (SC22) which was held in Dallas, Texas. The prize-winning paper will also be published in the *International Journal of High-Performance Computing Applications* (IJHPCA).

A cash prize in the amount of \$10,000 accompanies the award, which was conceived and funded by Gordon Bell, a pioneer in high performance computing and researcher emeritus at Microsoft Research.

About ACM

[ACM, the Association for Computing Machinery](#), is the world’s largest educational and scientific computing society, uniting computing educators, researchers, and professionals to inspire dialogue, share resources and address the field’s challenges. ACM strengthens the computing profession’s collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

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