

PIONEERS IN BIOMEDICAL RESEARCH SEMINAR

Presented by the Fralin Biomedical Research Institute at VTC and co-sponsored by the institute's Center for Human Neuroscience Research



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Virtual Seminar: The Future of Artificial Intelligence: A 3D Silicon Brain

Artificial intelligence benefited from shrinking transistors and connecting them densely in two dimensions. But the energy cost of signaling now greatly exceeds that of calculating. This relationship reduces the benefits of additional miniaturization. Signaling distance has been reduced by stacking circuits, but stacking reduces surface area for dissipating heat, forcing a 3D processor to operate serially, rather than in parallel. A fundamental solution would exchange binary coding, whereby a signal from a group of two units conveys one bit, for n -ary coding, whereby a signal from a layer of, for example, 1,024 units conveys 10 bits. This sparser and richer code would require exchanging Boolean logic for operators inseparable in time and space. Advances in cortical physiology suggest that this could be achieved with dendritic detectors that weight an input based on when it occurs and where it is received. This could allow a silicon brain to scale like a biological brain in energy and heat – linearly with the number of neurons – and thus be thermally viable in 3D.

FRIDAY, SEPT. 17 at 11:00 a.m.

Watch live via Zoom at <https://virginiatech.zoom.us/j/82722436593> or at <https://fbri.vtc.vt.edu/events/live-webcast.html>.



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