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Kirigami Graphene Transistors for Biological Sensing MICHAEL REYNOLDS, Cornell University, MORGAN BROWN, Oregon State University, KATHRYN MCGILL, PATRICIA DAVIDSON, JAN LAMMERDING, Cornell University, ETHAN MINOT, Oregon State University, JESSE GOLDBERG, PAUL MCEUEN, Cornell University — As flexible, locally amplifying probes, graphene transistors have potential applications in biological sensing, particularly for readout of extracellular potentials. We present here electrolyte-gating measurements of stretchable graphene transistors aimed at exploring this application. The graphene is etched into patterns inspired by the Japanese paper art of kirigami to permit in-plane stretching [1]. Using a technique developed in our group for manipulating these devices in solution, we can maneuver and stretch devices in an electrolyte solution while monitoring their electrical response. These devices show proximity-dependent gating to voltages on an additional small metal probe near the device, and we quantify the nature and sensitivity of this response. The flexibility of these devices makes them promising as wearable electronics for cells, and we present early results on interactions between graphene devices and cardiomyocyte cells.

[1]Blees, M. K. et al. Graphene kirigami. Nature (2015).

Michael Reynolds
Cornell University

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