Carbon takes many forms, from precious diamonds to lowly graphite. Surprisingly, it is graphite that is the most prized by nano physicists. Graphene, a single layer of graphite, can serve as a model system of massless Dirac fermions, or as an impenetrable membrane a single atom thick. Rolled up into a nanometer-diameter cylinder—a carbon nanotube—it makes great 1D transistors, quantum dots, and nanoguitar strings. In this talk, I will review some of our group's recent results on these remarkable materials, including ultrafast measurements of ballistic transport in nanotubes, studies of topological spin-orbit effects that arise from a nanotube’s cylindrical geometry, and inflating a graphene balloon that is one atom thick.