The fluorescent visualization of intracellular ions and metabolites has reimaged our basic understanding of the inner workings of cells, tissues, and living organisms. In contrast, there is a dearth of tools to fluorescently visualize extracellular fluxes. Part of the challenge stems from the fact that cellular egress is contrary to the pervasive intracellular-centric experimental paradigm. Recently, we have been using chemistry to target the cell’s glycocalyx, which ideally positions small molecule and protein-based fluorescent sensors within nanometers of the extracellular vestibules of ion channels and membrane transporters. My laboratory’s efforts to fluorescently visualize ions and metabolites entering and exiting cells using this technology will be presented.

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