Standard care of cancer therapy is highly dependent on the cancer type and patient. As a consequence, only marginal improvements (if any) in patient survival rates are observed. Undetected/unremoved cancer during surgery and resistance to treatments such as chemo and radiation therapy, are major causes for poor prognosis. To this regard, research in my lab will focus on the development of small molecule fluorescent chemosensors as cancer diagnostic tools that can be used to assess anticancer drug resistance and for the discovery of inhibitors to knockdown resistant pathways. Specifically, the design of chemosensors targeting the enzyme class, methyltransferases, will be discussed. We are also interested in developing next-generation probes for photodynamic therapy (PDT). Here, we will be using small molecule prodrugs or inhibitors as templates that can be synthetically tailored to achieve activation by intracellular enzymes overexpressed in tumors. This approach allows selectivity in cancer cells and reduces immediate toxicity to normal cells. Furthermore, these probes will allow real-time fluorescence imaging and can function as a guide for PDT, which in turn will permit combining PDT with fluorescence-guided surgery.