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### **Late-Stage Functionalizations**

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Late-stage functionalization reactions reliably functionalize already complex molecules to quickly access value-added molecular diversity. Late-stage functionalization is desirable in many areas of discovery such as in drug or agrochemical development, and a requirement in other areas such as the synthesis of positron-emission tomography (PET) tracers. I will describe the development of novel, modern highly selective reactions in late-stage functionalization, as well as their application in transition-metal-catalyzed and photoredox reactions, with a focus on the synthesis of  $^{18}\text{F}$  and  $^{19}\text{F}$  containing complex small molecules. In particular, I will describe the development of broadly useful C-H thianthrenation reactions, as well as the conceptual differences and advances of thianthrenium chemistry when compared to conventional reaction chemistry, with development towards applications in catalysis, drug discovery, and medicine.