Dendrimers are branched, well-defined polymeric systems, whose chemistry was made famous in the 1970’s by Dr. Fritz Vögtle. They possess a wide variety of applications, including catalysis, nanostructure formation, and drug delivery. The means of synthesizing these molecules have advanced throughout the years. Early on, divergent synthesis was made popular by Vögtle and colleagues, while in the 1990’s a convergent synthesis method was developed by Fréchet and Miller, among others. Since then, more methods have been established to improve the ease and yield of synthesis. This include “Click” chemistry, internal hydrogen bonding, and metallic complexation. While the advantages of these systems have grown in number as sophistication of their syntheses have advanced, there are ways in which these systems could still be improved. Dr. Moteki’s lab is working to design self-assembled, Janus-type dendrimers. Driven by sterics, these systems are able to self-assemble two separate, chiral ligands in a metallic complex. The lab aims to attach two different dendrimer structures to each of these ligands, and due to their sterically controlled nature, form a Janus-type dendrimer metallic complex. This system eliminates the need for extra synthetic steps, and allows for incredibly simple assembly and disassembly of the ligands, making them retrievable and recyclable.

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