Folded biopolymers perform diverse functions in biological systems. Most of these operations require the biopolymer chain to adopt a specific conformation. Over the past two decades there has been growing interest in the prospect that biopolymer functions might be recapitulated and perhaps even improved upon with unnatural oligomers that manifest discrete folding preferences. Such systems are referred to generically as “foldamers.” This lecture will provide an overview of the goals of this field, and progress toward those goals, with emphasis on contributions from my co-workers. We focus on peptidic oligomers that contain β-amino acid residues, exclusively or in combination with α-amino acid residues.