In 2007, indole arynes and their cycloaddition chemistry were discovered by Buszek laboratories. Since then, indole arynes and their cycloaddition chemistry have demonstrated their value in the construction of biologically active natural products, such as trikentrins and herbindoles. In addition to the tremendous value of indole aryne cycloaddition chemistry in natural products total synthesis, this chemistry has successfully contributed to library development and drug discovery fields.

Taking advantage of the relative electronegativity of fluorine atoms, we proposed four polyfluoroindole scaffolds that could potentially generate the all three indole arynes, namely, 4,5-, 5,6-, and 6,7-indole arynes, from a single platform through a combination of dehydrohalogenation and metal halogen exchange chemistry. In these efforts, a practical and efficient synthetic scheme was constructed via the Fischer indole reaction in order to design the four tri-fluoroindoles from the corresponding trifluoroanilines - a single platform to generate the three indole arynes.

In this talk, I will focus on four trifluoroindole systems, namely, 4,5,6-trifluoro-3-phenyl-1H-indole, 4,5,7- trifluoro-3-phenyl-1H-indole, 4,6,7-trifluoro-3-phenyl-1H-indole, and 5,6,7- trifluoro-3-phenyl-1H-indole, that were synthesized via the Fischer indole reaction in our group. A discussion on the future outlook for this important chemistry will be given.