Dr. William Knowles, in his 2001 Nobel Lecture, described his 1960s and 70s work in developing asymmetric hydrogenation catalysts. Now, almost 40 years later, although major advances have been made (e.g. Professor Noyori’s Nobel prize winning work in asymmetric hydrogenation), significant challenges still remain. On the one hand, this presentation describes innovation in asymmetric hydrogenation catalysis from both an academic and industrial perspective. It highlights recent advances and the commercialization processes regarding asymmetric hydrogenation. The broad array of asymmetric hydrogenation catalysts and their numerous applications for a variety of functional group hydrogenations will be reviewed. We will emphasis on the practical applications of asymmetric hydrogenation to make chiral pharmaceuticals and address unmet needs in asymmetric hydrogenation. The knowledge gained in this research can lead to “next generation” catalysts.

The versatile P-Chiral ligands developed by Zhang group