Supramolecular Crystallography: Weak Intermolecular Interactions in the Solid State

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An exciting research challenge in supramolecular chemistry is to design, synthesize, and characterize nano-sized architectures with applications in biology, chemistry, and materials science. Predicting and designing non-covalently bound supramolecular complexes and assemblies is difficult because of the weakness of the interactions involved, thus the resulting superstructure is often a compromise between the geometrical constraints of the building blocks and the competing weak intermolecular interactions. Our research interest has been focused on the studies of weak non-covalent intermolecular, *viz.* supramolecular interactions as the driving force in self-assembly and molecular recognition, especially in the solid state by single crystal X-ray diffraction. The lecture will highlight some of our recent studies on hydrogen and halogen bonded systems, π-π, CH…anion and anion…π interactions and metal ion coordination in molecular self-assembly and molecular recognition in various systems such a resorcinarenes, ditopic receptors, rotaxanes, M_4L_6 tetrahedra, M_8L_6 cube, spheres, knots, etc..

Some selected references: *Chem. Eur. J.* **2014**, *20*, 15144.*; Cryst. Growth Des.* **2014**, *14*, 6161.; *Cryst. Growth Des.* **2012**, 4919.; *Science* **2010**, *328***,** 1009.; *CrystEngComm* **2015**, *17*, 1231.; *Chem. Commun.* **2014**, *50*, 15920.; *Chem. Commun.* **2014***, 50*, 1959.; *Chem. Sci.* **2012**, *2*, 1235.: *Science* **2009**, 1461.; *Angew. Chem.* **2004***,* 1263.; *Chem. Eur. J.* **2006***,* 4289.; *Angew. Chem. Int Ed*. **2008**, 788.; *Chem. Sci.* **2015**, *6*, 354.; *Chem. Comm*. **2012**, 9983.; *J. Am. Chem. Soc.* **2008**, 4600.; *Angew. Chem.* **2012**, 3161.; *Nat. Chem.* **2012**, 15.; *Angew. Chem.* **2011**, 3479.; *Science* **2009**, 1697 - 1698.

Short biography:

Kari Rissanen did his PhD in 1990 at the University of Jyväskylä, Finland. After his work as Research Fellow and then a Senior Research Fellow of The Academy of Finland at the University of Jyväskylä, he became an Associate Professor of Organic Chemistry at the University of Joensuu, Finland. Since 1995 he has been professor and Head of the Laboratory of Organic Chemistry, University of Jyväskylä. He is also an Academy Professor of the Academy of Finland from 1.1.2008 – 31.12.2017. His research topics include structural and synthetic supramolecular, organic and nanochemistry, X-ray crystallography and crystal engineering.