

## 2. Tutorial on Residuated Lattices (1.5 hours) Peter Jipsen

This tutorial provides an up-to-date overview of residuated lattices. Starting with partially ordered sets, (semi)lattices, Galois connections, residuated maps and ordered monoids, we consider residuated lattices and *FL*-algebras within the framework of universal algebra. This is followed by a survey of examples and applications, including Boolean algebras, Heyting algebras, lattice-ordered groups, cancellative residuated lattices, (generalized) *BL*-algebras, involutive residuated lattices, linear logic algebras, (generalized) *MV*-algebras, and relation algebras.

The tutorial continues with the structure theory of residuated lattices (congruences, normal filters and direct decompositions), investigations of the lattice of subvarieties, and a discussion of the decidability of well-known equational classes in this lattice. A central theme is the direct connection between substructural logics and residuated lattices, which is framed within in the general context of algebraic logic. Open problems and interesting directions for further research are mentioned along the way.