P. Bryk, UMCS Lublin
During my stay in Lviv I carried out various scientific as well as teaching/learning activities together with members of the group of Prof. A. Trokhymchuk and Dr. T. Patsahan.

Scientific activities:

During my stay in Lviv together with dr W. Rżysko I developed a program for studying block copolymers adsorbed on solid substrates. The model consists of either fully flexible or partially rigid segments of two kinds connected by a chemical bond. The copolymer is adsorbed on a flat surface and the adsorption sites are arranged on a square lattice. We have found three distinct phases, the gas, disordered liquid and the ordered phase. For the shortest chains the order-disorder transition is first order, while for longer chains a phase diagram exhibits a critical end-point.

We have found that the disorder liquid phase exhibits a quite unusual structure, which is different to the typical liquid phase. In order to better characterize this kind of aperiodic structures we have applied Minkowski measures, which are often used in image analysis. I have implemented the marching-squares algorithm (Mantz et al., J. Stat. Mech. P12015 (2008)) into our code. The details will be published in a publication that is currently in preparation.

Teaching/learning (transfer of knowledge) activities:
During my stay I gave two lectures on computer simulations of simple and complex fluids. In addition I carried out several scientific discussions with Prof. Taras Bryk about ab-initio molecular dynamics simulations and his research activities, which involve simulations of high-pressure electronic properties of metals. With prof. A. Trokhymchuk I discussed the problem of the nature of crystallization in 2D systems and possible theoretical solutions to this problem. With dr Ivan Kravtsiv and T. Patsahan I discussed the field-theoretical approach to the problem of adsorption of Yukawa fluid at a hard wall.