We all learn from mistakes, but it would be worth focusing on the mistakes of others so that we do not have to bear the consequences of all bad choices. Teaching by observation is one of the most important principles of the socio-cognitive theory developed by a well-known American psychologist with Polish roots - Albert Bandura.

Inspirations with nature, in particular biology or sociology have been present in Computer Science for several decades, in particular in one of its departments called Intelligence. Computational algorithms using evolutionary, formative, swarm and agent inspirations have achieved the status of popular tools for solving computationally difficult problems (such as searching for the shortest route for a traveling salesman who has to visit all cities and the distance between them has different costs).

Theoretical research results prove that there are algorithms that are able to solve any optimization problems (all you need is to have some luck or wait a long time). Such algorithms include the Genetic Algorithm (according to the results of Michael Vose's research), Evolution Strategies (in accordance with the results of Gunther Rudolph's research) and the Evolutionary Multi-agent System (Byrski and Schaefer research). It seems, therefore, that new algorithms can be created based on those mentioned, which will have greater efficiency and effectiveness than their base versions.

The psychological inspirations mentioned at the beginning led to the development of a new class of computational algorithms, namely socio-cognitive algorithms, based on the combination of formative and swarm inspirations with the adoption of perspective and modeling on others. In this way, after introducing many species to such algorithms as the form algorithm or the swarm algorithm, new hybrid algorithms were obtained that were characterized by better efficiency and effectiveness than their base versions.

The proposed project is based on the introduction of socio-cognitive inspirations to the proven, mentioned above evolutionary algorithms. New species and complex relationships between them will be introduced to these algorithms. This will lead, we hope, to the diversity of solutions found and, as a result, to achieve better efficiency and effectiveness in solving difficult problems, such as the problem of route planning for many vehicles, searching for low autocorrelation sequences or searching for the shortest Golomb rulers. These problems are very difficult and at the same time have direct applications in practice. The research will be conducted on the basis of a proven (selected at the beginning of the project) computing environment, using the infrastructure of the Academic Computer Center Cyfronet AGH, including the excellent supercomputer Prometeusz, one of the fastest supercomputers in Europe, 131 computer on TOP500 list.