World-class academic and industry experience in multi-disciplinary studies of complex systems in different areas of science, business, and technology makes our group one of the leaders in providing solutions for the most challenging quantitative problems. Our approach is based on optimal combination of cutting-edge quantitative methods, realistic multi-scale simulations, and wide range of computational intelligence techniques.

Ability of discovering practical solutions for complex real-life problems is supported by our expertise in such different fields as plasma and space physics, nonlinear dynamics, quantitative finance, econometrics, and econophysics, expert systems and business intelligence, machine learning and computer vision, computational intelligence in biomedical applications and sport industry, and continuous multi-disciplinary research and development efforts.

The key advantage of such multi-disciplinary approach is ability to apply generic methods established in one field to similar problems in other fields. In many cases, such innovative approach could lead to solutions of challenging practical problems that are hard to address by traditional methods of the considered field. In turn, the specifics of the new application scope could lead to further improvements and generalizations of the original quantitative method or algorithm.

For example, analytical and simulation techniques for the analysis of non-stationary dynamical processes with long-range spatio-temporal correlations originated in plasma and statistical physics, provide a comprehensive toolbox to study complex dynamics of financial markets. This novel approach to quantitative finance, often referred to as econophysics, successfully complements traditional frameworks of applied finance and econometrics in risk management and similar applications.

However, consistent discovery of profitable and stable trading strategies for continuously evolving financial markets requires optimal combination of many different approaches: from state-of-the-art analytical and statistical quantitative models to empirical "rule-of-thumb" heuristics formulated by experienced market practitioners. We proposed and extensively applied a novel framework, boosting-based optimization, for automated discovery of ensembles of complementary trading and investment strategies demonstrating regime-independent stable performance.

Our generic model combination framework incorporates the best techniques from modern statistical learning and related fields as well as important proprietary algorithms and regularizations. More importantly, our adaptive approach is not only data-driven but also knowledge-driven. We are constantly analyzing and adding novel base models, strategies and empirical rules described in the related field publications or suggested by our own research efforts. Our optimization framework makes multi-objective decision which of the novel models has any complementary value and should be added to the optimal model ensemble.

Besides financial and business intelligence problems, we successfully applied our discovery framework to challenging biomedical and bioinformatics problems. For

example, a set of multi-component indicators capable of detecting subtle and/or intermittent physiological changes have been discovered. These physiological indicators can be applied for early detection of emerging pathology, diagnostics of hard-to-detect or rare abnormalities, early indication of medical treatment or therapy effects (positive or negative) as well as for less critical but important warnings such as overtraining in athletes.

Collection of important practical results of our active multi-disciplinary research constantly increases. Some of our solutions for particular applications can be evaluated and used by our clients online on 24/7 basis. Solution sets for biomedical, financial, professional sport, business intelligence, and other applications is constantly improving and expanded by our research and development efforts.