Solar energy is clean and nearly inexhaustible, therefore converting sunlight energy directly into electricity in fast and easy way is a promising approach to respond to the global challenge of growing energy demand. At the moment most commercial photovoltaics (PV) is based on crystalline silicon cells. However their possibility to increase their performance is limited. Another approach is expressed by organic photovoltaics (OPV) which rely on different principles and utilizes organic (or hybrid organic-inorganic) compounds as active materials. One of the most promising materials in organic photovoltaics applications are perovskites. Their application in OPV can lead to great progress in production of PV panels and significant reduction in costs. Application of perovskites in third generation of solar cells basically doubled their efficiency already on the initial phase of research. This kind of devices can be printed on thin layers just like simple ink in your inkjet printer, what facilitate fast coverage of large areas and application on elastic substrates, hence light and easy during transportation.

One of important layers used in perovskite solar cells are compounds selectively transporting electrons (and blocking transport of holes at the same time). The most common compounds are based on fullerenes (allotropic form of carbon in the shape of sphere, most abundant is composed from sixty carbon atoms). The aim of this project is preparation of library of indenyl derivatives of fullerenes adjusted to perovskites solar cells (PSC). We would like to test whether this kind of derivatives can effectively substitute [6,6]-phenyl-C61-butyric acid methyl ester – most common up to date compound in PSC. We expect that our target molecules will enhance performance of solar cells hence facilitate its way to commercialization and easy access to cheap energy for all the people around the world.