

## Project 2.1 Precisely Engineered Multichromophore Systems for Applications in Optoelectronics, Nonlinear Optics, and Quantum Computers

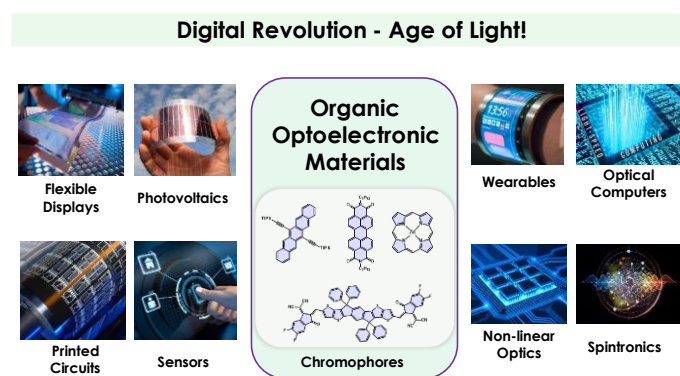
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**Institute:** Institute of Organic Chemistry PAS

**www:** [www.gawel.edu.pl](http://www.gawel.edu.pl), [www.icho.edu.pl](http://www.icho.edu.pl)

### Background:

This project addresses the growing demand for advanced optoelectronic materials, essential for the future of digital transformation. The development of nonlinear optical (NLO) and spintronic technologies opens new possibilities for ultra-fast data transmission and quantum information processing. A particular focus is on chiral molecular systems that exhibit unique properties in NLO and enable spin manipulation at room temperature, a breakthrough for quantum computers. The aim is to design and develop materials that contribute to advancements in electro-optic modulators, spintronic devices, and quantum computational systems.



### Aim:

The PhD project focuses on synthesizing, and analyzing novel multichromophore systems with precisely controlled spatial arrangements, intended for applications in nonlinear optics and spintronics. The goal is to develop materials capable of efficient second harmonic generation (SHG) and improving performance in electro-optic devices such as light modulators. The project also targets the development of chiral structures leveraging the chirality-induced spin selectivity (CISS) effect to enable electron spin manipulation in advanced spintronic devices. These molecular systems are expected to play a pivotal role in key future technologies, including quantum computers, ultra-fast communication networks, and data processing systems.

### Requirements:

- Master's degree in chemistry or a related field;
- Experience in organic synthesis or a closely related area;
- Proficiency in analyzing and interpreting experimental data using techniques such as NMR, MS, and UV/Vis spectroscopy;
- Prior research experience, particularly in experimental work, is advantageous;
- Strong written and verbal communication skills in English.