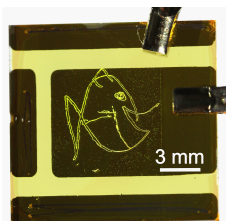
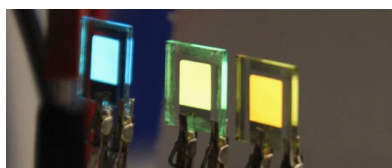
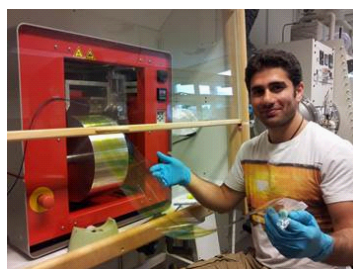
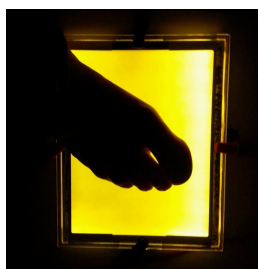
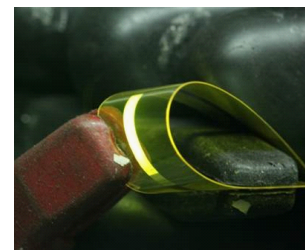
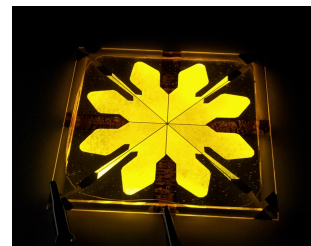


# Master thesis project opportunities in the Organic Photonics and Electronics Group

The Organic Photonic and Electronic group focuses on the study of complex device physics. Our research work is divided into two lines: **light-emitting electrochemical cells (LEC)** and **solar cells**. In our lab, we fabricate **efficient optoelectronic devices** via a wide range of solution-based techniques. Our research has **improved the device performance and stability**, which makes the devices closer to the demand for cutting-edge commercial applications. For instance, our **LEC can emit all visible colors** and can be printed—resembling how a conventional printer works—into a variety of substrate materials, including plastics, paper, and textiles. On the other hand, our research work regarding the **perovskite solar cell** is often referred to as the emerging solar technique for producing clean energy. The effort is mainly focusing on **performance improvement and further understanding of the solar cell's working principle**.



During **the autumn semester of 2021**, we will recruit master-thesis students to work in our group. The thesis work will mostly relate to one of two research lines mentioned above or presented below, but further discussion on a more detailed outline of the intended project will be necessary before any work can begin. The project is planned as a full-time master thesis project (30 ECTS). Applicants should have adequate education (physics, energy, chemistry, or materials science) and good English skills. Depending on the project, the candidate must be able to work independently and reliably, following advice.

## Open suggested projects

### Sustainable and novel optoelectronic devices

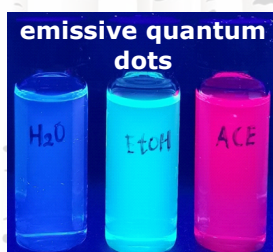
Topics:

- + Perovskite solar cells
- + Develop sustainable light-emitting devices

based on non-toxic quantum dots



birch leaves as raw material



Contact: [jia.wang@umu.se](mailto:jia.wang@umu.se)

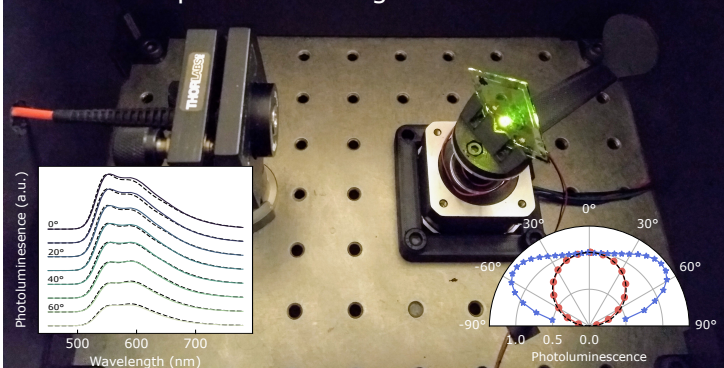
### Nano-patterning of the active layer in light-emitting electrochemical cells

Contact: [sandra.mattson@umu.se](mailto:sandra.mattson@umu.se)

### Develop a scientific instrument to measure the emitter orientation

Tasks:

- + **Programming** with Python a Raspberry Pi to control and synchronize several instruments
- + **Measuring** the angle-dependent photoluminescence emission of different materials
- + **Understanding** the emitter orientation using advanced optical modelling software



Contact: [joan.rafols-ribe@umu.se](mailto:joan.rafols-ribe@umu.se)

More information about light-emitting electrochemical cells, organic solar cells, and the ongoing activities in the research group can be found on our homepage (<http://opeg-umu.se/>) or by contacting Prof. Ludvig Edman ([ludvig.edman@umu.se](mailto:ludvig.edman@umu.se))

