



Nanooptics Group

Prof. Hartschuh



## Hiwi (m/f/d): Solution processed quantum dot photodetectors

**About Serino:** Photodetectors are central to many technologies spanning consumer electronics (handset cameras and laptops); fiber optic communications; data storage and information technology; surveillance; space exploration; gas sensing; and medicine, among others. To date, the photodetector industry represents a growing multi-billion-dollar market. Detection of near-infrared (NIR) photons is especially interesting, since widespread Silicon-based are only sensitive for wavelengths smaller than 1000 nm. Existing technologies for NIR photodetection are either too expensive or difficult to interface or lack the needed sensitivity. Emerging applications such as machine vision, gesture and face recognition, distance ranging and 3D vision, require on top of that fast photodetection – challenging to achieve for existing NIR detector approaches. In Serino, we are working on next-generation materials towards the realization of fast and sensitive NIR photodetectors. Our approach utilizes optimized nanomaterials such as colloidal quantum dots and perovskites and exploits their tunable bandgap energies to optimize charge transport and optoelectronic operation.

### Task description:

- Optimization of the recipe for the synthesis of quantum dots based on the hot-injection method.
- Thin film fabrication based on quantum dots ink.
- Electro-optical characterization of the final solar cell.

**Qualifications:** Student of material science, chemistry and related topics.

Ideally having experience in hot injection synthesis or synthesis of nano-particles or nano-crystals.

Ideally having experience in thin film fabrication via spin casting, doctor-blading, 3d printing, etc.

### Benefits:

Working in a multidisciplinary international team.

Contributing to our future publications.

Hours: max. 19 hrs./week possible.

Duration: initially limited to 3-6 months, can be extended to longer periods.

### Contact:

Amir Amin: Email: [amampc@cup.lmu.de](mailto:amampc@cup.lmu.de)

Ludwig-Maximilians-Universität, Department Chemie, Butenandstr. 5-13, 81377 München.