

## **Sustainable high efficiency multi-junction nanowire solar cells**

Mariia Shcherbakova, Magnus T. Borgström

Nanowire solar cells from III-V materials are perspective candidates for powering satellites due to their radiation hardness in comparison with their planar counterparts. We have first realized heterojunction nanowire photovoltaics to obtain solar energy harvesting efficiencies above the Shockley-Queisser limit by using a design with two and three bandgaps in a single nanowire. Our group has realized GaInP/InP/InAsP triple-junction photovoltaic axially defined nanowires that are optimized for light absorption. The device has an experimentally achieved open-circuit voltage of 2.37 V and modelled maximum efficiency of 47%. Electron-beam-induced current measurement using a probe-station integrated into SEM is used as an approach to control growth parameters and surface passivation that enabled quick improvement of the solar cell efficiencies.