

# “Photonic Integrated Chip-Based Trapping of Dielectric Nanoparticles”



## M.Sc. Thesis Project

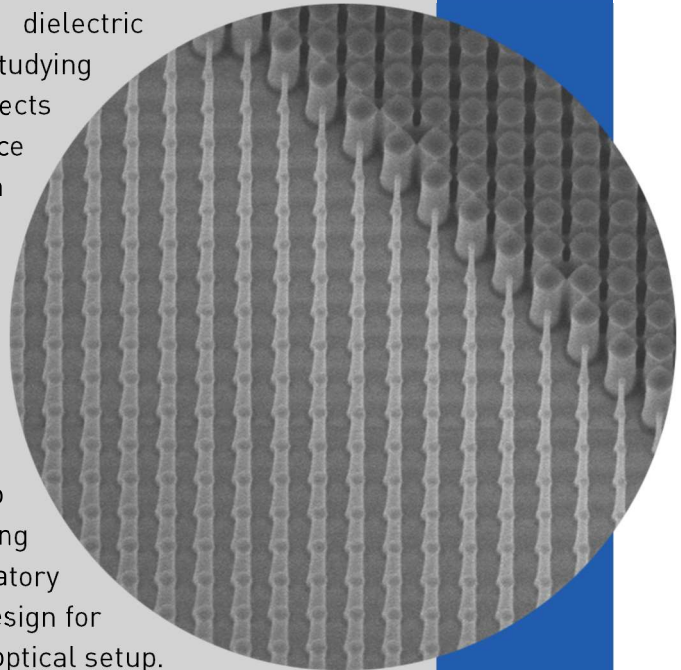
Prof. Romain Quidant, Nano-Photonic Systems Laboratory

We are seeking talented and highly motivated master students to join our team and contribute to cutting-edge research in the field of optomechanics, working on the design and characterization of integrated photonic chips for trapping and control of dielectric nanoparticles in vacuum.

**Project background:** Optical trapping of dielectric nanoparticles offers a rich platform for studying fundamental and applied physics, where various effects can be probed, ranging from quantum state coherence to force sensing and non-equilibrium thermodynamics. Through the use of advanced integrated photonic devices, particularly nanostructured materials such as photonic crystals and metalenses, optical properties can be tailored in a manner to enhance the control and detection of nanoparticles.

**Project description:** The aim of this project is to develop integrated photonic devices for interfacing silica nanoparticles. The first stage will involve laboratory experimental characterization of a novel metalens design for optical trapping, to be carried out using a dedicated optical setup. This will be followed by photonic crystal nanocavities, where the dielectric nanoparticle will be coupled to the optical cavity mode field. The work is primarily experimental in nature, however, students will be encouraged to contribute to the optimization of the implemented designs.

**Working in our group:** The NSL offers a pleasant, diverse, and dynamic work atmosphere along with a close supervision by experienced researchers.



Contact: [rquidant@ethz.ch](mailto:rquidant@ethz.ch), [nmeyer@ethz.ch](mailto:nmeyer@ethz.ch)

Duration: 6 months

Location: ETH Zürich, CLA E11-19

