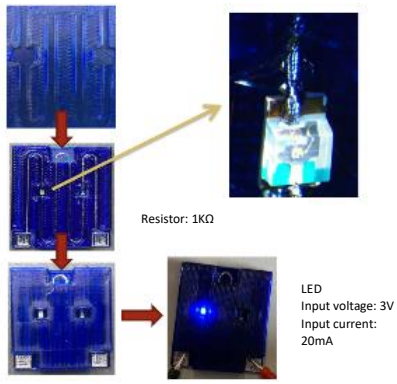
Bachelor thesis / Master thesis / HiWi (f/m/d)

Process development of hybrid printing of 3D electronics via Synkròtima, an in-house hybrid 3D printer

3D printing is a well-known additive manufacturing technology that is growing at a rapid pace, with new materials, upgrades, machines, software, and technologies appearing on the market each day. We, at **'Printing technologies and processes' group of Chair of MEMS applications**, are involved in the 3D printing of electronics by utilizing the flexibility and the design freedom provided by this technology, in our case, FDM (fused deposition modeling). After integrating a StarJet metal printhead, which is developed and patented in-house, a hybrid 3D printer, so-called "Synkròtima" is developed in-house and is able to print 3D polymer housing (via FDM extruder) with embedded conductive tracks and soldered microelectronic elements (via StarJet). Thanks to the StarJet, we can overcome the limitations that plague the current 3D printing of electronics in terms of conductivity and achieving that third dimension for the metal traces that all the world is currently focused to develop. With this head start in the printing of 3D electronics, we aim to design and fabricate real application demonstrators by carefully developing and stabilizing each step in this direction, starting with the process development of the various parameters involved in printing of electrical traces embedded in polymer substrates.



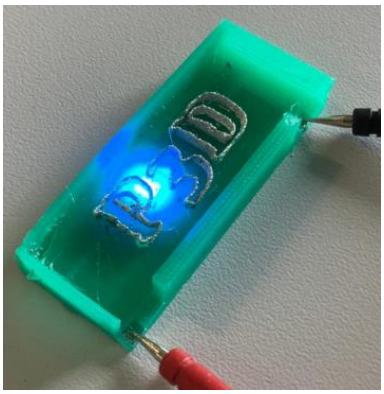


Figure 1: Some of the demonstrators developed at IMTEK previously showcasing the viability of this technology.

In our endeavor to be amongst one of the first people to successfully print electronics in 3-dimensions, embedded in polymer, we are looking for candidates who are enthusiastic to learn the in and out of 3D printing and the aforementioned StarJet technology and use the acquired knowledge and creativity to create sophisticated and real life application demonstrators. With so much to look forward to, the scope of work is open for **both bachelor and master students**. Your task:

- Designing and integrating electrical circuits in 3D encasing.
- Optimizing and developing process parameters for the FDM printing and StarJet metal printing to print functional models.
- Creating and fabricating real life electronic circuits embedded in polymer.
- Characterization of the developed models.

Your Profile:

We are looking for BSc/MSc in engineering, physics, material science or similar, with knowledge and interest in the field of electronics, and materials, and adequate knowledge of CAD and the willingness to learn, and finally the fascination to design your own 3D electronic models for real life use. Possibility to convert into master or bachelor thesis.

For more information feel free to contact us. Please send your application via mail to:

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