

PAID DIPLOMA / MASTER'S THESIS

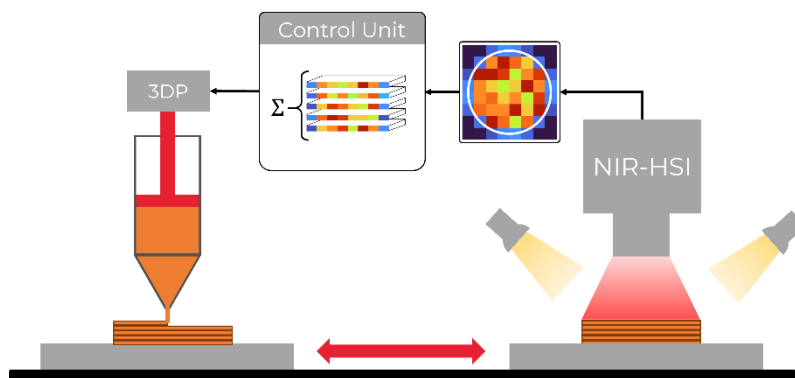
DEVELOPING AN ADAPTABLE SEMI SOLID EXTRUSION PRINTING PROCESS

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To dedicated students of process engineering, chemical and pharmaceutical engineering, chemistry, or polymer science and engineering.

Objective

This study aims at the development of a flexible semi solid extrusion (SSE) 3D printing process on FABRX' M3DIMAKER2 printer fitting for combined use with in-line and at-line monitoring. A well controllable and robust printing process forms the foundation of any 3D printing based manufacturing process. Goal of the thesis is to establish a knowledge space for selected model formulations (active pharmaceutical ingredients + excipients). This knowledge space should include variations of the composition and the process parameters (e.g. printing speed, mass flow, temperature) and their impact on the printing process. Beyond a stable operation during printing, the thesis shall also focus on starts and stops of the printing process and associated challenges like lag of material flow and oozing respectively. Special procedures or control mechanisms shall be developed and implemented to address these issues enabling the manufacturing of high quality products.



The special attention paid to interruptions of the printing process is based on the planned periodic analysis of the prints via near-infrared hyperspectral imaging (NIR-HSI). For this analysis the printing bed will be transferred between printing stage and analysis stage, as illustrated in the figure above. making it necessary to reliably stop and restart the process without creating any defects.

Within the framework of this diploma / master's thesis we offer the following

- Extensive participation in a top-level and industrially relevant research project in an international environment.
- Working with class leading equipment (FABRX M3DiMAKER²)
- Supervised training in the task
- Assistance of experienced staff with the implementation of innovative ideas
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Financing

- Compensation on the basis of a service contract

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