Printed Electronics @ pmTUC

- 20+ years experience in Printed Electronics
- Unique set of lab equipment from small scale test printers to big R2R printing presses
- Pre- and Post-press technologies
Upscaling Workflow

Lab-scale
↓
Lab-to-Fab
↓
Pilot-line
↓
Industrial line

General printability of WEARPLEX functional layers

Transition towards industrial manufacturing

Semi-industrial printing line with determined parameters

Mass manufacturing, project commercialisation
Lab Scale and Lab-to-Fab

- Evaluation of printability of all WEARPLEX functional materials
- Screen printing with focus on transfer to R2R process (metal screens)
- Development of a manufacturing recipe: Printing, pre- and post-processing parameters for all materials

![Wearplex Layer stack](image)
Pilot-line and large-scale manufacturing

• Semi-industrial R2R line with rotary screen printing
• Flexible post-treatment for all Wearplex materials: UV, IR and Hot-Air
• Corona discharge pre-treatment
Demonstration of R2R printed Electrodes

- Demonstration of fully R2R screen-printed Electrode stack at semi-industrial line
- Fine-tuning of printing and post-treatment parameters
- Identification of critical requirements for mass production
Large-Scale printing methods

- All Layers except for 2 are printable with metal-mesh based screen printing
- Evaluation of alternative R2R production methods for PEDOT:PSS (Gravure printing) and Skin/Interface material (Stencil printing and Slot Die Coating)

R2R Gravure printing test stand

Slot Die Coating unit at web-fed machine
Industrial Manufacturing Strategies

**Rotary R2R Line**
- Efficient high throughput manufacturing
- All layers except for 2 printable with rotary (metal) screen printing
- Needs further refinement in alternative production methods for PEDOT + skin/interface Layer or in material development

**Flatbed R2R/R2S Line**
- Lower throughput, stop-and-go process
- More flexible in printing form materials (PET Screens, Stencil printing..)
- Can handle all Wearplex Layer Materials
- Developed at SCT