Karlsruhe Institute of Technology

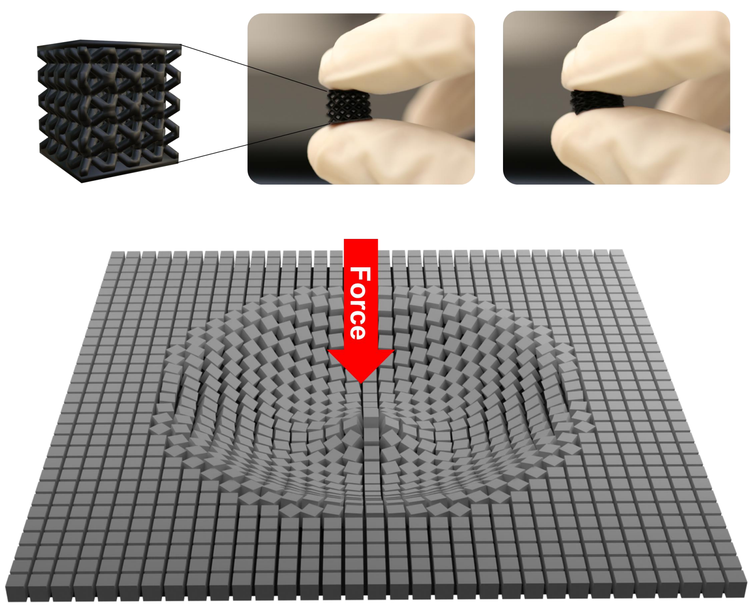
Institute for Automation and Applied Informatics (IAI)

Master Thesis

3D Inkjet-printed Large-area Pressure Sensors

Large-area pressure sensors are promising for a wide range of applications including health care monitoring, automobiles, soft-robotics, and artificial electronic skins. However, fabricating sensors over extensive areas with uniform performance remains a major challenge, yet it is crucial for accurate and reliable measurement of both pressure magnitude and position for applications. To address this, 3D inkjet printing of conductive piezoresistive materials could be a promising solution. As an emerging additive manufacturing technology it enables precise, drop-on-demand fabrication of micro-scale 3D structures which will further enhance the sensitivity.

This project aims to develop large-area piezoresistive pressure sensors using 3D inkjet printing technique by formulating conductive polymer-based printable inks. Various 3D primitive pressure sensitive cells will be printed and tested for the performance. Finally, the optimal 3D cells will be utilised to realise a large-area pressure sensor and employed for real-time position mapping.



3D printed pressure sensor array

3D inkjet printer

Your Tasks:

- Conduct literature research to familiarize with state-of-the-art research.
- Formulation of inkjet printable and UV-curable conductive inks.
- Optimize printing parameters for pattern fidelity and piezoresistive performance.
- Design, fabricate, and characterize pressure sensors using the developed conductive 3d inkjet printable ink.
- Implement large-area pressure sensing and back-end for real time pressure mapping.

This sounds exciting? Then get in touch!

We are happy to answer any questions you might have. If you are interested, please send us your application package via email (Nitheesh.Nair@kit.edu) including your current transcript of records and academic CV

Advisors:
Prof. Dr. Gerardo Hernandez-Sosa
Dr. Katja Nau

Research Field:
Physical Sensing

Work Place:
Campus Nord, IAI (Gebäude 445)
Practical work in Laboratory

Education, Experience, and Skills:

- Interest for Research
- Background in Physics, Material Science, Electrical or Mechanical Engineering

Language(s):
English

Starting date:
As soon as possible

For more information, please contact:
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