

ICB PhD public presentations

THE APPLICATION OF 3D PRINTING AND SOFT MATERIALS IN THE DEVELOPMENT OF ARTIFICIAL HEARTS

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Project Summary: Heart failure is a serious disease, which affects patients around the globe. Current artificial heart technology is based on rigid materials, yielding continuous blood flow and a high rate of adverse events.

The application of soft materials in artificial heart design enables the mimicking of the heart's motion during pumping, resulting in a more realistic blood flow situation as compared to current technologies. Using a 3D-printing, lost-wax casting technique, it was possible to manufacture an entirely soft artificial heart and test it under realistic conditions on a hybrid mock circulation. Additionally, *in vitro* and *in vivo* studies revealed that the modification of soft silicone with Bioglass nanoparticles improves the tissue integration thereof, which would enable better healing around the artificial heart powerline and reduce infection rates.

CV. Nicholas Cohrs graduated from ETH Zurich with a MSc in Chemical Engineering in 2015. He did his Bachelor at ETH Zurich and Imperial College London and gained industry experience as an Operational Excellence Consultant at Bayer AG. During his PhD Nicholas was named Forbes 30 Under 30 in Science & Healthcare and represented ETH Zurich at the Tallinn Digital Summit with EU Heads of State and Government.