



Michael McAlpine

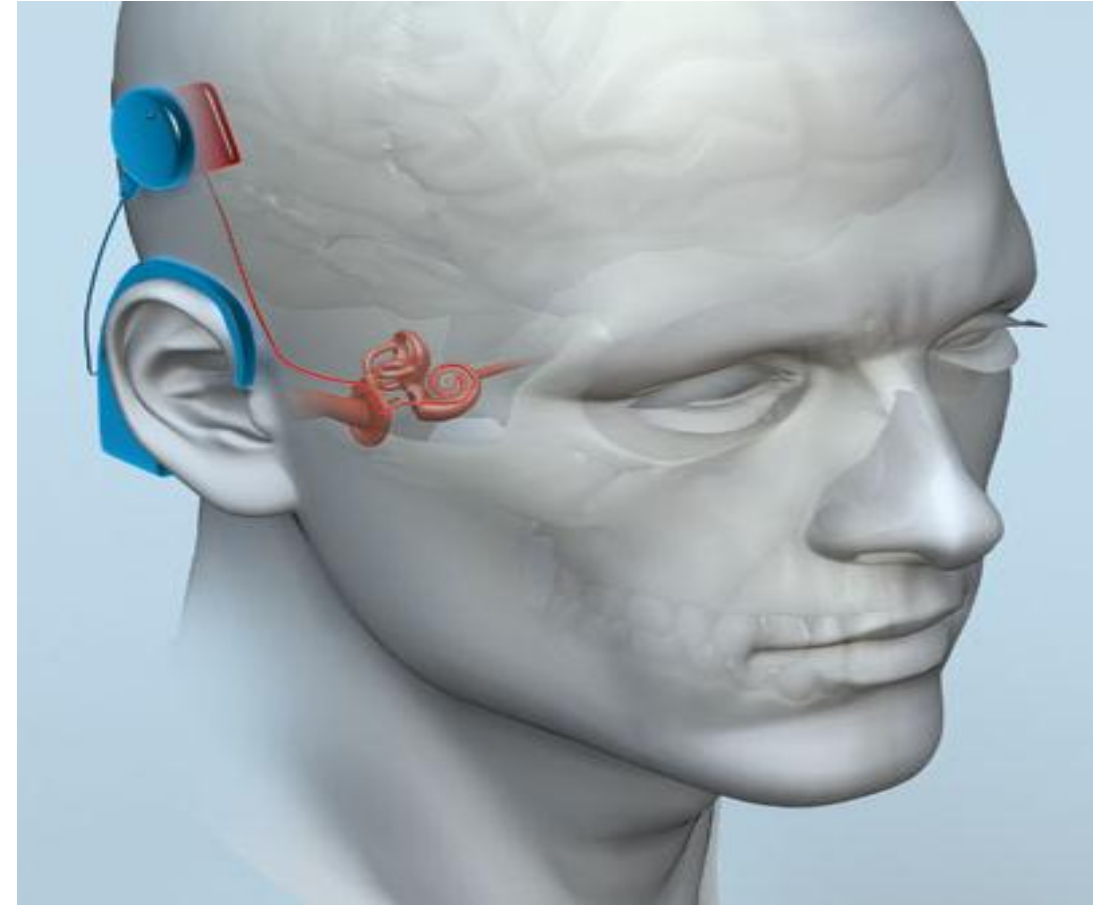
Assistant Professor

Princeton University

Bionic Humans

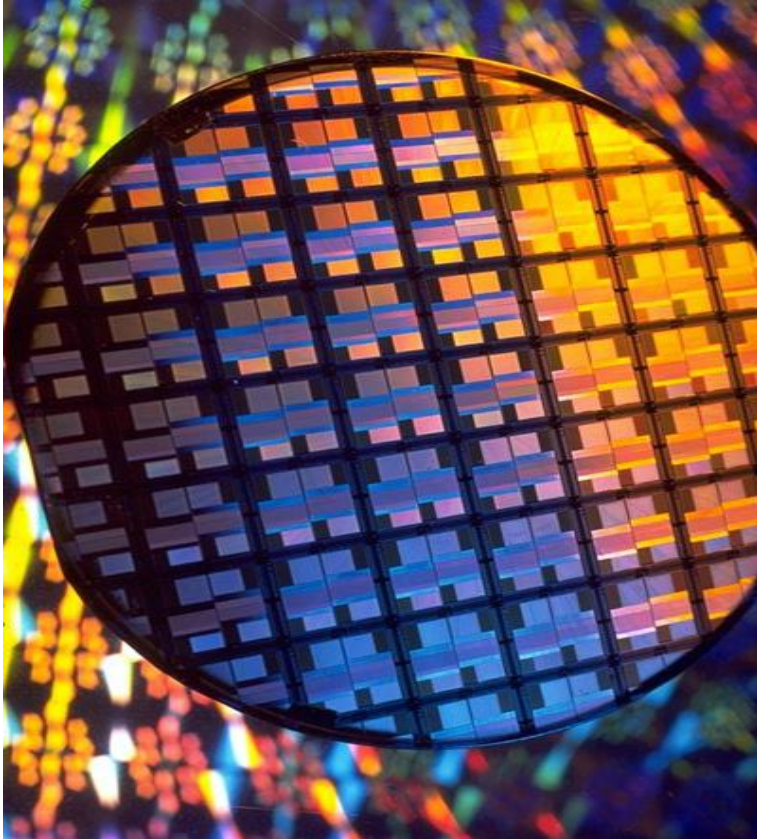


Traditional 'Bionics': Developing electrical/mechanical systems that can behave like humans



- **Human-Machine Interfaces**
- **Regenerative Biomedicine**
 - **Smart Prosthetics**

Electronics vs Biology



Electronics:

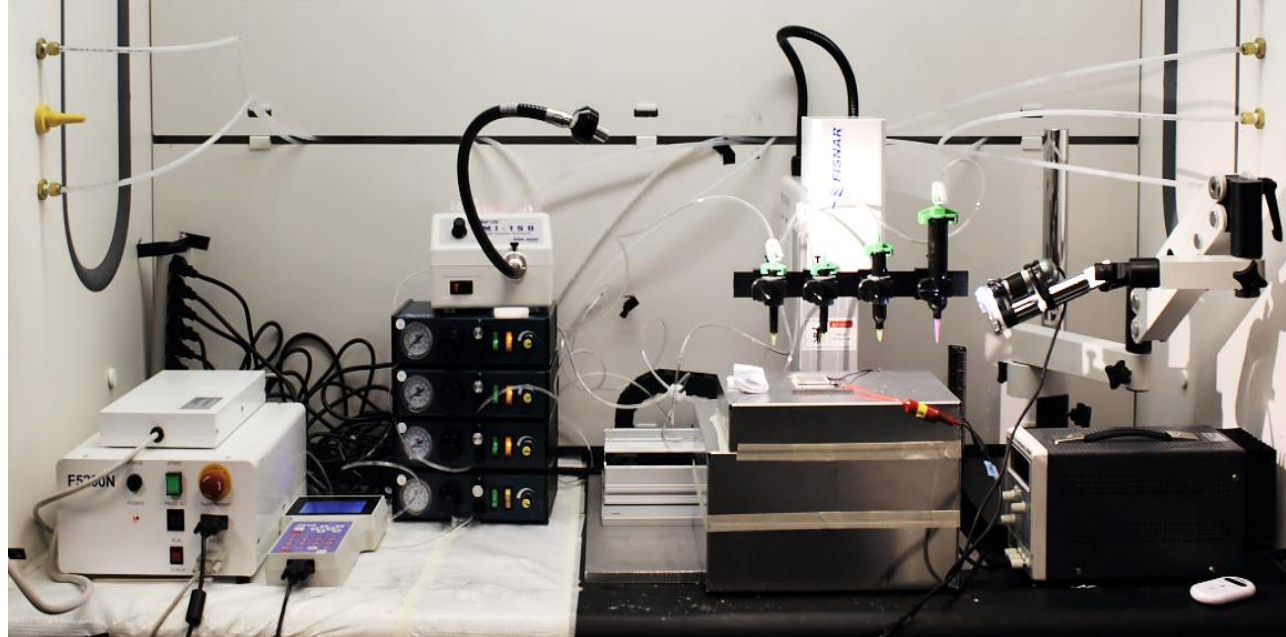
- Two dimensional
- Hard, rigid, brittle
- High processing temps



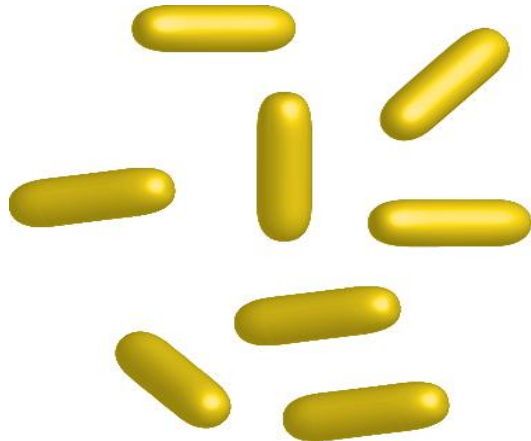
Biology:

- Three dimensional
- Soft, flexible, stretchable
- Temperature sensitive

3D Printing



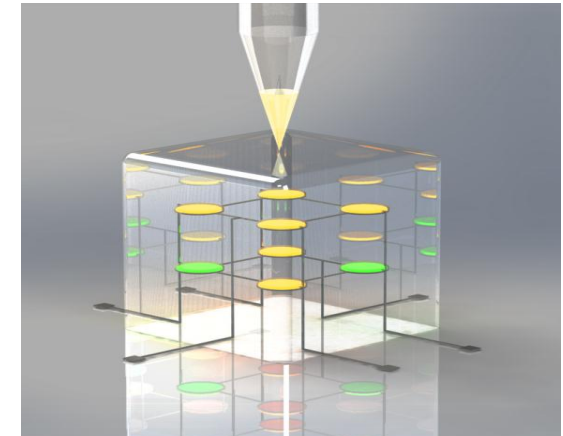
Functional Nano-Inks



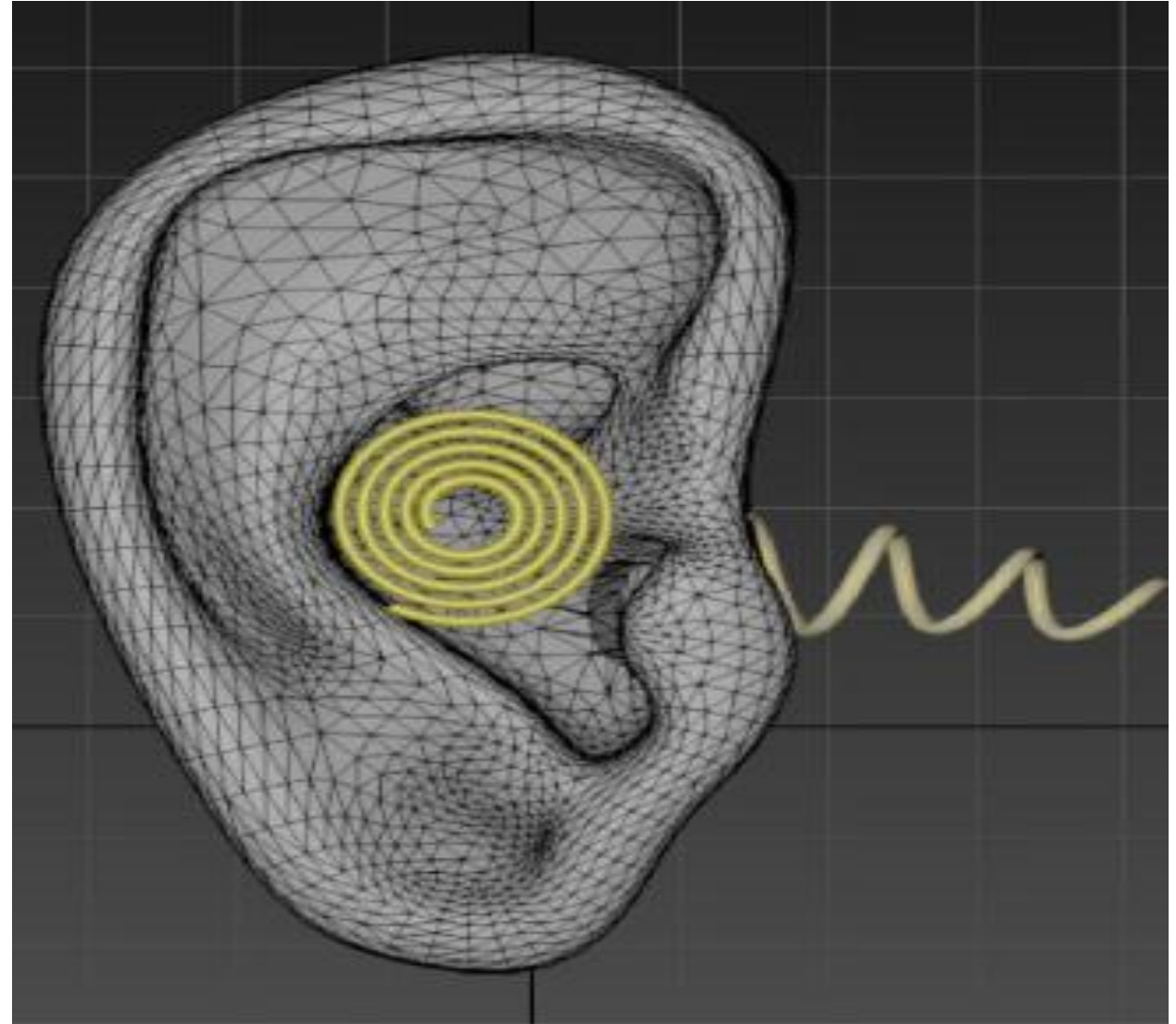
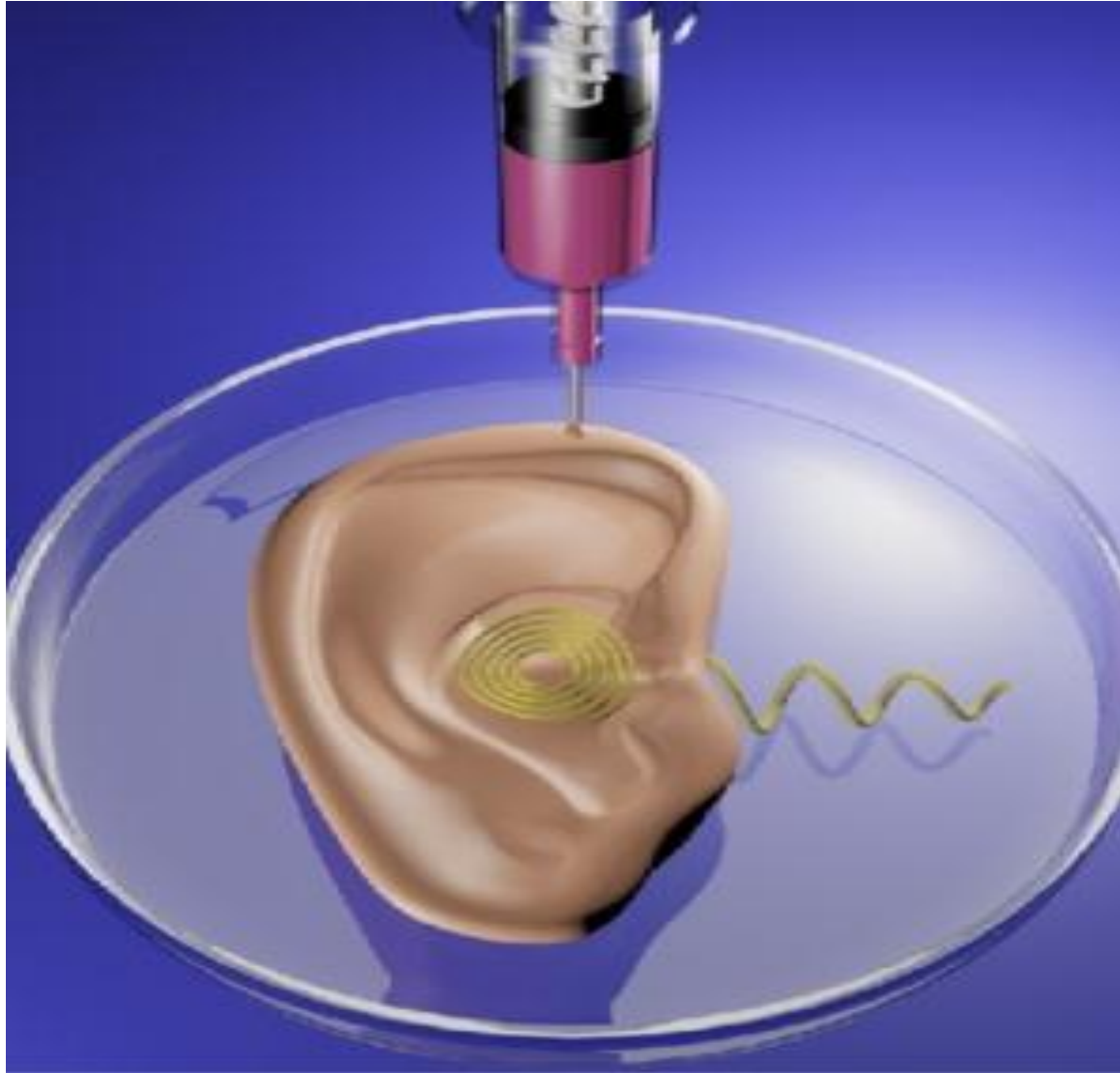
Microscale Printing



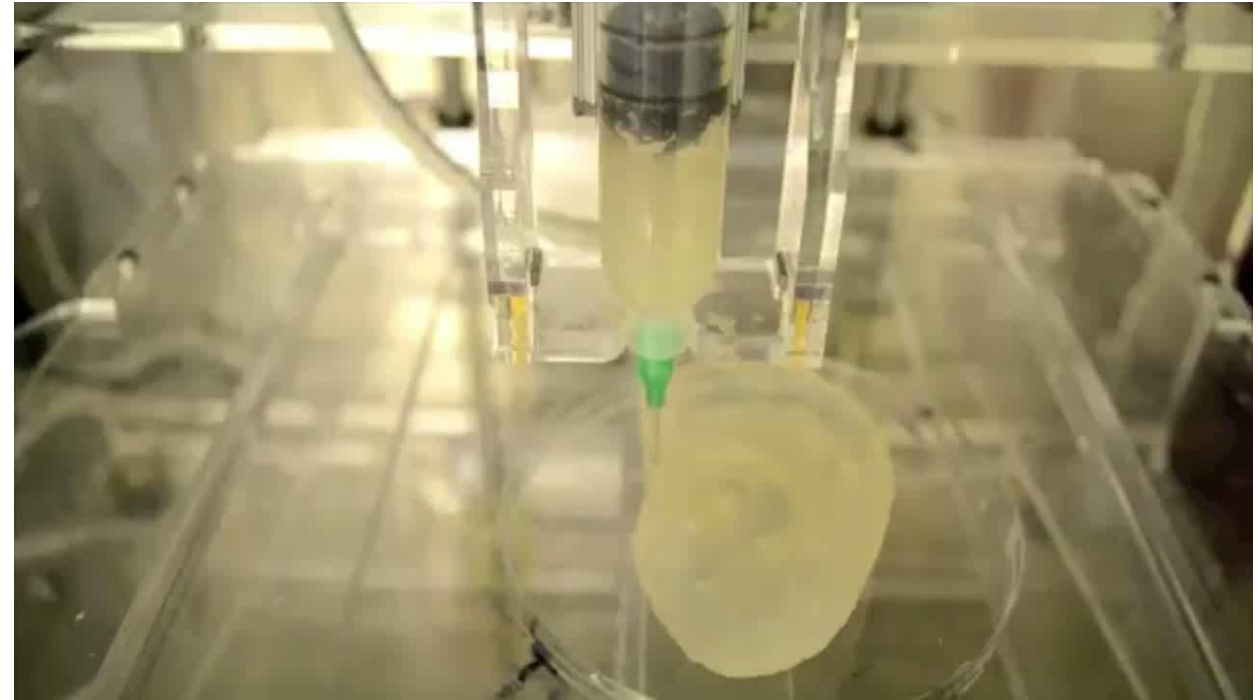
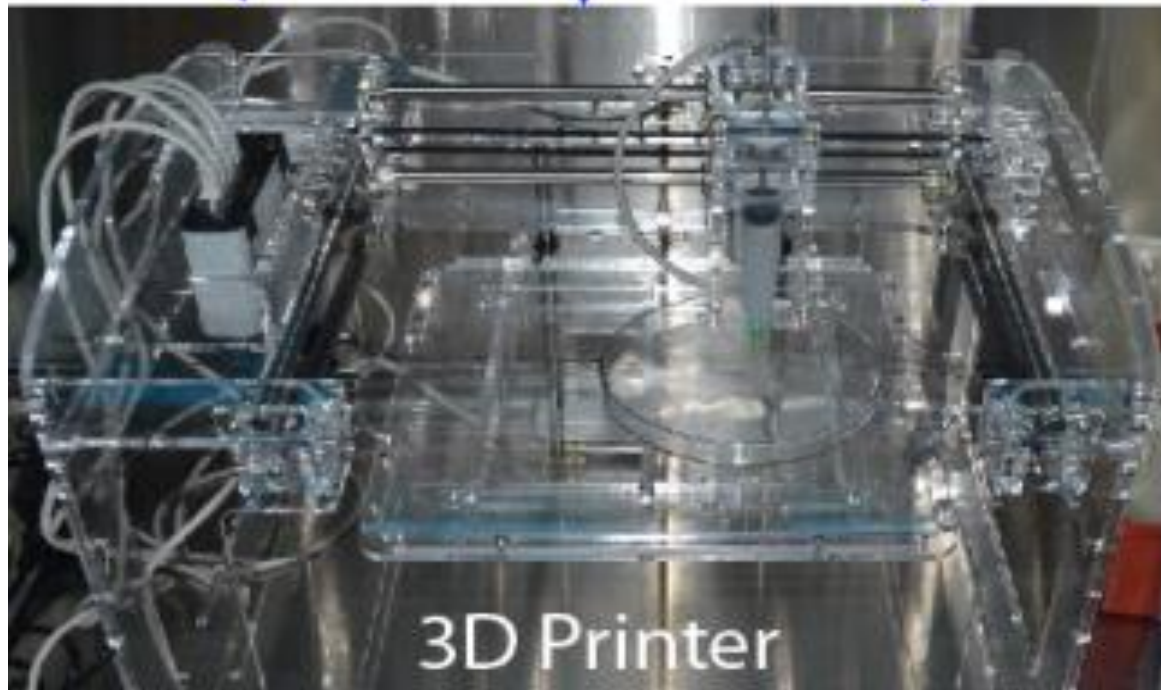
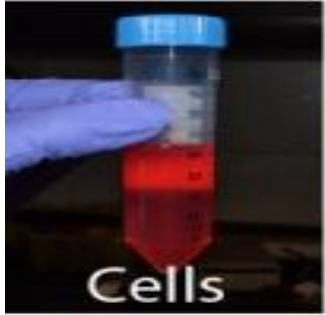
Macroscale Devices



Bionic Ears



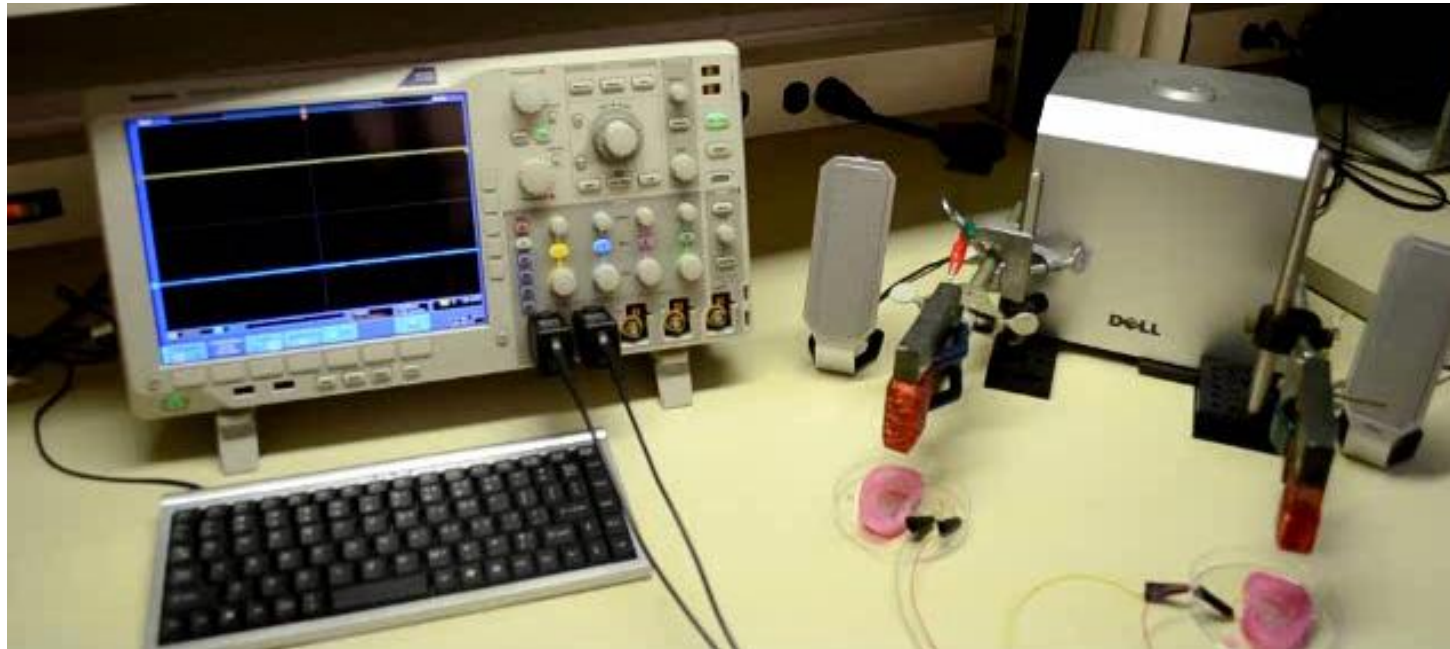
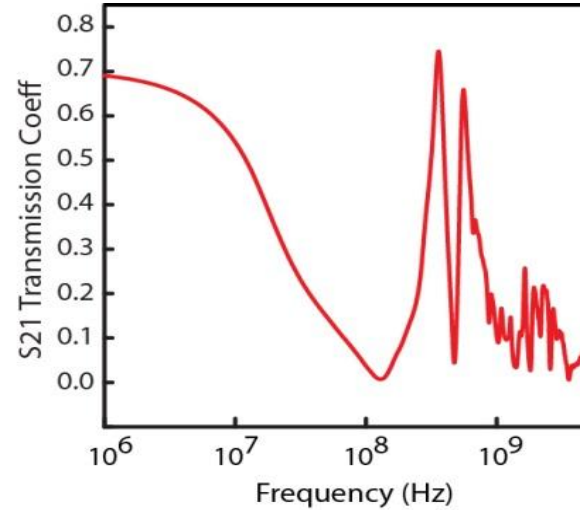
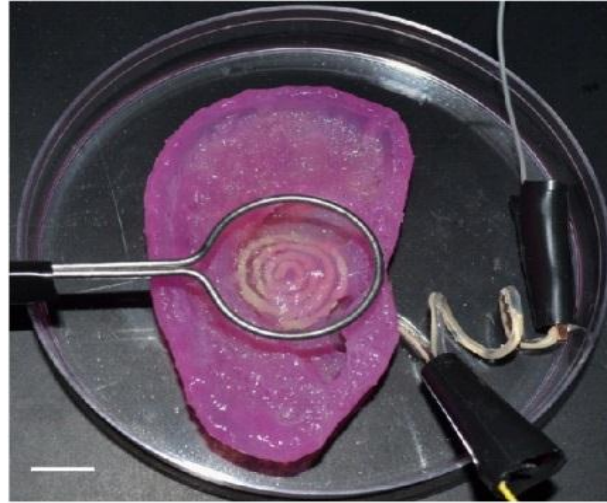
Interwoven Materials



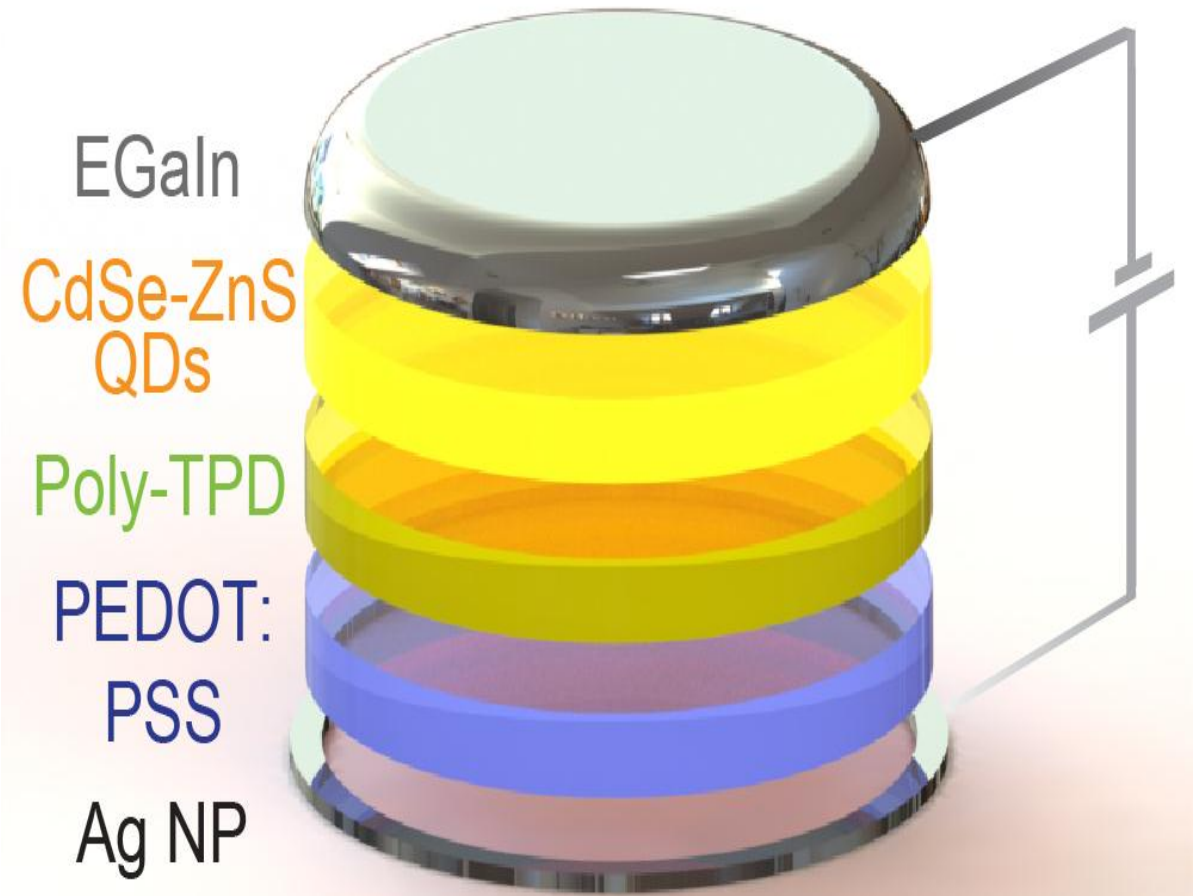
Biologically Real



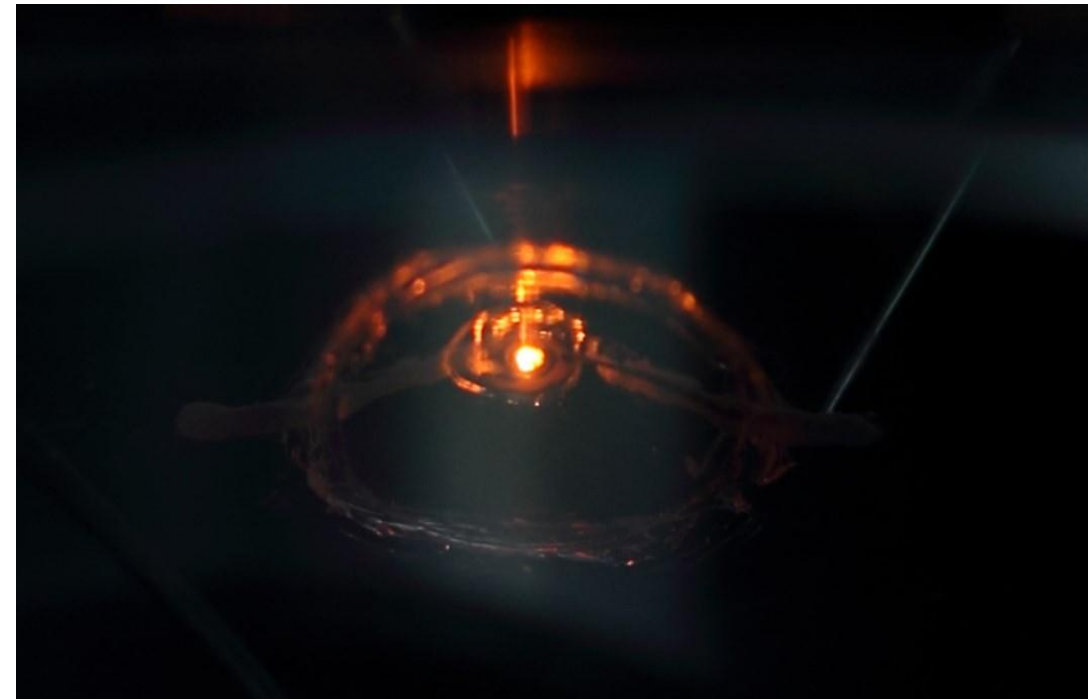
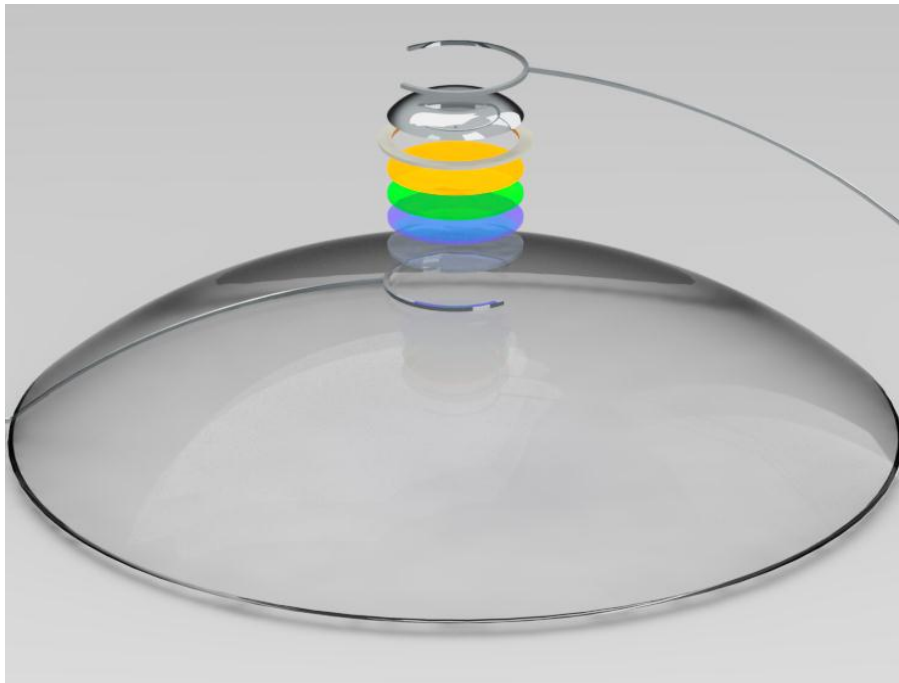
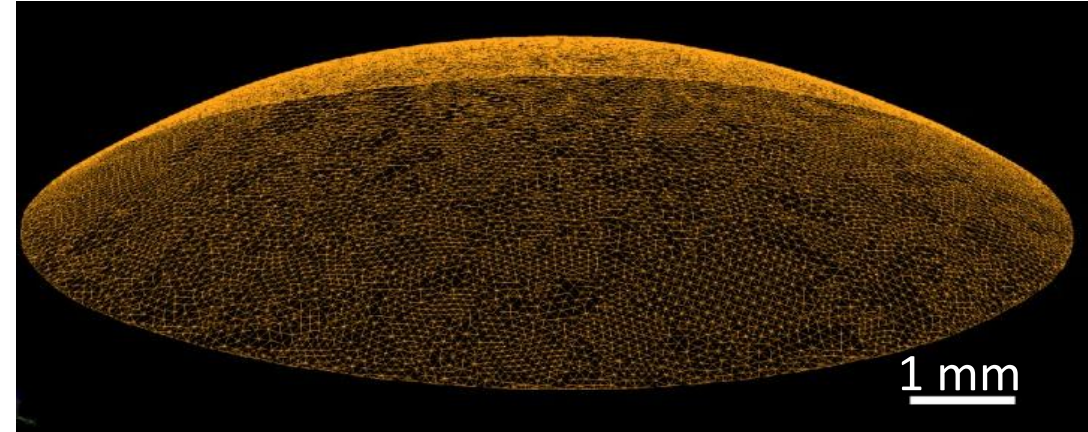
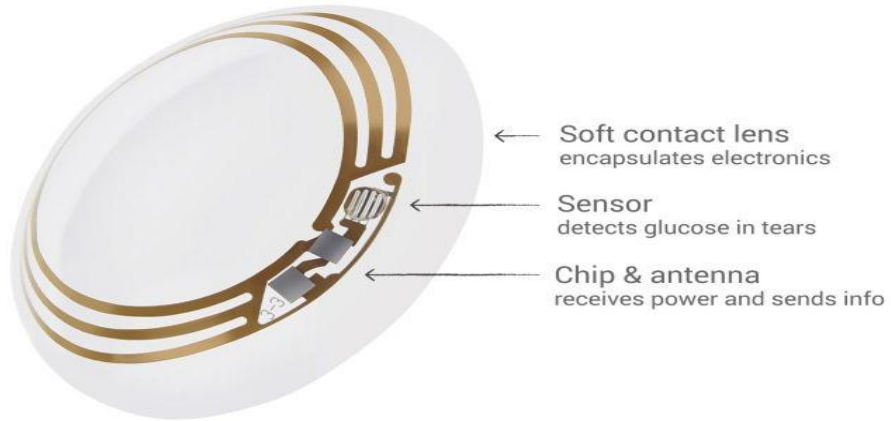
Bio-Augmentation



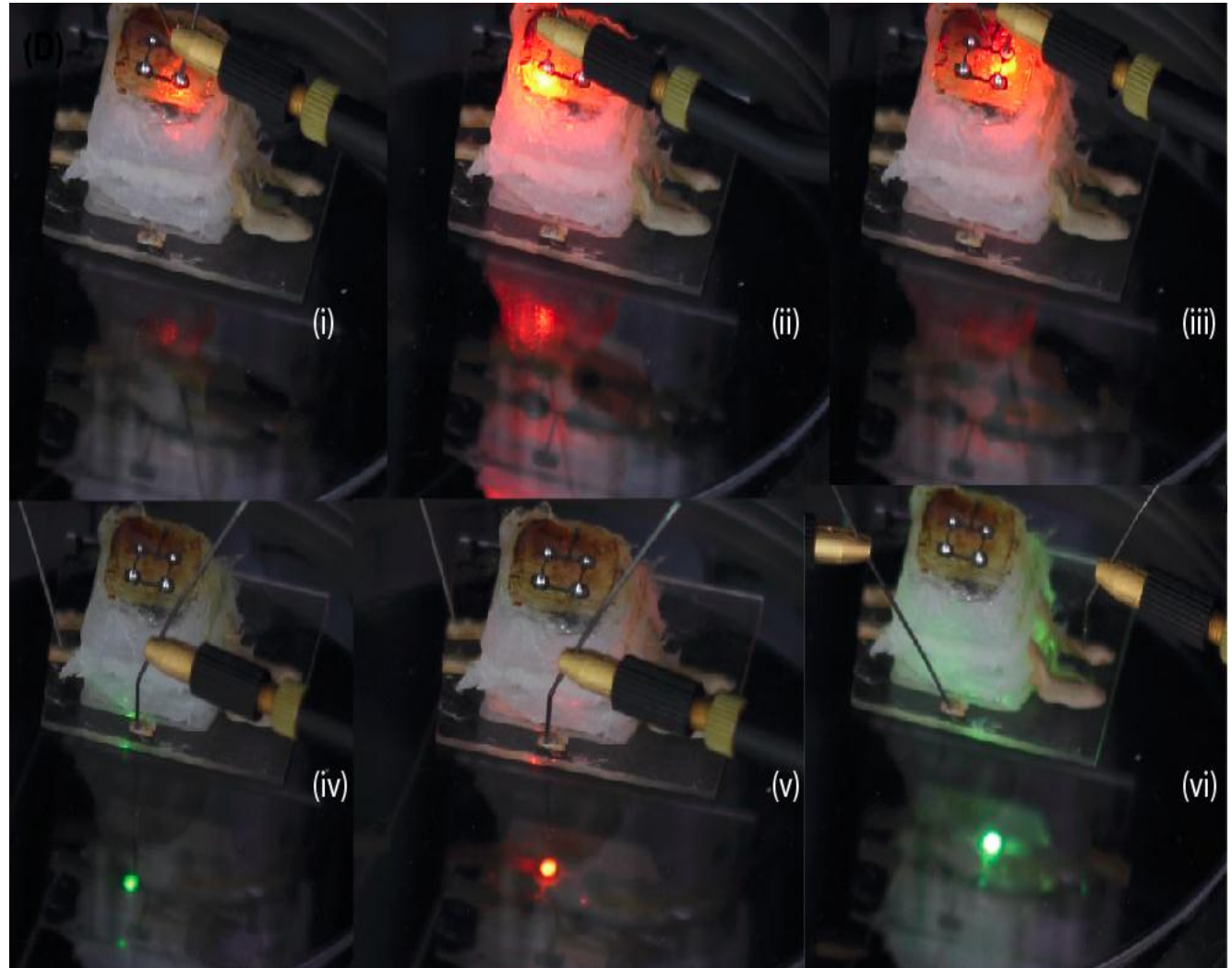
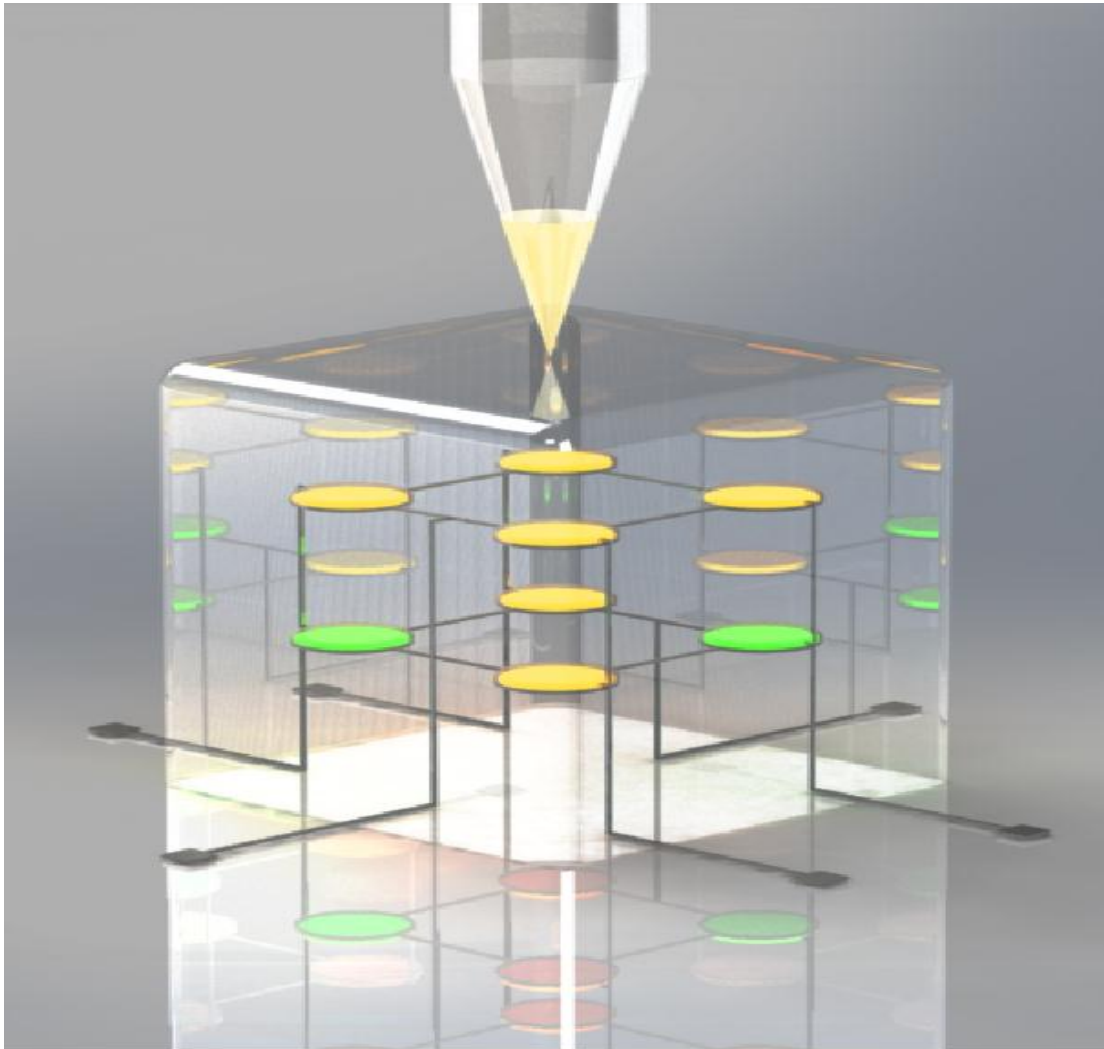
3D Printed Devices



Bionic Contact Lens



3D Electronics



McAlpine Group



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