Thoughts on the Technological Frontier Transforming the Life Sciences: Opportunities for Pennsylvania

O. Burak Ozdoganlar
Ver Planck Endowed Chair Professor
Mechanical Engineering, Biomedical Engineering, Materials Science & Engineering, and the Nanoscience Institute
Associate Director, Engineering Research Accelerator of College of Engineering

BioIntegrated Manufacturing & Microdevices (BIMM) Lab @CMU

Carnegie Mellon University

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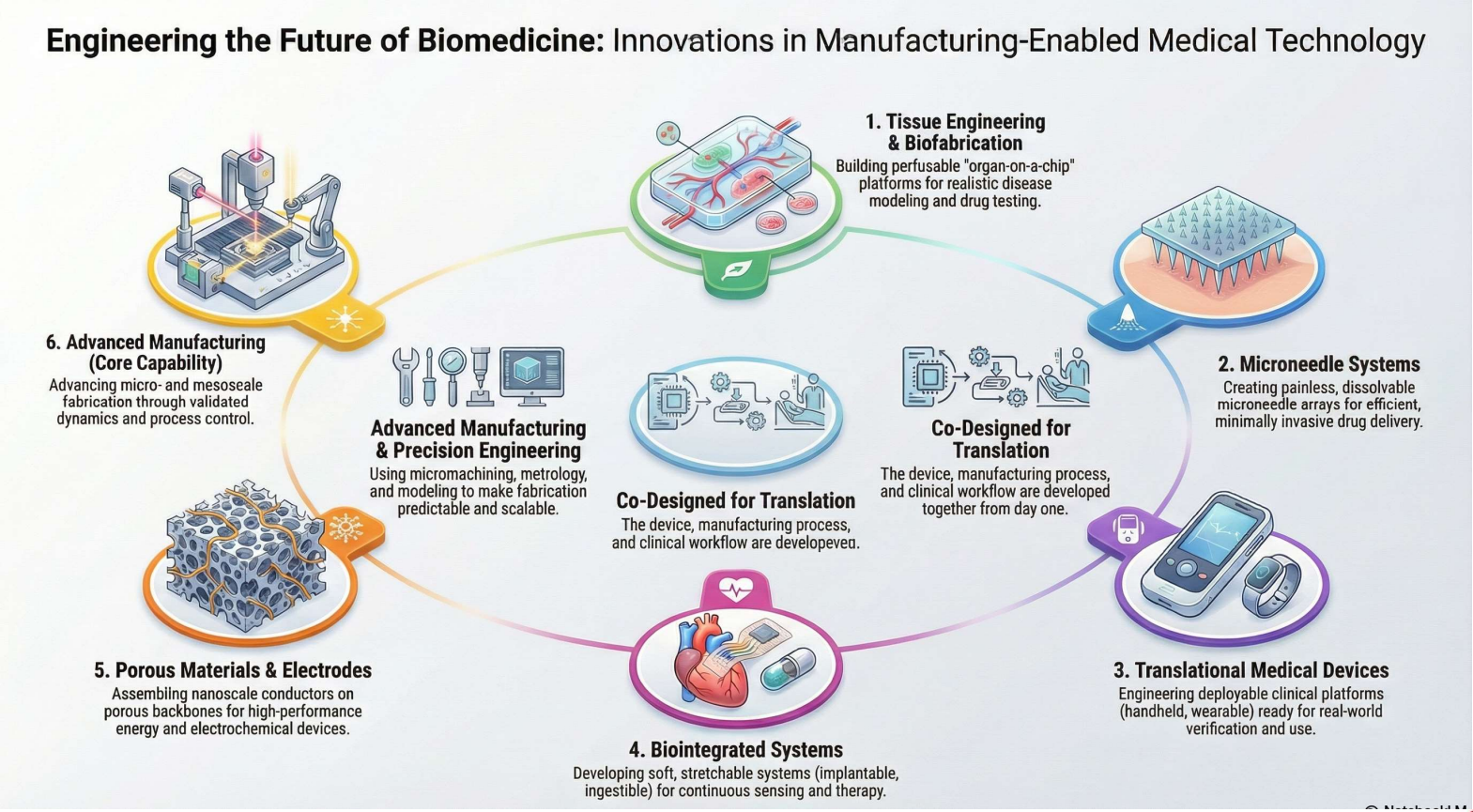
BioIntegrated Manufacturing & Microdevices (BIMM) Lab

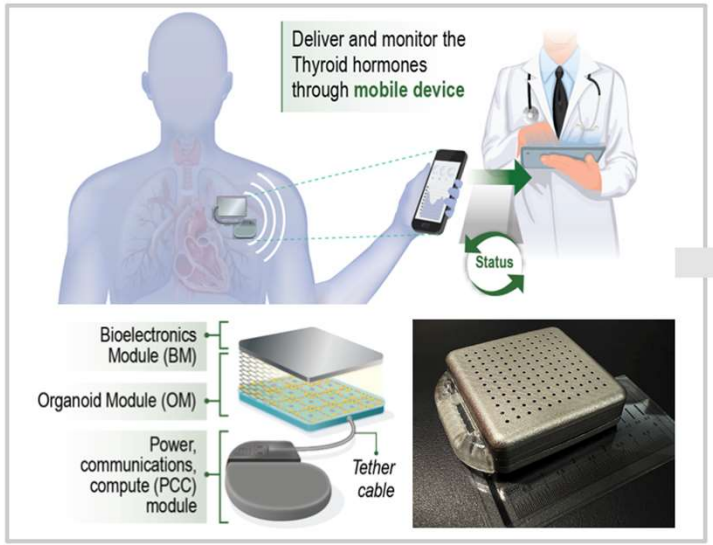


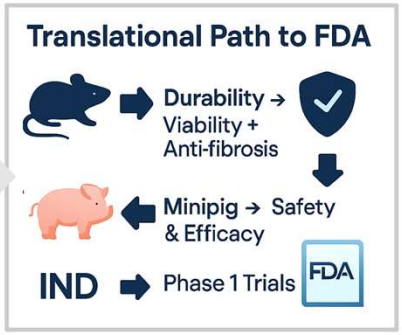
BIO-INSYNC: Biointegrated Implantable Systems for Cell-based Sensing and Therapy

REACT

ARPA H

- Funded by ARPA-H (**up to $42M**) for 5.5 years
- Led by CMU (**PI: Ozdoganlar**), and includes researchers from **UPitt** and **UPMC**
- "The team from Carnegie Mellon University, focusing on both the Living Sentinel and the Living Pharmacy tracks, which will monitor and treat hypothyroidism through their Biointegrated Implantable Systems for Cell-based Sensing and Therapy (BIO-INSYNC) device. BIO-INSYNC will continuously measure a person's hormone levels and produce precise doses of a missing hormone to maintain proper levels, reducing the burden for people who require life-long daily treatments."





* Clinical trials to begin in less than 4 years

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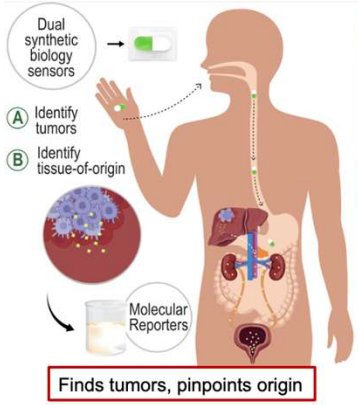
Cancer Detection for Early Tumors using Enhanced Cell Targeting

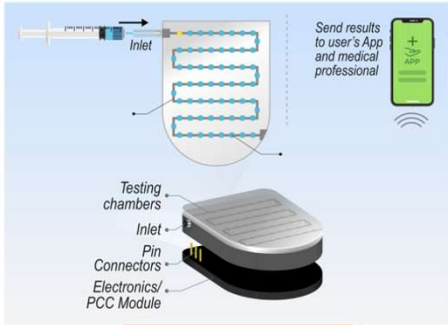
POSEIDON

ARPA H

- Funded by ARPA-H (**up to $26.7M**) for 5 years; Led by CMU (**PI: R. Taylor; co-I: Ozdoganlar**), and includes researchers from **UPitt/UPMC.**
- Developing a simple-to-use **multi-cancer early detection (MCED) kit** for detecting stage 1 tumors from urine samples, with high sensitivity, specificity, and tissue-of-origin prediction accuracy.
- "Carnegie Mellon University in Pittsburgh, Penn., with its commercial partner Ginkgo Bioworks, aims to develop orally-administered probiotic sensors, which will release bespoke barcodes for urine-based detection with a custom chip."



Finds tumors, pinpoints origin



Smart, connected testing

Affordable, at-home test kit

Next 30 years

In the U.S.		Globally	
40M+ Late-stage diagnoses	**29.1M** Deaths due to late	**200M+** Late-stage diagnoses	**130M+** Deaths du- to late detection
$6.7T **Total** cancer care costs.		**$32.2T** Total global cancer care costs.	

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