

Lehigh Bioengineering Seminar Series presents:

Dr. George C. Engelmayer, Jr., PhD

Founder and CEO: Cultivated Biomaterials LLC

“Making More out of Meat being Muscle: A selection of biomedical tissue engineering and cellular-agriculture highlights spanning academia and industry—a tale of synergy.”



Friday, October 3, 2025
10:45 AM-11:45 AM
HST 101

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Please contact the Bioengineering Department (inbioe@lehigh.edu) with any questions or comments.

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Abstract:

Over the past decades, and particularly since the pandemic and concerns over zoonotic diseases and supply-chain challenges, providing food security for Earth’s growing population has taken on paramount importance. With sustainability and ethical concerns around intensive animal farming, there is growing interest in building technologies to cultivate real meat from cells.

It is now possible to cultivate animal cells in bioreactors and combine them with plant-based ingredients to produce hybrid products. Cultivated meat production benefits from biotechnology advances but poses unique challenges, including scale-up to match global meat consumption. Indeed, the industrial-scale production and consumer adoption of cultivated meat is an example of the interplay between science, technology, and society. Diversity is a centerpiece of the cellular agriculture and cultivated meat space, as it has been the socially and environmentally mindful dedication of persons from all backgrounds that has advanced the field so effectively and rapidly. From food policy to cell biology, academic training spanning nutrition, ethics, and nearly all science and engineering disciplines is making an impact. In particular, the development of cultivated meats comprising principally cells and tissue has been guided by the principles of biomedical tissue engineering. Conversely, the nascent principles of cultivated meat have only begun to come full circle to inform biomedical advances.

In this talk, Engelmayr will highlight opportunities for biomedical-cellular agriculture cross-pollination and synergism through the lens of three academic-industrial examples:

- First, in “Bacon unwoven, muscle de novo,” we will explore how at my startup Myodenovo, Inc., some of the earliest nonwoven textile scaffolds guided the innovation of sustainable

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plant-based scaffolds and potentially healthier bacon, as well as parallels in muscle tissue engineering.

- Second, in “Learning the lay of leather from heart valve leaflets,” we will explore how at my startup Cultivated Biomaterials, the flexural biomechanics of tissue-engineered heart valve leaflets is guiding the design of cultivated leather having desirable bending characteristics, as well as how learnings may apply to improving heart valve designs.
- And third, in “Rock and roll for the biomasses, pump up the volume,” we will explore how bioreactors employing relatively simple fluid mechanical stimuli (e.g., as elicited by rocking, rolling, and perfusion) may be scalable for increasing cultivated meat biomass and leather production volumes, as well as how these technologies may be adapted to biomedical tissue engineering applications.

Personal Bio:

George C. Engelmayer, Jr., PhD is a biomedical engineer specializing in the field of tissue engineering. He studied at Penn State, the University of Pennsylvania, and completed his PhD under the guidance of Prof. Michael S. Sacks at the University of Pittsburgh. From 2005 to 2009, Engelmayer conducted postdoctoral research in cardiac muscle tissue engineering under the guidance of Dr. Lisa E. Freed and Prof. Robert Langer at MIT. Engelmayer served as an assistant professor in the Department of Biomedical Engineering at Penn State, a research scientist at Duke, and led an R&D team at the Durham, NC-based tissue engineering company Humacyte before moving to San Francisco in 2018. There, he held leadership roles in cultivated meat and cultivated leather companies, including Director of Bioprocess Engineering at UPSIDE Foods, VP of R&D at VitroLabs, and Chief Scientific Officer at Mission Barns. In December 2022, he founded cultivated meat startup Myodenovo, and in May 2024 he founded Vasavance. In 2025 he founded Cultivated Biomaterials LLC, a startup bringing to market the first cultivated leather harmlessly grown from the skin cells of a sanctuary-grazing cow named Angel.