

Breakthrough Technologies for the Warfighter

BUILDING ON THE PROMISE OF
REGENERATIVE MEDICINE





The Next Evolution of Medical Treatments

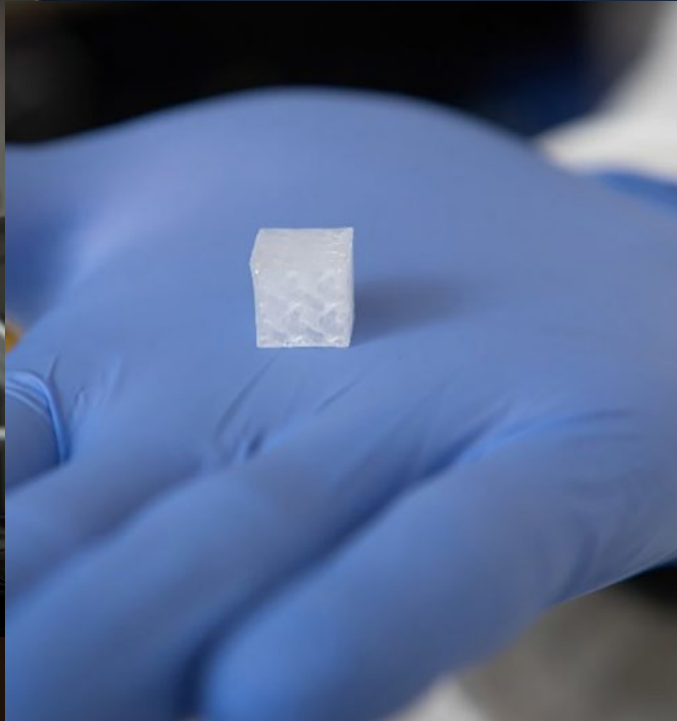
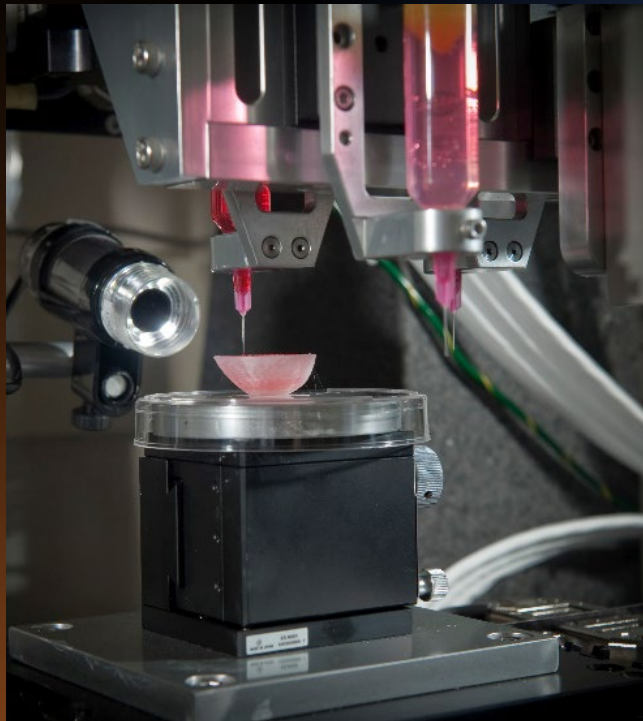
- Regenerative medicine has been called the "next evolution of medical treatments" by the U.S. Department of Health and Human Services. With its potential to heal, this new field of science is expected to revolutionize healthcare. It is our mission at WFIRM to improve patients' lives by developing regenerative medicine therapies and support technologies.



Wake Forest Institute for Regenerative Medicine (WFIRM): A Record of World Firsts

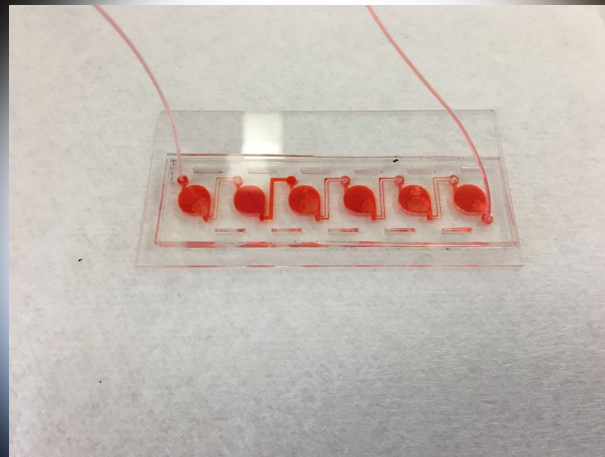
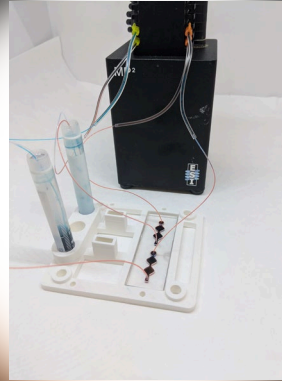
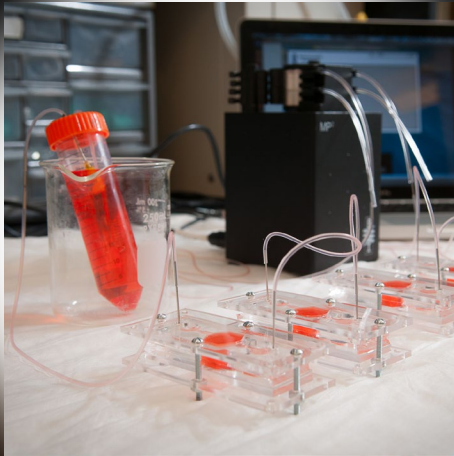
- As leading experts in the field of regenerative medicine, our faculty and research associates are pursuing multiple strategies simultaneously, using:
 - tissue engineering
 - cell therapies
 - diagnostics
 - drug discovery
 - biomanufacturing
 - nanotechnology
 - gene editing
 - 3D bio-printing

3D Bioprinting



- WFIRM was first to create a laboratory-grown organ implanted into a human
- The need to scale up the manufacturing process led to development of the Integrated Tissue and Organ Printing system
- Proved the feasibility of printing living structures – bone, cartilage and muscle tissue that developed a system of nerves and blood vessels
- First regenerative medicine microgravity experiment in space – May 21, 2023, AX-2 launch


Organ Tissue Equivalents (aka Body-on-a-Chip)



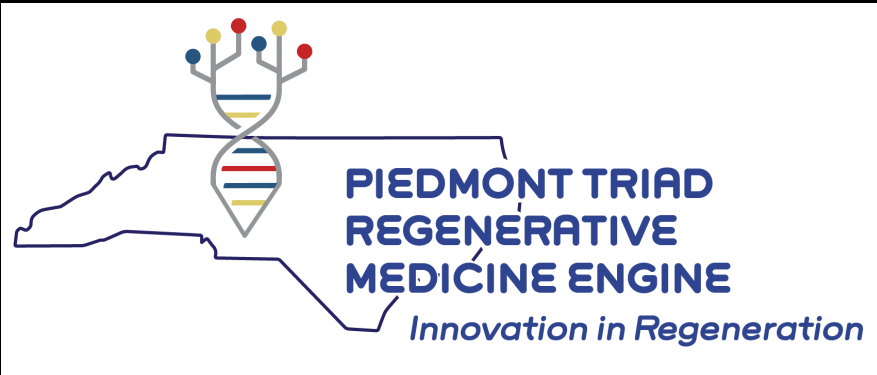
- Patient-specific cancer tumor organoid models are used now to better evaluate drug therapies for patients
- Lung-on-a-chip model used to assess treatments for hazardous chemical injuries and in the future could evaluate the human immune response
- Multi-organoid systems project seeking to predict viral and toxin morbidity/mortality and identify potential pathways of therapeutic intervention.
- Animal organoid systems correlated with human organoid systems to reduce or eliminate animal testing.
- Exploring OTE Environmental Sensor Concept for early detection of chemical and biological hazards

Support to the Warfighter



- On behalf of the Defense Health Agency, WFIRM leadership directs the **Armed Forces Institute of Regenerative Medicine (AFIRM)** consortium of more than 30 academic institutions and industry partners.
- AFIRM focuses on developing clinical therapies for wounded warriors and the general public in 6 areas: 
 - ✓ Craniofacial regeneration
 - ✓ Extremity regeneration
 - ✓ Genitourinary/lower abdomen
 - ✓ Skin and wound healing
 - ✓ On-demand blood
 - ✓ Cellular therapies for trauma

NSF Regional Engines

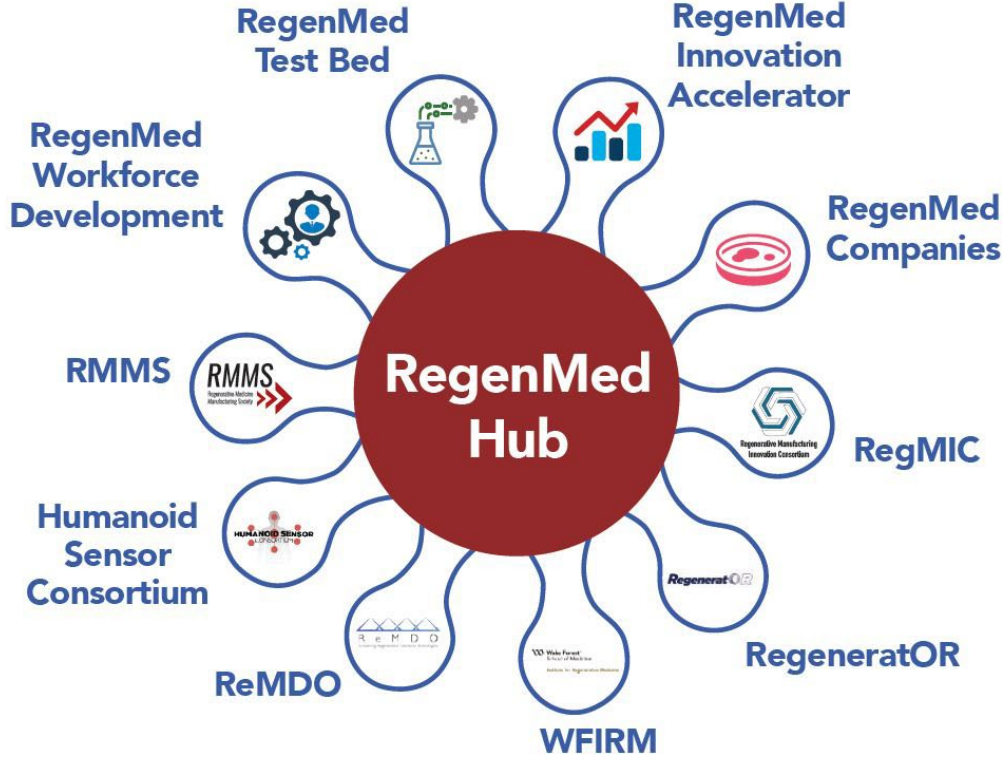


The Piedmont Triad Regenerative Medicine Engine will create an innovation ecosystem that nurtures and expands the regenerative medicine industry and a diverse workforce, providing jobs and increasing the economic health of the region. This will be accomplished by growing a research and translation infrastructure designed and managed to meet the needs of the emerging field of regenerative medicine.

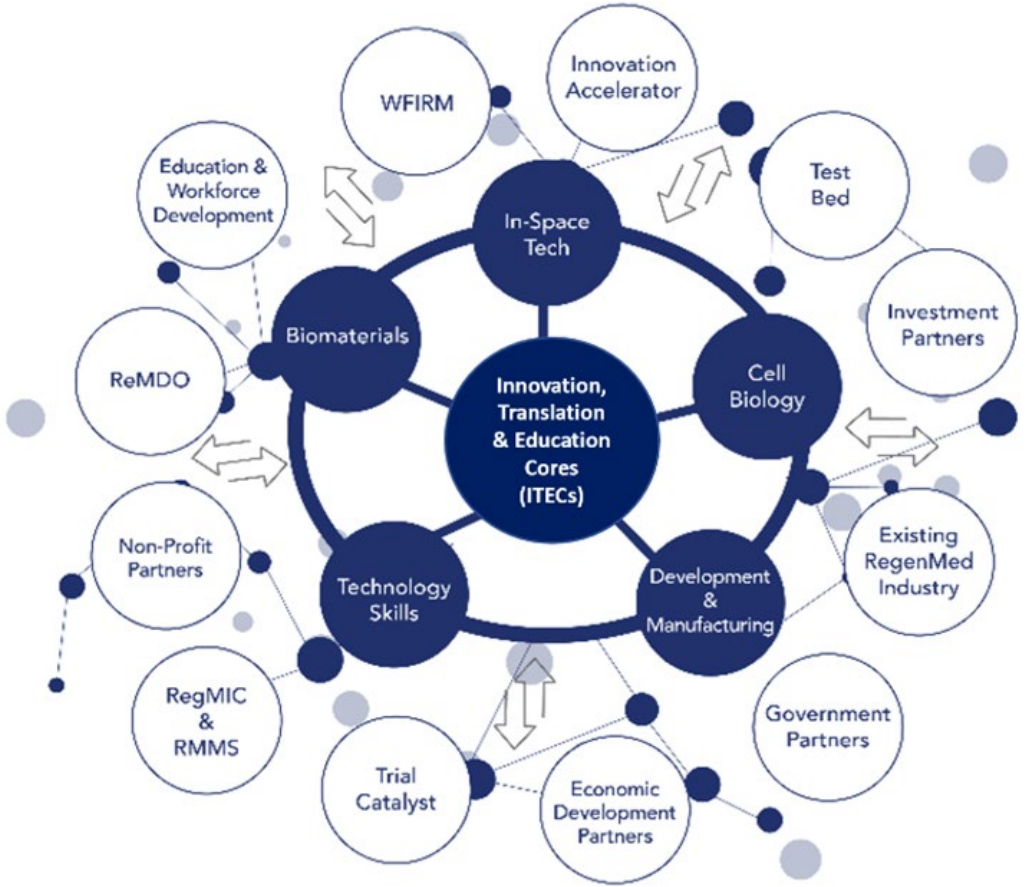
Initial Goals and Projected Accomplishments (2024-2026)

- **Establish new Innovation, Translation, and Education Cores** for new product ideation and development. Partners' "shovel-ready" products will be commercialized creating new companies and product-to-market collaborations for business partners.
- **Develop a pipeline of highly skilled technical workers** to address regen med employers growing needs and the skill gaps in the current workforce.
- **Expand industry partnerships** by recruiting new companies to the ecosystem and supporting business creation.
- **Create an effective Engine organization** to carry out project and program goals.

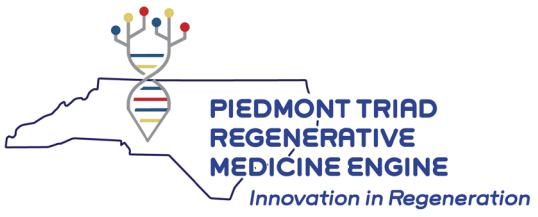
NCERM (NORTH CAROLINA ENGINE FOR REGENERATIVE MEDICINE)



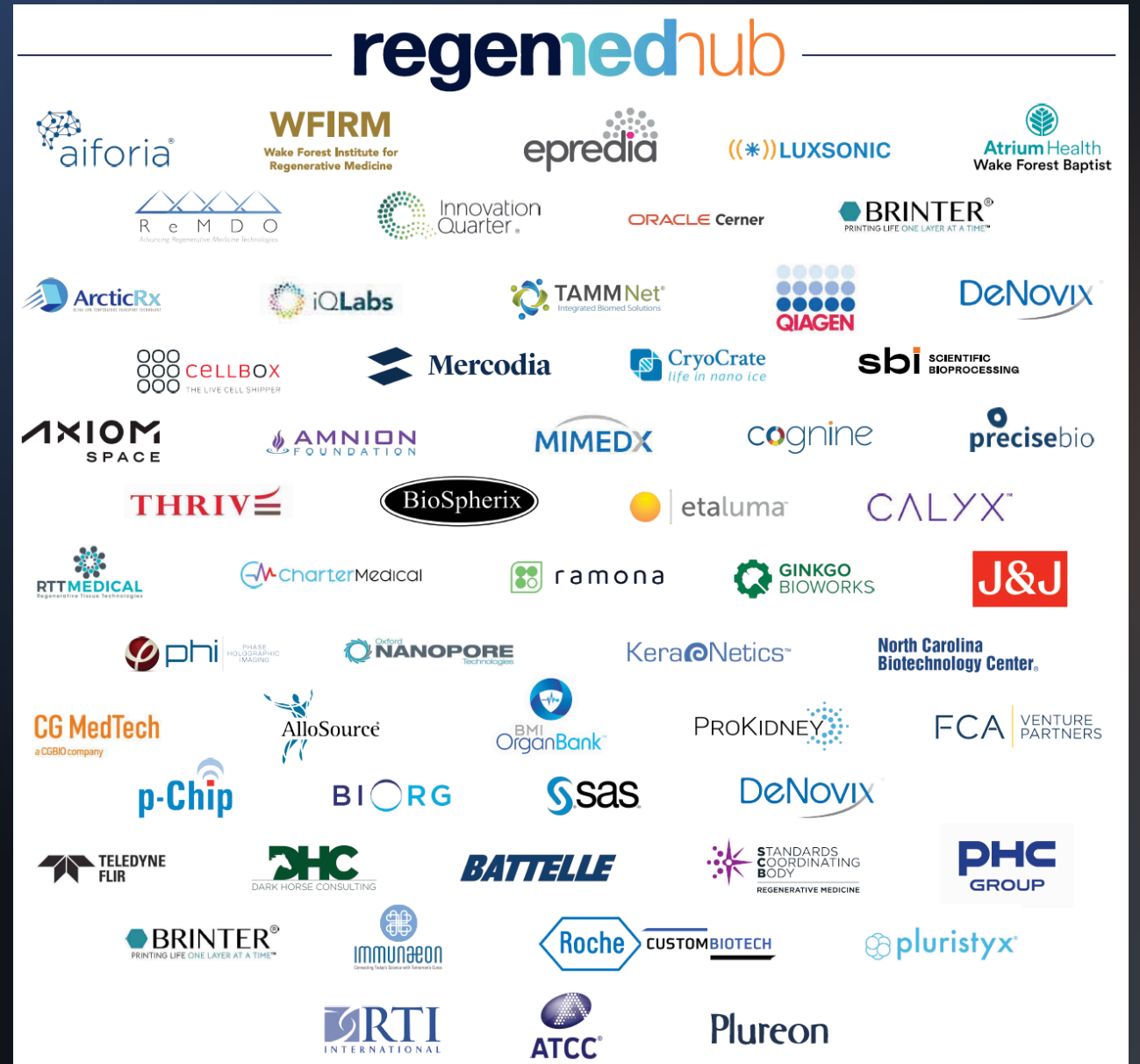
2022



2024



Our Growing RegenMed Hub Ecosystem



Thank You!

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Wake Forest Institute for Regenerative Medicine (WFIRM)

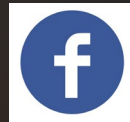


- ❖ <https://school.wakehealth.edu/research/institutes-and-centers/wake-forest-institute-for-regenerative-medicine>
- ❖ <http://remdo.org/>



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