



# NextGen Manchester Resiliency Council

**SNHPC Commission Presentation, November 28 2023**

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NextGen Manchester Resiliency Council

# What is Biofabrication?

*Biology + Engineering + Manufacturing + Automation = Biofabrication Industry*

**Broadly Defined:** A process that results in a defined product with biological function <sup>1</sup>

**Application:**



Tissue Engineering &  
Regenerative Medicine



Lab-Grown  
Leather



Lab-Grown Meat



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[1] Groll, Jürgen, et al. 2016. "Biofabrication: Reappraising the Definition of an Evolving Field." *Biofabrication* 8 (1): 013001. <https://doi.org/10.1088/1758-5090/8/1/013001>.

[2] Langer, R., and J. P. Vacanti. "Tissue Engineering." *Science (New York, N.Y.)* 260, no. 5110 (May 14, 1993): 920–26. <https://doi.org/10.1126/science.8493529>.

[3] Mason, Chris, and Peter Dunnill. "A Brief Definition of Regenerative Medicine." *Regenerative Medicine* 3, no. 1 (January 2008): 1–5. <https://doi.org/10.2217/17460751.3.1.1>.

[4] Accessed from: <http://hybridsofartandscience.blogspot.com/2009/09/whos-tools-are-they-review-of-book.html>

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**Tissue  
Engineering:**

An interdisciplinary field that applies the principles of engineering & life sciences towards the **development of biological substitutes that restore biological tissue function or a whole organ** <sup>2</sup>

**Regenerative  
Medicine:**

The process of replacing, engineering, or regenerating cells, tissues, or organs to restore or establish normal function <sup>3</sup>



The Vacanti Mouse <sup>4</sup>



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# The Opportunity

## *Revolutionary, curative treatments for chronic illness & traumatic injury*

### Human Impact & Inequity

- 6 in 10 Americans live with at least 1 chronic illness
- 100,000+ Americans on National Transplant

Waiting List

***17 lose their lives waiting each day***

### Economic Strain

- U.S healthcare outcomes trail other nations despite highest per capita spending in the world

***Diabetes: \$327 billion each year***

***Kidney disease: \$114 billion each year***

### The New York Times

#### *A Millyard Transitions From Textiles to Tech*

March 14, 2017



***Revitalizing a historic manufacturing area***



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# The potential has been known for decades

## Why commercialization failed in the past:

- Expensive manual manufacturing processes
- Regulatory challenges
- Fragmentation across disciplines

## What is different today:

- Advanced Regenerative Manufacturing Institute (ARMI) founded in 2016 to overcome long-standing barriers
- Combined expertise of nearly 200 entities across industry; academia; and government and non-profit sectors
- ARMI | BioFabUSA's Automated Tissue Foundry
  - Scalable, Modular, Automated, Closed manufacturing



# New Hampshire Biofabrication Cluster

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The \$1 billion Build Back Better Regional Challenge is part of the EDA's American Rescue Plan programs that aims to boost economic recovery from the pandemic and rebuild American communities.

The Challenge provides transformational investments to develop and strengthen regional industry clusters, all while embracing equitable economic growth, creating good-paying jobs, and enhancing U.S. global competitiveness.



**\$44M awarded to the New Hampshire's BioFabrication Cluster**



# NextGen Manchester Resiliency Council

## Our Vision:

To transform the **Southern New Hampshire Economy** with the establishment of a Biofabrication Cluster to further grow the regenerative medicine industry and lead the nation in the production and distribution of regenerative tissues as organs.

## Coalition Partners:



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# Our Mission

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*NextGen Manchester Resiliency Council*

To foster the growth and development of Manchester & Southern New Hampshire by creating family-sustaining jobs and expanded opportunity through the growth of the biofabrication industry.

Increase Manchester's  
annual GDP

Raise Regional  
Household Incomes

Reduce Poverty

Establish New Hampshire as a Global Leader in Biofabrication



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# Building on Regional Assets







## BioFabrication Manufacturing Facility



Produces Human Cells, Tissues, and Organs for Chronic Disease and Traumatic Injury

Equity Programs



Work & Learn



BioFab Training Facility

Feeder For CMO



BioFab Startup Lab

Goal: 30% workforce participation of underrepresented communities.



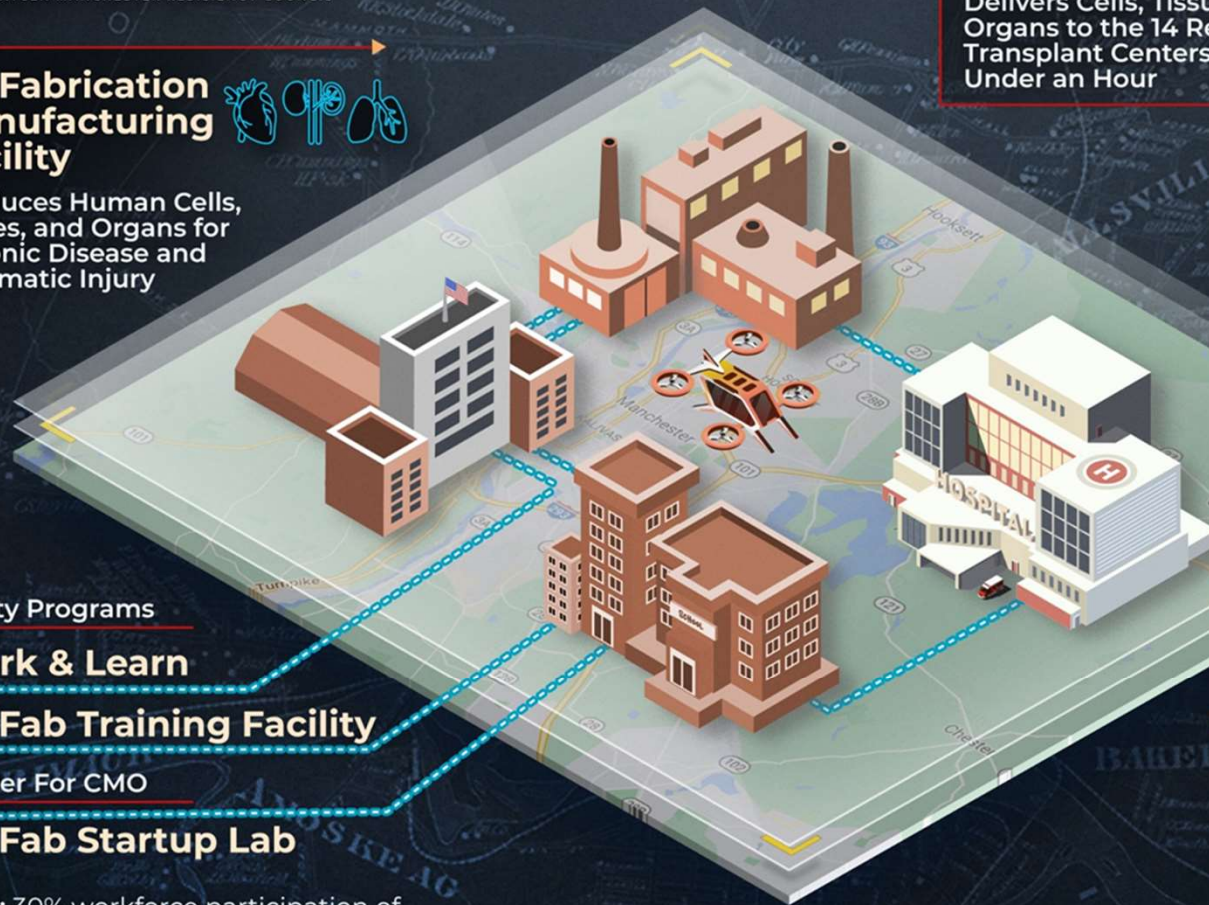
## Vertiport Network

Delivers Cells, Tissues, and Organs to the 14 Regional Transplant Centers in Under an Hour



Five Projects, 2023-2026+

6,913 direct jobs in Manchester  
37,250 total jobs direct + indirect



# Project Highlight: Biofabrication Startup Lab

*Company presentations at the Inaugural Startup Lab Investment Summit*



## Ryne Bio

Dopamine neuron replacement with potential to cure neurological disorders like Parkinson's disease



## Pro Therapeutics

Soft tissue therapies to regenerate tendons, tendons, ligaments & muscles to their native functioning



## Okulovision

Cellular therapies with potential to reverse, not just slow, central vision loss



## Minutia

Insulin-producing cellular transplants with nano sensors for people living with diabetes



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# Project Highlight: Vertiport Logistics Network

## *Advanced Aerial Mobility network for tissue & organ transplantation*

- Powered by electric vertical take off and landing planes (eVTOL)
- Initial location close to the Manufacturing Facility (*challenge point*)
- Network links with regional transport centers



# Project Highlight: Work & Learn Program

## Inspiring, Educating & Training the Future Workforce

Increased support for  
ESOL learners

Investments in public  
technology infrastructure

Transportation  
equity study

Reduce barriers to access opportunities

BioTREK Expansion

Manchester CREATES

STEM-MoBILE  
Lab Experience

Educate & inspire students

Student Employment  
Partnerships

Biofabrication Certificate  
Programs

Biofabrication  
Apprenticeship Programs

Train & match workers to jobs



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# Transportation Equity Study

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- Project Goal:** Connect residents from underserved populations with access to education and opportunity in the Millyard TOD District
- Objective 1:** Improve equitable, multimodal connections **between** the Greater Manchester area and Millyard TOD District
- Objective 2:** Improve equitable, multimodal connections **within** the Millyard TOD District



Community  
Outreach &  
Engagement

Data  
Collection &  
Analysis

Equity  
Challenges  
Report

Transport  
Equity Plan  
Framework

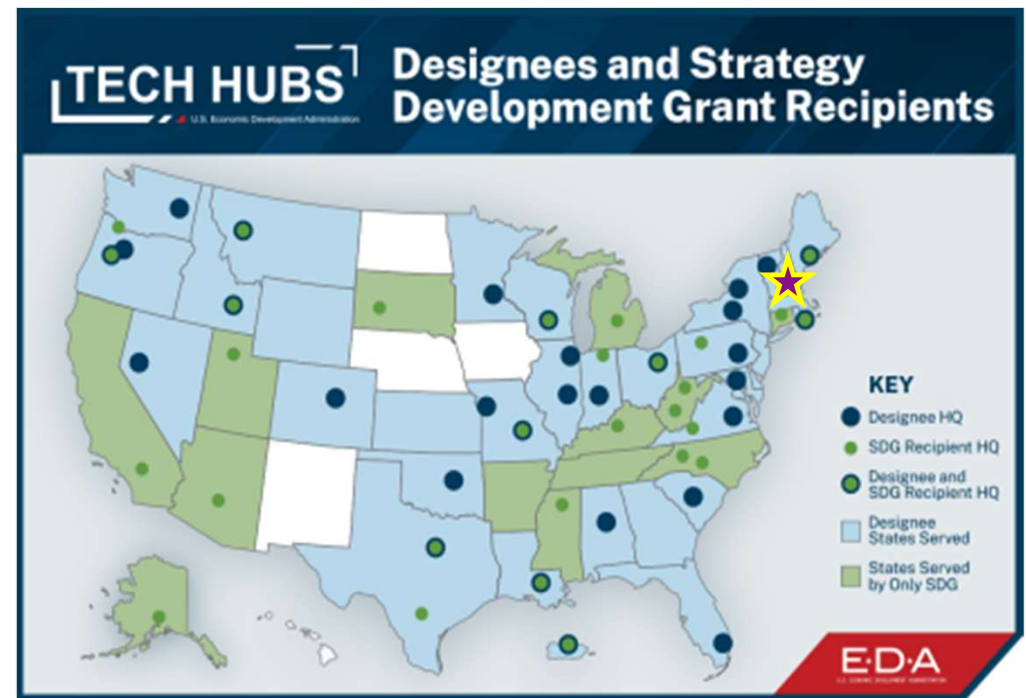
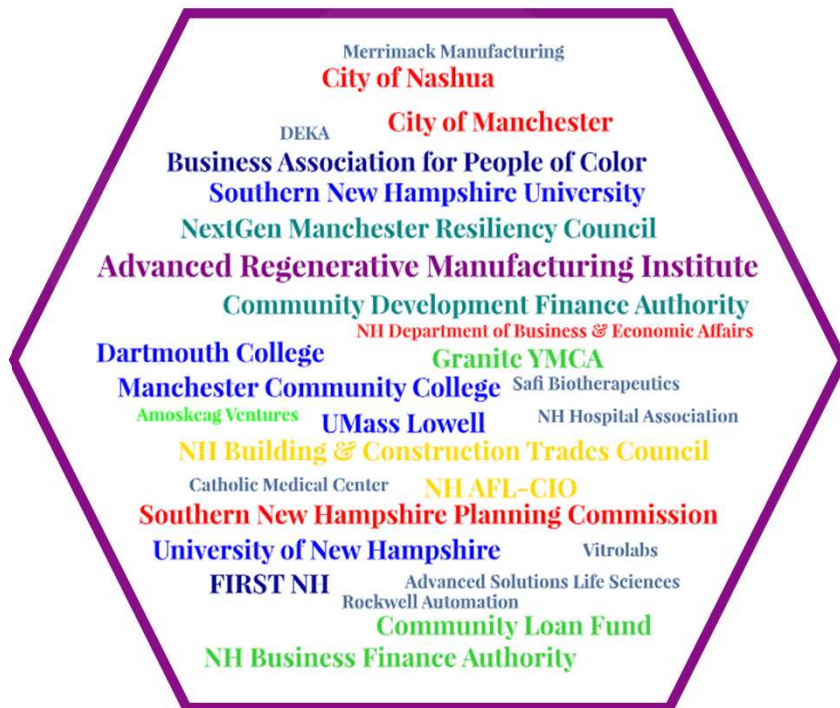
Implementation  
Action Plan



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# What Could be Next: Tech Hubs

## *ReGen Valley Consortium*



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# Keep in Touch!

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