Fostering Convergent Scientific Research and Industry Engagement in a University Setting: Challenges and Strategies

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University of Michigan
Health System

University of Michigan North Campus Research Complex

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Acquisition of NCRC Provided Us With:

- 362, 386 NASF Resource-Intense Laboratory Space
- 68,374 NASF Animal Space, Esp Large Animals
- 530, 000 NASF Non Resource-Intense Space for Dry/Admin
- 175 Acres Land for Building Expansion
- Leftover Equipment (e.g. MRI)
- Dedicated Power Lines, Generators

- A Campus Designed for a Pharmaceutical Company
- A Costly GMP Facility with Supporting Buildings
- Buildings Requiring Expensive Renovation/Demolition
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- Physical Distance from Other Campus Hubs
- A Complex Governance Structure

NCRC Development: Guiding Principles

- No single University unit can occupy the entire campus
- Doing nothing is expensive
- Utilize the space for purposes similar to its original use
- We HAVE to foster convergent science!

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Programmatic Composition of NCRC

- Cardiovascular
- Biointerfaces
- M-CIRCC (Critical Care)
- Translational Oncology
- Comput Med & Bioinformatics
- Inst. for Health Policy & Innovation
- Distr. Health Technologies

- Genomics Core
- Lab Animal Medicine
- IRBs
- Clinical Trials Offices
- SPORES
- BEC/OTT
- Venture Accelerator
- PPP

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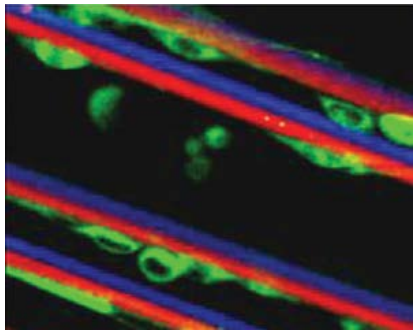
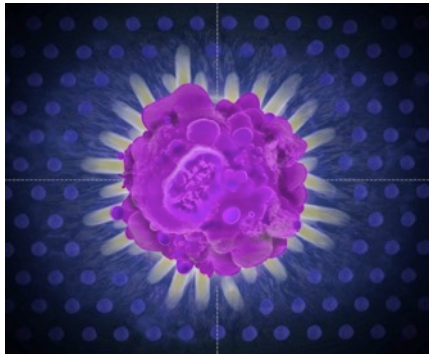
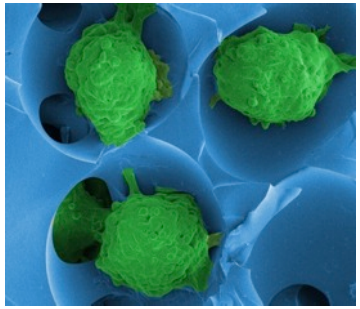
Biointerfaces Institute

21 research groups have co-located in UM's North Campus Research Complex. Working together under one roof, we are advancing research in four main areas:

- **biomaterials and drug delivery,**
- **cell and tissue engineering,**
- **microfluidics and sensors, and**
- **nanotechnology.**







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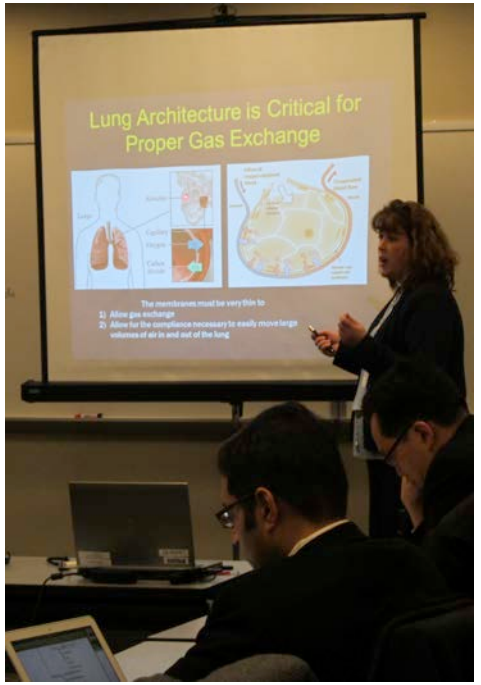
Convergence Through Grand Challenges

Noble Metal Nanoparticles for Biomedical Applications (July 2012)

- Co-sponsored by Biointerfaces Institute and IMRA America, Inc.
- 39 participants
- 13 researchers drafted 6 proposals for seed money
- 3 Successful proposals received $200K in seed funds



Detecting Rare Cells and Particles (January 2013)

- 57 participants
- 10 Local Biomedical Companies Participated
- 20 researchers drafted 11 proposals for seed money
- 3 successful proposal received $230K in seed funds
- Testbed for BI faculty ideas toward developing a Gen-3 NSF ERC Proposal

Nanomedicine Challenge (November 2013)

- 60 faculty participants + an additional 60 student participants in 1st day program
- 26 researchers drafted 9 proposals for seed money
- 2 successful proposals received $140K in seed funds
- 4 new researchers working in BI Integration Space as a result of seed fund awards

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Experiments with Convergence: MCubed

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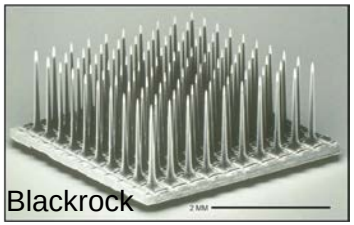
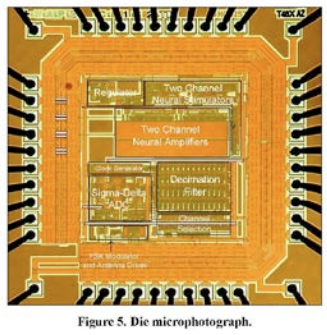
Cortical Neural Prostheses Lab

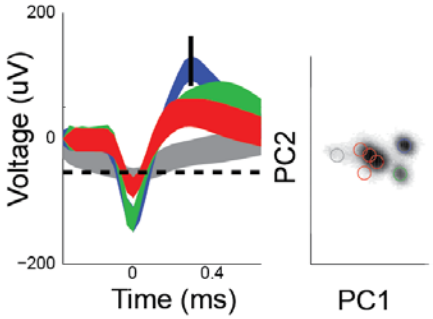
Multi-Electrode Arrays



Motor Neuroscience



Custom Electronics



"Decode" Algorithms

Advanced Prostheses

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What Do These Individuals Have In Common?

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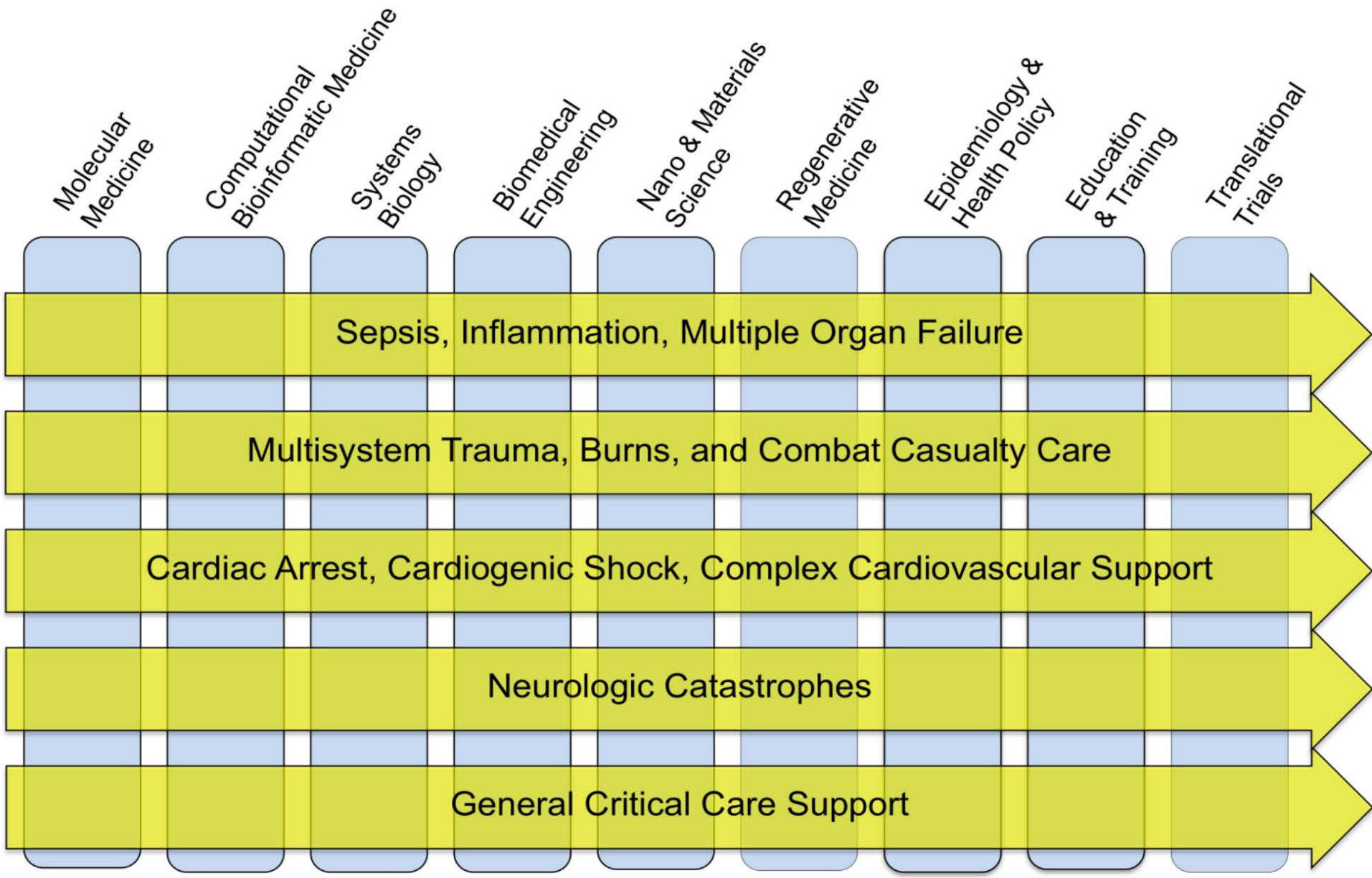
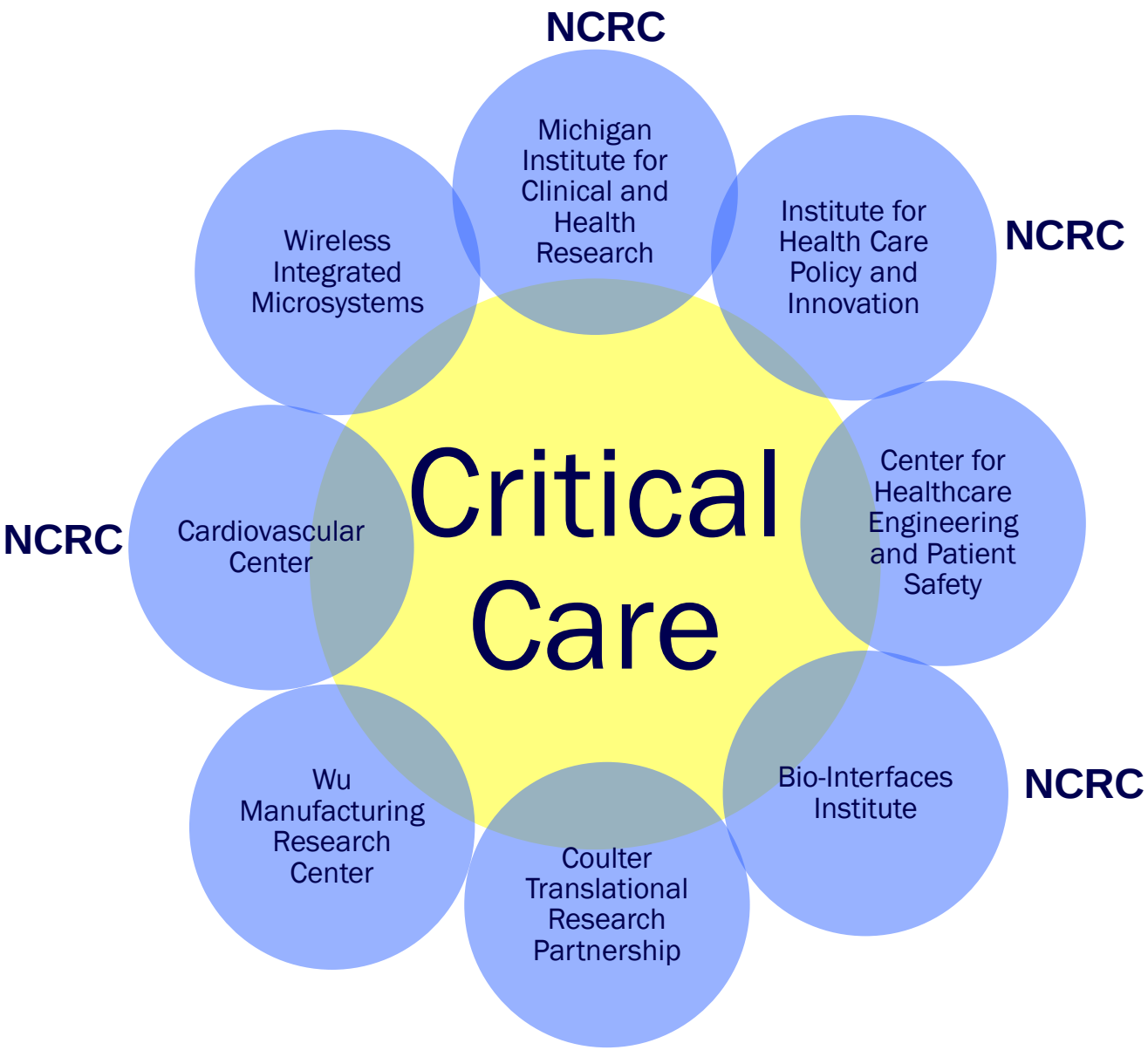
Unique Structure to Realize A True Economy of Scale



Existing UM Centers/Institutes/Interdisciplinary Programs With Potential to Impact on Critical Care



Five Years Later

- The head count at NCRC is 2,500, with ~800 more scheduled in the next 18 months
- 20% of new research grants awarded to the Medical School are to NCRC-based investigators (10% of entire university)
- Growth has been organic, and driven by the energy of the investigators (no grand plan)
- We have been able to collect metrics from day 1
- The balance of academia and industry is evolving
- NCRC is an ideal incubator to test innovative ideas to foster convergent science