

Biotechnology

Bio = Life

Technology = Solution

Biotechnology = the use of living cells and their molecules to solve problems and to make useful products
(e.g. vaccines, crops, bacteria that eats oil spills, . .)



“it is important to remember that biotech is the one industry that's poised to grapple with every major human and environmental challenge, from global hunger to global warming...”

– G. Steven Burrill,

Economic Impact

Money

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- **\$28.7 billion from biotech directly**
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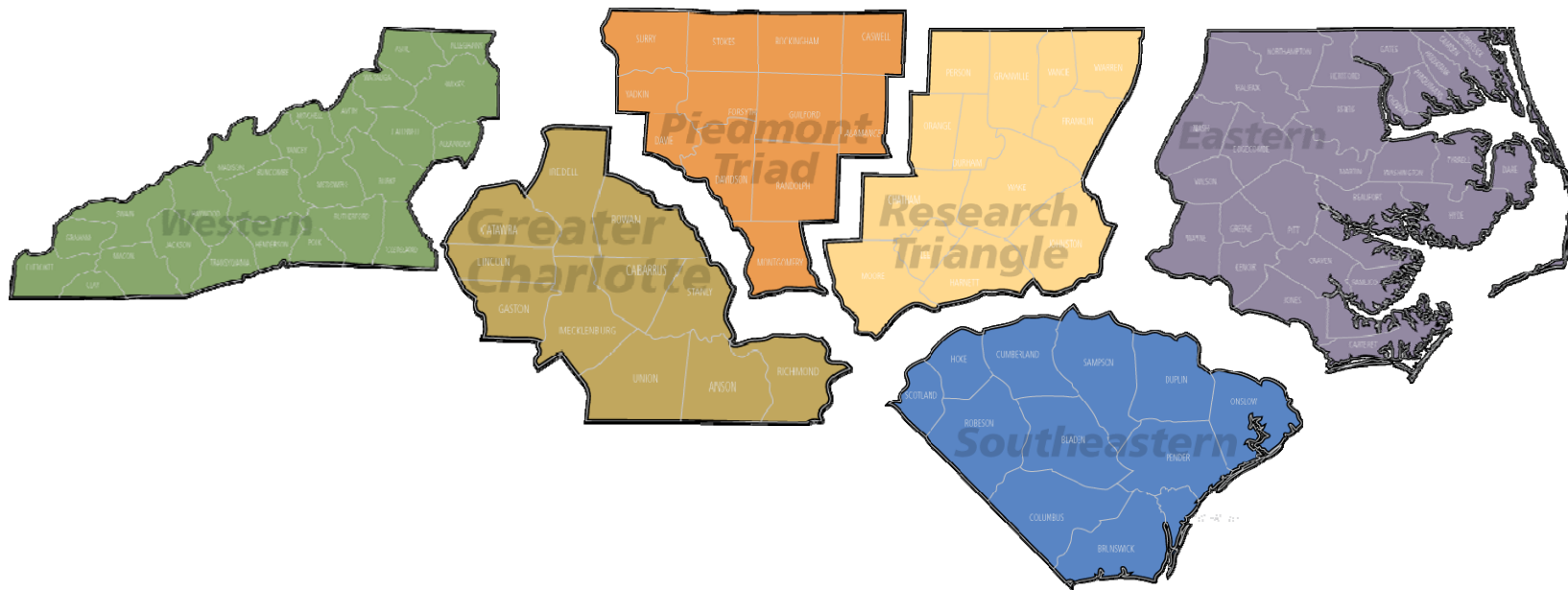
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Job Growth

- **8.5% growth over 5 years**
- **3X more than national average for biotechnology**
- **5X more than state average overall**

NC Ranks #3 in Biotechnology



To Be Part of Biotechnology

- **Facilities**
- **Critical Infrastructure**
- **Education**
- **Research**
- **Innovation**
- **Entrepreneurship**
- **Money**

Human Capital

David H. Murdock Research Institute

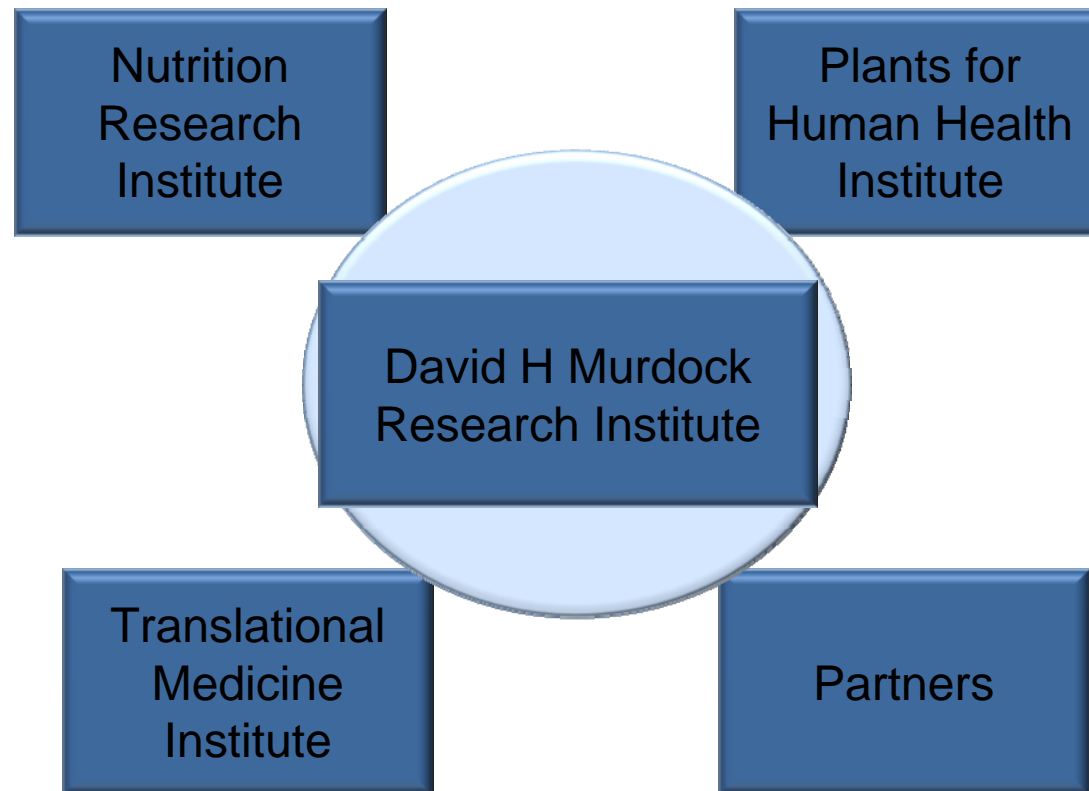
*Where the world's most powerful technologies have been integrated
into a cohesive and comprehensive research system*

...capable of solving the most demanding research

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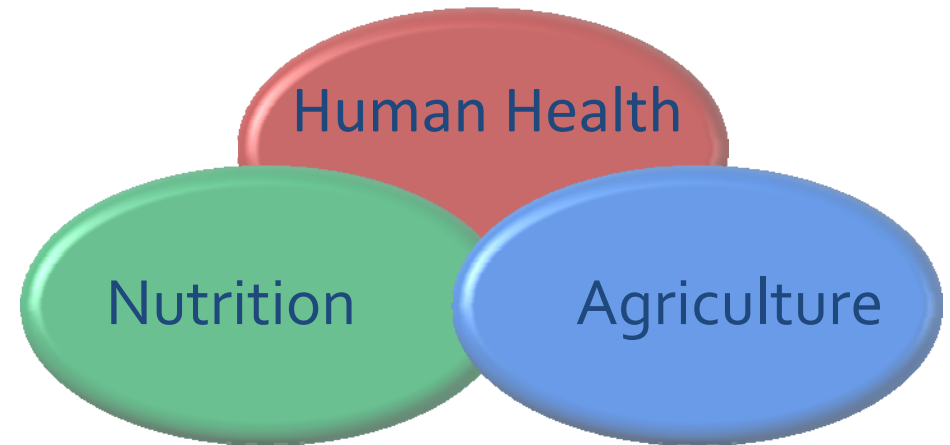
North Carolina Research Campus



**North Carolina State University • UNC Chapel Hill • UNC Charlotte • UNC Greensboro •
Duke University • North Carolina Central University • North Carolina A&T University •
Appalachian State University, RCCC**

**LabCorp • Anatomics • Carolinas HealthCare System • Dole • IMAF • Lovelace • PPD •
Microsoft • Sensory Spectrum • Zeiss**

NCRC & the DHMRI

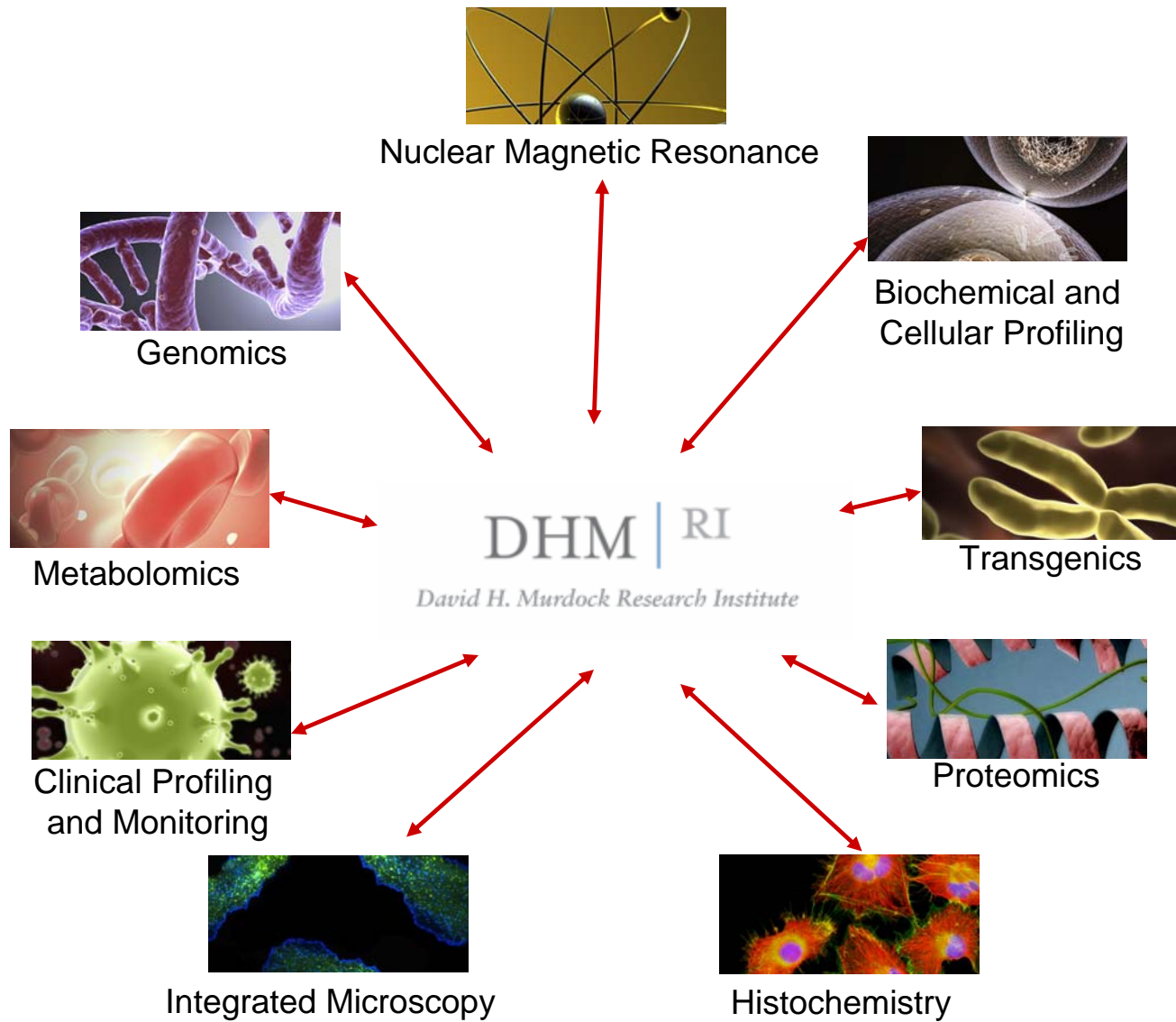


- Our mission is to be the leader at the intersection of human health, nutrition and agriculture using cutting edge science and technology platforms
- Develop unique partnerships via close collaborations to ensure the NCRC becomes a world class scientific community
- Provide new insights and novel interpretation through impactful science



A broad range of integrated multidisciplinary technologies are available at the DHMRI

... all under one roof!



With a computational environment designed to support such a diverse set of challenges

Overview

- **DHMRI:**

A not-for-profit corporation positioned to foster public-private partnerships at the intersection of academia and industry

- A research campus for applied research that leverages the Institute’s capabilities and capacity to advance science
 - Bringing complex human biology early to drug discovery
 - Providing a bridge to reclassify human disease
 - Redefining human diseases and the “book of medicine”
 - Improving crop productivity and plant nutritional value
 - Increasing clinical understanding of nutritional impact on human health
 - Focus on integrated systems

- **The Value Chain:**

- Focus and differentiation is based on developing multi-disciplinary integrated approaches to solve big questions in science.
- Build capabilities and capacity that integrate core system biology technologies and approaches.
- Establish partnerships with universities, other institutes, vendors, and established and emerging companies (particularly those showing opportunities for having significant economic impact) to grow the Institute.

Key Services Provided

- **One stop shop for ‘systems biology’ based approaches in agriculture , nutrition, and human health**
 - Genome scale DNA sequencing, data curation, annotation, and analysis
 - Access to ‘Omic platforms and expertise in
 - Integrated transcriptional, metabolite and protein analysis of:
 - Cells, Biofluids, Tissues, Plants
 - High throughput screening and profiling of biological samples
 - Microscopy and Imaging from live cells to laser-based microdissection
 - High resolution molecular structural analyses by Mass Spec and NMR
 - Technology infrastructure and data systems to provide secure, comprehensive, and uniform data management, analysis, integration, and visualization capacity and capabilities
- **Market Potential:**
 - Opportunities are to penetrate and exploit the niche segments regarding agriculture, nutraceuticals, food science, environmental sciences, and human disease to redefine our understanding of human health.
 - Opportunities to accelerate the translation of science from bench to market via unique intersection of applied research with academic and industry partnerships all within the campus.

INFORMATION RESOURCES

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Enabling Science through *flexible, practical* and *clever* technology solutions

BIOINFORMATICS

DHMRI's high throughput, fast-paced environment enabling researchers to selectively “undo” and “redo” operational steps within ordinary scripted workflows. Our system properly accounts for the dependencies of operations, and only duplicates functions when necessary.

Bioinformatics enables new scientific discovery at the union of science and technology. The DHMRI bioinformatics team:

- works closely with all the laboratories
- works directly with the scientific data generated at the DHMRI
- complements laboratory personnel

COMPUTATIONAL RESOURCES

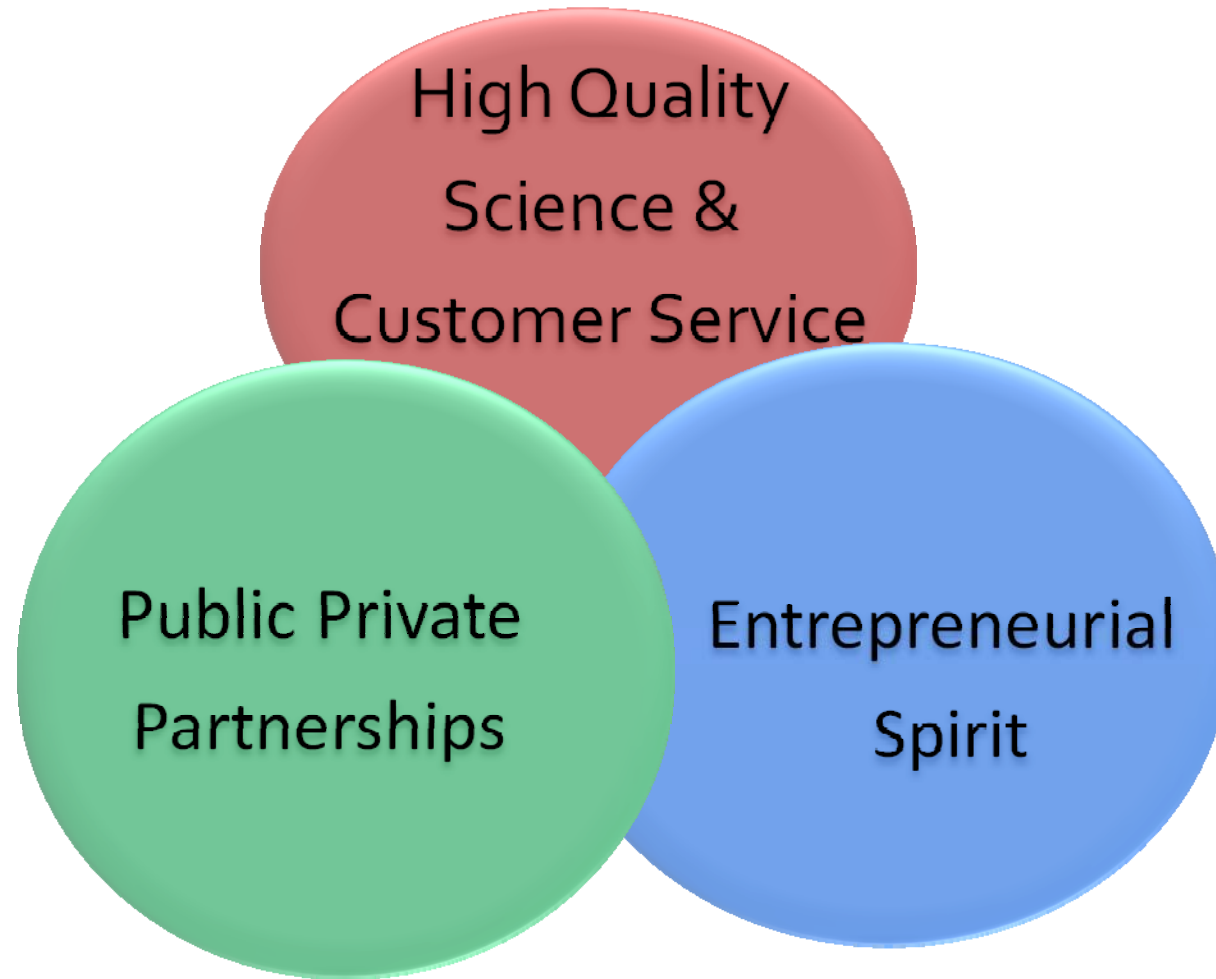
Comprehensive computational infrastructure that supports a flexible number of simultaneous users in a high performance computational environment and is available anywhere there is an Internet connection.

LABORATORY INTEGRATION

Facilitating a collaborative environment using technology and business disciplines for acquiring, managing integrating, optimizing, analyzing, inferring and referencing disparate data within our cross-discipline environment. Highlights include a centralized Enterprise Laboratory Information Management System (E-LIMS) system and our Integrated Sciences Data Warehouse (ISDW).



How We Deliver on Our Focus





The David H. Murdock Research Institute

Transforming Science at the Intersection of Human Health,
Nutrition, and Agriculture