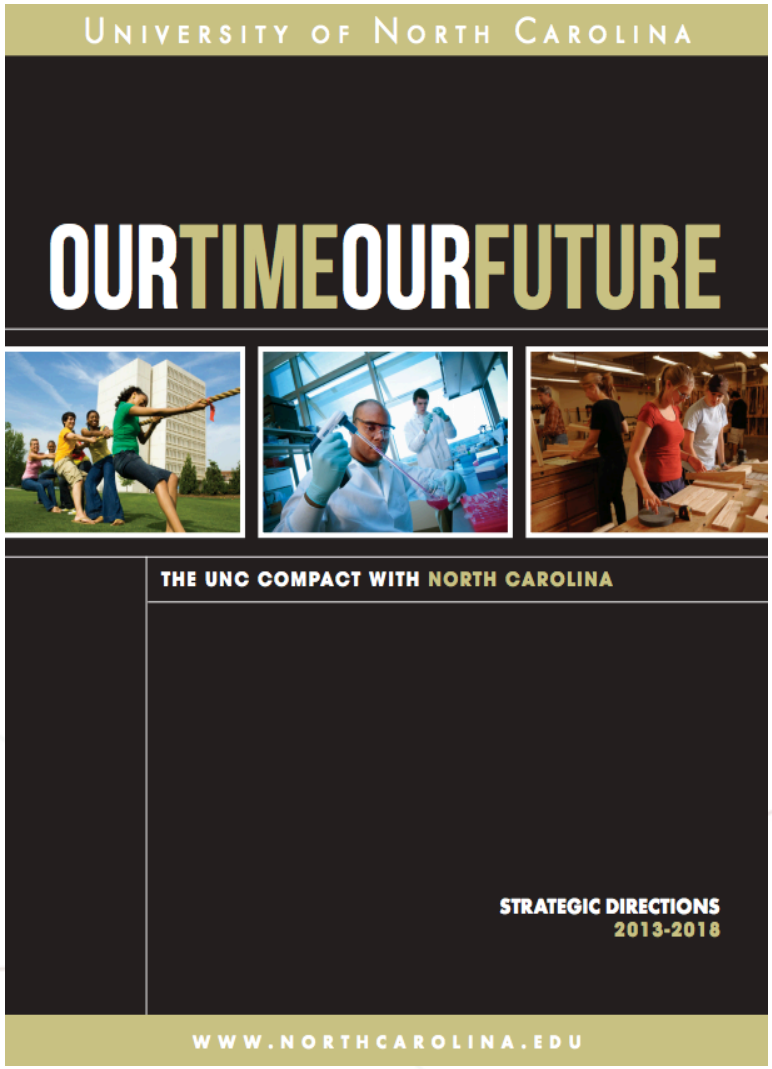
UNIVERSITY OF NORTH CAROLINA
A SYSTEM OF HIGHER LEARNING

UNC Strategic Directions



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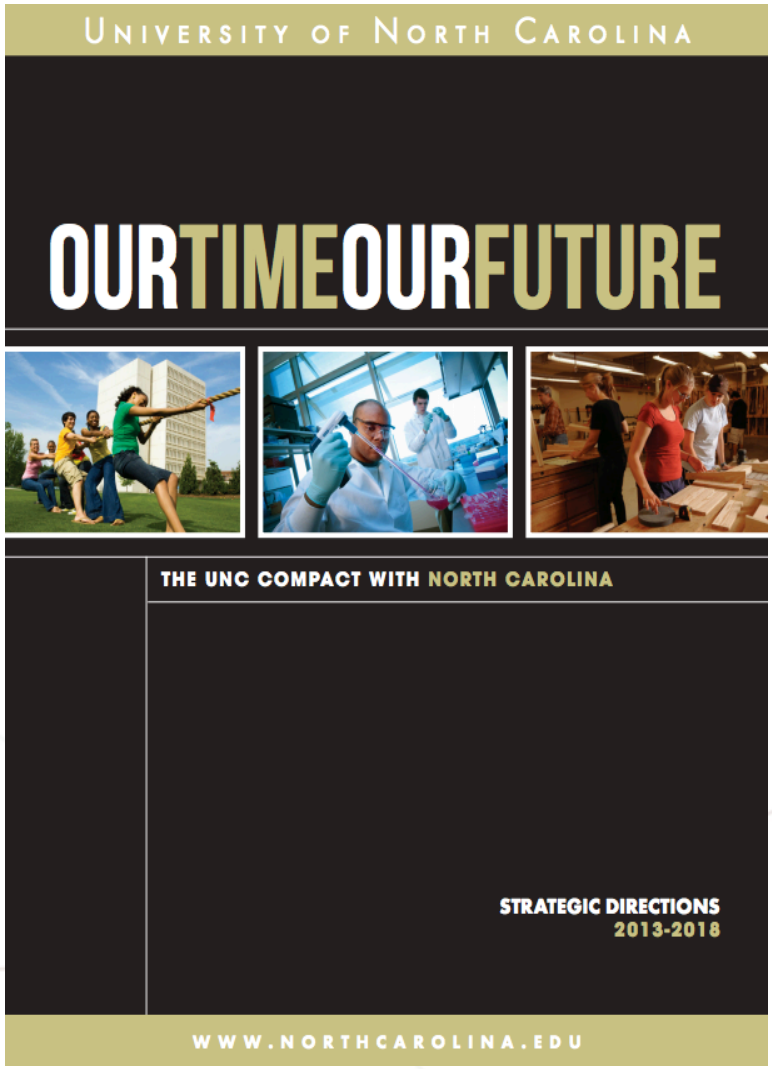
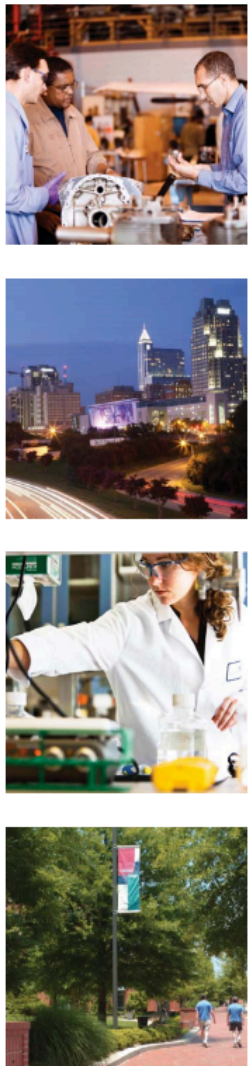
UNC Strategic Directions





December 2013

North Carolina Jobs Plan

North Carolina Economic Development Board

Recommended Strategies for Economic Growth
2014- 2024

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UNIVERSITY OF NORTH CAROLINA
RESEARCH OPPORTUNITIES INITIATIVE

The Future is Now

Realizing the potential of research and technology in North Carolina

Christopher Brown, PhD | Vice President for Research and Graduate Education

April 9, 2015

UNIVERSITY OF NORTH CAROLINA
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ROI Priority Areas

Pharmacoengineering

Defense, Military, and Security

Advanced Manufacturing

Data Science

Energy

Coastal and Marine Science

UNIVERSITY OF NORTH CAROLINA
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UNC Strategic Directions

Research Opportunities Initiative (ROI)

- SB744 – Support for OTOF/Game Changing Research
- Competitive process open to all UNC
- 74 pre-proposals requesting $105 million in funds
- $3M supporting six teams spanning five campuses

UNIVERSITY OF NORTH CAROLINA
RESEARCH OPPORTUNITIES INITIATIVE

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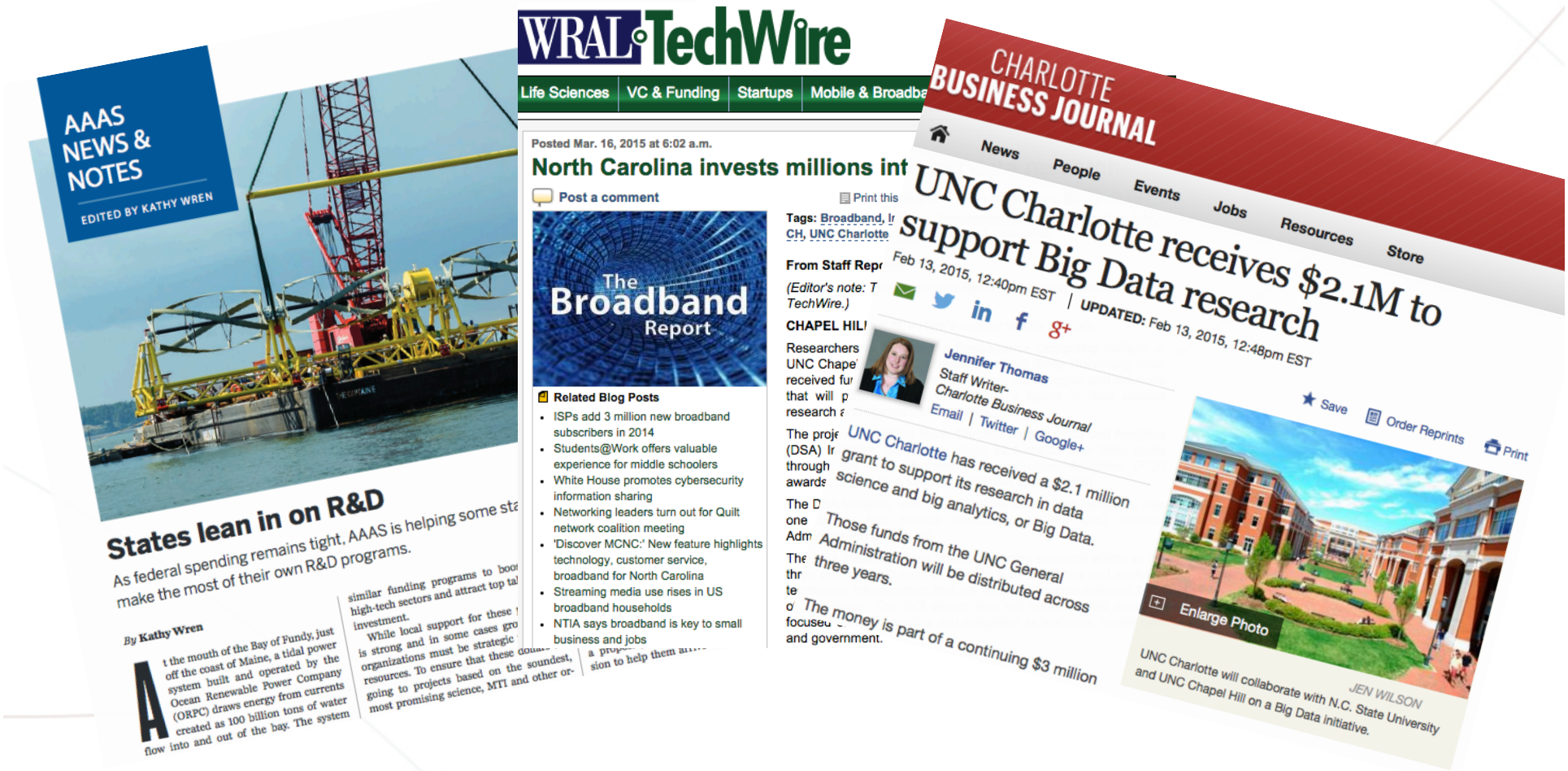
Statewide/National Visibility



AAAS NEWS & NOTES
EDITED BY KATHY WREN

States lean in on R&D

As federal spending remains tight, AAAS is helping some sta
make the most of their own R&D programs.

By Kathy Wren

At the mouth of the Bay of Fundy, just off the coast of Maine, a tidal power system built and operated by the Ocean Renewable Power Company (ORPC) draws energy from currents created as 100 billion tons of water flow into and out of the bay. The system

similar funding programs to boo
high-tech sectors and attract top ta
investment.
While local support for these
is strong and in some cases gro
organizations must be strategic
resources. To ensure that these
going to projects based on the soundest,
most promising science, MTI and other or-
sion to help them

WRAL TechWire

Life Sciences | VC & Funding | Startups | Mobile & Broadba

Posted Mar. 16, 2015 at 6:02 a.m.

North Carolina invests millions int

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The Broadband Report

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- Networking leaders turn out for Quilt network coalition meeting
- 'Discover MCNC:' New feature highlights technology, customer service, broadband for North Carolina
- Streaming media use rises in US broadband households
- NTIA says broadband is key to small business and jobs

Tags: Broadband, Ir
CH, UNC Charlotte

From Staff Repr

(Editor's note: T
TechWire.)

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CHARLOTTE BUSINESS JOURNAL

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UNC Charlotte receives $2.1M to support Big Data research

Feb 13, 2015, 12:40pm EST | UPDATED: Feb 13, 2015, 12:48pm EST

Jennifer Thomas
Staff Writer-
Charlotte Business Journal
Email | Twitter | Google+

UNC Charlotte has received a $2.1 million grant to support its research in data science and big analytics, or Big Data.

Those funds from the UNC General Administration will be distributed across three years.

The money is part of a continuing $3 million

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Enlarge Photo

JEN WILSON

UNC Charlotte will collaborate with N.C. State University and UNC Chapel Hill on a Big Data initiative.

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UNIVERSITY OF NORTH CAROLINA
RESEARCH OPPORTUNITIES INITIATIVE

NC Carbon Materials Initiative (NCSU, NCCU, UNC-CH)

NC Data Science and Analytics Initiative (UNC-C, NCSU, UNC-CH)

An Engineering Approach to Cancer and Heart Disease (UNC-CH, NCSU)

Salinity Gradient Energy (NCSU, UNC CSI, UNC-CH)

Detecting Pathogens in Marine Waters & Seafood (UNC-CH IMS, UNCC)

Using Algae for Large-Scale Vaccine Production (NCCU, UNC-CH, NCSU)

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The Future of Electronics

Silicon is out, carbon is in!

NC Carbon Materials Initiative: Materials Design, Processing, and Manufacturing

Institutions

NC STATE UNIVERSITY

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

NORTH CAROLINA CENTRAL UNIVERSITY
FOUNDED 1910

Priority Areas

- Energy
- Defense, Military, and Security
- Advanced Manufacturing

UNIVERSITY OF NORTH CAROLINA
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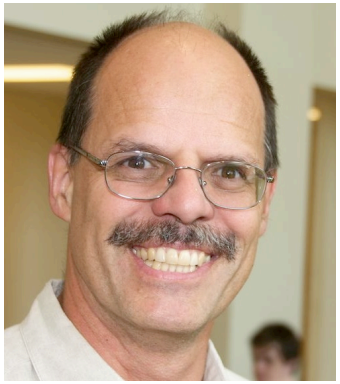
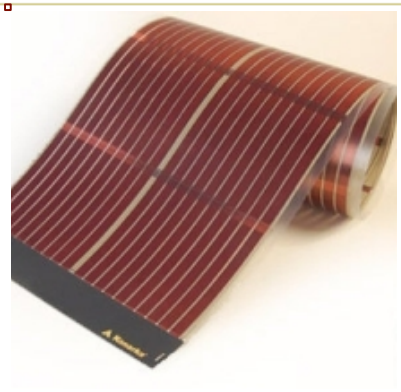
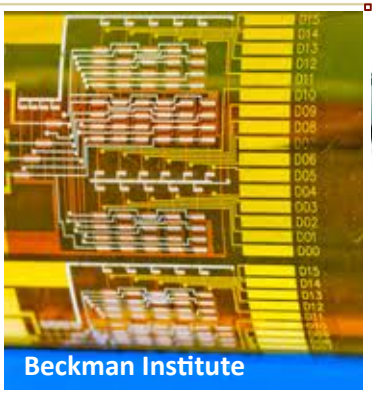
The Future of Electronics

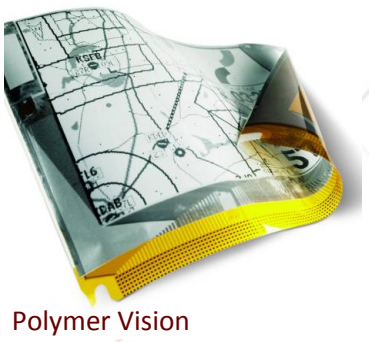

Harald Ade, PhD


OLED Displays


Organic Solar Cells



Organic thin-film transistors


Polymer Vision
E-paper

Major Impacts

- Silicon-based materials have reached their theoretical limits; we need a new material to address growing technology needs
- Ade and his team will develop new carbon materials and build specialized instrumentation to characterize the materials
- Unique collaborative effort will bring together expert researchers and highly specialized instrumentation to bring NC to the forefront of this field

UNIVERSITY OF NORTH CAROLINA
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The Future of Big Data

Cloud-based infrastructure comes to NC

North Carolina Data Science and Business Analytics Initiative: Using Analytics for Risk Mitigation

Institutions

UNC CHARLOTTE

NC STATE UNIVERSITY

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THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

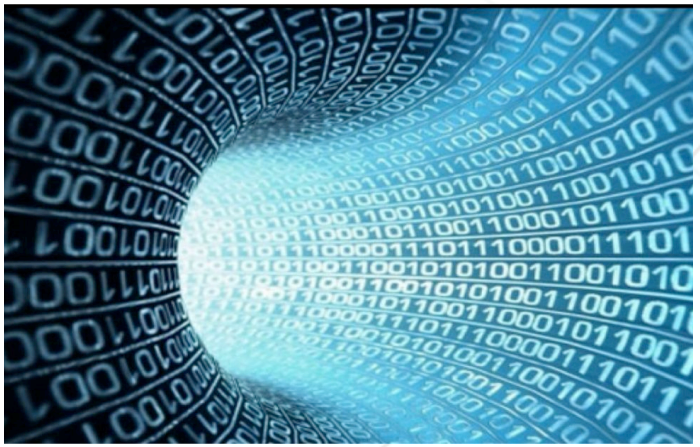
Priority Area

Data Science

UNIVERSITY OF NORTH CAROLINA
A SYSTEM OF HIGHER LEARNING

The Future of Big Data

Mirsad Hadzikadic, PhD



Major Impacts

- Develop strategic hubs of excellence to position NC as the national leader in fundamental and applied data science
- Set up state-wide cloud-based infrastructure by expanding NC State's Virtual Computing Laboratory (VCL)
- Expand access to the Data Observatory (RENCI and Odum Institute at UNC-CH) to allow state-wide access to large data sets
- UNCC's SOPHI data analytics hub will be used for storage, delivery, & retrieval of data
- Partner with industry to focus on risk mitigation

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The Future of Therapeutics

An engineering approach for treating cancer and heart disease

Pharmacoengineering: Integrating Engineering with Pharmaceutical Sciences to Improve Delivery of Therapeutics

Institutions

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

NC STATE UNIVERSITY

Priority Area

Pharmacoengineering

UNIVERSITY OF NORTH CAROLINA
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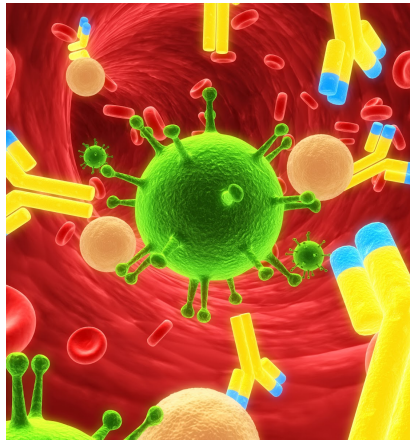
The Future of Therapeutics

Michael Jay, PhD

Frances Ligler, D.Phil., D.Sc.



Major Impacts

- Understand immune response to engineered nanomaterials
- Engineer biomolecular "homing" molecules to deliver drugs to precise disease locations (e.g., deliver chemotherapeutics to cancer cells)
- Adult-derived stem cell therapies for treating glioblastoma (brain cancer): specially designed stem cells migrate to cancer cells and release chemotherapeutic drugs
- Adult-derived stem cells that localize to heart tissue, break down scar tissue from heart attack, and regenerate healthy heart tissue
- Host international conference and set up NC as home base for Pharmacoengineering

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The Future of Clean Energy

Harvesting energy from mixing fresh and salt water

Salinity Gradient Energy: An Inexhaustible Clean Energy Resource for North Carolina

Institutions

NC STATE UNIVERSITY

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

Coastal Studies Institute
UNIVERSITY OF NORTH CAROLINA

East Carolina UNIVERSITY

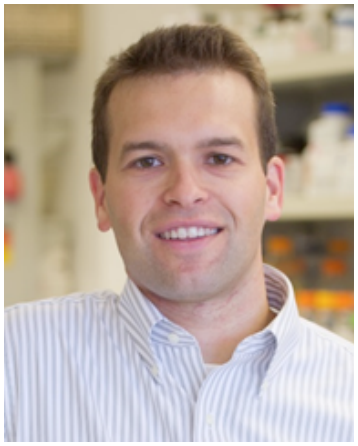
Priority Areas

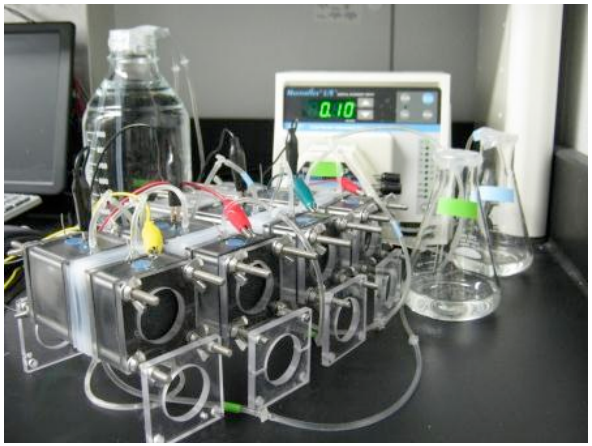
Energy

Coastal and Marine Science

UNIVERSITY OF NORTH CAROLINA
A SYSTEM OF HIGHER LEARNING

The Future of Clean Energy





Douglas Call, PhD

Major Impacts

- Use reverse electrodialysis to generate clean electricity using chemical differences between salt water and fresh water
- Technology allows for energy storage during off-peak hours
- Same technology can be used for wastewater treatment; technology is modular and can grow with a city's population
- Technology is poised to be a major player in clean energy worldwide (already being investigated in the Netherlands)
- Economic and environmental assessments as technology is being developed

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The Future of Food & Water Safety

Rapid detection of pathogens in marine water and seafood

Institutions

UNC INSTITUTE OF MARINE SCIENCES

UNC CHARLOTTE

Priority Area

Coastal and Marine Science

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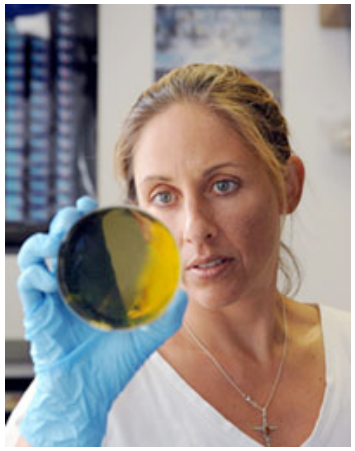
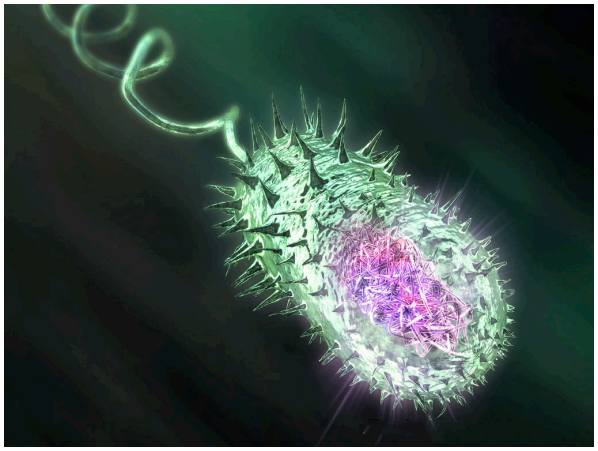
The Future of Food & Water Safety



Rachel Noble, PhD



Major Impacts

- Eating contaminated seafood or swimming in contaminated sea water poses major health risks
- Noble and her team will analyze large amounts of genomic data to rapidly find a unique molecular fingerprint for each harmful pathogen.
- Investigators will develop diagnostic kits to test seafood and sea water for disease-causing pathogens
- This work has clear commercial potential and could increase the speed of food and water testing by more than tenfold, allowing for earlier detection and alert systems

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The Future of Vaccines

Using algae for large-scale vaccine production

Institutions

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NC STATE UNIVERSITY

Priority Areas

- Pharmacoengineering
- Advanced Manufacturing

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The Future of Vaccines

TinChung Leung, PhD

Major Impacts

- Ebola drug is currently generated in tobacco plants through a time-consuming and laborious process
- Leung and his team propose to generate the drug using bioengineered microalgae, allowing it to be manufactured much more quickly
- Technology could be used for treatments and vaccines for other viruses like West Nile and rabies

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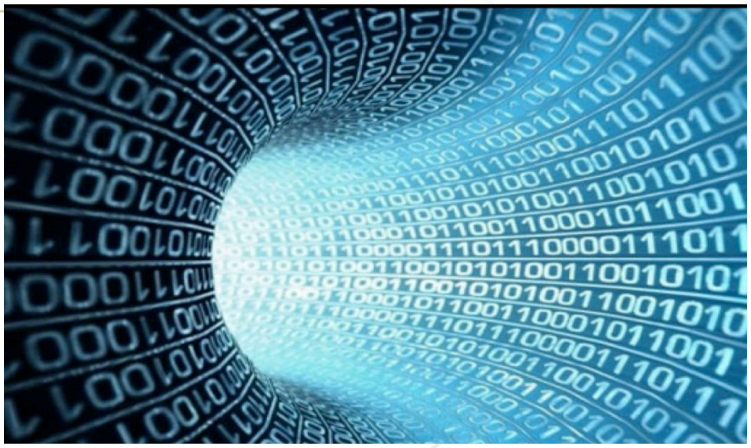

UNC Research Opportunities Initiative



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