

***Pathway to a Successful Interdisciplinary Initiative
- People, People and People -***

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NIH Nanomedicine Workshop

The NIH Nanomedicine Vision

- To **characterize** quantitatively the molecular scale components or nanomachinery of the cell

Biological Sciences and Physical Sciences

- To **control and manipulate** these molecules and supermolecular assemblies in live cells

Engineering

- To improve **human health**

Medicine

People

Multidisciplinary Research Team

Next Generation Interdisciplinary Researchers

Building a Community

Interdisciplinary Research

- ***Collaboration through faculty members***
 - no barrier among faculty members in colleges of engineering, medicine, sciences
 - no barrier among NIH Nanomedicine Centers

- ***Administration***
 - matching fund, space
 - constraints

- ***Active research team***
 - students exposed to wide range of research topics

A Cohesive and Talented Team

- **Success starting at initial organization stage**
- **Vision**
- **A group of researchers with prior collaboration experience**
- **Researchers with track record of success**
- **Proper mix of senior and junior researchers**

Institute for Cell Mimetic Space Exploration

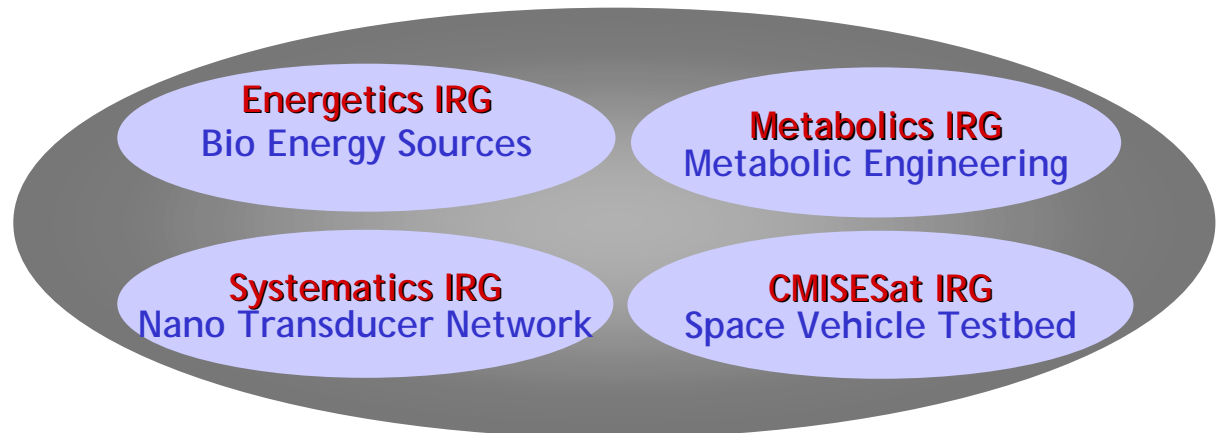
- An Institute for Bio-Nano-Informatics (BNI) Fusion -

Interdisciplinary Team

Medical Science - 3
Bio-engineering - 2
Bio-chemical Engineering- 1
Electrical Engineering - 3
Mechanical Engineering - 4
Physical Science - 3
Material Sciences - 1

Prior collaboration experience – cohesive
30 students - different undergraduate background

- organized student work groups
- working in various labs



NASA URETI

<http://www.cmise.ucla.edu>

Faculty members are world-class leaders in their own fields and have track records for turning scientific dreams into realities

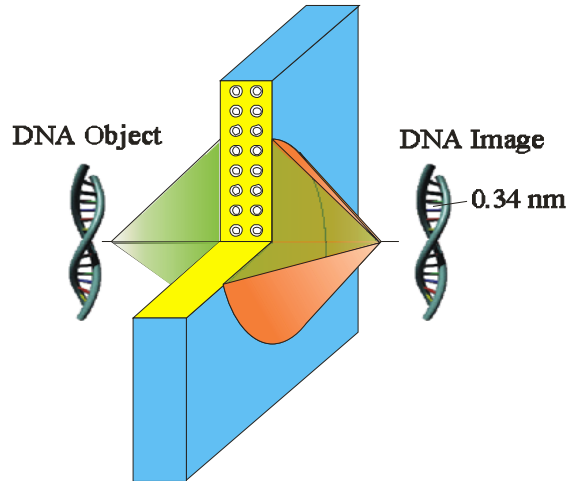
Member of Academy

NAE – Ho

IOM – McCabe

FREng – Gimzewski

FRS – Stoddart



Material with negative index of refraction

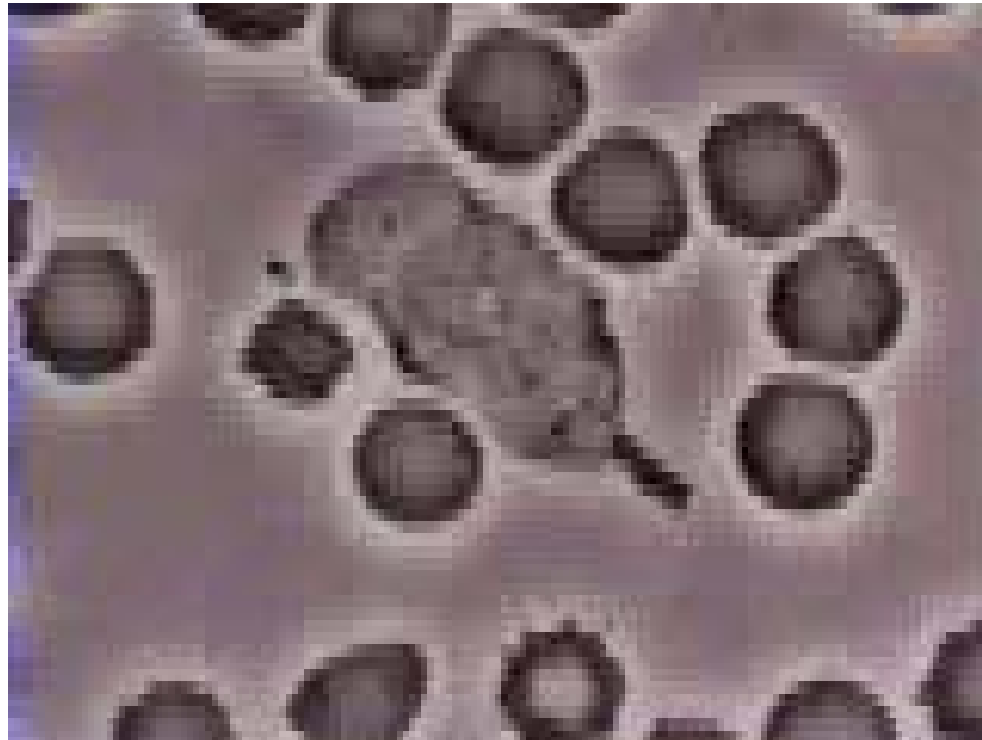
- amplification of near field optical wave
- superlens
- optical resolution to nanometer range

Zhang

Cell – a *system*

A collection of nano sensors, information processors and actuators forms an almost perfect functional system at micro scale

Neutrophil chasing a *S. aureus*

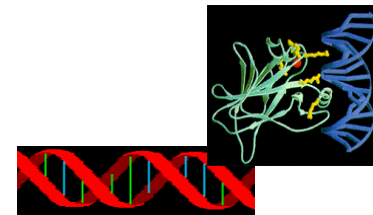
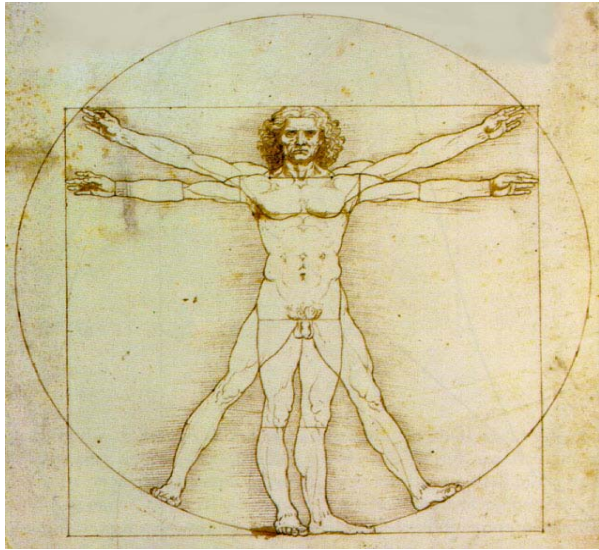


***Control of a complex system
Informatics***

Rogers

Span the Scales

- 10⁹ Apart -



A Successful Nanomedicine Initiative

- The Fusion of two Systems -

- A **cohesive system** of **talented people**
- Control living cell - a **system**

