

**Institute for Quantitative Biomedicine at Rutgers**  
**Interim Report on Launch of the Initiative**  
**July 31<sup>st</sup> 2015**

**Title of Initiative:**

Institute for Quantitative Biomedicine at Rutgers (IQB@R)

**Institute Website:**

[IQB.Rutgers.edu](http://IQB.Rutgers.edu)

**People:**

**Stephen K. Burley, M.D., D.Phil.**

IQB@R Roles:

Founding Director

Co-Chair, Research Working Group in Cancer Genomics and Proteomics

Co-Chair, Research Working Group in Antimicrobial Resistance

Rutgers Affiliations:

Distinguished Professor of Chemistry and Chemical Biology

Director, Center for Integrative Proteomics Research

Director, RCSB Protein Data Bank

Member, Rutgers Cancer Institute of New Jersey

**Gail Ferstandig Arnold, Ph.D.**

IQB@R Roles:

Associate Director

Associate Director, Graduate Program in Quantitative Biomedicine

Rutgers Affiliation:

Research Professor of Chemistry and Chemical Biology

**Eduardo Sontag, Ph.D.**

IQB@R Role:

Director, Graduate Program in Quantitative Biomedicine

Rutgers Affiliation:

Distinguished Professor of Mathematics

**Shridar Ganesan, M.D., Ph.D.**

IQB@R Role:

Co-Chair, Research Working Group in Cancer Genomics and Proteomics

Rutgers Affiliations:

Member, Rutgers Cancer Institute of New Jersey

Associate Professor, Robert Wood Johnson Medical School

**David S. Perlin, Ph.D.**

IQB@R Role:

Co-Chair, Research Working Group in Antimicrobial Resistance

Rutgers Affiliations:

Executive Director, The Public Health Research Institute

Professor, New Jersey Medical School

## Summary of the IQB@R Initiative

### **Vision:**

Rutgers system-wide center-of-excellence for interdisciplinary quantitative biomedical research.

### **Mission:**

- 1) To foster a vibrant, cohesive community of Rutgers basic, applied, and clinical scientists committed to collaborative application of tools from biology, chemistry, computer science, engineering, linguistics, materials science, mathematics, physics, and statistics to grand challenges in biomedical research.
- 2) To develop next generation researchers expert in the quantitative sciences for careers working at the interface with biology and medicine.

### **Executive Summary:**

#### Formation:

The Institute for Quantitative Biomedicine at Rutgers was established in the wake of the historic merger of Rutgers, The State University of New Jersey, with the University of Medicine and Dentistry of New Jersey (UMDNJ) as part of the university-wide strategic planning process initiated by President Robert L. Barchi. A competitive proposal to establish IQB@R, submitted in response to a call from the Office of the New Brunswick Chancellor, Dr. Richard L. Edwards, was formally approved by the University Board of Governors in December 2014.

The Institute was officially launched on July 1<sup>st</sup> 2015 to engage scientists from across the entire Rutgers system and foster creation of the biomedical research university of the future. This new initiative occurs in the midst of an unprecedented period of growth in access to patient genome sequences and complementary data coming from high-throughput measurements of biological systems.

The “perfect storm” of institutional change at Rutgers and the Data Science revolution provided the opportunity to establish a broadly inclusive center-of-excellence dedicated to collaborative application of tools from the quantitative sciences to grand challenges in biology and medicine.

Rutgers educators, researchers, and clinicians participating in various Institute activities are working together to redefine how the quantitative sciences of a traditionally structured research university will interoperate with the basic science and clinical departments of two major medical schools.

### Membership:

IQB@R Members will be drawn from the Schools of Arts and Sciences (SAS), Engineering (SOE), Environmental and Biological Sciences (SEBS), and Pharmacy (SOP), the Rutgers Cancer Institute of New Jersey (CINJ), the Center for Advanced Biotechnology and Medicine (CABM), the Child Health Institute of New Jersey (CHINJ), the Environmental and Occupational and Health Sciences Institute (EOHSI), the Human Genetics Institute of New Jersey (HGINJ/RUCDR Infinite Biologics), the New Jersey Institute for Food, Nutrition, and Health (NJIFNH), the New Jersey Medical School (NJMS), the Robert Wood Johnson Medical School (RWJMS), the Waksman Institute of Microbiology (WIM), and the Office of Research and Economic Development (ORED).

### Administrative Offices:

The administrative offices of the Institute are being provided at no charge by the Center for Integrative Proteomics Research (Proteomics, Rooms 105 and 106).

### Initial Priorities:

During Year One of Institute operations, efforts will be focused on the following tasks:

1. Forming two interdisciplinary **Research Working Groups** in **Cancer Genomics/Proteomics** (Co-Chairs: Ganesan and Burley) and **Antibiotic Resistance** (Co-Chairs: Perlin and Burley). Initial focus on these two research areas will build on considerable strengths resulting from the Rutgers/University of Medicine and Dentistry New Jersey merger. Both teams will develop short- and medium-term research plans, informed by deep subject matter expertise and the outcomes of SWOT (Strengths, Weaknesses, Opportunities, and Threats) analyses. Both inaugural Working Groups will be expected to seek federal funds to support collaborative research coming from these deliberations. During the latter part of Year One, the Institute will identify additional Research Working Groups that will be formed during Years Two and Three.
2. Establishing the **Rutgers New Jersey Core Facility for Cryo-Electron Microscopy and Tomography** that will be housed in a custom design/build microscopy suite located on the Ground Floor of Proteomics. The facility will be equipped with a 200 keV Electron Microscope equipped with state-of-the-art phase plate, automated cryogenic sample changer, and direct electron detection. This instrument will be the first of its kind in New Jersey, enabling high-resolution structural studies of large macromolecular complexes of importance in human health and disease. The facility will be operated by an expert technical staff and will be made available on a tiered fee-for-service basis to scientists from Rutgers, neighboring academic institutions, and industrial partners.
3. Organizing the **3<sup>rd</sup> Annual Interdisciplinary Quantitative Biology Boot Camp**, which will be held January 4-15 2016 in Proteomics and offered as an intensive, full-time Two Credit Winter Session course. The 2014 and 2015 Boot

Camps both attracted more than 100 participants from across the Rutgers (undergraduate, graduate, and, M.D./Ph.D. students, post-doctoral researchers, faculty, and staff). The focus of the 2016 Boot Camp will be Drug Discovery and Development (provided in collaboration with partners in industry), taking participants on the journey from Target Selection→FDA Approval.

#### Business Model:

The Office of the New Brunswick Chancellor, the Public Health Research Institute, the Rutgers Cancer Institute of New Jersey, and the Center for Integrative Proteomics Research are providing seed funding for IQB@R. Within three years, the Institute is expected to be fully self-funded from indirect cost returns derived from collaborative grant applications submitted by the Research Working Groups.

#### **Status Update:**

During the first month of operations, efforts have been directed at the following activities:

1. *Launch of the Institute Website.*

A “bare bones” version of the website can be found at IQB.Rutgers.edu. Further refinements will be implemented over the coming months.

2. *Formation of the Research Working Group in Cancer Genomics and Proteomics.*

The co-chairs met and scheduled the first organizational meeting of the Working Group for the afternoon of Monday September 21<sup>st</sup> 2015 in Proteomics Room 120. Invitations to interested parties across the Rutgers system will be circulated in early August.

3. *Formation of the Research Working Group in Antimicrobial Resistance.*

The co-chairs met and scheduled the first organizational meeting of the Working Group for the afternoon of Monday September 28<sup>th</sup> 2015 in Proteomics Room 120. Invitations to interested parties across the Rutgers system will be circulated in early August.

4. *Instrument Purchase for the Rutgers New Jersey Core Facility for Cryo-Electron Microscopy and Tomography.*

The instrument has been selected after lengthy discussions with potential vendors. The formal purchasing process will be initiated in early August in collaboration with the Office of Research and Economic Development.

5. *3<sup>rd</sup> Annual Interdisciplinary Quantitative Biology Boot Camp.*

Curriculum planning for the 2016 Boot Camp, scheduled for January 4-15, is underway. Invitations to the teaching faculty drawn from Rutgers and nearby pharmaceutical and biotechnology companies will be made in August.