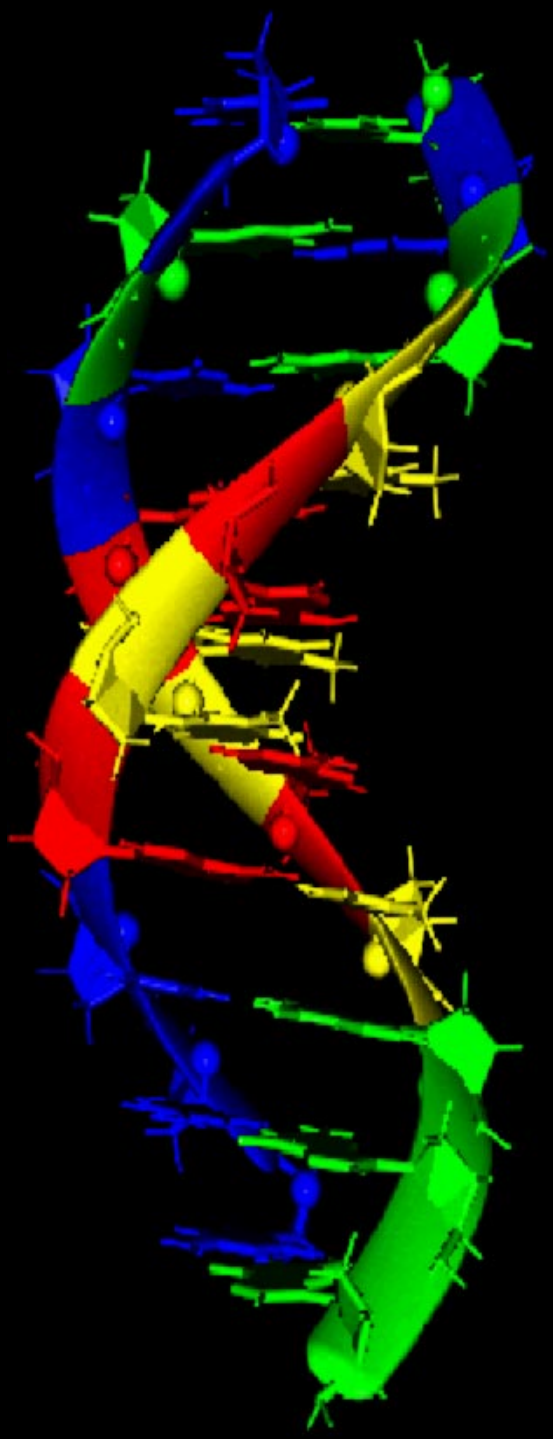

ENVIRONMENTAL BIOTECHNOLOGY INITIATIVE

A Proposal
from
The Marine and Environmental Focus

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Executive Summary

Mission Statement

The goal of the Environmental Biotechnology Initiative is to enhance the educational, training and research mission of the biological sciences at the University of Rhode Island through the development of state-of-the-art research and training facilities.

Objectives

Teaching:

- Incorporate biotechnology education and training into the undergraduate curriculum through the integration of biotechnology modules into existing courses and new offerings in biotechnology courses and laboratories.
- Develop biotechnology workshops for graduate and upper-level undergraduate student training.

Research:

- Enhance the research experience of undergraduates by providing training opportunities and support.
- Establish shared biotechnology resources with emphasis on Genomics, Transgenics, Imaging and Bioinformatics Facilities.
- Provide biotechnology expertise and training to URI researchers.
- Foster industrial-academic collaborations and interactions.

Outreach:

- Provide mechanisms for enhanced technology transfer.
- Develop workshops for advanced biotechnology training for industry personnel.
- Develop summer educational activities for high school students and teachers.

Environmental sciences are being transformed by new technologies to examine and manipulate the genetic makeup of plants, animals and microbes. The application of this technology is the emerging field called “Biotechnology,” a field that permeates many disciplines, including the medical, environmental and ecological sciences. We propose an initiative in the area of environmental biotechnology, which encompasses a vast array of applications. Some of the better known examples of environmental biotechnology include 1) production of cold and pest resistant plants, 2) isolation of heat stable enzymes from microbes in deep sea thermal vents and Yellowstone National Park geysers (a single enzyme, *Taq polymerase*, has generated hundreds of millions of dollars in income for Hoffman-La Roche), 3) production of bacteria that digest oil spills and toxic waste and purify domestic sewage, and 4) DNA fingerprinting to identify endangered plant and animal species (e.g. identification of illegally captured blue whales in Japanese markets). Environmental biotechnology, like

other areas of biotechnology, embodies advances in genetics, engineering and computer sciences.

The Environmental Biotechnology Initiative (EBI) is critical to the long-term health of the life sciences at the University of Rhode Island. To keep pace with the teaching and research needs of society, we face the challenge of modernizing our curriculum, along with our teaching and research facilities. Meeting this challenge will help to recruit outstanding students and faculty, to maintain and improve our prominence as a leading research institution, and to enhance our competitiveness as scientists.

The EBI is a University-wide program serving all the life sciences faculty and students. URI is an attractive site for such an initiative. We are successful in several marine initiatives and have strong basic and applied plant, animal and life science research programs that incorporate elements of molecular biology. The Initiative is meant to strengthen our existing research efforts by providing the framework to develop common resources and compete for programmatic funding opportunities in this rapidly growing area of biology.

Significance and Rationale of a Biotechnology Initiative at URI

Why an Environmental Biotechnology Initiative?

A biotechnology initiative makes sense for many reasons. College graduates and professionals in the marined and environmental sciences require these skills to compete for high paying jobs. These skills are in great demand in both industrial and academic markets. Entry level positions at the B.S. and M.S. level are exceedingly difficult to fill because of the lack of trained graduates and the rapid growth of the biotechnology sector. It is estimated that over 50% of all positions in the biological sciences will be in the biotechnology sector within four years. Therefore, URI would attract both undergraduates and faculty by having the biotechnology training and research infrastructure in place. EBI will support faculty in competition for grants, graduate students and postdoctorates. Finally, the Initiative will enhance industrial-academic collaborations, provide technology and licensing revenues, and attract high technology industrial development to the State.

Why at URI?

URI's unique faculty expertise, graduate and undergraduate clientele, and traditional marine and environmental infrastructure make it a particularly well suited institution for an Environmental Biotechnology Initiative. EBI will complement and enhance our existing marine and environmental research programs. It will add new dimensions to strengthen URI's Land Grant and Sea Grant traditions and capabilities. EBI will distinguish us as leaders in the emerging field of Marine and Environmental Biotechnology. EBI is compatible and interdependent with URI's existing efforts in marine and environmental sciences.

In sum, the Environmental Biotechnology Initiative is needed to enhance URI's strong role in the marine and environmental sciences. Our faculty and students will greatly benefit from biotechnology training and facilities. EBI is critical for our ability to attract and retain outstanding students and faculty, and to foster a competitive research environment.

An Environmental Biotechnology Initiative
for the
University of Rhode Island

Introduction

Although every study of living organisms that uses a microscope, computer or analytical instruments might be considered to be an application of biotechnology, for our purposes there are more useful and specific definitions. We define environmental biotechnology to mean the ability of the scientist to understand and use genes in ways that are useful to society and beneficial to nature. Biotechnology seeks new ways to use genes and gene-governed processes to create products, with manypractical uses in human and veterinary medicine, industry, and in environmental protection and remediation.

These technologies also have application in fields such as population and conservation genetics to study a single gene or protein to detect subtle evolutionary patterns or structure in populations of animals and microbes. On a long term and global scale, these same technologies offer our strongest hopes for dealing with the limited capacity of the planet - by making plants and animals used for food and fiber more efficient users of nutrients and water, more resistant to insects, diseases, and environmental stresses and enabling wise stewardship of limited global resources.

Teaching

Advances in our ability to manipulate genes, analyze their structure and visualize their products have influenced every discipline of biology from genetics and cell biology to systematics and ecology. As such, a complete education in the biological sciences requires that students develop competency in the area of biotechnology through coursework and laboratory experience. With such a background, our students will be extremely competitive for careers in the rapidly expanding field of environmental biotechnology. Within the next 4 years, 50% of the employment opportunities in biological fields will require expertise in biotechnology. At the Pfizer Corporation's research campus in nearby Groton, CT, alone, more than 500 positions for research technicians will be filled over the next 5 years.

We propose three major objectives for the enhancement of undergraduate and graduate education in the biological sciences at URI:

1) Expose life sciences students at all levels to modern research instruments and techniques. The EBI will provide students with the opportunity to receive training in advanced laboratory techniques. We envision that every undergraduate in the life sciences will be afforded the opportunity to obtain laboratory experience in environmental biotechnology by completion of the junior year.

2) Enhance the biology curriculum for non-majors. Resources available through the EBI will enable faculty to provide non-biology majors (e.g. general education courses) with an understanding of the

concepts and applications of biotechnology.

3) Enhance experiential learning opportunities. The faculty, facilities and instrumentation associated with the EBI will increase the opportunity for students to undertake research early in their academic careers. The EBI will enable URI to offer undergraduate and graduate students unique opportunities for developing expertise in environmental biotechnology.

"The EBI will enable URI to offer undergraduate and graduate students unique opportunities for developing expertise in environmental biotechnology."

Undergraduate Education

The specific undergraduate teaching objectives will be to integrate molecular approaches into existing life and environmental science courses, while providing additional training opportunities for interested juniors and seniors. We will accomplish this by using Biotechnology training facilities to hold undergraduate laboratories within existing courses. These laboratories will emphasize the use of molecular biology and biotechnology methods in all fields of marine and environmental sciences. Advanced training in biotechnology would be offered through specialized lecture and laboratory courses, and advanced technical workshops. These activities serve a dual purpose: they provide supplemental training to undergraduate interested in biotechnology and they provide formal training for incoming graduate students.

Graduate Training

The EBI will establish the University of Rhode Island as a leader in training students in the field of environmental biotechnology by implementing a rigorous curriculum that integrates training in environmental biotechnology into fundamental core courses, existing courses in specialized areas of biology and new courses in environmental biotechnology. The curriculum will be developed and delivered by faculty presently at the University as well as new faculty we expect to attract through the EBI. We will provide all graduate students in the life sciences the opportunity to receive training in state-of-the-art-methodologies in environmental biotechnology.

Research

Throughout the University, many scientists and their students are using sophisticated approaches and techniques to study living organisms. From such studies come answers to many of society's most pressing modern concerns. There are approximately 107 researchers at the University presently engaged in research in the biological, environmental, marine, agricultural, chemical, and engineering fields. Only 15 of these researchers routinely use the tools of biotechnology in their research. Examples of ongoing research at URI which employ these tools include: 1) conservation of species like the New England cottontail rabbit, 2) development of vaccines for Lyme disease and diseases of fish, 3) isolation and characterization of genes from pathogenic organisms, 4) genetic improvement of plants and species of agricultural importance (plants, finfish and shellfish, silkworm) through the transfer of genes involved in seed quality, nutritional quality, and resistance

to disease and environmental stresses, 5) creation of safer and more nutritional foods through the reduction or elimination of pesticides and 6) detection and removal of toxic or pathogenic products from foodstuffs.

Many faculty who would like to incorporate these methods into their research lack the facilities, equipment or training. The EBI will provide researchers at the University of Rhode Island with the tools necessary to perform cutting edge research in their fields. The goals of the EBI are to establish shared biotechnology facilities that will provide expertise and training in basic and advanced biotechniques to URI researchers, and promote interaction and collaboration with industry. Any faculty who wish to use the biotechnology capabilities made possible by the initiative for teaching, research or outreach would be able to do so. Faculty who rely on molecular biology or biotechnology would benefit from the enhanced facilities and instrumentation made available through the initiative.

Outreach

As Rhode Island's Land Grant and Sea Grant University, URI extends its teaching and research capabilities to meet practical needs for solutions to many of society's most challenging problems. The outreach mission of the EBI is to increase collaborative research with industry and develop workshops for training in methods employed in environmental biotechnology.

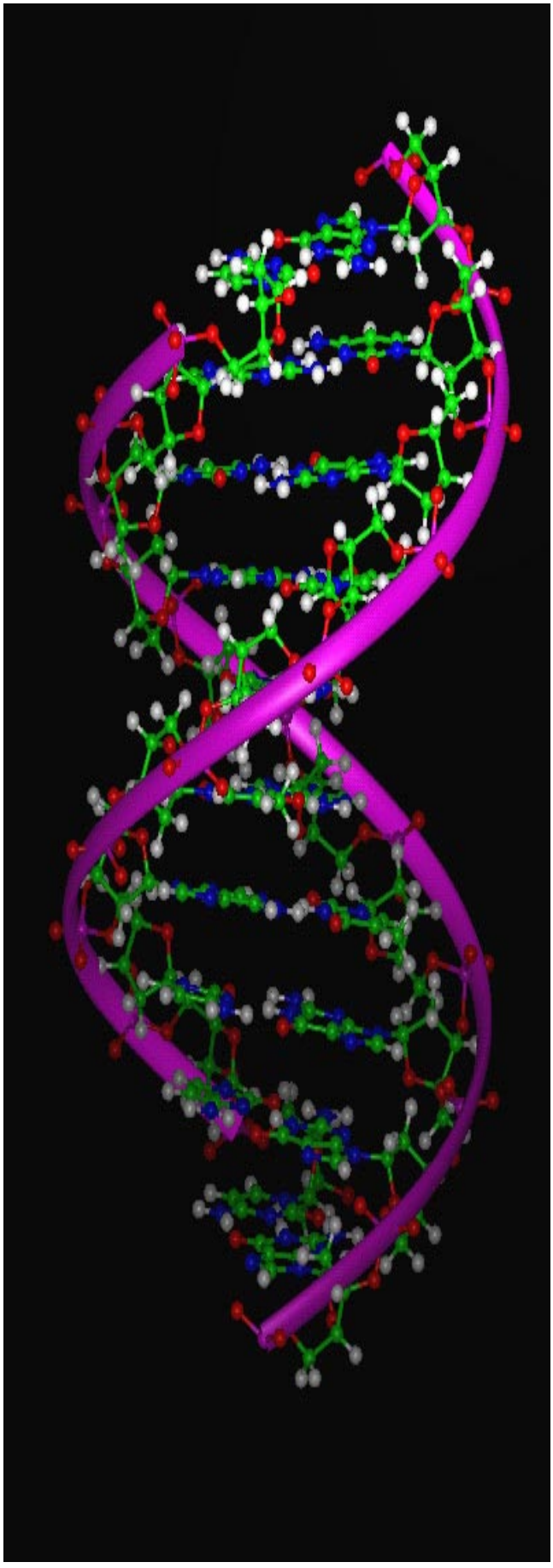
Collaboration and Technology transfer

The field of environmental biotechnology is undergoing rapid growth affording the University the opportunity to capitalize on collaborative research with industry. A significant percentage of environmental biotechnology is directed at specific problems facilitating the opportunity for collaboration with a diverse array of industries including biotechnology, agriculture, aquaculture, fishing, environmental management, etc. These collaborations will: 1) identify products and applications in the fields of life, marine and environmental sciences, 2) provide the expertise and instrumentation requisite for development of products, and 3) enhance revenues from patents and licenses. The potential for financial gain to the University is significant. The University of Wisconsin has received hundreds of millions of dollars during the past decade from royalties on warfarin, a potent rat poison. Recently, this compound has gained acceptance in human medicine as a blood-thinning agent.

Workshops

There is increasing demand for workshops to train scientists and research technicians in industry. Numerous regional and local environmental and biotechnology companies seeking training for employees will use workshops at URI providing a revenue stream to support students and staff. Workshops will be designed to address the topics and time frames best suited to the clientele. Examples of highly sought workshops include training in: Cell Culture and Fermentation, Polymerase Chain Reaction (PCR), Cloning and Recombinant DNA Techniques, New Tools in Diagnostic Methods for Environmental Pathogens and Food Safety.

There is a need for K through 12 teachers to bring modern biology into the classroom. The EBI would offer environmental biotechnology workshops to primary and secondary instructors where they



would receive instruction in the latest techniques and applications. Several Universities, including Wisconsin, Virginia, and Iowa State, publish newsletters and pamphlets targeting teachers and Cooperative Extension at U.C. Berkeley offers similar outreach programs.

What is Needed for the Environmental Biotechnology Initiative?

Many issues must be addressed in undertaking such a large initiative. Two of the most pressing are: 1) the design and creation of centralized facilities for sophisticated instrumentation and for teaching and research laboratories and 2) raising sufficient funds for facilities, instrumentation and staff.

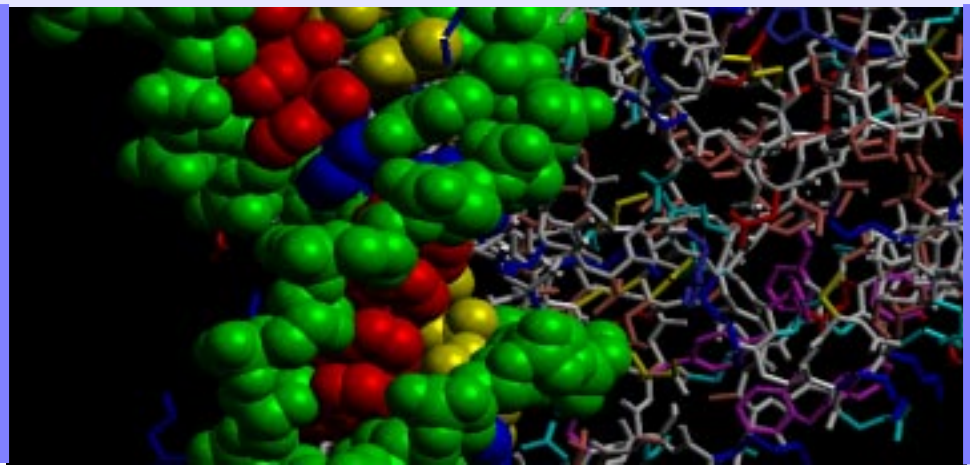
EBI Multi-User Facilities

To provide technology and advanced technical training and research support to students and faculty of the University of Rhode Island requires extensive and sophisticated facilities. The establishment of a centralized, multi-user biotechnology facility is a priority of the EBI. This facility will provide the technical expertise, training quarters and instrumentation needs for biotechnology teaching and research support. The EBI facility would be located in Ranger Hall and made available on a University-wide basis. Ranger Hall will also be the location of several research laboratories closely associated with the capabilities of EBI facilities. This state-of-the-art facility will be comprised of four major multi-user components. These are referred to as Genomics & Proteomics, Transgenics & Cell Culture, Imaging, and Bioinformatics.

Genomics & Proteomics

Environmental biotechnology begins with *genomics* — technologies to isolate and identify elements of genetic material and to characterize their function. In general, genes allow living organisms to construct specific molecules, mostly proteins (hence, proteomics), that serve specialized life processes (e.g. proteins used to form muscles or plant tissues for nutrient uptake, proteins in yeast that convert starch to sugar). The Genomics & Proteomics Facility will provide the technical resources and training needed to isolate and characterize the DNA, RNA or protein from any organism.

Technology	Application	Instrumentation
Gene Expression	Biosensors, environmental monitoring, target gene identification, bioprospecting	DNA Chip readers, DNA gridders, plate readers
DNA Fingerprinting	Population structure, food safety, pathogen identification, molecular ecology & evolution	PCR, robotic workstations, phosphorimagers
DNA Sequencing	Genome characterization, molecular evolution studies, molecular systematics, gene characterization	Automatic sequencers
Protein Expression	Antibodies, protein chemistry, ligands	FPLC, HPLC, electrophoresis



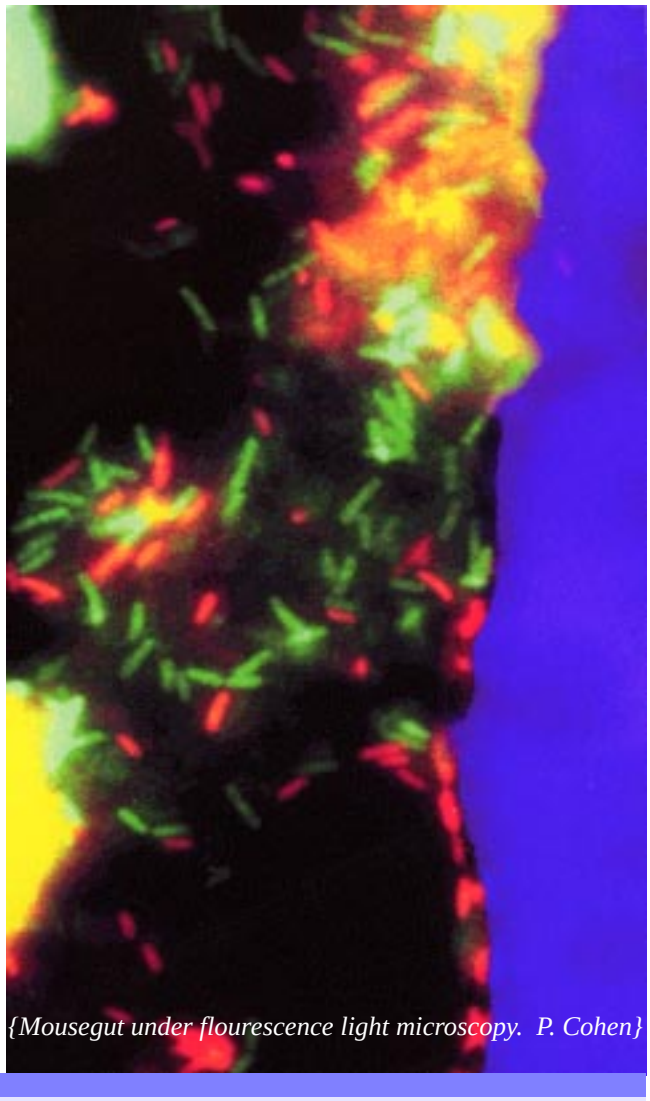
Transgenics & Cell Culture

Biotechnology often requires that genes be physically moved from one organism into another to modify function. Once moved, the cells or organism carrying the new gene are *transgenic*. Transgenic technologies require specialized instrumentation for introducing foreign DNA into cells and special containment facilities to culture organisms, individual cells or tissues. These facilities and instrumentation are designed to manipulate the genomes of microbes, plants, and animals such as fish, insects, or livestock.

Technology	Application	Instrumentation
DNA Transformation	Transgenic microbes, plants, insects, fish or livestock.	Microinjection, electroporation, biolistics
Cell Culture	Propagation of transgenic cells in vitro	Laminar flow hoods, incubators, shakers
Recombinant Protein Expression	Fermentation, bioremediation, pathogen resistance, food improvement or safety	Greenhouses, fish culture systems, fermentors, fields

Imaging

Genomics and transgenics create new combinations of genetic material — frequently referred to as recombinant DNA — and the process is more popularly referred to as simply "genetic engineering". The activity of new biological molecules (both beneficial ones used by a cell or malevolent ones that attack a cell) are often best understood through physical examination of the tissues or cells affected by the molecules. Various forms of high resolution light microscopy permit scientists to examine the cellular and subcellular location of genes and proteins. Electron microscopy, capable of extraordinary levels of magnification using electron or x-ray beams passed through very thin slices of tissue (transmission electron microscopy) or bounced off the surfaces of whole specimens (scanning electron microscopy), permit even finer resolution. Such applications, collectively referred to as *imaging*, augmented by sophisticated 2- and 3-dimensional computer graphics algorithms, allow resolution of macromolecules to a level never before achieved by conventional technologies.



{Mousegut under flourescence light microscopy. P. Cohen}

Technology	Application	Instrumentation
High Resolution 3D imaging in living cells	Subcellular DNA, RNA & protein localization	Confocal & deconvolution microscopy
High Resolution Imaging in Fixed Tissues	Subcellular DNA, RNA & protein localization	Transmission & scanning electron microscopy
In situ Hybridization	RNA expression, FISH	DIG microscopy
Histology	Tissue preparation and sectioning	Microtomes, cryomicrotomes

Bioinformatics

Computational methods are an integral part of biotechnology and represent one of the fastest growing sectors of biology. Keeping track of gene sequences and processing digital information is a daunting task that requires computational technologies, which we refer to simply as *bioinformatics*. For instance, genomic technologies require access to extensive DNA and protein databases via the WWW. Imaging requires three-dimensional reconstruction of cells and tissues from digital data. Digital images need to be processed and manipulated using sophisticated algorithms and output devices.

Technology	Application	Instrumentation
3D Reconstruction	Subcellular DNA, RNA & protein localization	Workstations & software
3D Modeling	Biochemistry, drug design, protein modification	Workstations & software
Biological Database Access	Gene functional analysis, molecular systematics	Workstations & software
Computational Training	Bioinformatics	Workstations & software
Digital publishing	Publications, seminars, teaching	Printers, scanners, etc.

Summary of Needs

The interests and needs of URI's scientists and students for information on genes and their functions are myriad. With enhanced facilities and training, the practical use of environmentally-oriented biotechnologies (as contrasted to medically-oriented) should stimulate even greater interest among students and faculty, and growing interactions with the public and private sector constituents.

Funding the Initiative

The funding needed to establish the EBI is significant. However, we have identified a large and diverse range of appropriate funding sources and we are convinced that the potential for the EBI to attract funding from these sources is outstanding. Furthermore, once the infrastructure goals of the EBI have been met, faculty participating in the EBI will have the potential to attract additional funds for educational and research programs. The academic, research and financial benefit to the University from establishing the EBI will be enormous and will extend far into the 21st Century.

We have identified four categories of funding requirements for the EBI: (1)renovation; (2)equipment & instrumentation; (3) curriculum support; and (4) programmatic support including staffing needs. Below we consider some of the major funding sources available for the EBI.

Renovation of Ranger Hall

Currently, $4.6 million is available through a bond issue and University commitments for renovation of Ranger Hall. Additional funds for architectural and engineering plans, building renovations including HVAC services, permanent equipment (such as hoods and cold rooms) will be needed. Private foundations such as the Keck and Kresge are excellent potential sources of funding for facility development. Government programs, such as NSF, USDA, DOE and DOD provide infrastructure grants on a 50:50 matching basis, up to $2 million. If relevance can be demonstrated, the NIH (including the Institute for Environmental Health) has infrastructure grants up to $400,000 and will cost-share above $400,000. Fundraising by the URI Foundation may raise significant dollars, once a campaign can be initiated, but this is dependent on the progress of the Ballantine Hall and Green Hall fundraising campaigns, now in progress. Other sources of funding for renovation are listed in Table 1.

Instrumentation & Equipment

Several sources of support exist to develop state-of-the-art instrumentation and equipment centers for multi-user teaching and research. Government sources include DOE, DOD, NSF, NIH and the USDA (50:50 match). Private foundations include The Champlin Foundation, The Rhode Island Foundation, Keck and Pew Foundations (average award: $250,000). Direct industrial support and indirect support through The Samuel Slater Technology Fund can provide up to $675,000 per year. Other sources of funding for instrumentation and equipment are listed in Table 1.

Curriculum Support

Several government and private foundations support the curriculum initiatives designed to enhance the undergraduate and graduate educational experience. These enhancements could include summer workshops, summer and academic year internships, and improvement of existing courses for training of undergraduate students in preparation to enter the workforce. Teaching enhancement grants are provided by various government agencies, including the NSF, NIH, USDA and others listed in Table 2. NSF, in particular, has a range of funding opportunities linked to education, including “Collaboratives to Integrate Research

Table 1. Facilities & Equipment Funding Opportunities for the EBI

Agency	*Program*	*Type*	*Amount ($1000's)*
Apple Computer	Education Grants	Equipment	25
Brooks Foundation	General	Equipment	50-100
Dept. Defense	Air Force Research Instrumentation	Equipment & Facilities	50-1,000
Dept. Defense	Army Research Instrumentation	Equipment & Facilities	50-1,000
Dept. Defense	Navy Research Instrumentation	Equipment & Facilities	50-1,000
Dept. Education	Educational Research & Improvement	Equipment & Curriculum	500
Dept. Education	Educational Research & Improvement	Equipment & Facilities	2,000
Dept. Energy	Equipment	Equipment	100-500
Dept. of Commerce	Telecommunications & Information	Equipment & Facilities	
Gloeckner Foundation	General	Equipment	
Hewlett-Packard	National Grants Program	Equipment	10-75
Keck Foundation	General	Equipment & Facilities	250-500
Kresge Foundation	Equipment Grants	Equipment & Facilities	150-300
Kresge Foundation	Science Initiative	Instrument.t & Labs.	100-500
NASA	Environmental Assessment	Equipment & Teaching	30-500
NIH	Internet Connection	Networking	30-50
NIH	Shared Instrumentation Program	Equipment	100-400
NSF	Biological Infrastructure	Instrumentation	2,000
NSF	Computer & Information Sciences	Bioinformatics	30-200
NSF	Experimental & Integrative Activities	Equipment	30-200
NSF	Human Resource Development	Fac. for Disabled Res.	100-2,000
NSF	Major Research Infrastructure	Equipment & Facilities	100-2,000
NSF	Multi-user Equipment & Instrum.	Equipment	20-400
Pew Charitable Trust	General	Facilities & Teaching	500-1,000
USDA	Agricultural Telecommunications	Equipment, Teaching	
USDA	Strengthening Awards	Equipment & Infrastruct.	10-250
W.M. Keck Found.	General	General Facilities	100-1,000

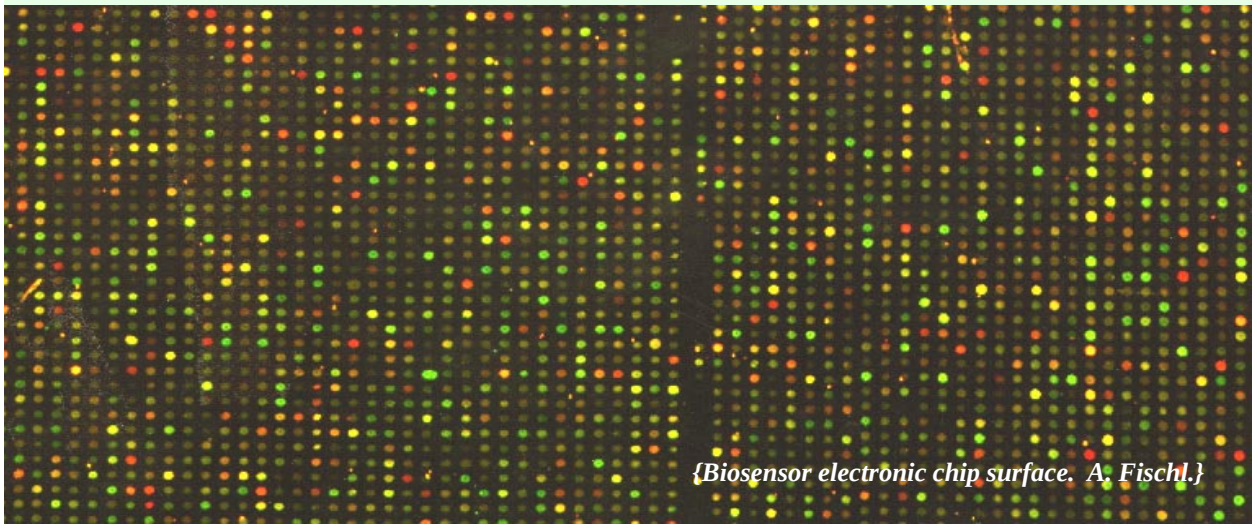
and Education". Internship opportunities will be provided through collaboration with industry, including such local companies as Pfizer, Dominion Diagnostics, DeKalb, Bayer, Monsanto, DuPont, and Millenium Pharmaceuticals. Private foundations also provide support for teaching enhancement. These include the Howard Hughes Medical Institute, which is currently considering a proposal from URI, the Pew Foundation and others listed in Table 2. Project collaborations with the EPA and NOAA (NMFS - CMER Program) could also be useful.

Programmatic Support

Trained staff are needed for instruction in laboratories and work shops. These individuals are also needed to supervise the operations of EBI facilities. We envision these positions to be funded from a variety of sources including income generated through professional services such as summer workshop offerings, undergraduate and graduate teaching activities, and programmatic grant support. Additional operating expenses for EBI facilities will come from user fees, laboratory and workshop fees, licensing and royalty income, and overhead from grants to EBI faculty.

Table 2. Curriculum Funding Opportunities for the EBI

Agency	*Program*	*Amount ($1000's)*
Ameritech	Curriculum enhancement	
Apple Computer	Computers in teaching	
Bristol-Meyer Squibb Foundation	Education	250-500
NTIA	Information Infrastructure	350-750
Culpeper Foundation	Environmental Education	
Cummings Foundation	Environmental Courses	
Dept. Education	Biology Teaching	Up to 350
EPA	Environmental Education	Up to 250
GTE Foundation	Technology Education	
NIH	Science Education	
NIH	Graduate Training Fellowships	
NIH	Postdoctoral Research Fellowships	20-70 annually
Hewlett Foundation	Teaching Innovations	100-150
Hewlett-Packard Co.	Teaching Instrumentation	Up to 500
Hughes Medical Institute	Undergraduate Education	1,000-2,000
Intel Foundation	Science Education	
Johnson & Johnson Foundation	Education	
W.M. Keck Foundation	Education Programs	
Kresge Foundation	Science Initiative	100-500
MacArthur Foundation	Conservation Education	
Macy Foundation	Undergraduate Education	
Merck Foundation	Science Education	
Metropolitan Life Foundation	Curriculum Development	
NEC Foundation	Science Education	
NSF – CISE	Undergraduate Research	300-600
NSF – ATE	Curriculum Design & Development	300-600
NSF	Instructional Materials	
NSF	Graduate Research Education	Up to 5,000
NSF – CCD	Science Curriculum Development	200
NSF – CCLI	Curriculum & Laboratory Improvement	200-500
NSF – CCLI	Educational Materials	200-500
NSF – GOALI	Academic Liason with Industry	
NSF – REU	Res. Experience for Undergrad.	
Pew Foundation	Higher Education & Reform	
Rockwell Corporate Trust	Science Education	



{Biosensor electronic chip surface. A. Fischl.}

Summary & Recommendations

The EBI provides a cohesive and attractive mechanism to enhance resources for research, teaching, and faculty improvement in the biological sciences. The EBI will provide technology training to URI undergraduates and graduates while greatly enhancing biotechnology development in the State of Rhode Island. We are confident that, given the Administration's strong backing, many of our applications for outside support will be successful. Our goal is to make the EBI a model program for student recruitment, research enhancement and technology development in Rhode Island.

In the initial stages of planning Administrative support for the EBI is urgently needed. This support can be provided in a number of direct and indirect ways. For instance, a URI partnership is needed to formulate curriculum enhancement activities and to initiate applications on behalf of the EBI. Many of the foundation applications must be prioritized and sanctioned and approve by URI Administration. The EBI will require the attention of State of Rhode Island and Federal representatives if state and federal appropriations are to be directed toward this initiative. Finally, staff support for teaching and facilities oversight are needed to begin our program. In sum, this University-wide initiative is an excellent investment for the University of Rhode Island that has the strong support of the life, marine, and environmental sciences faculty throughout the University.

{Bioluminescent molecules in jellyfish. M. Gomez-Chiarri}

{Credits: Editing by T. Bradley, M. Gomez-Chiarri, S. Dellaporta and R. Rhodes. Photos as credited. Molecule models from www.imb-jena image library. Layout by RI AES, using Adobe ® PageMaker 6.5 and Photoshop 4.0}

A Note on Process

The Environmental Biotechnology Initiative sprang from a series of faculty discussions in the Summer and Fall of 1997. In response, Deans Leinen and Brownell wrote to President Carothers in November 1997 to propose "a coordinated approach to the improvement of facilities for biological sciences at the University." On December 3, an open forum entertained discussion of the desirability of advancing Environmental Biotechnology as the second major initiative (in addition to the Coastal Institute) of the Marine and Environmental Focus. Nearly four dozen faculty attended to convey enthusiastic support for the concept.

In January 1998, Dean Leinen formally charged a Committee of faculty, whose names are on the cover of this proposal, to "organize their thoughts about an environmental biotech initiative and identify the actions that are necessary to begin such an initiative." In a parallel development, in February the University Space Allocation Advisory Committee received a preliminary report outlining major aspects of the Environmental Biotechnology Initiative and the feasibility of using Ranger Hall as a physical focus, providing centralized facilities for the Initiative.

In a series of several open meetings during January through May 1998, the Environmental Biotechnology Initiative Committee met to refine their ideas. In addition, many other discussions with individuals and academic departments took place to discuss the Initiative. The Committee is grateful to all who participated in these discussions and who contributed their ideas. On June 16, 1998, the proposal was formally endorsed by the Marine and Environmental Focus committee. It was approved by the U.R.I. Faculty Senate in September 1998.