

# GROWING ENGINEERING RESEARCH AND TECHNOLOGY DEVELOPMENT IN NEW YORK STATE

## UNIVERSITY AT BUFFALO SCHOOL OF ENGINEERING AND APPLIED SCIENCES (SEAS)

**Action Requested:** A modern, flexible, Engineering and Computer Science and Emerging Technologies Building to support growth and major new initiatives in advanced technologies for research excellence and economic development.

**Overview:** The School of Engineering and Applied Sciences at the University at Buffalo (UB), The State University of New York, is a major economic development resource for Western New York and New York State. Its 112 faculty currently educate over 2500 undergraduate students and 1100 graduate students and conduct approximately \$35 million per year (\$300,000 per faculty member) of externally funded research. SEAS faculty, staff, and students are actively engaged in projects for over 175 New York State companies each year. SEAS performs at this high level of activity while maintaining high quality educational programs with the highest Bachelors and Masters degrees per faculty of any public university ranked in the top 50 engineering schools in the nation.

Following the completion of the five major engineering buildings, between 1974 and 1982, and the Ketter Hall expansion in 1989, the then-modern facilities with capacity for growth helped spur a substantial increase in externally sponsored research from \$2.9M (\$30,000 per faculty member) in 1984 to more than \$23M per year (\$200,000 per faculty member) by the early 1990s.

**The Problem:** UB's engineering education, research, and development, which is expected to lead technological and economic development, has not seen a new building in more than 20 years. Yet technology, with all its complexity, has continued to advance at a blistering pace. As our research, educational, and economic development activities have continued to grow, our facilities have become undersized and outdated. Major activities, such as the Center of Excellence for Document Analysis and Research (CEDAR) and the Center for Unified Biometrics and Sensors (CUBS) reside in leased space. 18,600 sq. ft. of decaying trailer space (photograph right), built in 1988, house



large interdisciplinary activities in disaster response and visualization, among others. These trailers currently house approximately 160 researchers and graduate students and also undergraduate teaching labs that are used by hundreds of students. Faculty and graduate students have had to use facilities at other universities for many years, hampering our ability to compete and to support industrial outreach activities. An expansion and modernization of facilities is required to attract and retain top productive faculty and students.

**Potential Impact of a new building:** Modern space and facilities will allow expansion of fundamental and applied activities related to advanced devices and systems of many kinds. SEAS areas of focus that would directly benefit from the new building are:

- Photonics, microelectronics, and hybrid materials
- Information technology and computing: artificial intelligence, information security, high performance computing and cyber-infrastructure

- Hazard and disaster mitigation, homeland defense, environmental engineering, and energy
- Simulation, design and visualization of complex systems
- Bioengineering

Strengthening the ability of SEAS to excel in the creation and dissemination of knowledge has at least ten pathways to prove Western New York and New York State:

- Expansion in total income to the State through external research grants and technology-development contracts attracted to New York
- Retention and expansion of R&D and technology activities in New York's companies through sustained supply of locally available engineering and applied sciences graduates
- Stimulus to conventional industries in New York through the availability of high quality university graduates (who have received research training)
- Effect of direct stimulation of existing companies' commercial activities (through collaboration, research contracting, informal advice, etc. from engineering and applied sciences faculty)
- Creation of new technology-based spin-off companies
- Direct employment generation (engineering and applied science) in the university
- Intellectual property income to the university (and other income related to technology commercialization)
- Multiplier effects of local business stimulation through purchase of R&D supplies and services from local providers
- Multiplier effects of personal spending in Western New York by research personnel employed at the university
- Economic benefit of improvement to the image and structure of industry in New York due to the presence and growth of research activities

**Building and Costs:** State commitment provides a significant contribution towards challenging us to work with our partners to leverage additional funding for the building.

**Criteria:**

**75,000SF Net as follows:**

- 15,000 Administration/Offices
- 35,000 Generic Dry Lab/Research Space
- 20,000 Generic Wet Lab
- 5,000 Server/Computer Machine Room

**Desired Features:**

- Large ground floor footprint
- Large receiving dock and overhead door
- HEPA filter supply air for wet labs
- 10,000 NSF dry lab to have 15' ceiling clearance
- Large service elevator

Therefore;

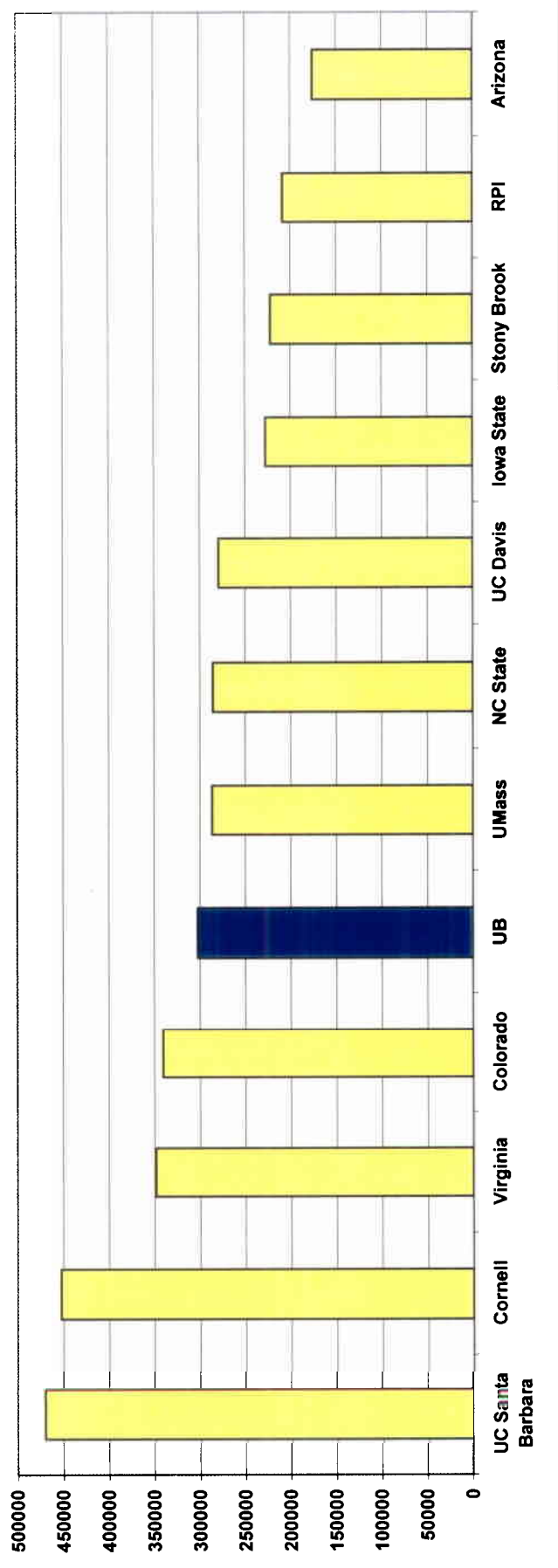
**Probable Cost Assumptions:**

Total Gross SF of Building	132,617 SF
Total Net SF of Building	75,038 SF
Design Cost	\$6,812,000
Construction Cost	\$43,188,000
<b>TOTAL</b>	<b>\$50,000,000</b>

Costs include:

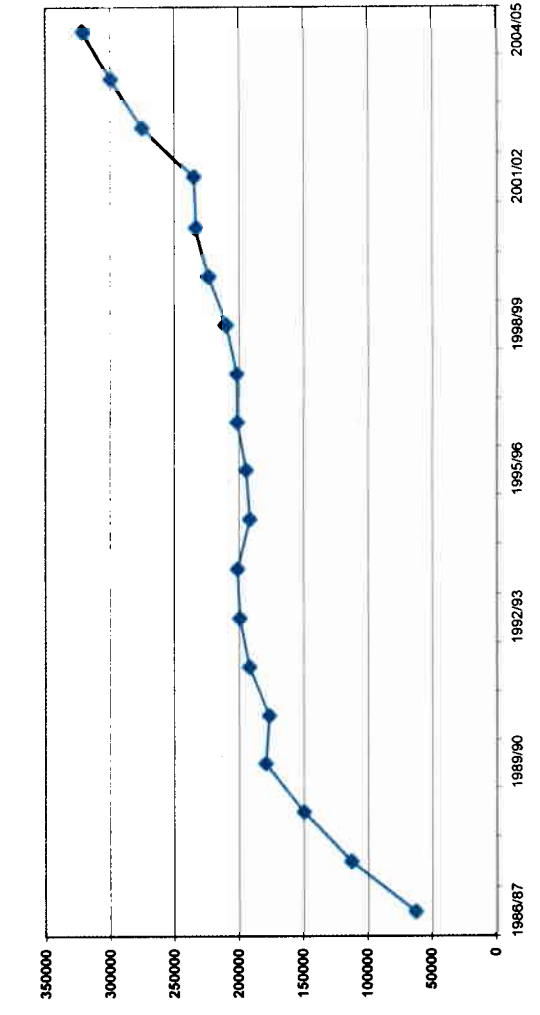
- Site work and site utilities
- Mechanical equipment and lab benching
- Escalation on costs assuming January 2010 is midpoint of construction

# 2004 Engineering Research Expenditures per Faculty



	# of Faculty	Research (000s)	Total Research/Faculty
University of California, Santa Barbara	131	61,605	470,267
Cornell	246	111,361	452,687
University of Virginia	135	47,042	348,459
University of Colorado at Boulder	171	58,242	340,596
<b>The State University of New York at Buffalo</b>	<b>114</b>	<b>34,481</b>	<b>302,465</b>
University of Massachusetts, Amherst *	108	30,935	286,435
North Carolina State University	302	86,225	285,513
University of California, Davis	192	53,594	279,135
Iowa State University	216	49,122	227,417
State University of New York at Stony Brook	122	27,060	221,803
Rensselaer Polytechnic Institute *	166	34,597	208,416
University of Arizona *	154	27,071	175,786

## Engineering Research Expenditures per Faculty 3 Year Averages



\* CSE is outside of the Engineering School but CSE numbers are included in the totals for comparison purposes