AGENDA

1. Call to order
2. Introduction of new members
3. Approval of the minutes of the regular meeting of April 9, 2004, as distributed
4. Resolutions
   (a) A RESOLUTION ON CONSTRUCTION OF NEW SCIENCE FACILITIES AS THE TOP PRIORITY AMONG NEW ACADEMIC STRUCTURES (04/1) (Resolution 04/1 attached)
   (b) A RESOLUTION ON RESEARCH PRIORITIES AT THE GEORGE WASHINGTON UNIVERSITY (04/2) (Resolution 04/2 attached)
5. Introduction of Resolutions
6. General Business:
   (b) Nomination for re-appointment by the President of Professor Scott B. Pagel as Faculty Senate Parliamentarian for the 2004-05 Session
   (c) Nomination for election of Professor Joan E. Schaffner (GWLS) to serve a three-year term on the Dispute Resolution Committee commencing May 1, 2004
   (d) Nominees for election of Chairs and members of Faculty Senate Standing Committees for the 2004-05 Session (list to be distributed at the meeting)
(e) Nomination for appointment by the President to the following Administrative Committees: Joint Committee of Faculty and Students: Ralph O. Mueller, Faculty Co-Chair; Magdalene F. Ferretti, Mamoon Hammad, Amy J. Mazur, Edward M. Robinson, Phyllis M. Ryder, and Harry E. Yeide;

(f) Nomination for appointment by the Board of Trustees to the following Committees: Trustee’s Committee on Academic Affairs: Arthur E. Wilmarth, Jr.; Trustee’s Committee on Student Affairs: Ralph O. Mueller; Trustee’s Committee on External Affairs: Cynthia Lee; Trustee’s Special Committee on Information Technology: Philip W. Wirtz

(g) Nomination for election by the Faculty Senate to the Student Grievance Review Committee: Mary Beth Bigley, Jeffrey Brand-Ballard, Katherine Goodrich, Catheeka Ismail, Susan LeLacheur, Stephen McGraw, Patrick McHugh, Mark Mullen, Thomas Quasney, and Edward Robinson

(h) Report of the Executive Committee: Professor Arthur E. Wilmarth, Jr., Chair

(i) Annual Reports of Senate Standing Committees

7. Brief Statements (and Questions)

8. Adjournment

Dennis L. Geyer
Dennis L. Geyer
Secretary
A RESOLUTION ON CONSTRUCTION OF NEW SCIENCE FACILITIES AS THE TOP PRIORITY AMONG NEW ACADEMIC STRUCTURES (04/1)

WHEREAS, science and technology have a critical impact on all life, and;

WHEREAS, investment in science facilities and science programming is an investment in the future of students, of the Institution, and of society, because it creates the opportunity for:

- strengthening teaching and learning at the undergraduate and graduate levels;
- increasing the enrollment and retention of talented science majors, in general, and diversity among science majors, in particular;
- attracting and retaining accomplished undergraduate students, whatever their major;
- increasing the number of non-science majors who enroll in science courses;
- bringing to students a command of the tools of focused inquiry, mentored discovery-based learning, collaborative problem-solving, writing, quantitative and informational literacy, and information exchange essential for work and lifelong learning;
- improving post-graduate outcomes in graduate/professional school acceptances and job placements;
- recruiting and retaining outstanding faculty;
- attracting exceptional graduate students and postdoctoral researchers in the sciences;
- improving professional placement of doctoral graduates;
- enabling collaborations and emerging interdisciplinary interactions in teaching and research;
- increasing research involvement and productivity for students and faculty;
- increasing competitiveness for external grants for such purposes as research, curriculum and faculty development, and instrumentation;
- enhancing connections to area external partners, e.g., the NIH, the Smithsonian; The Institute for Genome Research, the Goddard Space Flight Center, the Children’s National Medical Center, the Naval Research Lab, and National Institute for Standards and Technology;
- expanding technology infrastructure through state-of-the-art laboratories and general purpose classrooms;
- affecting the University community in a positive manner with respect to morale, inspiration, involvement, collegiality, cooperation, and social interaction;
- attracting benefactors, engaging alumni, and expanding the endowment; and;
WHEREAS, an investment in science facilities and science programming advances the Institution’s Strategic Plan for Academic Excellence by creating the opportunity for:

- delivering engaged and consequential undergraduate education;
- becoming a tier-one research institution;
- promoting quality, highly visible, revenue-generating graduate education;
- recruiting and retaining a diverse, nationally and internationally known, faculty producing increased research;
- leveraging the D.C. environment to deliver a world-class education;
- integrating research and teaching to solve problems in the urban environment;
- fostering a sense of community through a unified approach to science, and;

WHEREAS, understanding the draw of science and the revolution that is occurring within it, local universities, competing universities, aspirant universities, and schools of lesser status have constructed or committed to construct new science facilities, and;

WHEREAS, new science facilities will benefit other Schools, other CCAS disciplines and disciplines within the Schools that depend on excellence in the basic sciences both in academics and research, by providing the opportunity for:

- access to additional technology-enabled general use classrooms;
- flexible arrangements to accommodate the changing landscape of science;
- greater integration of mathematics, statistics, and computational sciences with other disciplines across the University, and;
- enhanced opportunities for cross-disciplinary collaborations, and;

WHEREAS, the construction of new science facilities and the accompanying benefits would have such a major immediate and future impact on the Institution, that funding by revenues generated by individual gifts, capital campaigns, indirect cost recovery, reallocation of funds, and new revenues (e.g., financial value derived from the old hospital site, tuition-generating programs and certificates) is justified, and;

WHEREAS, the quality and quantity of existing science facilities and science programming deprive the students, the Institution, and society of the full-benefits cited above and thus, undermine the effort of the Institution to achieve the goals stated in the Strategic Plan for Academic Excellence, NOW, THEREFORE,

BE IT RESOLVED BY THE FACULTY SENATE OF THE GEORGE WASHINGTON UNIVERSITY:

(1) That the Faculty Senate endorses the investment in new science facilities that accommodate the physical, life, and mathematical sciences and science programming as the top priority among future academic projects; and

(2) That the new science facilities will be defined with respect to size, site, use (school-wide, university-wide) and program goals through a careful collaborative planning process that includes science and non-science faculty, academic deans, campus planners and architects, advancement staff, and budget officers.
INTRODUCTION

The Executive Committee of the Faculty Senate requested (September 17, 2003) that the Physical Facilities Committee identify the most pressing academic need with respect to the construction of new facilities in light of the approaching availability of the old hospital site. It became apparent quickly that Annual Reports filed by previous Physical Facilities Committees from 1996 forward spoke to the need for new science facilities. (Perhaps even earlier committee reports, not reviewed by the present committee, speak to this need. Dean Caress spoke of the promise of a new science building when he was recruited to GW which indicates long-term recognition by some of the need). In this eight year period of time, we have seen the actual or planned construction of several academic buildings-Media and Public Affairs, ESIA, Law School addition, SBPM under construction, and a School of Engineering addition in the planning stages. Moreover, in 1985, members of the Commission on the Year 2000 made 18 recommendations in their report to President Elliott on strategic planning. In June 2001, President Trachtenberg in an address to the Board of Trustees noted that only one of these recommendations was not met, to provide “At the earliest possible time, … modern laboratories for teaching in the natural sciences and engineering, and additional facilities to support research and teaching in these areas.” Thus, the Physical Facilities Committee, convinced of the need for new science facilities, took on as its charge, with the approval of the Executive Committee, the development of a rationale in support of new science facilities.

The committee’s charge did not include recommending a size or site for new science facilities. While the old hospital site could, indeed, be the location for new science facilities and/or be a source of new revenue to finance new facilities either on that or other property, the committee agreed that the future use of the old hospital site should be leveraged to best benefit the Institution. Implicit in the Committee’s position is the view that revenue/space derived from the old hospital site should contribute toward construction of new science facilities.

THE RESOLUTION

WHEREAS, investment in science facilities and science programming is an investment….. (supported by PKAL Report; “What Differences Do New Facilities Make?”—excerpts in attachment 1 and full copies available in the Senate office)

PKAL is self-described as an informal alliance of individuals and institutions engaged in the work of transforming undergraduate programs in science, mathematics, engineering, and technology (SME&T). Since its beginning in 1989 with continued support from NSF, the work of PKAL has given attention to all aspects of undergraduate SME&T environment—faculty, curriculum, facilities, as well as larger institutional and national
issues. In 1997 the PKAL Committee of Visitors (COV) made site visits to eight colleges and universities, representing the wide diversity of higher education that had made major investments in facilities and programs. Their intent was to answer the question—What differences do improved facilities make? The COV sought to determine if and how the investment paid dividends with respect to student learning, as well as the extent of institutional transformation gained by new and renovated spaces. Until this study, the impact of improved facilities may well have been self-evident, but “knowing that this is so is one thing; demonstrating it is another”. No previous effort had been made to gather data and information on the impact of facilities improvements on: student learning; faculty productivity; departmental and institutional enrollments; and institutional vigor. The PKAL report supports each of the bulleted items that relate to impact on faculty and undergraduate education (the study did not address graduate education) in this clause. However, it is reasonable to extrapolate PKAL’s conclusions on undergraduate education to graduate education.

WHEREAS, an investment in science facilities and science programming advances

... (See strategic goals 1,3,4, 5 and 6 in the document, “Sustaining Momentum, Maximizing Strength.” Excerpts are given in attachment 2).

WHEREAS, understanding the draw of science and the revolution that is ...

(Information collected from websites and telephone contact.)

Schools constructing/planning construction of new science facilities

<table>
<thead>
<tr>
<th>Aspirant</th>
<th>Competitors</th>
<th>Local</th>
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<tr>
<td>Yale</td>
<td>USC</td>
<td>U.Maryland-College</td>
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<tr>
<td>blueprint for</td>
<td>construction set to</td>
<td>Park-new chemistry</td>
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<tr>
<td>future calls for</td>
<td>begin on 100,000 sq. ft.</td>
<td>wing, 67,000 sq. ft.</td>
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<td>new science</td>
<td>facility</td>
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<td>facility</td>
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<tr>
<td>Harvard Medical</td>
<td>Penn-Vagelos Labs,</td>
<td>new engineering bldg.,</td>
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<tr>
<td>School- new</td>
<td>102,000 sq. ft. new</td>
<td>160,000 sq. ft., open 2005</td>
</tr>
<tr>
<td>research bldg., 525,000 sq. ft.,</td>
<td>facility for bioeng., chem., chem.eng., medicine</td>
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<tr>
<td>began 9/03</td>
<td>commitment to construct new life sciences bldg.</td>
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<td></td>
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<td>new bioscience bldg.,</td>
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<td>138,000 sq. ft., construction begins 6/04</td>
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<tr>
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<td>184,000 sq. ft., completion 7/05.</td>
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<tr>
<td>NYU- new instrument ctr.</td>
<td>just opened.</td>
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<td></td>
<td>Vanderbilt-new medical research bldg.</td>
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<tr>
<td></td>
<td>Notre Dame- new science hall for chem., biochem., biol., physics, 202,000 sq. ft., construction underway</td>
<td></td>
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</tbody>
</table>
WHEREAS, new science facilities will benefit other Schools, other CCAS....

GW has many likely internal partners that will benefit from new science facilities:

- The School of Engineering has major efforts in computational biology, materials development, and transportation analysis that could be natural partners in new science facilities. Biomedical engineering, an area of Selective Excellence, could benefit from new facilities through existing relations with the biomedical sciences;
- The Law School with strength in intellectual property law and patented work therefrom has a common interest with CCAS;
- The SMHS has a significant shared interest in new science facilities. Doctoral degrees in the six biomedical science programs are awarded by CCAS. Existing cooperative research arrangements between faculty in the SMHS and CCAS could be enhanced;
- The SPHHS has programs in health services, health policy and exercise science that dovetail with basic and applied scientific inquiry;
- The Elliott School is connected to science through its Center for International Science and Technology Policy and its Space Policy Institute;
- The SBPM has efforts in technology and involvement in business issues in science and technology in an international context and,
- The GSEDH has worked with CCAS on science and mathematics education and is considering BA/MEd programs to train K-12 science and mathematics teachers.
- The CCAS has disciplines within the college with distinct but not readily apparent interests in the sciences e.g., geography with programs in mapping and physical geography; psychology with programs in cognitive psychology, and anthropology with a focus on human origins.

WHEREAS, the construction of new science facilities and the accompanying benefits....

The benefits to the Institution of new science facilities have been identified in previous WHEREAS clauses. Funding for new science facilities is major. Do the benefits derived justify the cost? The Executive Vice President and Treasurer, Louis Katz, in a meeting made several key points with the committee:

- The need for new science facilities is “pretty well documented”;
- New science facilities would really need to move the Institution forward, and if they do, “new facilities can be made to happen”;
- Dollars for construction come generally from reallocation of funds, fund-raising, and indirect cost recovery. However, at this time there is the unique opportunity to use financial value from the sale of the old hospital site to pay for new science facilities.
- A facility for school-wide use would occupy 100,000-200,000-sq. ft., and one for university-wide use would occupy 300,000-400,000 sq. ft. The estimated cost/sq. ft. is $300-400. Thus, new facilities would cost between $30,000,000-$160,000,000. The VP could not imagine that the scale of the final facility decided would cost less than $50,000,000.

The committee reviewed the construction costs (reported in the 2003 PKAL Assembly Report) for numerous new science facilities that were built between 1995-2003. The new science facilities ranged in size from 9000 to 264,000 sq. ft. at a cost of $125-$258/sq.ft. for a total cost ranging between $3,250,000- $66,400,000. The higher projected cost (VP Katz) for science facilities at GW may be attributed to the region and time to future construction.

WHEREAS, the quality and quantity of existing.... (Information gathered from Dean Frawley.)

Sciences in CCAS occupy about 90,000-sq. ft. of space distributed across campus. This is less than half that needed, and the present space configuration is counterproductive to unity and
Demand on instructional laboratory facilities and related teaching space for courses exceed capacity. Physics is distributed across six buildings and three campuses. Teaching laboratory infrastructure is outdated. Students report better high school facilities (Hatchet 10/03). Chemistry is located in Corcoran Hall, built in the 1920’s and brought to Code in 1987. The building has no loading dock, no elevator adequate to move large equipment, no roof space for additional exhaust ducts, inadequate equipment storage space, lab classes are saturated and students denied access (labs operate from 8:00 a.m. to 10:00 p.m. M-Th). There is inadequate laboratory space for undergraduates, in general, and majors, in particular, to conduct undergraduate research. Biology and Geology are located in Bell Hall. About 30% of the space have been renovated in stages over the past 30 years. There is no room for additional funded research or instrumentation advancement. There are a lack of adequate office space for new faculty and a lack of laboratory space to train students, in general, and majors, in particular. Forensic Science has about 1700 sq. ft. of laboratory and teaching space and only 300 sq. ft. of this is dedicated to research. This is a program with great potential, due to heightened interest in the field, to grow its MA programs. Anthropology occupies about 1800 sq. ft. distributed across Lisner Hall, Phillips Hall, and building BB. Mathematics located in Funger Hall is scheduled to move into temporary space in Old Main in August 2004 for an indefinite period.

Approved and respectfully submitted by the Physical Facilities Committee,

Jerome Danoff
Robert Donaldson
Linda Gallo (Chair)
Michael King
Donald Paup
Bradley Sabelli
George Stephens
Jean Pec (ex officio)
Anyah Dembling, student member (ex officio)
Project Kaleidoscope (PKAL) is an informal alliance of individuals and institutions engaged in the work of transforming undergraduate programs in science, mathematics, engineering, and technology.

Since its beginning in 1989 with support from the National Science Foundation, the work of PKAL has been kaleidoscopic, giving attention to all aspects of the undergraduate SME&T environment—faculty, curriculum, facilities, as well as to larger institutional and national issues. From an initial base of primarily liberal arts colleges, colleagues and partners from other kinds of institutions—public and private, large and small—have joined in the work of getting science education right. Since Phase II began in 1992, nearly 3400 individuals from over 660 colleges and universities have participated in one or more PKAL activity. Phase III began in 1998.

Current support for Project Kaleidoscope comes from:

- **The Exxon Education Foundation**—
  For the PKAL Faculty for the 21st Century Program

- **The National Science Foundation**—
  Directorate for Education and Human Resources/Division of Undergraduate Education—
  For the Undergraduate Faculty Enhancement Workshops
  Office of Science and Technology Infrastructure—
  For the Facilities Committee of Visitors
  Directorate for Biological Sciences—
  For the PKAL F21 Leadership Institutes

- **The Fund for the Improvement of Postsecondary Education, U.S. Department of Education**—
  For the Phase III Core Institution Program

- **The W.M. Keck Foundation**—
  For the Keck/PKAL Consultant Program

- **The Camille and Henry Dreyfus Foundation, Inc.**—
  For the Chemistry Writing Project

PKAL has also received grants from:

- The Research Corporation
- The W.K. Kellogg Foundation
- The Pew Charitable Trusts

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### Background

In 1997, with support from the Office of Science and Technology Infrastructure at the National Science Foundation, a Project Kaleidoscope (PKAL) Committee of Visitors (COV) made site visits to eight colleges and universities, representing the wide diversity of higher education in this country. All institutions had taken seriously the challenge to transform the environment for learning and had made a major investment of resources toward renewal of facilities and program. Through meetings with faculty, administrators, and students, tours of new spaces, and review of institutional materials, the COV sought to determine if and how the investment paid dividends in respect to student learning, as well as the extent of institutional transformation occasioned by the new and renovated spaces.

This report presents their findings. The Committee of Visitors found improved spaces are making a difference in that they:

- create the opportunity for strengthening learning, with greater student access to opportunities to 'do science,' from introductory courses through upper-level courses for majors
- introduced an increasing number of students to the art and excitement of doing research, thereby fostering critical thinking, problem-solving, and communication skills
- enable flexible scheduling and use, accommodating students with different learning styles and different career aspirations
- play a role in recruiting strong faculty, as candidates see the value the institution places on these disciplines and their commitment for the future
- accommodate emerging interdisciplinary thrusts in teaching and research
- feature expanded technology infrastructures that support programmatic reforms based on an increased use of instructional technologies, and bring to students a command of the tools of information exchange essential for work and life-long learning
- leverage the search for external support, making the institution more competitive in obtaining grants for research, curriculum, faculty development, and instrumentation
- are an occasion for revisiting institutional priorities, and for considering the allocation or reallocation of resources so that those priorities can be funded over the long term.

### COV Institutions

- [Carleton College (MN)](#)
  - Center for Mathematics and Computing and Hullings Hall for Biological Sciences
  - New: $21.5 million
- [Claremont McKenna, Pitzer, and Scripps Colleges (CA)](#)
  - W.M. Keck Science Center
  - New: $12 million
- [Grand Valley State University (MI)](#)
  - The Seymour and Esther Miller Hall of Science
  - New: $41 million
- [Kennesaw State University (GA)](#)
  - The Science and Allied Health Building
  - New: $15 million
- [Rensselaer Polytechnic Institute (NY)](#)
  - Walker Laboratory
  - Renovation: $11 million
- [The University of Oregon (OR)](#)
  - The Science Complex
  - Addition and renovation: $45.6 million
- [Washington and Lee University (VA)](#)
  - Parnell, Howe, and Great Halls
  - Addition and renovation: $23.2 million
- [Xavier University of Louisiana (LA)](#)
  - Norman C. Francis Science Center
  - Renovation: $20.8 million; Additions

### The Committee of Visitors

- Stanley Mertzman, Professor of Geology–Franklin and Marshall College
- Frank Rothman, Provost Emeritus and Professor of Biology–Brown University
- Dorothoa Widmayer, Professor of Biology Emerita–Wellesley College
- Lee Walker Willard, Associate Dean (Trinity College)–Duke University

Coordinated by:

- Julie Monson, Education Consultant
- Joanne L. Narum, Director, Project Kaleidoscope
**COV Findings**

New facilities enable an expanded technology infrastructure that:

- gives students greater access to data from external sources and from college networks at all hours of day and night.

- supports a variety of programmatic reforms that require increased instrument use, making them more available and providing more independence in their use.

- encourages greater institutional support for faculty and staff to use computers for more than word processing.

- raises the expectations for and use of technologies across campus.

- brings students a command of the tools of information exchange essential for work and for life-time learning.

**Findings—Teaching and Learning**

**Improvements in pedagogy.**
Efficient, attractive classrooms and laboratories equipped with modern instrumentation and advanced computer technologies create an environment that encourages innovative teaching and expanded research opportunities for undergraduates. For example, at RPI, the replacement of formal lectures by interactive modes of learning (the "studio" method) is enhanced by the flexible, modular arrangement of furniture and computers in classrooms.

Six of the institutions visited incorporated advanced computer technology that, together with programs that train faculty in its use and potential, expand pedagogic opportunities. The modern technology permits increased access to and analysis of data generated with sophisticated instruments. In Carleton College's Huling Hall, for example, images that originate from electron microscopes can be sent throughout the building, displayed on a computer monitor for individual analysis by students, or projected for classroom viewing.

**Student research.** The importance of an undergraduate environment that is 'research-rich' was evident at several of the institutions visited. Dedicated space suitable for individual or group research projects made possible expanded opportunities for students to do truly experimental work— to do science as scientists do science.

Carefully planned adjacencies of teaching laboratories, research laboratories, and instrument rooms, as at Kennesaw State University, permit wide sharing of expensive, sophisticated equipment, a cost-effective measure.

**Student/faculty interactions.** The new spaces generate increased faculty-student and student-student communication and collaborations in several settings, with peer-learning taking place in informal settings in hallways and alcoves as well as in formal settings in classroom and lab.

Classrooms and laboratories have been designed to permit easy circulation of faculty, or grouping of students for discussion during laboratories. Social spaces adjacent to faculty office clusters, or at major intersection points of traffic, facilitate impromptu as well as scheduled get-togethers. At Xavier University of Louisiana, reporting of student research at local and regional conferences is stressed as part of their extensive student mentoring programs.

The COV found that the contrast to the previous facilities heightened the impact of new space on teaching and learning.
**Findings—Institutional Impacts**

**Enrollments.** The interplay between new facilities and enrollments is complex. Science majors increased at most, but not all of the institutions. Total science enrollments increased at a faster rate than total institutional enrollments, apparently due at least in part to the new facilities. Such enrollment increases also reflected greater institutional attention to attracting non-majors into the study of science and mathematics. Reflecting national trends, the enrollment increases were concentrated primarily in biology and computer science. At Carleton College, which maintains a steady-state in total enrollment, science enrollments increased after the new facilities were opened.

**Faculty.** The most visible impacts of improved space were on morale, which improved greatly at all of the institutions, and faculty effectiveness. Faculty noted that their time can now be redirected in constructive ways (working directly with students) and away from such issues as safety of obsolete equipment. The improved meeting spaces, both formal and informal, have led to increased faculty interactions between departments. A positive effect on recruiting strong new faculty as a result of up-to-date facilities was mentioned at Grand Valley State University, Kennesaw State University and the University of Oregon, and is likely to be the case at the other institutions as new searches take place.

**Planning.** The COV found ample evidence of the value of an open, detailed planning process, with broad involvement of various sectors of the campus community, including administrators, students, staff, and faculty colleagues from all disciplines.

- This was most evident at the University of Oregon, which has a rich heritage in campus-planning policy, dating back to the early 20th century. Leaders of the science faculty who were to become the users of a nine-building complex were involved in all stages of the planning and played the major role in the decisions taken. Faculty from non-science fields were also enlisted in the planning. A strong faculty/administrative "shepherd" provided leadership and continuity during the long process. The resulting complex of buildings has reinforced the University's commitment to interdisciplinary Institutes, by "horizontally" integrating each Institute on a contiguous floor of various connected departmental buildings.

The planning process at several institutions served to educate various constituencies about the activities of the others, and brought to the fore institutional versus disciplinary priorities.

**COV Findings**

- improved facilities, with spaces designed to accommodate a community of scholars:
  - encourage communication between students and faculty and informal use by students
  - make science a more visible and more central part of the education for all students
  - support the development of programs that bridge the disciplines, and offer students opportunities to develop majors that link the sciences with other disciplines
  - play a significant role in attracting strong new faculty to the campus.
In all eight projects, architectural siting and distinction were important design criteria. At the University of Oregon, the new buildings connected and hid old ones that were unattractive anomalies on the campus. The science complex now forms a new and beautiful segment of campus, which is visited and used by all members of the University. At The Claremont Colleges, the Science Center is a handsome structure strategically located at the corner of the three abutting campuses of the colleges that together administer the Joint Science Department. The Science Center at Washington and Lee University, joined by bridging two historic science buildings, fits in with the existing historic nature of the campus yet provides a sophisticated modern facility that opens up the back half of the campus and creates a new campus axis.

Facility Issues. Major physical space issues varied at each institution. Informal spaces for student and faculty interaction, while often singled out for their importance, were sometimes scaled down due to budget cuts; classrooms were also scaled down at some institutions. However, the value of community space was emphasized in the personal interviews, and was quite evident in the tours through several of the new facilities. Issues in regard to safety and accessibility were also addressed in the planning.

Financial Issues. The COV noted a strong two-way synergism between new building projects and grant funding.

At Xavier University of Louisiana, selection by the NSF as a “Model Institution for Excellence” helped to generate the programmatic needs for improved infrastructure. At other institutions, the availability of a first-class facility strengthened applications to external agencies for program, faculty development, and equipment.

Operating costs rise with expanded or improved science facilities. For example, Padnos Hall at Grand Valley added 30% to total academic space utilities, and required hiring an extra engineer. The COV found that, most often, plans had been made for covering these costs.

Once opened, new science buildings can play an important role in future fund raising. Several of the elegant structures visited are used by development, university relations, and admission offices for presentations to donors, friends, and prospective students and parents.

These buildings, individually and collectively, are a visible commitment to quality undergraduate programs in science, engineering, technology and mathematics, and a reminder that such programs will be a hallmark of institutional excellence for the 21st century.

COV FINDINGS

Improved facilities make a difference as they:

- provide space for expanding enrollments, particularly in biology and computer science
- affect enrollments by attracting exciting and excited students to the campus
- support greater involvement with teachers and students in regional elementary and secondary schools
- offer students spaces for research and study that are safe and easily accessible.
The Need for Improved Undergraduate Facilities

Why are improved facilities needed? The campuses reviewed by the COV had a common story about the inadequacy of former spaces and structures for science.

Enrollments. Of the institutions visited, three had been experiencing dramatic increases in institutional enrollments (Grand Valley State University, Kennesaw State University and Xavier University of Louisiana), and most were responding to greater student interest in science/mathematics, creating higher course enrollments.

Obsolescence. At some institutions, facilities that were renovated or replaced dated from the early years of the 20th century and were manifestly obsolete. Even when facilities had been built more recently (during the Sputnik-inspired building boom of the 1960s), they were inadequate as contemporary learning environments. With time-worn systems, these outdated facilities required significant work merely to achieve minimum safety standards and to meet current codes.

Obsolescence was evident from several perspectives, including:

* pedagogical approaches: facilities were outmoded in that their designs reflected out-of-date styles of teaching and learning
* new directions in science: facilities did not encourage the interdisciplinary interactions that are increasingly a part of research and education in the scientific and technological worlds
* technologies: emerging educational technologies that required updated infrastructure configurations of classrooms and labs could not be accommodated
* research-rich environment: the role of research and research-training in the education of undergraduate students was not recognized in planning for spaces built over 30 years ago.

Equally critical was the emergence of a new educational vision. Revisiting institutional missions and seeking to attract a broader student audience to the study of mathematics and the various fields of science, the COV institutions had determined that these fields of inquiry needed to be more visible. The fields needed to be seen as a more integral part of the undergraduate experience, and as a fitting preparation for a wide range of vocational and leadership opportunities for all students.
Conclusions

For over a decade, leaders of higher education have recognized that the environment for learning science and technology must change. The self-evident advantages of new, carefully planned facilities to maximize the benefits of these changes have been emphatically confirmed in the present study. The COV found rich synergism among curricular innovation and faculty and student morale, externally-funded grant support for programs and equipment and new facilities. The impact of new and renovated facilities has been significant. The students learning in these spaces will make an important societal contribution in years to come with the skills and capacities they are developing.

Has the investment demonstrated positive results and how do you know?

The COV answers to this question should be of value to other institutions in the process of planning for new spaces and structures for undergraduate programs in science and mathematics. Understanding how these spaces make a difference should also inform current discussions at the national level about shaping the future of these undergraduate programs.

What we learn from these eight projects advances our understanding about the relationship between the potential to develop human resources essential to shape our nation's future in a world of unprecedented scientific and technological opportunities; we also better understand the potential of the infrastructure that supports education, research-training, research and development in science and technology, mathematics and engineering.

As more undergraduates are exposed to science and mathematics in facilities that allow them to ‘do science’ under conditions that more closely resemble those found in contemporary and future work settings, they will be better prepared to move into positions in business and industry and academe that require scientific and technological skills. Equally important, these students will be better prepared for the difficult judgments about the ethical dimensions of science and technology that they will be called upon as citizens to make.

The heart of this report is in interpreting the human experiences that took place in the planning of and living and working in these new facilities. Every institution studied in the report discussed how the new environment affected human emotions and behaviors such as morale, inspiration, involvement, collegiality, cooperation, and social life. A building that does not welcome us, does not foster all sorts of team-work, and does not promote the vital connection among teachers and students, infrastructure and curriculum cannot contribute to improved teaching and student learning, to strong enrollments, to the potential for increased external funding, to greater research efforts and to ongoing planning for the future of the institution.

The academic vision is that GW become one of the preeminent urban research universities in the nation and world, recognized for...externally funded research across the disciplines. The vision derives from society’s need for continuing scientific discovery, applications of technology, and synthesis of information to create new understanding of, and solutions to, human and societal problems.

The academic mission is to provide faculty and students with the optimal environment...

GOAL 1: Move GW solidly into the ranks of the first-tier educational institutions through quality undergraduate education and selected top-ranked graduate programs, especially at the doctoral level.

- “building greater excellence in undergraduate education by increasing academic challenge, enhancing student engagement, and fostering greater student-faculty interaction.”
- Recruit, retain, and graduate academically talented and able undergraduate students.
- Enhance student engagement in learning and discovery-based education...by expanding undergraduate research...

“Major factors influencing an institution’s rankings and prestige are the quality of its doctoral programs and professional placement of its doctoral graduates. High-caliber graduate programs and students also play a key role in the recruitment and retention of excellent faculty and in the enhancement of the undergraduate learning experience.”

- Recruit, retain, and graduate highly-qualified graduate students.
- Provide graduate students with a challenging learning environment...

GOAL 3: Move GW into the ranks of the top-tier research institutions through continued and enhanced facilitation of faculty scholarship and research growth.

- Recruit, reward, and retain an outstanding and diverse faculty. The faculty will be “recognized for excellence in research, scholarship, and teaching”.

“Research plays a vital role in the life of the mind and in the solution of local, national, and global problems...the size and quality of GW’s research enterprise contribute to institutional prestige, visibility, and the ability to attract and support top graduate students. GW will support “projects that capitalize on interdisciplinary strengths and assets of our faculty, centers, and institutes...” “Such investment will have major payoffs for student engagement as GW creates communities in which faculty, post-doctoral scholars, graduate students, and undergraduates work together at the forefront of discovery”.

- Increase the quality and quantity of research and scholarship by GW faculty, graduate students, and undergraduate students.
- Increase externally-funded research grants and contracts.
- Build a strong, campus-wide undergraduate research scholars program.
• Support interdisciplinary research...to encourage cross-department and cross-school collaboration.

GOAL # 4: Continue to develop a strong sense of community.
“One element of academic excellence is a strong campus community characterized by diversity and a sense of inclusiveness”...“Students must have spaces and venues in which they can interact with fellow students and faculty”...”Faculty must have opportunities to collaborate with colleagues and to share their work on a regular basis”...”continue to provide opportunities for our students to benefit from our rich partnerships in the D.C. metropolitan area through research...”
• Create a campus environment that values...diversity.
• Increase the number of faculty from underrepresented minority groups...
• Promote and preserve a spirit of collegiality among GW faculty.
• “...offer social opportunities” to students.
• Enhance the quality of the teaching and learning environment and student-faculty interaction through the construction and renovation of academic...facilities.

GOAL # 5: Strengthen GW’s infrastructure...Deliver new and expanded technology to all areas of the University.
• Equip an appropriate number of general purpose classrooms with state-of-the-art instructional technology to meet the needs of GW faculty.
• Maintain attractive, well-equipped classrooms, laboratories...and other physical facilities to support established academic priorities.

GOAL # 6: Maintain a strong financial base.
“New financial resources are required to...support undergraduate research, construct new academic buildings and laboratories...”
• Pursue multiple strategies for revenue generation, recognizing the value of income from external grants and contracts, new and expanded master’s...programs, ...and gifts from alumni, friends, foundations, and corporate partners”.
WHEREAS, it is a stated goal in The George Washington University Strategic Plan for Academic Excellence to move GW into the ranks of the top-tier research institutions through continued and enhanced facilitation of faculty scholarship and research growth; and

WHEREAS, stated goals of The George Washington University Strategic Plan for Research include developing a more supportive research culture and environment at GW, increasing the quality and quantity of research by both faculty and students, increasing the amount of sponsored research at GW, and enhancing the reputation of GW as a research oriented university; and

WHEREAS, implementation of these goals requires that “GW will support increases in the quantity and quality of funded and unfunded faculty research and scholarship essential to the University’s overall prestige,” as stated in the Strategic Plan for Academic Excellence; and

WHEREAS, while recognizing the recent efforts of the Administration of The George Washington University to increase the support of research infrastructure on the University, School, and Departmental levels, a review by the Senate Committee on Research has determined that the amount budgeted for support of research has been and still remains only a fraction of that which would be sufficient to accomplish these goals; and

WHEREAS, in particular, the budget for the Research Enhancement Incentive Award (REIA) program, which gives PIs, departments, and schools funds to reinvest in research in proportion to their sponsored research activity for such critical needs as proposal development, startup packages for new faculty, and equipment cost sharing vital to many grant proposals, has remained flat while research activity, productivity, and external funding has increased; and

WHEREAS, the REIA budget ($655,000) was insufficient in FY04 to fully fund REIA payouts under the current formula (which would have dictated a payment of $1,121,000 for FY03 research activity); and

WHEREAS, there is currently no mechanism to ensure that the REIA budget grows in proportion to the growth of research activity; NOW, THEREFORE

BE IT RESOLVED BY THE FACULTY SENATE OF THE GEORGE WASHINGTON UNIVERSITY:

1. THAT, as a first step in fulfillment of the above stated research goals, the Faculty Senate urges the University to institute a plan to fully fund REIA from indirect cost recoveries
and tuition paid by externally-funded grants and that a mechanism to ensure that the REIA budget grows in proportion to the growth of research, where, based on the current formula and an estimated 15% in the average growth in external grant indirect costs and tuition, the additional funding needed for FY05 is $645,000 (an estimated payout of $1,300,000 - $655,000), and the additional funding needed for FY06 is $195,000 ($1,495,000 – $1,300,000);

2. **THAT**, understanding the importance of prioritizing objectives, the Faculty will continue to work with the Administration to develop other specific research priorities to be pursued aggressively over the next 3-5 years and to recommend mechanisms for funding these priorities;

3. **AND THAT**, more generally, the Dean of each school or college be encouraged to continue to support research at The George Washington University and that the University endeavor to set budgeting priorities in accordance with the fulfillment of the above stated research goals.

Faculty Senate Committee on Research
March 26, 2004