THE MILLENNIUM PROJECT
UNIVERSITY OF MICHIGAN

2006 ANNUAL REPORT TO THE PROVOST

JAMES J. DUDERSTADT

INTRODUCTION

The Millennium Project at the University of Michigan is a research center engaged in both the study and creation of the future through over-the-horizon technologies. Located in the Duderstadt Center, the Millennium Project provides a platform for exploring the impact of advanced technology on social institutions, ranging from nation-states to governments and industry to the university itself. In some ways, the Millennium Project is the analog to a corporate R&D laboratory, an incubation center, where new paradigms can be developed and tested. Rather than being simply a "think-tank", where ideas are generated and studied, the Millennium Project is a "do-tank", where ideas lead to the actual creation of working models or prototypes to explore possible futures.

The Millennium Project in the Duderstadt Center

The Millennium Project also serves as a platform for an array of activities associated with my role as President Emeritus and University Professor of Science and Engineering, an appointment that allows me to teach, participate in scholarship, and stimulate activities throughout the University. During its first several years, the Millennium Project was supported primarily through University funding (expiring in 2001) at a level of roughly $300,000 per year (together with the funding of a secretary and my own appointment as President Emeritus). During this period the Millennium Project provided a platform for the creation of the State of Michigan's first virtual university, the Michigan Virtual Automotive College (which I served as startup president) and then later the early phase of the Michigan Virtual University. It also provided support for an array of instructional and research activities concerning the future of the university, involving several UM schools and colleges (LS&A, Public Policy, Engineering, Education, Information, Residential College) as well as external organizations (National Academies, National Center for Postsecondary Improvement, National Science Foundation, and the One Dupont Circle group of national education organizations), including my chairing several major national studies (e.g., the NAS study of the Impact of Information Technology on the Future of the Research University and various COSEPUP studies on federal research policy). It provided as well a platform for my continued involvement in scientific work (e.g., chairing the Nuclear Energy Research Advisory Committee of the Department of Energy and various NSF projects).

In more recent years, the Millennium Project has been predominantly supported from external funding (aside from $50,000 per year of flexible funding from the Provost and the support of my base appointment as Emeritus President). In particular, we have had a major grant from the Atlantic Philanthropies Foundation ($890,000) and several grants from the National Science Foundation (totaling $510,000) that have enabled us to work on several projects of particular interest (e.g., developing regional "roadmapping" strategies for the implementation of technology in education and developing new visions of engineering education, research, and practice). We have also attracted grants from nonprofit foundations to support new University activities (e.g., $610,000 from the Dow Foundation to support postdoctoral students in the new Science, Technology, and Public Policy). Furthermore, several of my external activities have been supported by additional grants channeled through the National Academies or other organizations (e.g., the IT Forum, the COSEPUP Committee on Federal Science and Technology Policy, and the Great Lakes Regional Economic Development project).

MAJOR ONGOING PROJECTS

The Impact of Exponentiating Technologies on Society

The Millennium Project has been heavily involved in activities exploring the impact of disruptive technologies such as info-nano-bio technology that evolve exponentially (e.g., Moore's Law). Working through the National Academies, we have led a major effort (the IT Forum) to assess the impact of information and communications technologies on knowledge-intensive organizations such as research universities, corporate R&D laboratories, and national laboratories. Many of these activities will continue through the National Science Foundation and other federal agencies with Dan Atkin's appointment as first director of NSF's new cyberinfrastructure division and my role as chair of the NSF Cyberinfrastructure Advisory Committee.

The Future of the University

The Millennium Project continues to be actively involved in studies concerning the future of higher education in general and the research university in particular. These have been coordinated with both national efforts (National Academies, ACE, AAU, NASULGC, AGB, Educause), international groups (the Glion Colloquium, OECD), and regional efforts (e.g., Michigan, Ohio, North Carolina, Texas, California, Missouri). Of particular note here are my roles as a member of both the Secretary of Education's Commission on the Future of Higher Education (the Spellings Commission) and the Association of Governing Boards' Task Force on the State of the University Presidency.

National Science Policy

I continue to be heavily involved in national science and technology policy. In particular, during the past year I have chaired a major blue ribbon study by the National Academy of Engineering concerning the federal investment necessary to sustain the nation's technological leadership (a precursor to the "Gathering Storm" report and the American Competitiveness Initiative); a subcommittee of the National Academy's Committee on Science, Engineering, and Public Policy concerned with measuring performance in basic research and working closely with the Office of Management and

Budget; and serving on the guidance committees for studies of Interdisciplinary Research and Major Scientific Facilities.

UM Science, Technology, and Public Policy

We have made very considerable progress in building the new Science, Technology, and Public Policy program, centered in the Ford School but involving students and faculty from across the University. This spring the Rackham Executive Board approved the offering of our new STPP graduate certificate program, based on a five-course sequence developed over the past two years. We have received a $610,000 grant from the Dow Foundation to support a STPP postdoctoral program over the next five years, which will add to our capacity to expand both instructional and research activities (including both the introduction of an undergraduate course and Washington-based internships). We are now seeking major endowment through the Michigan Difference Campaign to fund a senior faculty chair in STPP. (I will continue to serve as co-director of this program until another senior faculty member can be recruited.)

University of Michigan Energy Research Initiatives

After serving the past two years as chair of both a committee exploring major energy research activities as well as the executive committee of the Michigan Memorial Phoenix Project, I have merged these committees into a university-wide Michigan Energy Research Council. The first task of this new body has been to develop a plan for creating the Phoenix Memorial Energy Institute as an umbrella organization to coordinate and promote the University's energy research activities (already conducted at a level of $35 million per year). Working closely with VPR Forrest, a multiple-year plan has been developed for building upon the renovated Phoenix Memorial Laboratory and a combination of state, federal, and private support to position the University as a leader in multidisciplinary research in energy sciences, applications, and policy, with particular emphasis on transportation applications.

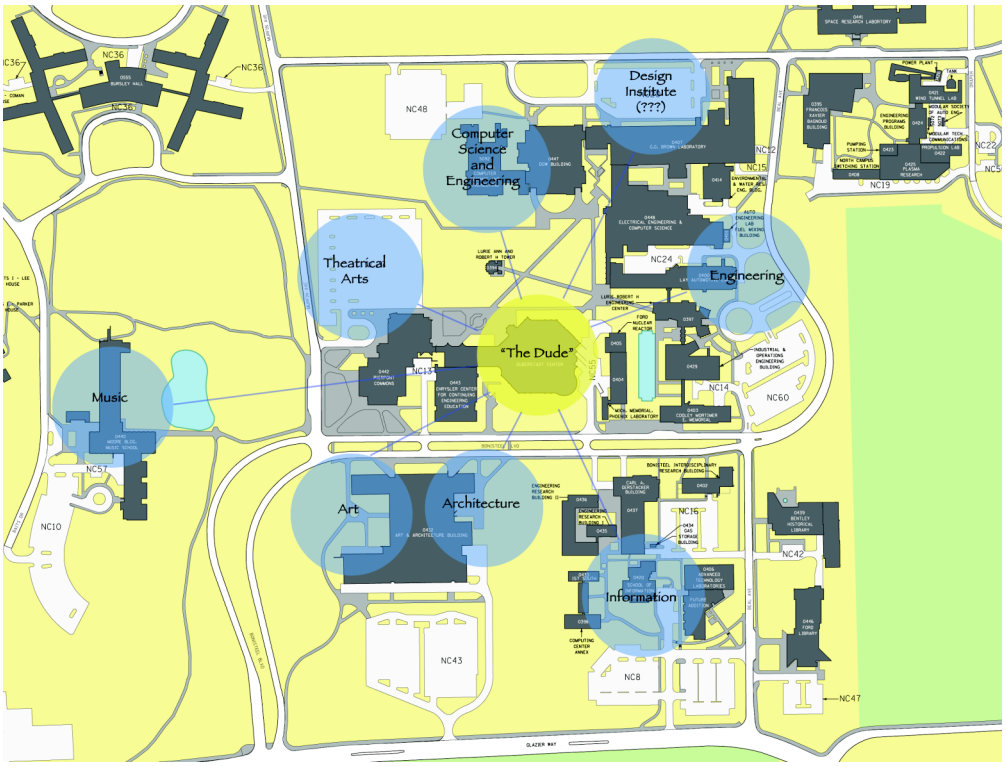
Regional Strategies for a Global, Knowledge-Driven Society

Our regional economic development studies aimed at developing strategies for building the workforce and knowledge infrastructure necessary to complete in a global, knowledge-driven society and culminating in The Michigan Roadmap, has triggered a

great deal of interest not only within Michigan but in other states and nations. A broader activity involving the multiple-state Great Lakes region is moving ahead, working with the Brookings Institution. There has been interest expressed in such road-mapping efforts at the international level (Ontario, OECD, and the EU).

The daVinci Project: Creativity, Invention, and Innovation

The North Campus of the University has a formidable concentration of academic programs characterized by the common intellectual activities of creativity, invention, and innovation (e.g., art, architecture, music, engineering, information technology, and design), along with unique commons facilities such as the Duderstadt Center, the Chrysler Center, and the Pierpont Commons. The presence of the Walgreen Center for Performing Arts will significantly enhance the character of this academic constellation, once referred to by the North Campus deans as the Renaissance Campus.



With the growing priority of the nation given to innovation as the key competency required for economic prosperity and national security in a "flat world", it seems natural to undertake a major effort to better integrate and support joint efforts among these

academic units. The Millennium Project continues to support multidisciplinary student innovation projects (Project Inspire).

The Michigan History Project

Largely stimulated by Anne Duderstadt's strong interest in the history of the University of Michigan, we have launched a number of projects designed both to better document elevate the awareness of the important role that the University has played throughout its history. This spring two new volumes went to press and are scheduled for fall publication: *A Pictorial History of the University of Michigan* (Anne Duderstadt), and *Ten Years Before the Mast: Navigating the University through Stormy Seas*, a semi-autobiographical analysis of university leadership. In addition, we are nearing completion of a new website on the history of the University campus (http://umhistory.org/), including a description of the evolution of every building on the UMAA campus, 3-D simulations of the campus at various points in its history, and navigable virtual reality simulations of the campus at 25 year intervals. In addition the website will contain linkages to thousands of images and references concerning the University's history of possible interest to students.

A Society of Learning

The emerging "perfect storm" of globalization, knowledge economies, demographics, and disruptive technologies has stimulated a growing recognition of the critical importance of lifelong learning in securing economic prosperity, national security, and social well-being. In today's "flat world" (a la Friedman), democratic societies–and state and federal governments–must accept the responsibility to provide their citizens with the educational and training opportunities they need, throughout their lives, whenever, wherever, and however they need it, at high quality and at affordable costs. This will be a major theme for the year ahead, at the state, federal, and international level (and will likely give rise to major recommendations concerning the topic of lifelong learning in the final report of the Secretary of Education's Commission on the Future of Higher Education).

MAJOR NATIONAL LEADERSHIP AND SERVICE ACTIVITIES

Chair, National Academies IT Forum, a Government-Industry-University Research Roundtable committee concerned with the implications of rapidly evolving information technology for the future of the nation's research universities (2000-2005)

Chair, Guidance Committee on the Federal Science and Technology Budget, Committee on Science, Engineering, and Public Policy, National Academy of Sciences (1997-2006)

Chair, National Academy of Engineering-NSF Study of United States Engineering Research Capacity (2004-2006)

Chair, Cyberinfrastructure Advisory Committee, National Science Foundation (2006 -)

Chair, Presidential Search Committee, National Academy of Engineering (2005-2006)

Co-Chair, Glion Colloquium (EU-US consortium of university presidents and corporate leaders, which meets every two years in Glion, Switzerland; June 2005: University-Business Partnerships; June 2007: The Globalization of Higher Education)

Member, Secretary of Education Commission on the Future of Higher Education (2005-2006)

Member, Association of Governing Boards Task Force on the State of the University Presidency (2005-2006)

Member, University of California Task Force on Compensation, Accountability, and Transparency, UC Board of Regents (2005-2006)

UNIVERSITY LEADERSHIP ACTIVITIES

Chair, Science, Technology, and Public Policy Program, Gerald R. Ford School of Public Policy

Chair, Michigan Energy Research Council (resulting from the merger of the Hydrogen Initiatives Committee and the Executive Committee of the Michigan Memorial Phoenix Project)

OTHER SERVICE ACTIVITIES

Chair, National Academies Workshop on OMB Performance Assessment Ratings Tool (PART) with Federal Agencies (2004 -)

Member, Tulane University Post-Katrina Planning Team (2005-2006)

Member, Kansas City Project Team (develop a strategic plan for higher education in Kansas City) (2005-2006)

Member, China Higher Education Project, Jiangsu Province (Nanjing) (2006 -)

Member, Harrington Fellows Advisory Board, University of Texas (2000-2006)

Director, The Michigan Roadmap Project (developing a plan for the future of higher education in Michigan together with state leaders) (2003 -)

Member, Great Lakes Project (working with Ford School and Brookings Institution to develop a regional strategy for the future of the Great Lakes states) (2005 -)

Member, Scientific Advisory Panel, National Center for Atmospheric Research (2001 -)

Member, Visiting Committee, MIT Department of Nuclear Engineering (2001 -)

Member, Visiting Committee, Georgia Institute of Technology (2003 -)

Member, Executive Council, American Association for the Advancement of Science (2006 -)

Director, Unisys Corporation (1990 -)

INSTRUCTIONAL ACTIVITIES

Leadership of effort to create new Science, Technology, and Public Policy program, including new graduate concentration program, faculty recruiting, and fund-raising.

PP 754: "Issues in Science, Technology, and Public Policy" A new graduate course in research topics in STPP for PhD candidates (82 students enrolled)

EXTERNALLY FUNDED ACTIVITIES

"Education in the Digital Age: Leadership, Linkages, and Roadmaps" Atlantic Philanthropies Grant to UM, $890,000 for 3 y (JJD PI) (2001 – 2004)

"Choosing the Future: Information Technology and the Research University" Atlantic Philanthropies Grant to National Academy of Sciences,

$1.5 M for 3 y (JJD Co-Director)) (2001 – 2004)

"21st Century Engineering: A Roadmap to the Future", National Science Foundation, $250,000 for 2 y (JJD PI) (2004 – 2006)

"Science, Technology, and Public Policy Postdoctoral Fellowship Program", Dow Foundation ($610,000) (JJD Co-PI) (2006 – 2011)

Millennium Project Activities, Greater Kansas City Community Foundation ($42,500) (JJD PI) (2005 – 2006)

PUBLICATIONS[1]

Books

James J. Duderstadt, *Ten Years Before the Mast: Navigating the University through Stormy Seas* (University of Michigan Press: Ann Arbor, 2006) (in press)

Luc Weber and James Duderstadt, eds., *Universities and Business: Partnering for the Knowledge Economy*, Glion V Conference (Econometrica: Paris, 2006)

Anne M. Duderstadt, *Michigan Through the Seasons* (Millennium Project, The University of Michigan: Ann Arbor, 2005) (with photographic work by JJD)

Anne M. Duderstadt, *A Pictorial History of the University of Michigan* (Millennium Project, The University of Michigan: Ann Arbor, 2006) (in press)

Major Reports

James J. Duderstadt, chair, *Engineering Research and America's Future: Meeting the Challenges of a Global Economy* (National Academy Press: Washington, D.C., 2005)

James J. Duderstadt, *A Roadmap to Michigan's Future: Meeting the Challenges of a Global, Knowledge-Driven Economy, A Technology Roadmapping Exercise* (Millennium Project, the University of Michigan: Ann Arbor; 2005)

Benno Schmidt, James J. Duderstadt, et. al., *A City of Promise: The Future of Higher Education in Kansas City* (KC Futures Task Force, 2005)

James J. Duderstadt, et. al., "Cyberinfrastructure", A Special Issue of *Issues in Science and Technology*, Vol. XXII, No. 1 (National Academies Press, Washington, 2005)

Joanne Kosberg, Robert Hertzberg, James J. Duderstadt, et. al., *University of California Task Force on Compensation, Accountability, and Transparency* (University of California Regents, Oakland, 2006)

James J. Duderstadt, *A Framing Document for the Work of the Commission* (2005); *The Working Draft of the Quality Subcommittee*, Secretary of Education's Commission on the Future of Higher Education (2006) (Department of Education, Washington, DC)

Papers and Chapters

James J. Duderstadt, Wm Wulf, and Robert Zemsky, "Envisioning a Transformed University", *Issues in Science and Technology*, Vol. XXII, No. 1 (National Academies Press, Washington, 2005) pp. 35-41

James J. Duderstadt, "The Future of Higher Education in the Knowledge-Driven,

[1] Many of these publications are available on our website: http://milproj.dc.umich.edu/

Global Economy of the 21st Century", in *Creating Knowledge, Strengthening Nations: The Changing Role of Higher Education*, Ed. Glen A. Jones, Patrician L. McCarney, and Michael Skolnik (University of Toronto Press, Toronto, 2005) pp. 81-101.

James J. Duderstadt, "Fixing the Fragmented University: A View from the Bridge", in *The Fragmented University*, Edited by Joseph Burke (In Press)

James J. Duderstadt, "University-Industry-Government Partnerships for a 21st Century Global, Knowledge-Driven Economy: An American Perspective", *Universities and Business: Partnering for the Knowledge Economy*, Glion V Conference (Econometrica: Paris, 2006) pp. 19-29

James J. Duderstadt, "University-Business Partnerships for a Knowledge Society", *Universities and Business: Partnering for the Knowledge Economy,* Glion V Conference (Econometrica: Paris, 2006) pp. 281-297.

Other Knowledge Resources

Anne Duderstadt and James Duderstadt: University of Michigan History Website:

http://umhistory.org/

Anne Duderstadt, Mort's Map: A Research Tool for Historians of University History:

http://umhistory.dc.umich.edu/mort/

LECTURES, ADDRESSES, AND PRESENTATIONS, 2005-2006[2]

September 19 Conference of University Alumni Directors, Ann Arbor
"Financing Higher Education"

September 30 UM EECS Dinner for George Haddad, Ann Arbor
"Remarks"

October 6 Distinguished Lecture Series, Penn State University, State College
"Rebooting the Civilian Nuclear Power Program in the U.S."

October 6 Penn State University, State College
"The Future of Public Higher Education in America"

October 10 Great Lakes Strategy Meeting, Henry Ford Museum, Dearborn
"Building a Knowledge Economy in the Great Lakes States"

October 27 Ford School Class on Public Policy, UM, Ann Arbor
"The Michigan Roadmap"

November 2 Federal Research Bank of Chicago Summit, Chicago
"Building a Knowledge Society"

November 10 UM College of Engineering Visiting Committee
"Energy Research at Michigan"

November 15 National Action Committee for Minorities in Engineering, Washington
"Diversity in the Science and Engineering Workforce"
(Acceptance of Reginald Jones Award)

November 16 UM Executive Officers Briefings
State and national initiatives

November 17 NSF Engineering Research Center 20th Year Meeting, Washington
"Discovery-Innovation Institutes"

November 18 Long-Range Planning Team, University of California, Berkeley
"Renegotiating the California Master Plan"

November 21 Higher Education Administration Class, UM, Ann Arbor
"The National Commission on the Future of Higher Education"

November 22 Eng 110 Class, Ann Arbor
"The Future of the Engineering Profession"

November 23 Medical School, UM, Ann Arbor
"The Future of the Medical Profession"

November 29 Association of Governing Boards Task Force Meeting

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"The State of the Academic Presidency"

December 14, UM Buildings and Grounds Breakfast
"The Importance of Staff to the University of Michigan"

January 12 Chemistry PhD Seminar, UM Ann Arbor
"The Future of the University: A View from the Oort Cloud"

January 24 Goldwater Institute, Phoenix
"New Financing Paradigms for Higher Education"

January 25 Association of Governing Boards Meeting, Phoenix
"Higher Education for the Public Good"

February 2, Spellings Commission, San Diego
"Quality Objectives for Higher Education"

February 7 Spellings Commission Hearings, Seattle
"Future of Higher Education in America"

February 15 Ann Arbor Rotary Talk
"A Roadmap for Michigan's Future"

February 16 Eng 110, UM, Ann Arbor
"Engineering for the 21st Century"

February 28 Teleconference lecture to Iowa State Conference, Ames
"The Imperatives of Globalization"

March 8 Digital Revolution Seminar, UM, Ann Arbor
"New Educational Paradigms"

March 14 Ford School Conference on the Future of Michigan, Ann Arbor
"The Role of Higher Education in the Knowledge Economy"

March 20 Spellings Commission Hearings, Boston (chair)
"The Future of Higher Education in America"

March 23 Engineering for Community, UM Class, Ann Arbor
"Globalizing Engineering Practice"

March 24 Midwest Biomedical Engineering Conference, Ann Arbor
"The Role of Research in America's Future"

April 5 Kansas City Chamber of Commerce Conference, Kansas City
"A Future Vision for the Greater Kansas City Region"

April 6 Spellings Commission, Indianapolis
"Do No Harm!"

April 8 Committee on Institutional Cooperation Meeting, Ann Arbor
"The National Commission on the Future of Higher Education"

April 17	National Academy of Engineering Regional Meeting, Ann Arbor "The Future of Automotive Technology" Meeting Chair
May 8	Convocation of NAE and Engineering Professions, DC "Engineering Research and America's Future"
May 10	NCAA Leadership Committee, Dallas "Governance and Leadership in College Sports"
May 15	Olin College of Engineering, Boston "The Future of Engineering Education"
May 18	Spellings Commission, DC "Findings and Recommendations"
May 25	Roundtable on 21st Workforce, Lansing "Michigan's Future as a Knowledge Economy"
May 27	China University Leadership Forum, UM "The Future of Higher Education in America"
June 6	Frye Institute, Emory University, Atlanta "A University for the 21st Century"
June 12	AGB Task on the State of the University Presidency, DC "Findings and Recommendations"
June 15	Cyberinstrastructure Advisory Committee, NSF, DC (Chair)
July 10	National Meeting on Engineering Mechanics, Ann Arbor "Welcome"
September 11	The Research Library in the 21st Century, UT Austin "The University Library: IT's Poster Child"
September 25	U.S. Association for Energy Economics, Ann Arbor "Sustainable Energy Futures: Myths and Realities"