



# The Changing Nature of Research

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And the Future of the University



# A History of Change

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- Monasticism
- Scholasticism
- Scientific Revolution
- Humboltian University
- Land-Grant Universities
- The Research University



# The American Research University

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- *Science, the Endless Frontier*
- Partnership of federal government with universities (rather than independent academies or institutes)
- Competitive grants and contracts: investigator initiated, peer reviewed, merit awarded
- Both basic and applied research (“curiosity-driven” vs. “strategic” research)



# Some Mixed Blessings

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- Dominance of the disciplines
- A research-dominated faculty culture
  - Grantsmanship determines compensation, promotion, tenure
  - Feudal system: graduate students and postdocs = serfs
- The entrepreneurial university
  - Burdens on faculty, transactional culture
  - Loss of institutional direction, public purpose
- Shifting winds of federal research
  - From guns to pills (NIH > 60% of campus-based research)
  - Market rather than policy driven



# Changing Nature of Research

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- Erosion of disciplinary boundaries
- Balance between basic and applied research
- Changing methods for conduct of research
- Powerful new tools of research
- Relationship between research and education
- Commercialization of research enterprise



## Erosion of disciplinary boundaries

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- Dynamic nature of scholarship
- New disciplines born at the boundaries of the old
- Complexity, nonlinearities, emergent behavior
- Consilience...



# Basic vs. applied research

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- Curiosity-driven (“Baconian”)
- Mission-oriented (“Newtonian”)
- “Jeffersonian”: fundamental research needed to build knowledge base for practical applications
- (Pasteur’s quadrant)



# The Conduct of Research

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- From single investigators to teams
- Importance of scholar communities both within and across disciplines
- Networks, collaboratories
- International character of research





# The Tools of Research

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- Dramatic increases in power, scope, and cost
- Cyberinfrastructure
- Grid computing
- Data repositories
- Creativity vs. analysis



# Research, Education, and Learning

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- Conventional wisdom: research and teaching are mutual reinforcing
- Key to graduate education in U.S.
- Undergraduates?
  - Constructionist learning (Dewey, Piaget)
  - Classroom to laboratory to professional practice



# From Partnership to Procurement

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- Government Performance and Results Act (GPRA)
- President's Management Agenda
- Performance Assessment Rating Tool
- OMB R&D Criteria Effort
- Is the university just another federal contractor?



## Commercialization of the Academy

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- Capturing the commercial value of intellectual products (now from both research and instruction)
- Constraints on scholarly communication
- Distortion of faculty culture



# Implications for 21st C University

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- Intellectual architecture
- Missions
  - Teaching, research, service
  - Learning, discovery, engagement
- Governance (lay boards, shared governance, amateur leadership)
- Market competitiveness vs. public purpose



# New Paradigms

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- Core-in-cloud university
- New civic “lifeforms”
  - Community knowledge structures
  - Knowledge and learning networks
- The University a la Neuromancer



# The continuity of change

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- The changing nature of scholarship will transform the nature of the university, as it has so often in the past.
- The challenge: preserving the most fundamental and enduring values and purposes of the university