UNIVERSITY OF HOUSTON

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Testimony before the Texas Senate Subcommittee on Higher Education
regarding undergraduate research and research commercialization on July 23, 2008

Research clusters: An avenue to broaden undergraduate research participation and enhance commercialization

- **The University of Houston has organized six research clusters:**
  - Research clusters are multidisciplinary, challenge-based groups of investigators that include and draw on the strengths of existing research centers, institutes and laboratories within multiple academic departments and colleges.
  - They take advantage of the interrelationship of research areas and capitalize on six areas in which the university and region have strategic advantages.
  - They are faculty-driven, multi-level frameworks that connect researchers with expertise in various disciplines in a multicampus system with **industry partners** and funding agencies.
  - They provide an inclusive foundation for collective scholarly activity, while mentoring and fostering at all levels, the sharing of ideas across traditional academic boundaries.
  - Each cluster develops a strategic approach, which includes cluster hiring and investment in core facilities, as well as student and commercial business involvement during the research process.
  - They are entities that naturally foster **economic development, educational relevance, enhanced workforce development and entrepreneurial thinking**.

- **Research clusters allow UH to:**
  - Build critical mass
  - Align research projects with critical community, state and national needs
  - Facilitate partnerships with the business and medical communities
  - Create national standings in key areas
  - Attract top-notch faculty and students while significantly **enriching the student experience**
  - Leverage the university's and region's strategic strengths
  - Provide a hands-on research experience in which undergraduates truly contribute their unique strength and business partners are actively involved*

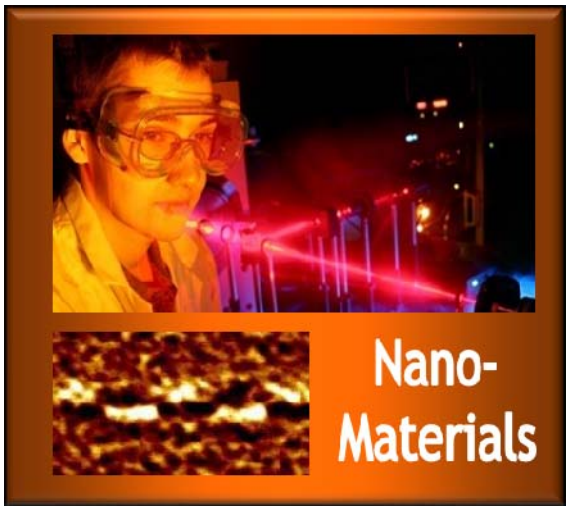
- **UH's six research clusters include:**
  - Arts & Human Enrichment
  - Bio-Med Sciences & Engineering
  - Community Advancement & Education
  - Complex Systems/Space Exploration
  - Energy, Sustainability, and Security

** This approach not only applies to education in the sciences and engineering – but to arts/humanities and business as well.*
See section entitled "Undergraduate Research" and Figures 1, 2 and 3.

- Nano-Materials

- **Ultimate Goal:**
  - To integrate research, academics and industrial experience into a challenge-based, unified approach to undergraduate and graduate education and research.

UH's research clusters:



Undergraduate research

- **UH is dedicated to:**
  - Encouraging an entrepreneurial approach to discovery
  - Facilitating a hands-on educational experience, thereby increasing retention
  - Providing for a seamless transition to the work force or graduate school
  - Establishing team-based work groups, through research clusters, that allow for mentoring at each level of involvement
  - Using classroom discovery and research process integration
  - Exploring and finding solutions for broad, interdisciplinary challenges

- **Learning outcomes:**
  - Students will be able to formulate a research question or problem.
  - Students will be able to identify basic principles and knowledge related to their research questions or problems.
  - Students will be able to develop a research plan to address or resolve specific questions or problems.
  - Students will be able to collect and interpret data and information to resolve the questions or problems.
  - Students will demonstrate awareness of the responsible conduct of research.
  - Students will be able to articulate their research findings through written, performance, and/or oral presentations.

Figure 1

Elements of the Quality Enhancement Plan

Figure 2

UH *Discovery-Based Learning Initiative*

Research-Related Skills Training	Research Opportunities
• Research-Supportive Curriculum – Core Courses – Major Courses – Research-Intensive Courses	• Credit-Bearing Research – Undergraduate Research – Independent Study/Project – Senior Honors Thesis – Research Internship • Volunteer Research • Stipend-Supported Research • Faculty Grant-Supported Research • On-Campus Research Opportunities Database • Houston Research Internships Database
• Co-Curricular Programs – Workshops and Tutorials – Real-World Team Projects Database – Work-Study Research Internship – Research Dissemination Venues – Reality Chats	

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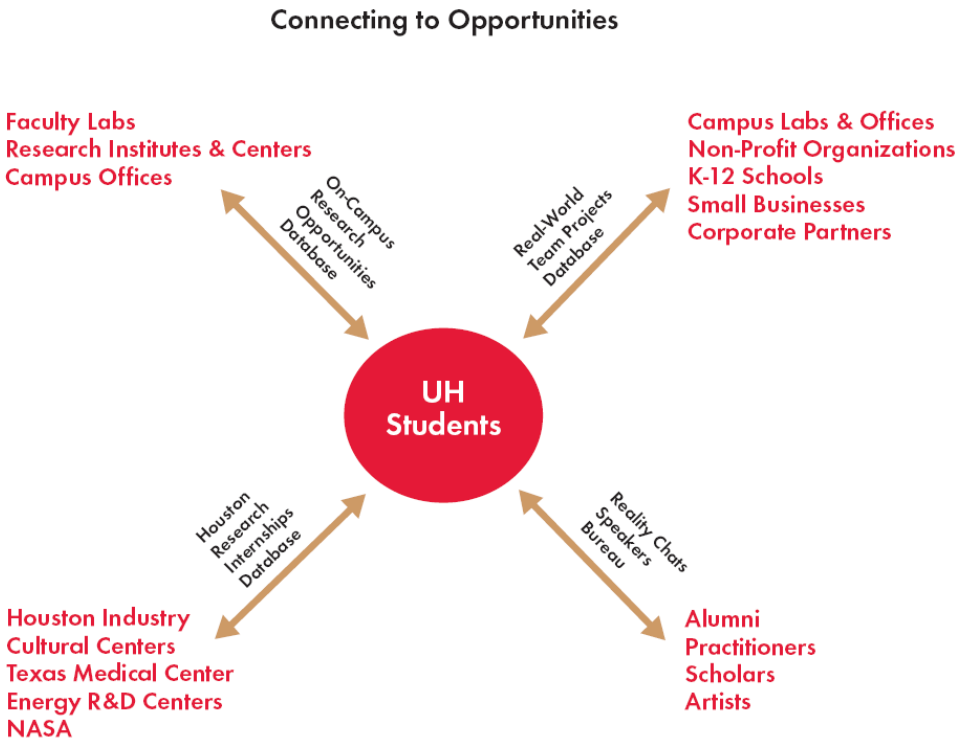
Figure 3



Research Commercialization

- **Because UH researchers are organized in clusters matched with grand challenges, it is much easier to develop government, industry and academic partnerships on a national scale in which Texas can lead (e.g., energy, wind alliance, health, nuclear receptors and cell signaling).**

- **The Center for Industrial Partnerships (CIP):**
  - Was established in March 2007
  - Was approved as a nonprofit by the UH Board of Regents in November 2007

- **CIP members:**
  - **Eureka Genomics**, a spin-off, became the first member in November 2007
  - UH and Eureka have established a licensing agreement and five research agreements
  - **Baker Petrolite**, the CIP's second member, has established a research agreement
  - Membership for **DOW, Trinity Industries, Cameron Industries, Total and NanoRidge** is pending

- **Established an innovation pipeline:**

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- Created with Houston Technology Center and UH Small Business Development Center
- Encourages faculty spin-off companies through on-sight training and advising

- **Texas BioProducts Industrial Council (July 2007):**
  - Hosting quarterly meetings
  - Hosted major seminar in May

- **Lone Star Wind Alliance**
  - Lead for DOE, NREL, CRADA
  - Lead for formation and organization of government, industry and academic alliances
  - Lead for Vestas Wind Systems negotiations – Vestas moving Wind Research Center to Texas

- **Presentations for:**
  - UH senior seminars
  - College of Technology
  - Cullen College of Engineering
  - UH undergraduate research summer program