

ILLINOIS INSTITUTE  
OF TECHNOLOGY

# Many Voices, One Vision

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Deans Committee:  
Final Recommendations  
November 17, 2008

**DEANS CHARGE**



# Memo

**TO: DEANS AND DIRECTORS**

**FROM: JOHN L. ANDERSON**

**DATE: SEPTEMBER 4, 2008**

**RE: STRATEGIC PLAN: IDEAS FOR CREATING VISIBILITY,  
SUSTAINABILITY AND SYNERGY**

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I would like to update you on our progress in developing the university strategic plan and invite your direct participation as we head into the critical phase of the process.

You will recall that last January we met to discuss my draft vision statement for the future of the university. Based on your input and that of trustees, senior staff and faculty, the current vision statement is:

*IIT will be internationally recognized in distinctive areas of education and research, using as its platform the global city of Chicago, driven by a focus on professional and technology-oriented education, and based on a culture of innovation that embraces bold and transformational ideas.*

The Board of Trustees and I are looking for ideas and initiatives that will enable IIT to make a quantum jump in its place among the elite institutions of higher education, not just an incremental increase in reputation. By “jump in its place”, I am not referring to rankings, though a better ranking will follow. What we mean is that IIT will be the third major national/international university in Chicago, along with the University of Chicago and Northwestern – different than these two institutions but mentioned in the same breath. To meet this goal and achieve our vision, we need to not only advance our core areas, where we currently have comparative strengths, but also create an environment that embraces new, bold ideas and promotes a culture of innovation. It will take one to two decades to achieve this goal, but we must start now.

To get us moving in this direction, I appointed a Steering Committee consisting of faculty, staff and students to gather ideas from across the university community, sift through them and make recommendations to me for the university’s future directions based both on the information they have gathered and the concepts expressed in the attached paper. Their report to me is due on November 15.



### **Charge to the Deans and Directors**

A concept paper that proposes two parallel approaches to the strategic plan will be sent by September 12. The first approach is a focus on improvement by bolstering our core areas. This approach is least abstract because it aligns with current strengths and involves the re-configuration of our current activities, with requisite investment of resources. The second approach, parallel to the first, is development of an “innovation sandbox” concept and a plan to establish it at IIT. These two approaches overcome the two major hurdles facing strategic planners: first, the issue of turf and self interest and the difficulty we all have in relinquishing some of it; and second, the enormous barriers blocking new ideas that emanate from strong, established programs. The first approach, selectively advancing our core, addresses the first hurdle, while the second approach, the innovation sandbox, addresses the second.

Investments made in initiatives involving the core areas must satisfy the “investment triangle” – the initiative must promise to: 1) raise the visibility of IIT, 2) offer a reasonable plan for financial sustainability, including identification of a champion for the initiative, and 3) promote synergy among different areas of the university so as to advance multiple disciplines. The investment triangle will be the metric rule for evaluating ideas now and in the future.

As the key academic leaders of the university, I invite you to work collaboratively among yourselves and with Alan Cramb, as acting Dean of Armour College of Engineering, to develop three to five ideas to dramatically enhance the core, that meet the standards of visibility, sustainability and synergy. Your concepts, when evaluated along with those of the Steering Committee, will form the foundation of my recommendations to the Board of Trustees at the February Executive Committee meeting. I will need the drafts by November 15<sup>th</sup>, to give us time to both evaluate them and develop implementation strategies for those that show the most promise.

Please use the attached template in developing the elements of your ideas.

In addition, I would like each of you to comment on the concept paper’s proposal for creating the “innovation sandbox” in a memorandum to me. Please consider how this concept might align with your plans for your academic unit. (See page 3 for concept paper.)

Thank you very much for your leadership and your contributions to this critical planning process. Please refrain from sharing this with anyone else at this time.

John L. Anderson



# STRATEGIC PLANNING DEANS COMMITTEE

## Committee Members

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### Members

**R. Russell Betts**

*Dean, College of Science and Letters*

**Harvey Kahalas**

*Dean, Stuart School of Business*

**Donna Robertson**

*Dean, College of Architecture*

**C. Robert Carlson**

*Dean, Center for Professional Development*

**Harold Krent**

*Dean, Chicago-Kent College of Law*

**Candace Wark**

*Associate Dean, Armour College of Engineering*

**Ali Cinar**

*Dean, Graduate College*

**Ellen Mitchell**

*Dean, Institute of Psychology*

**Patrick Whitney**

*Dean, Institute of Design*



# DEANS COMMITTEE REPORT

## VISION, MISSION AND GOALS

### VISION

IIT will be internationally recognized in distinctive areas of education and research, using as its platform the global city of Chicago, driven by a focus on professional and technology-oriented education, and based on a culture of innovation that embraces bold and transformational ideas.

### MISSION

To provide distinctive and relevant education in an environment of scientific, technological, and professional knowledge creation and innovation.

### GOALS

Below are a set of goals and sub-goals in five broad categories. Each of the sub-goals will need to be further developed and refined, the required resources evaluated and identified, as well as the establishment of milestones and metrics defining pathways to the end goals and the measurement of success. We recognize that the current list of goals is incomplete. It needs additional specific sub-goals; and the goals and sub-goals need to be related to the resources and structures required to support the mission.

- 1. IIT will develop a culture of innovation and intellectual vitality. We will embrace bold and transformational ideas that change what and how we teach, how we approach research and scholarship, and how we approach interactions and partnerships with our constituents and stakeholders.**
  - a. IIT leadership will work to ensure recognition and reward of participation and contributions
  - b. Creation of physical, fiscal, and administrative structures to facilitate innovation
  - c. Engage our constituents, stakeholders, and supporters for input and participation in innovation
  
- 2. To make IIT and its graduates more strategically competitive, IIT will develop and provide an outstanding and highly regarded undergraduate education in science, technology, and the professions with a strong basis in, and with strong connections to, the context of the modern world.**
  - a. Develop curriculum and programs that define the “IIT education” as a unique combination of disciplinary excellence with broad knowledge and awareness of the modern world



- b. Develop themes reflective of IIT that will infuse our curriculum at all levels and our scholarship
  - c. Create structures and processes that enable our students to succeed from recruitment through graduation
  - d. Link education and research at all levels
- 3. Through expanded graduate and professional programs, IIT will attract and train the best graduate students from a diverse national and international pool in cutting edge science, technology, and the professions.**
  - a. Build linkages to institutions in the USA and abroad that will facilitate the recruitment of the very best graduate students.
  - b. Provide attractive financial and other support for graduate students
- 4. IIT will be internationally recognized as a center for the creation of knowledge in basic science, technology and the professions, not only within and at the frontiers of traditional disciplines, but also at the overlaps of knowledge relevant to the major questions and issues of the 21<sup>st</sup> century. This recognition will come from innovative development of opportunities presented by the unique aspects of IIT's makeup and situation.**
  - a. Create the physical and organizational infrastructure to support cutting edge research and scholarship within and across the disciplines
  - b. Develop and articulate themes that will infuse IIT's interdisciplinary and multi-disciplinary research and scholarship across the institution
  - c. Create structures and support for innovation
  - d. Recruit and retain the best faculty with competitive offers of salary, start-up, and facilities
- 5. Situated in the global city of Chicago, IIT will build on the inherent advantages and opportunities presented by its location. Using Chicago as a studio, IIT will engage the problems of the city and will leverage the advantages of its scientific, cultural, and professional institutions and traditions.**
  - a. In line with the growing international standing of Chicago, IIT will expand its strategic relationships with a network of similar – technology focused – institutions around the globe
  - b. IIT will enhance the existing and build new, mutually advantageous, collaborative relationships with Chicago's research, educational, cultural, governmental, business and other institutions and communities in areas that align with our strategic priorities
  - c. Where IIT's knowledge and skills can be brought to bear, we will endeavor to apply them to the challenges and opportunities presented by our location in Chicago
  - d. IIT will act as a focal point in the city of Chicago for select activities and programs.



As an example of how these goals might apply, here we elaborate on one of the ideas contained in the set – namely, the creation of one to three themes that will differentiate IIT by creating opportunities for faculty to make links across the university, to attract students that are more broadly based than traditional IIT students, and to attract philanthropic support.

## **BACKGROUND & CORE DISCIPLINES**

### **BACKGROUND**

IIT will build on some of its capabilities across core disciplines to create one to three themes that will differentiate the university. It is envisioned that activities directly influenced by a theme would range from 10 to 15% of the curriculum and 20 to 35% of the research and scholarship

Differentiating IIT by a theme has the following goals:

Increase opportunities for faculty research by making relevant links across the university

Attract undergraduates who are broader based than the current typical IIT students

Attract philanthropy

### **CORE DISCIPLINES**

The core competencies within the various schools and related centers will provide the intellectual base for developing themes that cross IIT.

#### **1. College of Architecture**

##### ***Strengths of COA that also exist in other good architecture schools***

- a. Design/build
- b. Advanced technical knowledge (e.g., digital interfaces in buildings, new materials usage)
- c. Fully integrated knowledge of all aspects of building design
- d. Sustainable design, energy matters

##### ***Strengths where COA is recognized as a leading school***

- a. Design excellence
- b. Design/build/develop and BIM technologies
- c. Professional landscape program and its intersections with architecture studies
- d. High-rise design
- e. The Council for Tall Buildings and Urban Habitats, housed with COA, and access to a world-wide network of professionals involved in all aspects of urban growth
- f. Global network of architecture affiliate schools, institutions



- g. Chicago firms, conducting global practices and providing strong career opportunities
- h. Teaching faculty represents leading design talents in Chicago and from around the world
- i. Mies heritage, both architecturally and pedagogically
- j. Werner Sobek, top design and engineering, potential research enterprise at IIT

## **2. Armour College of Engineering**

### ***Strengths in Armour that also exist at other good schools.***

- a. *Chemical and Biological*
- b. Energy and sustainability, such as fuel cells, batteries, supercapacitors, solar cells, hydrogen storage, wind energy, etc.
- c. Biological engineering
- d. Advanced materials and nanotechnology
- e. Complex systems and complexity

#### *Aerospace*

- a. Aerospace and flow control
- b. Architecturally integrated renewable energy
- c. Advanced navigation architectures and algorithms for aerospace and terrestrial vehicle systems, emphasizing modern satellite navigation system
- d. Unmanned Aerial Vehicles (UAVs) and Unmanned Ground Vehicles (UGVs).

#### *Mechanical and Manufacturing*

- a. Product development that complements the current MMAE initiative in “Sustainable Manufacturing”
- b. National Coalition for Manufacturing Innovation

#### *Electrical and Computer*

- a. Perfect power prototype
- b. Test and energy management
- c. Energy and alternative resource projects
- d. Communication and signal processing
- e. Computers and microelectronics
- f. Power and control

#### *Civil, Architectural and Environmental*

- a. Systems and construction, transportation and environmental engineering
- b. Energy efficiency and sustainable development
- c. Civil engineering systems and infrastructure





### ***Strengths where Armour is recognized as a leading school***

- a. Sustainable manufacturing
- b. Energy and sustainability
- c. Transportation
- d. Bioengineering and biotechnology
- e. Pritzker Institute of Biomedical Science and Engineering
  - i. Medical Imaging Research Center
  - ii. Center for Diabetes Research and Education
  - iii. Center for Integrative Neuroscience and Neuroengineering Research
  - iv. Center for the Study of Condensed Soft Matter
  - v. BioCAT

### **3. Chicago-Kent College of Law**

#### ***Technology-related research and programs that are recognized nationally***

##### *IP Program*

- a. Ranked in top ten in *U.S. News & World Report*
- b. Attracts national and international students (the only international IP LL.M. program in the U.S.)

##### *Institute for Science, Law & Technology*

- a. Sponsors long-term, multi-disciplinary research, public conferences, judicial training, and symposia for journalists, under the direction of Professor Lori Andrews, recipient of numerous awards and honors
- b. Research at junction of science, technology and law, including diabetes

##### *Center for Access to Justice and Technology*

- a. Promotes the use of the Internet in teaching, practice, and public access to the law and conducts research, builds software tools, teaches classes and supports faculty, staff and student projects on access to justice and technology
- b. Manages and promotes the Access to Justice Author™, leads the A2J Student Editorial Board (A2J-SEB), and directs the Self-Help Web Center (SHWC) under the direction of Professor Ron Staudt, winner of the 2008 Louis M. Brown and 2007 Howell Heflin Awards

#### ***Strengths of Chicago-Kent that also exist in other good law schools***

- a. Trial and appellate advocacy programs
- b. Law offices of Chicago-Kent
- c. Legal research and writing program

#### ***Academic niches***

- a. Institute for Law and the Workplace serves as an intellectual home for the labor and employment law community and attracts national attention to Chicago-Kent as a center for research, training, and dialogue



### ***Potential for academic improvement in the coming years***

- a. Revive energy and environmental law program by hiring new faculty this fall
- b. Regulation of financial markets
- c. Expand clinical offering for start-up businesses

## **4. Center for Professional Development**

### ***Strengths of CPD that also exist in other good centers for professional development***

- a. Database, software and web design techniques
- b. Instructional and human computer interface design
- c. Voice and data communication technologies
- d. Computer, network and information security and forensics
- e. IT innovation and entrepreneurship
- f. Management of information technology
- g. Industrial logistics, facilities management, and manufacturing technology
- h. Sustainable manufacturing and energy management
- i. Corporate-sponsored IPROs

## **5. Institute of Design**

### ***Strengths of ID that also exist in other good design schools***

- a. Product design
- b. Communication design
- c. Early-stage prototyping to help reframe problems

### ***Strengths where ID is recognized as a leading school***

- a. Ethnographic observation that is applied to discover users' unstated needs
- b. Linking the creation of user value to the creation of economic value
- c. Systems thinking and planning probabilistic and competitive systems more so than deterministic systems)
- d. Human-centered innovation
- e. Making complex information easy to understand
- f. Strategic design (helping organizations answer "Where to play? and "How to win?")
- g. Communication planning and product planning



## **6. Institute of Psychology**

### ***Strengths of Institute of Psychology that also exist in other good psychology schools***

- a. Teach and conduct scientific research on human behavior in which evidence is gathered in the course of properly designed, methodologically sound, theory-driven studies; acquired data are analyzed by scientifically valid methods; work is not confined to a content area but has broad applicability and utility
- b. Great deal of core knowledge about human behavior (motivation, decision-making, leadership, communications, culture, conflict, regulation of emotion, group processes, social behavior, personality, etc.) that can be brought to bear on myriad issues that would enhance other areas of inquiry. For example, post-occupancy evaluation within architecture is best conducted with knowledge and input from psychology; health research is deepened by the integration of human behavior and psychology, etc.
- c. Knowledge base of psychology is applicable across sectors (work, education, health care, industry, families, communities, cultures)

### ***Strengths where Institute of Psychology is recognized as a leading school***

- a. Unique combination of divisional areas (clinical, rehabilitation, industrial organizational/business psychology)
- b. Expertise in psychometric theory, test security, survey and test development
- c. Leader in rehabilitation counseling and work to maximize the functioning and adaptation of persons with disabilities
- d. Strength in research design, methodology and applied statistics
- e. Core expertise in leadership
- f. Excellent scientist/practitioner program in clinical psychology focused on evidence-based interventions.

## **7. College of Science & Letters**

### ***Strengths of CSL that also exist in other good schools***

#### *Applied Mathematics*

- a. Applied analysis
- b. Computational mathematics
- c. Discrete applied mathematics
- d. Stochastics

#### *Biology Chemistry and Physics (BCPS)*

- a. Cancer research
- b. Superconductivity
- c. Accelerator science
- d. Neutrino and particle physics
- e. Bioscience at ANL's APS.



### *Computer Science*

- a. Real-world systems; the systems range from peta-scale high performance computers distributed real-time systems and networks to complex information systems

### *Humanities*

- a. Philosophy

### *Social Science*

- a. Policy analysis—especially with respect to technology policy—and urban affairs

## ***Strengths where CSL is recognized as a leading school***

### *Mathematics and Science Education*

- a. Extremely well funded with future opportunities for growth and recognition

### *Biology Chemistry and Physics*

- a. Biological studies at Argonne’s Advanced Photon Source
- b. Strong linkages to accelerator science at Fermilab

### *Applied Mathematics*

- a. Computational Finance

### *Computer Science*

- a. Data mining
- b. Application of computing to humanities

### *Humanities and Social Science*

- a. Linkage to technology in humanistic studies

## **8. Stuart School of Business**

### ***Strengths of Stuart that also exist in other good business schools***

- a. Integration of organizational innovation and social issues
- b. Financial engineering (application of quantitative methods and technology to financial issues)
- c. Quantitative and technological applications to economic and business issues
- d. Entrepreneurship

### ***Strengths where Stuart is developing relatively unique expertise***

- a. Strategic competitiveness (revising and implementing strategic management constructs to deal with the 21<sup>st</sup> century)
- b. Environmental management and sustainability
- c. Integration and cross-disciplinary examination of business theory and practice for “the next economy”
- d. Drivers for innovation within business organizations



## **THEMES**

The following themes have potential to describe a wide selection of research projects.

- a. “Sustainable innovation”
- b. “Humanizing technology”
- c. “Healthy environments and urban habitat”

Pages 31 through 33 illustrate the general idea of how themes will have several projects that can be addressed by several schools. These projects are just examples

Pages 36 through 38 in the appendix show how the potential projects can be clustered into sub-themes that may be at the right level for interdisciplinary work. Note that a project can be in more than one theme.

## **CRITERIA FOR THEMES**

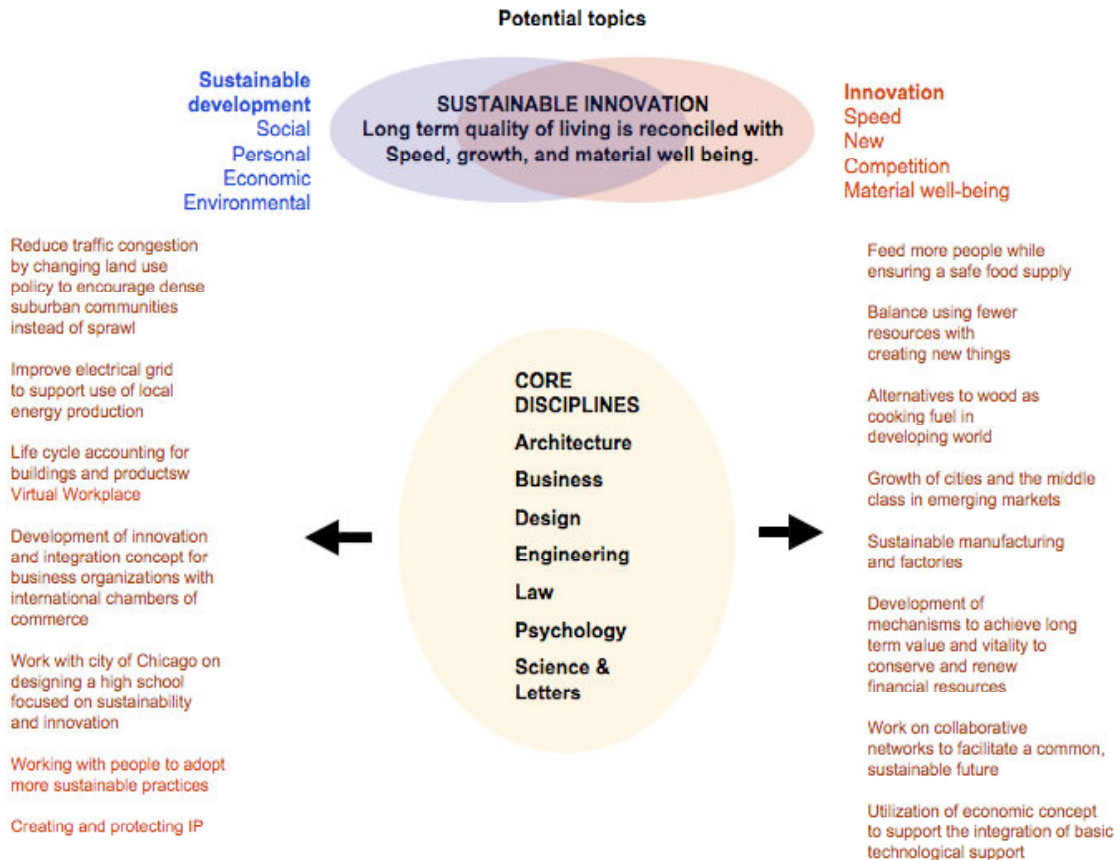
Each theme needs to meet these criteria:

- a. It has long-term relevance to the world so it can be a platform for attracting funding, students and faculty who want to be part of it.
- b. It is sufficiently understandable and unusual to be newsworthy.
- c. It points in a general direction, leaving room for growth over time and enabling each academic unit to participate in a meaningful way.
- d. To be meaningful, a theme should be specific enough to be different from the positions of other good schools. A test of whether a theme is too general or not is that it should leave room for competing organizations to stake out positions that are different yet still valid. For example, “computing” was meaningful for CMU because it was specific. Alternatively, “improving lives and inventing the future” is so general that all universities would say they do this.
- e. When applied to a class or a research project, a theme should result in work that is different from classes and projects that do not use this theme.



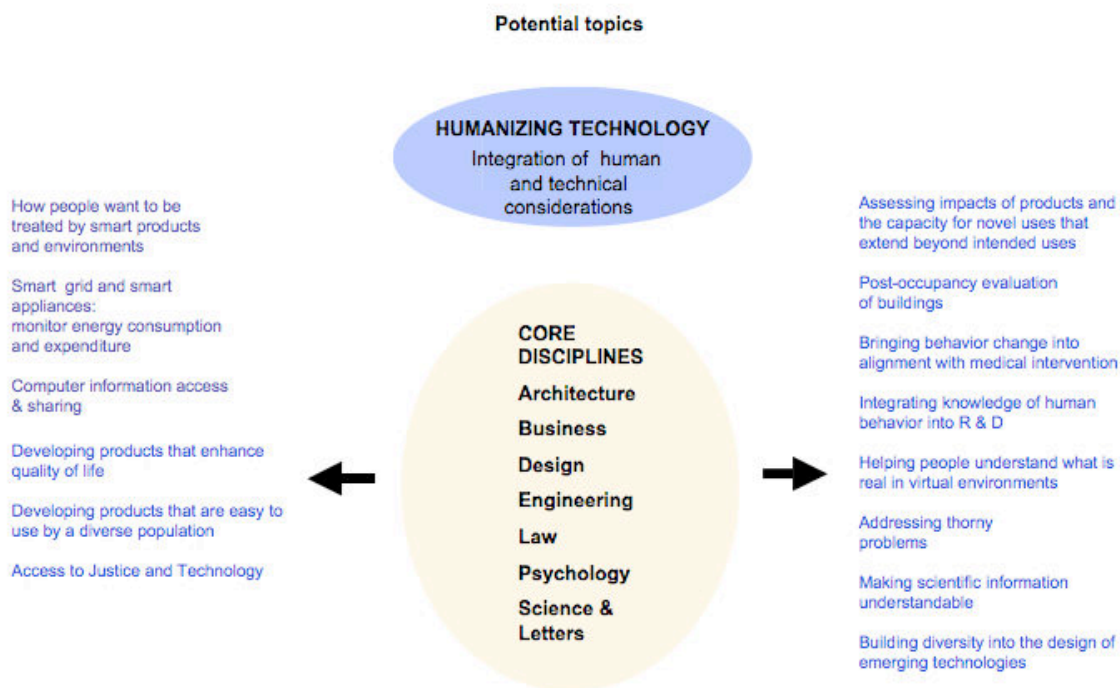
## RESEARCH TOPICS RELATED TO THEMES

“**Sustainable innovation**” is about the apparent conflict between sustainability and growth. Innovation is about developing new things, speed, growth, and competition. On the other hand, sustainability tends to focus on environmental, social, and economic well-being and is often willing to forgo the new in favor of slow development and cooperation.



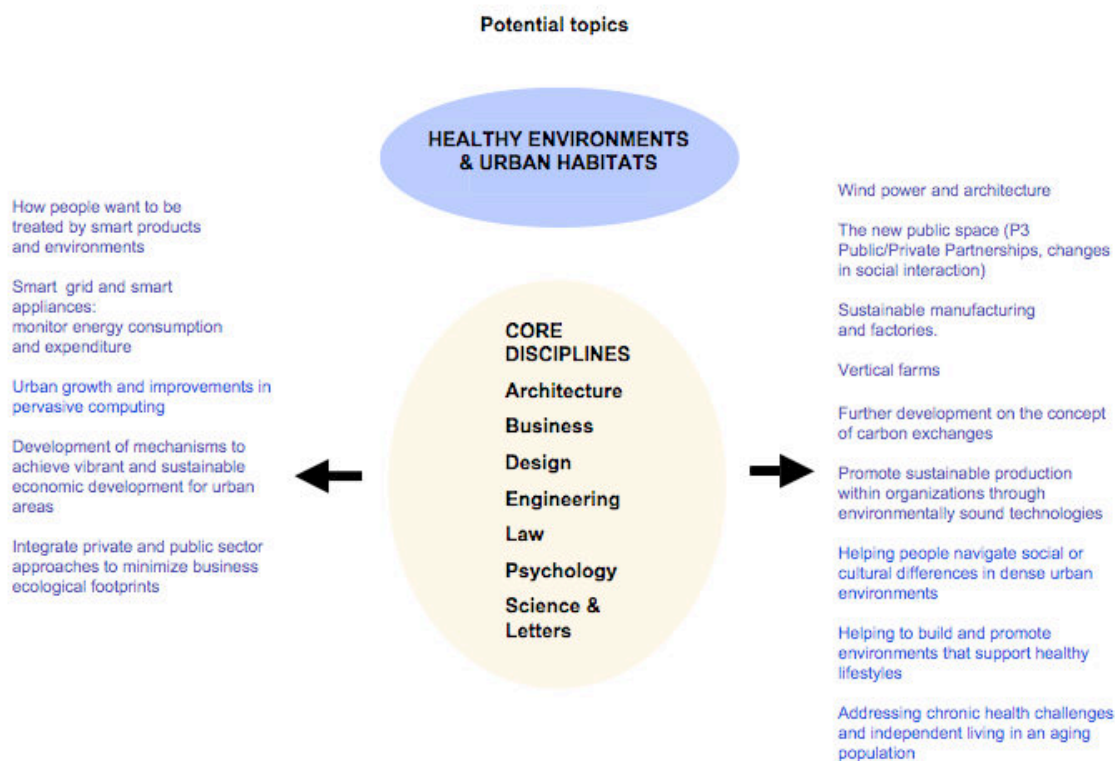


**“Humanizing technology”** is about the integration of the human and the technical considerations at the most fundamental level. It focuses on integrating human concerns into the design and assessment of new and emerging technologies.





**“Healthy Environments and Urban Habitats”** is about the demographic shift in the 21<sup>st</sup> century to a majority living in urban settings, with rapid growth of cities in developing countries, and more choosing urban over suburban live/work settings in developed economies. Human health, safety, sanity, mobility, communications, public space and social networks, and many other aspects of daily life in urban settings are critical questions facing our society today.







## NEW UNDERGRADUATE CURRICULUM

General goal: make students (and IIT) strategically competitive

### **Questioning existing structure**

The changes in the undergraduate program should not only focus on course content but should also examine delivery systems with a goal of increasing flexibility and choice for the students. The learning experience must deliver its content in unique and innovative ways. We should explore integrating course work, learning communities and service courses.

Full integration of curriculum with co-curriculum activities is essential for a true learning experience with barriers and silos reduced or eliminated within the university and between IIT and the community/society.

With the masters becoming the entry level degree to be a professional, the bachelors can have more electives which will enable undergraduates to gain knowledge in areas beyond their majors.

### *Specific changes to consider*

- a. Develop more 5-year undergraduate/masters programs
- b. Create an integrated program across the 4 years, including a freshman seminar that starts with a book that all incoming students read that sets the theme for that cohort; organize IPROs capstones, seminars, and ITP's around that theme
- c. Build the intellectual discourse with more speakers and entertainment events that are thought provoking
- d. IPROs need a name change to reflect the excitement of the new program

### **Content beyond a major**

- a. Understanding of other disciplines and perspectives
- b. Understand multiple pathways to creativity and diverse ways of learning
- c. Understand how to foster & protect innovation
- d. Understand how to lead people
- e. Understand human motivation, culture, and social processes
- f. Be able to make a reasoned argument
- g. Express complicated information in simple visual and verbal forms.
- h. Work in teams
- i. Understand conflict resolution
- j. Strategic competitiveness
  - i. Creativity
  - ii. Entrepreneurship
  - iii. incisive decision making
  - iv. Innovation
  - v. Leadership
  - vi. Sustainability (from an environmental perspective as well as an organizational one)



IIT should consider taking advantage of its strength in design. Design, which focuses on visualizing information, dealing with problems of ambiguous complexity, and creating innovations that focus on human experience, is emerging as a core set of abilities for the early 21<sup>st</sup> century. IIT can lead by teaching design across the curriculum.

This would have five content areas:

1. Make to know
  - a. Prototyping and sketching as a way of exploring ideas and resolving problems
2. Visual thinking
  - a. Understanding the language of signs and symbols
  - b. Understanding the structure and characteristics of media
  - c. Making complex information easier to understand
  - d. Visual narratives
3. What before how
  - a. Methods of understanding problems and forces of change to ensure you are working on the right problem before you start to solve it
4. Probabilistic and competitive systems
  - a. How to think about non-deterministic systems, cope with (enjoy) ambiguity, create options instead of single answers, think with scenarios, and understand the relationship between economic value and human value
5. Human-centered design
  - a. How to observe users' activities and use knowledge of patterns of daily life as a source for innovation.



## APPENDIX

Examples of how potential projects can fit into clusters and into themes.

<b>POTENTIAL RESEARCH PROJECTS</b>	<b>SUSTAINABLE INNOVATION</b> General projects	<b>SUSTAINABLE INNOVATION</b> Healthy environments & cities	<b>HUMANIZING TECHNOLOGY</b>
<b>SUSTAINABLE INNOVATION</b>			
<b>INFRASTRUCTURE</b>			
Improve electrical grid	X	X	
Life cycle value of buildings and products	X	X	
Work with people to develop sustainable practices	X	X	
Virtual workplace	X	X	X
Apply innovation concepts developed for business and city organizations	X	X	
Work with Chicago on school focused on sustainability & innovation	X	X	
<b>EMERGING MARKETS, BASE OF THE PYRAMID</b>			
Increase food availability & safety	X	X	X
Balance productivity & sustainability	X	X	X
BoP: fuel, water, jobs	X	X	X
City growth and sustainable emerging markets	X	X	
<b>URBAN GROWTH</b>			
Sustainable factories	X	X	
Reduce traffic congestion	X	X	
Develop mechanisms to achieve long-term value in order to conserve financial resources	X	X	
Collaborative networks for sustainability	X		
Economic concepts for supporting basic tech	X	X	



**POTENTIAL RESEARCH PROJECTS**

	<i>SUSTAINABLE INNOVATION</i> General projects	<i>SUSTAINABLE INNOVATION</i> Healthy environments & cities	<i>HUMANIZING TECHNOLOGY</i>
<b>HUMANIZING TECHNOLOGY</b>			
<b>USER EXPERIENCE &amp; INTERACTIVE SYSTEMS</b>			
Human factors of smart products, environments, & media	X	X	X
Understanding what is real in virtual worlds			X
Smart grid & appliances	X		X
Smart homes	X	X	X
Computer information access & sharing	X	X	X
Human factors of products, media, & environments		X	X
Assessing unintended use	X	X	X
Demystifying medical information		X	X
Integrating knowledge of behavior into R&D			
"Thorny" or "wicked" problems re: human systems	X	X	X
Making scientific information understandable	X		X
Building diversity into emerging technology	X	X	X



**POTENTIAL RESEARCH PROJECTS**

	<i>SUSTAINABLE INNOVATION General projects</i>	<i>SUSTAINABLE INNOVATION Healthy environments &amp; cities</i>	<i>HUMANIZING TECHNOLOGY</i>
<b>HEALTHY ENVIRONMENTS &amp; URBAN HABITATS</b>			
Smart products, environment, & information	X	X	X
Smart grid & appliances	X	X	X
Cities and pervasive computing	X	X	X
Mechanisms for vibrant & sustainable economic health		X	X
Public & private approaches to minimize businesses' carbon footprint	X	X	
Wind & solar integrated with architecture	X	X	
New public spaces 3P	X	X	X
Sustainable factories	X	X	
Vertical farms	X	X	
Carbon exchanges	X	X	
Sustainable production via environmentally sound technologies in organizations	X	X	
Navigating social difference in dense urban environments		X	X
Environments that promote healthy lifestyles	X	X	X
Health & independent living in aging population		X	X