Project Plan for IPRO 341

1. Objectives

IPRO 341's objective is to extensively research and evaluate the societal, economical and environmental implications of nanotechnology-based products, mainly building materials, and detail the possible obstacles in integration of this technology into design, public policy issues and general public engagement.

As part of this objective, the team will closely collaborate with architecture students from Ball State University (BSU) in the process of designing a nano-houses in order to evaluate their chosen nano-materials, explore possible side effects and offer alternatives where required. Research of the implications will be carried out in parallel with the theoretical designs as to develop a more efficient, successful, user friendly and safe final product.

2. Background

IPRO 341, Insight, is an ongoing project that has been extremely successful in the past evaluating emerging technologies in its first semester (fall 2005), and strictly nanotechnology in the spring 2006 semester. With emerging technologies on the rise such as nanotechnology, the amount of stakeholders is endless because it has the potential to affect almost everyone. There is a dire need to understand the advantages and disadvantages concerning nanotechnology and IPRO 341 will continue to explore and evaluate these.

With nanotechnology on the rise at an accelerated pace, it is crucial to evaluate its capabilities of enhancing known matters outside a protected environment. Once nanotechnology leaves its controlled environment and interacts with the millions of uncontrollable factors in the world, it is impossible to predict what can happen because we are opening a whole new world of existence and modification. Thus it is important to theoretically analyze how nanotechnology affects the world around us in ways broader than the traditional scientific approach has taught us. Societal implications are very important for any type of new technology but what makes nanotechnology a much more crucial topic is its miniscule size. At the nanometer level where chemical properties of

atoms are changed and being manipulated, close inspection is crucial to make sure nanotechnology does not lead to another environmental issue comparable to asbestos. Another area where societal implications of nanotechnology have to be studied is in architecture and building materials. We need to make ensure that building materials with nano-particles are safe to the user and our environment and that they will be safe for decades to come.

This semester, our project is comprised of two teams: our IRPO team, 341, is teaming up with a group of architecture students at Ball State who are in a studio class using nanomaterials to create a new type of building utilizing these new enhancements.

3. Methodology

A blanket statement of our objectives can be summarized as follows: IPRO 341 is to determine nanotechnology's role in society (including its implications), research nanomaterials, investigate the building materials chosen by our BSU counterparts, and advise them of potential problems and replacement nanomaterials they may use. Determination of nanotechnology's role in society will be resolved by thorough research of the materials. Our research will not be limited to the nanomaterials in use at BSU's NanoStudio in order to offer possible safer and more efficient alternatives where found applicable.

To conduct our research, the IPRO team will consult nanotechnology papers, nanotechnology consortium newsletters, journals and databases, and academic institutions and businesses involved in nanotechnology. General websites found through internet search engines may assist the team in discovering new nanomaterials; however, the factuality of these websites can be questionable, so they will only be used to uncover new materials before scholarly research takes place.

In addition to conducting research on nanomaterials, the IPRO team intends to determine the impact on industries that manufacture conventional materials which will be replaced by these nanomaterials. Financial details will be estimated by evaluating approximate costs of these materials, their sustainability and longevity in the building, and additional costs inferred by their use. Furthermore, an informed hypothesis of its

impact on society will be formulated from examining societal reactions to the proliferation of earlier revolutionary technologies.

The IPRO team intends to apply the aforementioned criteria (implications, cost, etc.) to the materials in use by our BSU counterparts; since their building designs incorporate nanomaterials, it is vital to understand the positive and negative aspects of these nanoparticles. To this end, IPRO 341 will focus our research efforts on these materials so we can provide BSU with information on possible toxicity and safety issues. The research conducted by the IPRO team will guide and supplement the building designs that are being created by BSU.

The summary of obtained information will occur on weekly bases through up-date letters send to BSU students highlighting the main achievements and discoveries. Collaboration between IIT and BSU is expected to be multi-facet and will occur as needed. Planned mediums of communication include e-mail and videoconferencing using facilities provided by IIT, as well as several collaboration tools we're currently investigating include Breeze software program. In addition teams will meet in person on both campuses.

The mid-term IPRO report is expected to incorporate extensive research into existing and theoretical materials considered by BSU students as well as their early evaluation. Final presentation will contain the information obtained by each of the subgroups dealing with specific material plus particular case studies of technology's environmental, social and economical implications. All deliverable reports will be generated by dividing the tasks equally among the team members to be reviewed by the group.

IPRO 341 plans to document its results of incorporating the research and theoretical engineering of nano-materials into architecture models by publishing an article in a scholarly journal, designing an easily-found, easily-read informative website to disperse our findings to the public, and creating a final educational video that can be downloaded from that site.

4. Expected Results

Expected results can be divided into two categories as pertaining to chosen case studies and materials used in architectural designs created through collaboration with BSU students.

1. Impact of nanotechnology will be presented in the form of case studies concentrating on evaluating the vast implications in various areas such as demography, quality of life, market variations, environmental changes and personal beliefs.
2. Final product designed by BSU students in collaboration with IIT will not only visually present possible uses of nano-materials but also explore and thoroughly explain their advantages and disadvantages thereby creating a well-rounded project.
3. A scholarly journal paper and an informative and interactive website will be created to serve as a tool to share the obtained experience of multidisciplinary collaboration between two schools on a project where not only new technology was theoretically implemented but also evaluated in the design process.

5. Project Budget

Our project will not require significant financial assist. The expected spending incorporates collaboration, research and interactive presentation tools, as shown.

Available	$500.00
Proposed Spending	
Meeting refreshments	$50.00
Research Books	$50.00
Marketing	$100.00
Rental of Plasma TVs	$200.00
Short movie	$100.00

6. Schedule of Tasks and Milestone Events

Building Material Research	
Presentation 1	Sept.12
Presentation 2	Sept.28
Mid-term Presentation	Oct.17
Final Presentation	Nov.2
Case Study	
Narrowing to 3 Objects	Sept.12-Oct.17
Pre-eliminary Presentation	Oct. 19
Final Presentation	Nov.9
Collaboration with BSU	
Personal Meetings	Aug.26, Sept.29, Oct.27
Videoconferences	Sept.12, Nov.16
IPRO Deliverables and Activities	
IPRO Games	Aug.26
IPRO Project Management Workshop	Sept.8-9
IPRO Project Plan	Sept.22
Mid-Term Report	Oct.20
IPRO Day Guideliness and Tips Session	Nov.13
Web site URL	Nov.22
Exhibit	Nov.22
Brochure	Nov.27
Presentation	Nov.29
Final Report	Nov.30

7. Individual Team Member Assignments

The IPRO 341 Insights includes the following members:

IIT Advisor: Janet Staker Woerner

BSU Advisor: George Elvin

Research Advisor: Jeanne Link

IIT Students:

Bastrzyk, Marta B. – 5th year aerospace engineering and applied mathematics

Hernandez, Jose – 4th year aerospace engineering

Kim, Tae Young – 4th year chemistry

Lerash, Kevin – 4th year political science and master's public administration

Lybolt, Crystal – 2nd year aerospace engineering

Seatton, Brandon – 5th year electrical and computer engineering

Skontos, George – 5th year applied mathematics

Sopko, Tyge – 5th year electrical engineering and CPE

Vaks, Nir – 3rd electrical and computer engineering

BSU Students (all are 3rd year architecture major):

Agan, Amber

Boone, Elizabeth

Buente, Adam

Coleman, Jessica

Gerding, Eric

Glass, Andrew

Goyak, Matt

Holt, Nicole

Mullendore,

Jessica

Perchlik, Emily

Ripley, Paul

Presently, IIT and BSU are divided into five sub-teams. Each of these teams consists of four students from IIT and BSU, with varying numbers from each university. Each team has two nanomaterials that were chosen by the BSU students; the IIT students are collecting research material to present to their BSU counterparts in this collaboration. Additionally, these teams are self-governing; there is no designated leader. The sub teams and their tasks are as follows:

Sub Teams	Members	Materials
1	Marta Bastrzyk	
	Tae Young Kim	quantum dot lighting
	Adam Buente	carbon nanotube sheets
	Elizabeth Boone	
2	Jose Hernandez	

	Nicole Holt	OLED panels
	Emily Perchlik	carbon nanotube sheets
	Jessica Mullendore	nanosensors
3	George Skontos	
	Tyge Sopko	expandable building envelope
	Andrew Glass	nanosensors
	Amber Agan	
4	Kevin Lerash	
	Crystal Lybolt	carbon nanotube sheets
	Eric Gerding	OLED panels
	Paul Ripley	
5	Brandon	
	Nir Vaks	nanosteel-coated fabric
	Matt Goyak	TBD
	Jessica Coleman	

8. Designation of Roles:

The structure of this IPRO team is unconventional due to the objectives we wish to accomplish and the collaboration methods employed. All parties involved agreed to attempt following a different chain-of-command as compared to previous IPRO this team's members were in. High ethics, trust, hard work and dedication were agreed as the bases for our team values. Therefore, based on those, a decision was reached to make all team members equal, with equal responsibilities. The IPRO 341 has no designated team leader and there is no vertical team integration. Therefore, all positions, although responsible for various kinds of documentation and events, share the same research expectations.

The agreed team roles are:

Marta - meeting facilitator, who controls the direction of the discussion during the meetings, creates meeting agendas and keeps track of deadlines.

Kevin – IPRO liaison, who handles administrative work with the IPRO office.

Tyge – scribe that takes meeting minutes.

Jose – web site developer and iGROUPS facilitator

Tae and Brandon – nanotechnology researchers, who follow cutting-edge nanotechnology news on daily bases.
Nir – marketing director, who is in charge of marketing our IPRO and ensuring uniqueness of team's presentation on IPRO Day.
George – assistant, who supports various other positions as required; a past IPRO 341 leader with valuable experience.
Crystal – weekly summarizer, who recaps our weekly meetings, findings and any collaboration that occurred from IIT's end in the form of a letter addressed to BSU students.

9. Closing Statement:

The future holds the true analysis of this project in its promise to actually use these materials in every aspect of human life.