IPRO 336

The 21st Century Farm

Grow in, grow up!

Faculty Advisor: Blake Davis

IPRO Sponsor: John Edel, Bubbly Dynamics LLC

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TEAM CHARTER

1. Team Information

NAME	CONTACT EMAIL	STRENGTH	DEVELOP	EXPECTATIONS
Preston Andrews	pandrew4@iit.edu	Material and Information Management	Time management and communication	I expect to find out if such a proposal is possible and if so set up a base plan
Talha Bhatti	tbhatti@iit.edu	Electrical Engineering	At this point, I am focusing on how to grow crops as far as energy is concerned & whether to grow crops in small garbage cans or big containers.	
Adrien Binet	abinet@iit.edu	Architecture, Organization, Team leading	Agricultural indoor systems	To design a system that is easy and cheap to build and allow for year-round production.
Jason Bredau	jbredau@iit.edu	Use of various Digital Drawing and 3d Modeling Programs, Spatial and Program Organization.	Mechanical/Electrical Systems, Integration of Green Systems Architecturally. Commercial Production of Agricultural.	My expectations for myself is to gain more knowledge of various ways of organizing program and spaces. Also to further increase my knowledge areas I know little about including commercial agriculture and integration of green technology to a building. My expectation for this IPRO project is to see that it have at least a bit of impact for the idea and practice of urban farming in the years to come.
Emily Chen	echen5@iit.edu	Coordination, organization, attention to detail	Public communication	To develop a firm foundation for the future of urban farming.
Jacob Davis	jdavis29@iit.edu jdavis135 @gmail.com	Design, space planning, 3D modeling/ rendering, animation	I would like to learn more about sustainable design and working with passive systems.	
Gaurav Gaonkar	ggaonka1@iit.edu	Biology, Presentations, organization	Be able to learn more on sustainable systems	I expect to learn more about sustainable systems as well as more about vertical farming
Raul Garcia	rgarciaf@iit.edu	Spatial Design, Flash	Mechanical and	I expect to find out if it is

		Slideshow presentations, Visual Design	Electrical Systems for green buildings	possible to build this kind of farms, in order to re-design a new concept of urban space.
Fernando Guerrero	fguerrer@iit.edu fernando_gr60 @hotmail.com	My strength is my knowledge in computer engineering and previous experience in greenhouse's electronics systems to control the temperature	My needs are my lack of ability to communicate my ideas in English language , improve abilities to work with team member from other careers, get more knowledge about power systems	I expect that at the end of this project I can have a better vision about how to work in a multidisciplinary environment, improve my ability to communicate my ideas in English language, consolidate my skills in computer engineering, increase my knowledge in power systems, make social network with people from others careers that could be useful for future personal business ideas or projects
Richard Gulling	rgulling@iit.edu	Agricultural Architecture	Lighting systems and mushroom culture	To really progress this idea of vertical farm and to play a vital role in the Plant
Michael Kagehiro	mkagehir@iit.edu	Research, easy personality to work with.	Experience with working with other majors and always looking to improve communication and knowledge.	
Elnaz Moshfeghian	elnaz.mosh @gmail.com	Organization & time management, versatility	Being able to work well if there is a deadline for every step as opposed to a general deadline for the bigger task at hand	For every team member to pull their own weight and for goals to be realistic
Jose Maria Nunez-Gimeno	jnunezgi@iit.edu	Spatial Design, Flash Slideshow presentations, Visual Design	Mechanical and Electrical Systems for green buildings	I expect to find out if it is possible to build this kind of farms, in order to re-design a new concept of urban space.
Zachary Phillips	zphilli1@iit.edu	Very good at gardening and with different sorts of fish.	I feel that I need a creative environment with little constraints to exercise my skills and talents	
Isaac Plumb	iplumb@iit.edu	Graphics and presentations	Time management	To offer the client an exceptional proposal
Emily Ryan	eryan2@iit.edu	Communications	Time management	To gain experience with real client relations, gain knowledge with vertical farming, and produce a quality product that the client enjoys.

Jake Skaggs	jskaggs@iit.edu	Design and presentation. Spatial problem solving, structural assessment / design. (Architecture). Documentation.	Agricultural systems, mechanical/ electrical, project coordination.	To advance my knowledge of architecture and planning through an integrated approach to problem solving. To learn strategies for agricultural processing and energy use which will provide a base for further research and implementation of a progressive approach to building. To design a successful space in which to grow food using passive energy systems. To learn how to harvest both agricultural goods and underutilized energy sources in the urban context.
Konrad Sobon	ksobon@iit.edu	Strong design skills. Very profficient with various computer software as well as with visualization techniques.	I would like to learn more about the passive design systems. Develop a broader scope of understanding of sustainable design.	I would like to find out if such a project can actually become a reality.
Travis Valmores	tvalmore@iit.edu	Versatility	Time Management	Efficient teamwork

2. Team Purpose and Objectives

a. The purpose of this IPRO is to establish a strong foundation for the future of urban agriculture. We recognize the growing problems regarding the traditional methods of agriculture, and given the rate of growth of the world population, we propose a plan to grow food more efficiently and economically in urban areas.

Ideally we are looking at large, industrial warehouse-type buildings that have outlived their primary use, and creating a plan that utilizes these buildings to grow enough food for the surrounding communities. This plan is composed of three major components: the agricultural systems necessary for indoor farming such as hydroponics, the design of the space that utilizes all the current and future energy cycles within the building, and the marketing of urban agriculture that identifies the desirable crops of the communities and promotes urban farming.

b. The objective of this IPRO is threefold:
    i. Agricultural Systems Subteam: Research and determine best growing methods for different indoor agricultural systems.
    ii. Design Subteam: To take advantage of the spatial opportunities of the industrial building in order to create the best system for growing indoors through efficient energy systems.
    iii. Marketing Subteam: To determine which products are most profitable and sustainable in the urban farm environment. Secondly, to market the team's plan to stakeholders such as the sponsor, city zoning council and future urban farm owners.

3. Background

a. The sponsor of this project is John Edel of Bubbly Dynamics, LLC. He is in the process of securing the title of an out-of-use warehouse building on 39th and Ashland which has a total of 600,000 sq.ft. of usable space. Of this space, he would like to designate 200,000 sq.ft. for the growth and production of economically viable agriculture. He is interested in diversity among crops and programming in order to maximize profit and create a sustainable business model. Also among the programmatic elements will be a restaurant and light industrial space. Our IPRO will be concerned with developing sustainable energy and agricultural systems in the context of the urban environment and providing a model for a successful urban agricultural business. We will also explore the best ways to passively maintain the systems and to program the spaces for optimal circulation and efficient processing.

4. Team Values Statement

Our team's emphasis is on communication between one member to another. We aim to be in contact with one another through many means possible whether it be through internet, phone or meeting face to face. This is to allow any information one member may need to be easily transferred to them to prevent time from being wasted in waiting. Also this will allow for members to meet up with one another to resolve and questions or conflict that may occur. Through keeping in contact with the other team members will be able to coordinate and accomplish our goals for this project.

PROJECT METHODOLOGY

1. Work Breakdown Structure

	Agricultural Systems	Design	Marketing	Project Deliverables
Week 1 – 2	1. Initial research. -energy -lighting -plants and animals	1. Analysis: Programming/Processing 2. Identification of Energy Systems	1. Contact sources 2. Research potential products to produce 3. Make list of most valuable food produced by urban farming	
Week 3 – 4	1. Organization of cycles 2. Narrowing down of Selected plants & Animals.	1. Analysis: Programming/ Processing in Response 2. Application of Energy Systems	1. Continue contact relations 2. Coordinate with agricultural systems 3. Research market strategies	Project Plan Due Friday, 9/11/09
Week 5 – 6	1. Synthesis with subteams. 2. Design a prototype	1. Synthesis: Design Development 2. Coordination of Energy Systems and subteams.	Collaborate with other sub teams for market strategies	
Week 7 – 8	Build and test prototype		First draft of market scheme	Midterm Presentation
Week 9 – 10			Revise market scheme draft	
Week 11 – 12	Multi-team collaboration	1. Synthesis: Documentation/ Design 2. Collaboration of all subteams.	Finalizing with subteams	
Week 13 – 14	Finalizing growing systems		Prepare for presentation	
Week 15	Multi-team collaboration			Final Presentation Wednesday, 12/2/09

a. Agricultural Systems Team

i. Energy Loops / Agricultural Systems Design

1. The purpose of this subteam is to research and develop the best growing methods for an indoor agricultural system. Systems will change depending on what plants, animals, and insects are involved in the process.

2. Focus will be on the interactions between the different systems and how they tie into the building and its mechanical systems.

3. The systems will differ in temperature, humidity, lighting, and will have to tailor to the different combinations of species involved.

b. Design Team

i. Space Planning / Programming / Processing

1. Members: Jake Skaggs, Isaac Plumb, Jason Bredau, Raul Garcia, Jose Maria Nunez-Gimeno.
2. Preliminary plan in detail:

   Weeks 1-2: Analysis: Programming/Processing: Group members will each submit a few schemes which attempt to solve the space planning issues and determine proper programming ratios and circulation systems for all processes.

   Weeks 3-4: Analysis: Programming/Processing in Response: After we have determined our rough spatial layout we will meet with marketing and agricultural systems teams and gather information which will begin to inform our exact needs for planning the agricultural processes and other spaces.

   Weeks 5-10: Synthesis: Design Development: Group members will choose a scheme to develop in coordination with all groups and begin to make definitive design decisions based on group research and programmatic elements. We will begin to produce documents and drawings for presentation and planning purposes.

   Weeks 10-16: Synthesis: Documentation/Design: Look back on previous work and continue developing the design based on energy parameters and agricultural systems/marketing analysis. Complete design and begin implementation/review process.

ii. Energy Systems

1. Members: Emily Chen, Jacob Davis, Fernando Guerrero, Konrad Sobon.
2. Preliminary plan in detail:

   Weeks 1-2: Identification: Group members are assigned to research a specific energy system that the sponsor has requested.

Other systems that will work are also encouraged as part of the research.

Weeks 3-4: Application: Energy systems are applied to the spatial solution that the Design subteam has collectively created. Adjustments are made as necessary in order to promote the most efficient use of space.

Weeks 5-10: Coordination: Information from other subteams will be incorporated in the design; modifications may be necessary in order to create a smooth solution. Documentation and drawings will be created and tested.

Weeks 10-16: Collaboration: The design will be custom fitted for the building but alternatives are also included for a flexible solution that interested parties can use for their reference. A handbook will be created for this purpose.

c. Marketing Subteam

The marketing team's work is in two phases; General Research and Planning, and Marketing and Advertising the Multi-Team Plan

1. General Research and Planning
    a. Research and select the best produce for the vertical farm environment based on factors such as yield per square foot, profit per square foot, growing season, market demand, cost of upkeep and ease of growth.
    b. Speak to and build a relationship with valuable contacts such as the project sponsor and those involved/versed in the work of building vertical farms.
    c. Coordinate with the Agricultural Systems team to develop best growth plan, monitor results and adjust plan as necessary

2. Marketing and Advertising the Multi-Team Plan
    a. Research market strategies to enhance impact of final presentation
    b. Coordinate with other teams to learn more about the details of the design and update marketing materials accordingly
    c. Prepare, revise, and implement a marketing scheme
    d. Produce a final publication and other informational documents to distribute to sponsor and future vertical farmers

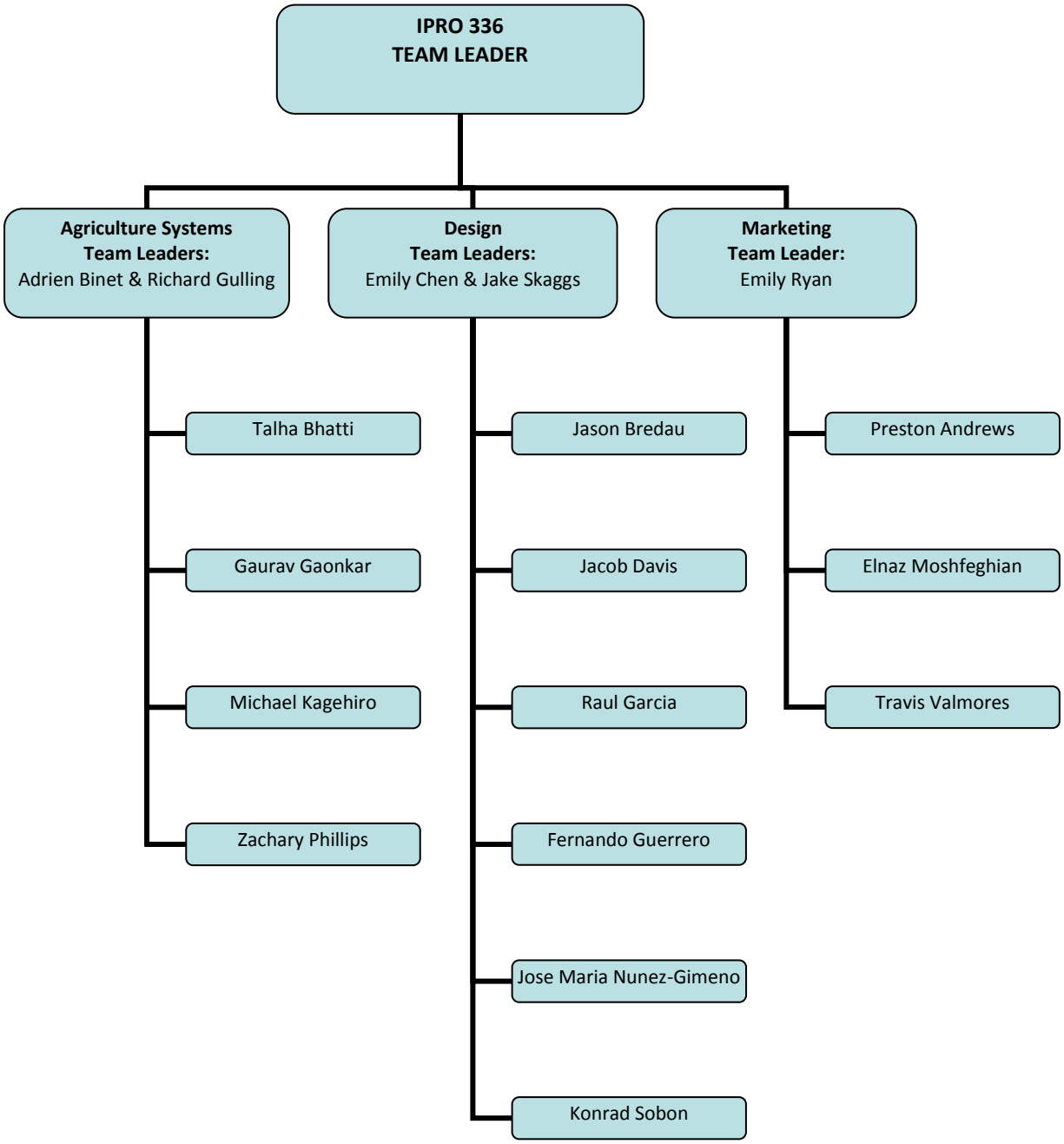
2. Expected Results

We expect to design and begin implementation of an urban agricultural business which uses all available modern technology to maximize efficiency in both cost and energy use. We will create a prototype which will serve to educate future urban agricultural projects and begin to inform future decisions regarding the feasibility of growing food in an urban condition. We expect to design a system which will function mostly off the grid and pay for itself in a relatively short amount of time.

3. Project Budget

Subgroup	Amount	Note
Agricultural Systems	$200	Prototype
	$20	Traveling expenses
Design	$60	Team Building Exercises
	$30	Printing Materials
	$60	Modelmaking Materials
Marketing	$30	Printing Materials
	$30	Reference Logging
Total:	**$430.00**	

4. Team Roles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TEAM LEADER
Agriculture Systems
Team Leaders:
Adrien Binet & Richard Gulling
Design
Team Leaders:
Emily Chen & Jake Skaggs
Marketing
Team Leader:
Emily Ryan
Talha Bhatti
Gaurav Gaonkar
Michael Kagehiro
Zachary Phillips
Jason Bredau
Jacob Davis
Raul Garcia
Fernando Guerrero
Jose Maria Nunez-Gimeno
Konrad Sobon
Preston Andrews
Elnaz Moshfeghian
Travis Valmores