



Mission

The Drexel Smart House is a student-led, multidisciplinary project to construct an urban home to serve as a "living laboratory" for exploring cutting edge design and technology. Participants will conduct research and develop designs in the areas of environment, energy, interaction, health, and lifestyle with the ultimate goal of improving quality of life in the urban residential setting.

Executive Summary

The Drexel Smart House is a unique project with the goal of creating a building that functions as a home while serving as a test site to continually conduct research on innovations intended to improve living environments. Home design and technology has not seen any significant advances since the refrigerator and air conditioning—the Drexel Smart House plans to change that. By implementing the creative ideas of young minds, under the guidance of experienced teachers, the Drexel Smart House will provide the perfect model and testing environment for an improved approach to home life by integrating recent technological advances.

Drexel Smart House will create an unprecedented opportunity for a large group of dedicated students from diverse fields within the university to work toward a common goal. Through student-led (undergraduate and graduate from all of the colleges and majors) research and design, the Drexel Smart House will explore new residential designs and technologies. Ultimately the students work will come to fruition through implementation of research and design into an urban home, where involved students can live and work, studying the effectiveness of new ideas and demonstrating the benefits of the Smart House.

The project will model what the urban home of the future could look like and will show how quality of life can be improved through smart design and technology: simplifying daily life, decreasing environmental impact and providing a healthier living environment.

Objectives

The Drexel Smart House seeks to challenge the traditional concept of a personal residence and architectural space. We live in a time where people are concerned about an economy which is driven by conspicuous consumption. America is the most technology-rich country to have ever existed, but this is not entirely positive.

The Industrial Revolution marked the beginning of using finite resources to drive technological

development and production. For the past two centuries this model worked within limits, but it has become clear at the beginning of the 21st century that these finite resources must be preserved and conserved. Most everyone is aware that fossil fuels are running out. More importantly, everyone can agree that if there are feasible and affordable alternatives to pumping waste into the air and ground, they ought to at least be investigated. Drexel Smart House is an ideal opportunity to investigate these alternatives.

Additionally, the Smart House will be a test bed for new technologies that are meant to improve and simplify life. These technologies can be used to improve quality of life while decreasing or having no more affect on the world around us. The different areas being addressed are:

Environment

Smart House plans to decrease the environmental footprint of the residents through intelligent planning, use of novel materials, and alternative energy. We intend to implement sustainable and environmentally friendly products to produce a livable house with no negative environmental impact. Extra care must be taken due to the urban Philadelphia setting.

Energy

Energy is becoming an increasingly important issue in today's society. People have come to realize that resources are finite. Smart House will investigate alternative energy sources, such as solar and geothermal, and will also utilize low energy devices and energy recovery systems. The ultimate goal is to generate all energy on site.

Interaction

Technology should be easy to use and benefit your daily activities. Smart House will be addressing the way in which people interact with technology by improving existing and creating new methods of interacting with computers and other technologies. Additionally, technologies will be networked to create an intelligent and aware living environment.

Health

The importance of a healthy home is usually overlooked, yet this should be an integral part of any home design. Indoor air quality and the ability to remotely (and non-invasively) monitor one's health are examples of projects that will be incorporated into the Smart House.

Lifestyle

In today's world people spend more time working than ever before, so it has become more important than ever to increase the efficiency of our day-to-day living. Smart House will provide more efficient living and work spaces through smart design, automation, and improved computer access. Smart House also plans to improve the quality of leisure time spent in the home.

Location

Drexel Smart House has recently secured a property from Drexel University. It is located at 35th and Race street in the heart of Powelton Village. It is an approximately 5,000 square foot house excluding usable basement space. It is positioned in an ideal location, close to both the residence halls and academic buildings. The residence has enormous potential given a careful renovation. We intend to upgrade the property, but not at the expense of it's tradition and history. The site will be an outstanding showcase for Drexel Smart House technology and designs. Here students will live and interact with new technologies and designs on a daily basis. This will allow effective study of new technologies. Moreover, the building is close enough to campus to allow for tours by students and outside parties. Additionally, Drexel Smart House plans to incorporate a small classroom space that takes advantage of the Smart House resources.



Figure 1: Front elevation of 35th and Race property



Figure 2: Rear elevation of the 35th and Race property

Social Impact

The goal of this project is to introduce new technologies, aimed at improving life, into an environment where they can be properly tested. The best way to properly test these technologies is by living with and using them every day. Students will eat, sleep, and work in the space interacting with and testing the technologies 24/7.

We plan to push the project beyond typical boundaries and to accomplish what has never been imagined in the past—when you think of the Drexel Smart House, think of a house twenty years from now. Technologies and designs that originate in the Smart House will not just stay there. What good is a Smart House if other people do not see the resultant work?

For this reason we plan on opening the house for tours and allowing people and corporations to see the developments and learn ways that they might be able to change their own homes. In addition we hope to increase public access through various means of media outreach such as documentaries, interactive websites, 3D models, etc. This project does not just affect Drexel. It affects the world.

Many different projects will be involved in the first phase of the house, but the task does not stop there. As time goes by, new ideas are formed, and resources grow, new ideas will be brought into the house so that even fifty years from now, the house will be ahead of its time. As technologies prove themselves feasible in a household, students will focus on taking them out of the Smart House and bringing them to the public through commercialization.

We have set out to question the concept of everyday living and everyday space. We like to push boundaries. Does a room have to be the same room all the time, or could it become something entirely different on your command? Why can we not have all of our computer files accessible from any device on any screen? Can groceries be automatically ordered and delivered into your refrigerator? Why not use the sun as the primary source of light during the day? We have been stuck in an old model where people simply have not posed these questions because the field lacks innovation and creativity. The young minds from fields as varied as art and medicine who are involved in the project bring a new freshness to a field which is too standardized and stale.

We want to change your life. We want to make it Smart. Drexel Smart House is better living through smart design and technology.

Closing Remarks

The world is a rapidly evolving place. The seemingly infinite resources that fueled the growth of the American economy over the past two centuries is quickly coming to a close. America is coming to the realization that continued growth must be modulated, fundamentally, by conservation and innovation. It is our hope that by building a Smart House that juxtaposes the individual's conception of technology with an innovative use of space, that we will generate new insights into home-building, technological development, and the art that defines how individuals live everyday life.