



ME481:

OVER A DECADE OF SOCIETAL SERVICE BEYOND THE CAMPUS BOUNDARY

American higher education is frequently accused of abdicating its responsibility to society. Colleges and universities are criticized for inattention to teaching, for an overemphasis on research that is perceived to be irrelevant and costly, and for failing to address the pressing needs of local communities. Furthermore, this situation has been exacerbated recently by reduced funding from legislators to flagship universities like MSU. Clearly the future of the United States is being sabotaged!

While there is considerable truth in these assertions, the Department is striving diligently to maintain standards and become actively engaged with groups of taxpayers throughout Michigan and beyond. Consider the capstone design class, ME481, for example. In this senior-level course, each team of four students functions in an unstructured industrial environment with a professorial mentor assigned to each team, research is prosecuted on contemporary issues that industry perceives to be relevant, and through this advancement of knowledge, economic development and also community growth are fueled. Thus we remain firmly wedded to the fundamental canons of the Morrill Act of 1862 that provided the basis for land-grant institutions like MSU: the public good. Let's examine this thesis by briefly chronicling the history of the class.

"Congratulations on another extraordinary 'Design Day.' You and your colleagues have shaped a truly unique event that brings the scholarship of engineers together with community partners in a program that benefits Michigan State University students, potential MSU students via the pre-college event, and all of the faculty, advisors, and mentors who combine their talents to upgrade the quality of products produced by Michigan businesses. I don't think that there is an aspect of outreach scholarship that this program fails to touch." These sentences, written by Dr. H.E. Fitzgerald Assistant Provost for University Outreach and Engagement at MSU, are merely one set of complimentary remarks that the Department has received from numerous societal sources including Senator Carl Levin's office and also Governor Granholm's office. But it wasn't always like this!

Collaboration with manufacturers began in the 1994 Fall Semester following decades of academically-neutered sterile paper studies. Projects didn't involve design-build-test and

report. The 80+ students worked on two industry-sponsored projects: one from General Motors in Lansing and a second from 3M in St. Paul, Minnesota. Thus, while the students were excited by this paradigm shift, project choice was severely limited in this embryonic outreach program! But things changed very quickly because manufacturers vigorously embraced this new program of societal service, the Department's faculty and staff were dedicated to its mission, and the students relished the opportunity to work on real-world industrial projects. This triumvirate provided the foundation for success.

The first semester of this win-win program involved the re-design of products to enhance their performance, but subsequently new products have been developed, manufacturing facilities have been enhanced, and products have been refined to reduce costs. During the past decade, students have completed over 400 projects sponsored by manufacturers in California, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Nebraska, Ohio, Ontario and Tennessee. These projects have involved interactions with over 100 large, medium-sized and small companies in over 50 different municipalities, and over 30 distinct industries ranging from orthodontic devices, furniture, veterinary equipment and aerospace structures, to consumer electronics, materials recycling, food processing, machine tools and of course, automotive.

In addition to projects offered by manufacturers, in 1998 the humanitarian projects were initiated. These projects are focused on the development of devices to improve the quality of life for children affected by diseases like cerebral palsy or meningococemia. Currently Shell Oil funds them and they are part of a more eclectic, broader educational initiative: one beyond the confines of the classical college curriculum that includes not only scholarship

but also character development, leadership, and service. It is eloquently captured by the following sentence penned by John A. Hannah, 12th President of MSU; "Our task is to make not merely better farmers, or veterinarians, or engineers, but better citizens, capable of appreciating the finer things in life, able and willing to take their part in shaping the destiny of their country." We wholeheartedly support this assertion.

The above meritorious features and significant accomplishments of ME481 have been responsible for the class being recognized as one of the nation's premier capstone programs and this is reflected in the abundance of projects submitted by manufacturers each semester. This condition has been achieved because of clear societal needs for such collaborative efforts between town-and-gown. Indeed for any nation to excel in the international marketplace, societal vortices must be established where streams of knowledge from both academia and industry mix synergistically to not only change the human condition but also create viable solutions to contemporary societal problems.

Thus in ME481 we are privileged to advance knowledge through the collaborative efforts of student teams, professors, university staff and industrialists. We transform lives on campus and in the communities that we serve. We invigorate companies through the generation of fresh ideas, out-of-the-box thinking, innovation and creativity. And we enhance lives in the municipalities where these companies are located because we stimulate economic development and community growth.

These impressive characteristics should be no surprise to any Spartan because MSU is a land-grant university. Our mandate is the public good...despite budget cuts and criticism from beyond the banks of the Red Cedar River!



LEADERSHIP...

is the process by which the behavior of an individual, or a group of individuals, is influenced in order to achieve a desired objective.

While there are several styles of leadership, the Design Program nourishes and sustains the growth of the essential leadership qualities in our students so that they will become societal and technological leaders in the professional world that lies beyond the campus boundary.

To lead people, walk beside them...As for the best leaders, the people do not notice their existence. The next best, the people honor and praise. The next, the people fear; and the next, they hate...When the best leader's work is done, the people say, "We did it ourselves!"

Lao-tzu (580 BC)

The task of leadership is not to put greatness into people, but to elicit it; for the greatness is there already.

John Buchan (1875-1940)



Alumni Quotes:

ABOUT THE DESIGN PROGRAM

Since its inception in 1994, hundreds of mechanical engineering students have vigorously responded to the unique challenges of the Design Program. Here are some genuine quotes from several alumni who have generously taken time to write down and share their reflections on the program – and what it means to them.

Looking back on the courses I took at Michigan State, the ME design series was imperative in preparing for my current career. Initially, Design I and II represented a welcomed change of pace as we were assigned a project that demanded us to use creativity, ingenuity, and teamwork – skills that generally aren't crucial for success in many other ME courses. However, it became even more necessary in Design III to exercise these skills and to be able to assess the strengths and weaknesses of each team member with the intent of maximizing individual contributions to the team. At the time I didn't realize how relevant these skills and experiences would be for my current full-time job as a project engineer for Shell Oil Company. Seeking input from project stakeholders and subject matter experts, keeping the customer informed, thinking outside the box, setting dates for milestones, working within a budget – the parallels go on and on. A few words of wisdom that have stuck with me came from our Design III industrial advisor, Nate Verhanovitz, when he said, "At the end of the day all you have is your reputation." In my current job, I develop projects far enough to decide whether the payback is sufficient or if it should be canceled due to lack of return to the company. I'm entrusted to be honest, not take shortcuts, and to make recommendations that reflect what is truly best for my employer. Consequently, I'm not evaluated based upon how many projects I execute, or by how fast I complete a project, but by the reputation I've earned every step along the way.

*Mike Primeau
Project Engineer
Shell Oil Company
Norco, Louisiana*

The final Design class at MSU felt like a lesson in enduring stress. It required various skills learned from previous courses, but with a clear target on creating a tangible and useful product. Design emphasis was placed on functionality, cost, and manufacturability, while



focusing little on aesthetics and complexity. Deadlines were numerous and unpredictable, and it seemed finding enough time to complete everything was unfeasible. Due to conflicting schedules, weekends were the only time the group was able to meet. Additionally, our company was located more than an hour drive away, and required our team to work around their schedule. Furthermore, little guidance was provided, and our projects, despite the effort, were continuously viewed critically with little to no praise. This all seemed unacceptable for a class in the final semester of senior year.

Ironically, a year later when driving home from the office at 3am following a 21 hour work day I realized that this design class had been the first small taste of what was to come. Reality outside of school, unfortunately, is vastly different from the general school experience. Formulas, theories, concepts can all be obtained from any textbook when needed, and computer programs, along with prior company knowledge usually eliminates the need to do any complicated mathematics. Technicians now perform most of the testing, and designers are responsible for CAD work. The vast amount of information accumulated over the past years suddenly seems like a waste. Time management, communication, and the simple ability to get things done are what bring success. Tasks have invariable deadlines, and routinely require the completion of many subtasks first. Managing these subtasks frequently involves others, and proper communication is essential to completing them on time. Communication with departments outside engineering is imperative. Having a working knowledge of sales, accounting, manufacturing, etc and being able to communicate effectively on their level is an immense asset. Finally, you must be able finish

things while overcoming any and all obstacles that arise. When designing a new product, it is your responsibility to determine key specifications, choose the right materials, develop appropriate test plans, and interpret the results correctly. More often than not, plans do not unfold as expected. The ability to improvise and continue to push forward without instruction or guidance is vital. As a working engineer, you are always fighting fires.

Although not fully realized at the time, these and many other realities were made apparent during my final semester. In many ways, the Design course at MSU was a small case study in real life engineering. It exposed students to real life situations and expectations, and provided the necessary tools to respond and succeed. No matter your experience in this class, there is no doubt it will better prepare you for what is to come. If anything, it is disappointing that more classes do not take this approach in giving students a prospective glimpse of their near future.

*Dave Kent
Takata TSBI
Product Engineer
Auburn Hills, Michigan*

Spartan Engineers, let me start out by emphasizing the fact that by graduating from Michigan State University with an engineering degree, it means you have graduated from one of the best design programs in the country. In my opinion, a degree from State doesn't reflect how well you can regurgitate equations on exams or how long you can study the night before an exam; it reflects your ability to work with a team on intense design projects while managing your other course load. The success of these projects isn't shown in a grade, but the impact of the project will be reflected in your work in the future.

When interviewing with dozens of companies, the process consisted of endless questions of my experiences in design projects—how did

Alumni Quotes Continued:

ABOUT THE DESIGN PROGRAM

your team work together, how did you manage your time, how did you break up the work?... Companies are interested in how you handled these projects because they reflect how you will fit into their corporate scheme. Upon completing my program, I was offered positions at several companies. After reviewing my options, I selected York-Johnson Controls. Since the beginning of June, I have been interacting with many people from across the country and have gone through some pretty intense training. I found myself at times sitting in meetings and at my desk having flashbacks of class where we discussed many of the design processes. Not one person I have met, with the exception of the fellow Spartans, has had the same background that I have been given from the MSU design program. The program gave me a lot of experience working in groups and following a specific design process. The capstone design project was probably the most beneficial, not only did I get experience with the design process, but I had the opportunity to actually work for a company and get their feedback!

Between the three key design classes, the experiences I had give me a real advantage over the other engineers with engineering degrees. My colleagues came from schools across the country and none had the same exposure we received. Granted, it was crazy while I went through it and it seemed very tedious at times, looking back it all made sense. The whole design process is used in the corporate world everyday! So, my advice to you is to soak up as much of this as you can because contrary to what you may think now, you will use it and think about it in the future. The design program is a unique aspect of your degree and helps define you as an engineer!

*Brad Herbeck
Associate Sales Engineer
York-Johnson Controls
Auburn Hills, Michigan*

One of the most influential experiences in my Michigan State career would have to be the Design Program. A lot of people feel intimidated and scared going into the first design class. Everyone is worried about getting good grades and winning the competition. One piece of advice I can give you is: don't worry about your grades so much, worry about what you learn. And to be honest, I don't remember what grade I got in my design classes, but I do remember all the people I've worked with and

all the projects I was involved in. Experience is what makes you stand out and succeed in the real world, not grades. I believe the Design Program at Michigan State has prepared me for my first job.

From the first design class to Dr. Thompson's senior design course we were encouraged to work on teams to complete our projects. The program really teaches you how to interact with people and lead a team. And that is very important in the industry, no matter if you work in the plant or an office. The Design Program does a good job of getting people from all kinds of different backgrounds to work together and succeed.

The MSU staff will always be willing to help, even if it's a professor you don't know. The program encourages the students to go ask for help if needed because the professors have an enormous amount of experience in the industry and with new technologies.

The most important class, by far, was the senior design course. You get professional experience while being guided by industry experts and Michigan State University staff. The class takes a team from beginning of a project to implementation stage in less than four months, which is almost unheard of in the industry. Students interact with industrial advisors, academic advisors, and now even other colleges on campus. Experience from other colleges is something I wish I could have on my team when I was in the Design Program. People from different academic backgrounds add expertise to the team. This is exactly what happens in the real world; people from all different backgrounds work together on the same project, with everyone doing their part to succeed. One of the most important things to learn is to trust other people with responsibility. I think the Design Program provides students with that opportunity.

*Dmitriy Kats
Nuclear Operations Program Engineer
Lockheed Martin Corporation
Ballston Spa, New York*

One way that has proven to be of use to me when making difficult decisions is a decision matrix I learned from Dr. Thompson. It was so helpful I even used it to decide which job I wanted to take after I graduated from college. I tallied up the various factors: location, benefits, quality of assignments, opportunity for advancement, cost of living, salary, etc. which were associated with each of my job

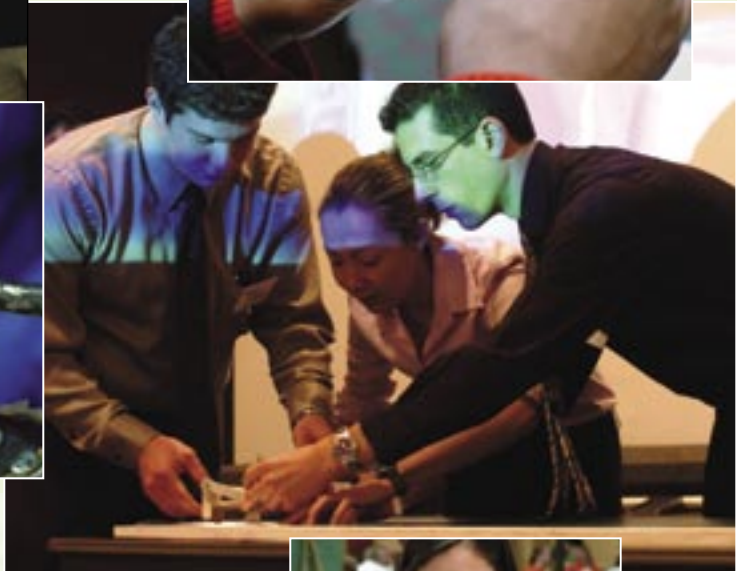
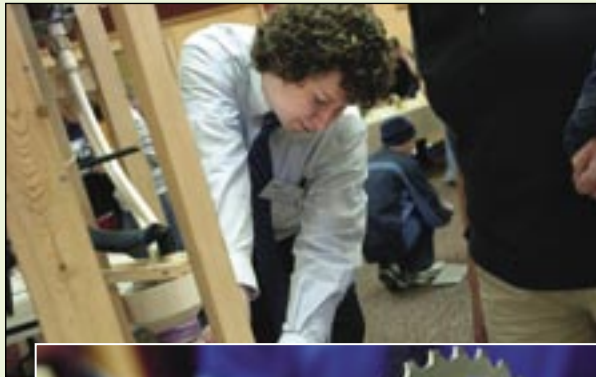
offers. I also assigned a weighting factor to each criterion and then gave each job a score. From there a decision was not difficult to make because I could see which job suited me best overall. This skill is one of many skills I gained from the design program at Michigan State University.

As I continue to gain more knowledge outside of college, I have broadened my perspectives and I am challenged as much as I have ever been in all aspects of my life. I find that to have a good solution to any problem, a well thought out plan is crucial. A quick fix will often cause the same problem to resurface. Thus, design skills are of utmost importance. Understanding the root cause of the problem, whether it be buying the right car or choosing the right design for a webpage, will have the biggest impact on the results. The design program has taught me how to overcome challenges in my job and given me an edge when I am given a project. I am very proud to have graduated from such a fine program because I feel I am becoming a "go to" guy at work due to my problem solving skills.

I have seen in the corporate environment of Ford Motor Company that the utmost importance in business falls on innovation. The ability to innovate is what sets apart the leaders from the followers, and the "cream of the crop" from the mediocre. I learned how to innovate from the Bulk Materials Transport Competition in my Design II class. The teams competing in that competition were just like miniature companies competing in the marketplace. After all the research, development, manufacturing, testing and time spend bragging (marketing) about your rice-carrying-stair-climbing robot, one competition gave the results and reward to those teams that were the best. So many skill sets were incorporated into the competition that are also crucial in business. Aspects such as teamwork, work ethics, resourcefulness, communication, and design skills had major impacts on winning the competition, just as they do on competing businesses in the marketplace. I'm willing to bet that the students who perform well in that competition will all go on to have very successful careers.

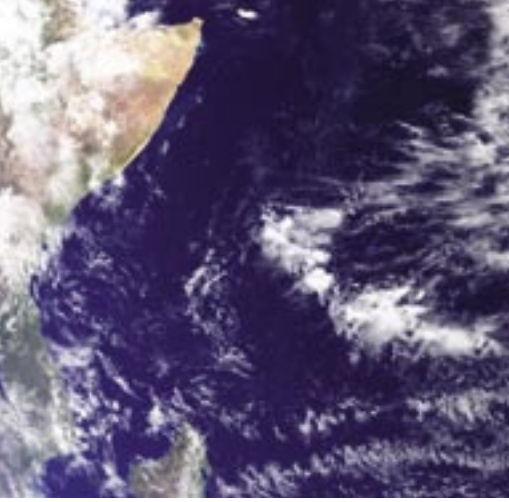
*Patrick Fay
Ford Graduate Program
Ford Motor Company
Dearborn, Michigan*

innovate / inspire / motivate



create / engineer / inspire





The Humanitarian Project for Developing Nations

Never doubt that a small group of thoughtful, committed citizens can change the world;
indeed it is the only thing that ever has. – Margaret Mead (1901-1978)



A vision for multi-disciplinary projects involving: the College of Agriculture & Natural Resources; the College of Arts & Letters; the College of Communication Arts & Sciences; the College of Engineering; and the Eli Broad College of Business

- Eradicate poverty and hunger
- Reduce child mortality
- Ensure environmental sustainability
- Develop global partnerships
- Stimulate economic development
- Combat diseases and enhance health
- Dramatically enhance the undergraduate experience

MICHIGAN STATE
UNIVERSITY

Some Useful Tips:

FROM SUCCESSFUL AMERICAN INNOVATORS

Practical innovation more than anything else is the primary reason why America has achieved preeminence in the world while other well-endowed nations have failed to excel. Over 100 years ago, ambitious risk-takers characterized the flood of immigrants to enter this country and these pioneers possessed numerous desirable attributes. But it was their gifts for innovation that accelerated our nation's growth. It wasn't that they were simply good at invention but they excelled at putting that inventiveness to public use. These innovators were responsible for changing the very fabric of our society and ultimately the face of the world.

Here are ten lessons that can be learned from these pioneers:

1. MAKE NO ASSUMPTIONS ~ Break-throughs come when assumptions are discarded.
2. FIRST ISN'T ALWAYS BEST ~ Understanding comes from failure; success comes from understanding failure and acting upon this knowledge.
3. IT'S OK TO STEAL ~ More innovations come from borrowing and the combination of ideas than from simple invention. The imaginative association with ideas previously considered separate is a hallmark of innovation.
4. DIFFIDENCE WON'T DO ~ An idea might work only when it's pushed to its limits.
5. NOTHING WORKS THE FIRST TIME ~ Innovation is often cut off too soon because backers fail to appreciate that it takes time to work out the wrinkles.
6. NEW IDEAS DISTURB ~ If the majority of observers don't pooh-pooh a new idea, then it is probably not a very good idea.
7. CROSS-POLLINATION WORKS ~ Boundary transgressors are able to mobilize knowledge more flexibly and selectively than others.
8. SUCCESS IS RISKY ~ The most dangerous moment in the life of a company is when it has succeeded; because it will stop innovating. This is when the company will be attacked in the marketplace by imitators. Innovators are, by definition, barrier-breaking troublemakers.
9. WHEN ONE-PLUS-ONE EQUALS THREE ~ Many innovators flourish in partnerships. However the partnerships must be psychologically complementary.
10. PLUGGING INTO NETWORKS ~ Individual innovators may be successful but they are much more likely to succeed in a network.

Related Inspirational Quotes of Note:

Henry Ford (1863 – 1947)

Developed the people's car
"I refuse to recognize that there are impossibilities. I cannot discover that anyone knows enough about anything on this earth definitively to say what is and what is not possible."

"Businessmen go down with their businesses because they like the old way so well they cannot bring themselves to change. One sees them all about – men who did not know that yesterday is past, and who woke up this morning with their last year's ideas."

Amadeo Giannini (1870 – 1949)

The people's banker
"The tendency when a man gets on top is to shut himself off from the masses, forgetting the little fellow who made him."

Juan Trippe (1899 – 1981)

He took the world into the jet age
"A man can be born rich, he can be born brilliant. He can be lucky or he can be persistent. The most important thing is to be persistent."

George Doriot (1899 – 1987)

He started the first venture capital company
"A committee is an invitation to do nothing. Very few committees can perform better than the weakest man."

Samuel Insull (1859 – 1938)

He served cheap electricity to America
"Here is an industry (the electricity-supply industry), which supplies convenience and comforts to the day laborer, which kings could not command half a century ago."

Design Day Awards:

S O M E N E W I N I T I A T I V E S

You will no doubt recall from your high school Latin classes that the word “engineering” is derived from the medieval Latin root “ingenium,” and this ancient word means “to design” or “to create.” Thus from a linguistic perspective, engineering is design. If there were no design activities in the curriculum, there would be no engineering degrees, no classes to attend, and no examinations to pass! Yes, quite a thought!

The Kids’ Choice Award

It is therefore quite logical for design methodologies to have a special place in the undergraduate curriculum because it is the very essence of engineering. It is the very heart of the engineering profession; a vortex where eclectic streams of knowledge mix. At MSU this observation is certainly true, as clearly evidenced by the thread of design woven through the fabric of the course offerings and also our end-of-semester Design Day in the MSU Union Building. This memorable day, with the largest attendance on the College calendar, has developed even more prestige recently with the creation of two new awards for students at the junior and senior levels. We anticipate that they will serve as a steadfast fulcrum for leveraging the development of enhanced design appreciation in the student body. My purpose here is to provide you with some background on these awards.

The Scottish-born American classicist Gilbert Highet penned the words, “Whenever there are beginners and experts, old and young, there is some kind of learning going on, and some sort of teaching. We are all pupils and we are all teachers.” This fundamental truism implicitly provided the motivation for The Kids’ Choice Award presented to a team of ME371 students on Design Day. This award comprises a gift voucher, a certificate and *The Sparty Plaque*.

The plaque was designed and manufactured by Mr. John Thon’s 7th grade technology class at Holt Junior High School. It features a plate engraved with past winners of the award and a Spartan helmet created from two valves and a piston. This award, and the associated activity for experiential learning, was motivated by numerous requests from pre-collegiate students who had expressed the overwhelming desire to learn more about the diverse collection of

machines showcased by ME371 students. In response to these requests, a forum for constructive dialog between pre-college students and ME371 students was established. Thus, groups of 7th – 12th grade students are required to interview MSU students to learn more about the engineering principles associated with their prototypical systems displayed in the Gold Room of the Union. Based on these lively conversations, each group assigns points for the best designs. Pre-college students gain scientific knowledge from engineering students, and since the ME371 students are compelled to explain clearly the features of their machines, they develop valuable communications skills. Both sets of students learn from the conversations. Both are students, and both are teachers!

The winners in the 2006 Spring Semester were: Matthew Bauer, Aaron Cole, Richard Henderson, Matthew Holley and Ryan Slobodian.

The Leonardo DaVinci Scholars

In the 2003 Fall Semester, the Department began the process of creating an endowment fund for undergraduate design education and initiated the Leonardo da Vinci Undergraduate Design Scholarships to recognize excellence in mechanical engineering design. These scholarships were created to honor and encourage the adoption of the spirit and innovative approaches of this universal genius by the undergraduate population.

In addition, these scholarships were created to emulate the prizes and the associated prestige established by the inventor Alfred Nobel. This Swede was one of history’s great innovators, holding 355 patents, and whose invention of dynamite in 1866 made him one

of the world’s wealthiest men. “Justice,” wrote Nobel, “is to be found only in imagination.” No greater proof of this Swedish inventor’s faith in individual genius is likely to be found than the prizes that have been awarded in his name during the past century. Upon his death, his last will and testament set forth the unprecedented idea of rewarding those whose works of innovation and imagination have conferred the greatest benefit to humankind. These prizes, the Nobel Prizes, have since become synonymous with human excellence. Indeed, the prestige associated with these Nobel Laureates is immense and it dwarfs the accompanying financial award. That’s our template!

Now at MSU we are indeed focused on technical innovation rather than literature or peace; and yes, we are concerned with much smaller amounts of money. However, we are nevertheless recognizing and saluting the spectacular design accomplishments of the Department’s talented students...they are the very future of our nation!

And, you might ask, they are called Leonardo da Vinci Scholarships? Not Nobel Scholarships? Yes, that’s right! While Alfred Nobel was undoubtedly a superstar, his accomplishments are dwarfed by those of Leonardo da Vinci because the Italian exhibited an intense curiosity and an insatiable desire for knowledge about every field of human endeavor.

The Leonardo Scholars (*continued*)

This Renaissance man was one of the most versatile geniuses in history. While he created some of the most famous paintings of all time, his domains of expertise extended beyond the warp and weft of the canvas to anatomy, astronomy, botany and geology, and in addition, he designed machines and drew plans for hundreds of inventions. Furthermore many of these inventions were 500 years ahead of their time!

ME471 is the class where the fundamentals of the design process are presented coherently, and where a semester-long, design-build-test-validate project and associated competition comprise a major portion of the final grade. Furthermore, since this project incorporates numerous diverse aspects of many under-

graduate disciplines, it was decided to use this “hands-on” engineering project as the criterion for selecting the Leonardo Scholars. The winning team in the class competition is awarded Leonardo da Vinci Undergraduate Design Scholarships comprising a financial component, a medallion and a commemorative certificate.

The winners in the 2006 Spring Semester were: Jon Bendert, David Gasparovich, Andrew Hartsig and Aaron Huber.

The winners in the 2006 Summer Semester were: Benjamin Greyerbiehl, Peter Kopinski and Gonzalo Marulanda

These gifted students have clearly demonstrated tenacity and teamwork; the ability to integrate theory and practice; the intelligence to complete intertwined analytical and creative tasks; and the managerial skills to fully capitalize on right-brained and the left-brained thinking. Of course these facets of innovation are essential not only for success in engineering design, but also in numerous other aspects of life too. The design faculty anticipate the maturing of these attributes in these students and we strongly encourage the current Scholars, and future generations of Leonardo Scholars, to exploit their meritorious talents in societal service for the public good. The consequences will be immeasurable!

We must share our strengths...

We must share our resources, and we must share our wealth. Only then can this land-grant university's Design Program in the Mechanical Engineering Department effectively serve the needs of contemporary America by effectively educating university students, by effectively fueling economic development in Michigan's communities, by effectively invigorating manufacturers, and by effectively creating a robust foundation for the nation's future. A future that will undoubtedly feature our current generation of technologically-adept MSU students who will have been transformed into innovative professional engineers and societal leaders.



Individuals in eight large corporations enthusiastically embraced the above clarion call and it is because of their generosity that the current generation of MSU students, and also those who come later, will be able to receive an enhanced educational experience in the Department. The corporate sponsors are:

Derek Andrews, Senior Manager, **Boeing Company**, St. Louis, Missouri

Houston Brown, Manager, Graduate Recruitment & University Relations, **Shell Oil Company**, Houston, Texas

Brian Green, Military Inlet & Exhaust Systems Mechanical Engineer, **General Electric Company**, Cincinnati, Ohio

Stefan Jockusch, Vice President: Research and Development, **Dematic Corporation**, Grand Rapids, Michigan

James Lammers, Vice President, **W.A. Dart Foundation**, Mason, Michigan

R. Morris, Manager, Management Recruiting, **Norfolk Southern Corporation**, Norfolk, Virginia

Mitsunobu “Tony” Takeuchi, CEO and Chairman, **Denso North America Foundation**, Southfield, Michigan

Edward Willis, Assistant Vice President, **Union Pacific Railroad Company**, Omaha, Nebraska

On behalf of the students who will benefit immeasurably from these gifts, and also their parents who will witness the intellectual growth of their offspring, we sincerely applaud the benevolence of these eight industrialists. Clearly they are wise stewards of their funds and of their time, they embrace a panoramic vista of life and its numerous challenges and opportunities. And they are clearly good citizens. They have noble motives. Sir Richard Steele, that benevolent English essayist, dramatist, journalist and politician wrote, “The noblest motive is the public good.” How very true!



Thomas Alva Edison Scholars:

I N U N D E R G R A D U A T E D E S I G N

“Any other bright-minded fellow can accomplish just as much if he will stick like hell and remember nothing that’s any good works by itself. You got to make the damn thing work.” These words were uttered in a fit of frustration by Thomas A. Edison, America’s most productive inventor, who has 1,093 patents to his name. He was an impresario of innovation. He was the quintessential American inventor.

Thomas Edison spent his formative years in Port Huron, Michigan, where he failed to excel at school. Nevertheless, upon entering the workforce he quickly made a science of innovation and he made innovation from science. His fertile eclectic mind was responsible for numerous diverse groups of inventions including those associated with the telegraph, the mimeograph, the incandescent light bulb, the phonograph, the telephone transmitter, an ore separator, cement manufacturing facilities, the kinoscope, alkaline batteries and of course Menlo Park, the blueprint for the modern research and development laboratory. Furthermore, Edison’s diverse accomplishments were ultimately responsible for the creation of at least three industries: electricity-supply, musical entertainment and motion pictures. What a laudable contribution to the human race!

The spectacular accomplishments of this creative genius and classic innovator have motivated the initiation of an award in the ME481 course to honor this Michigianian superstar. Our objective is to encourage the adoption by our students of Edison’s indefatigable indomitable spirit, his innate curiosity and creativity, and his innovative entrepreneurial prowess.

Of course you may wonder why we regard these specific human traits as being so important. Well, it’s because we are convinced that practical innovation, more than anything else, is the primary reason why America was catapulted into such a preeminent role on the international stage in recent history while other well-endowed countries failed. It’s not so much our ability to invent but rather our ability to put that inventiveness to practical use. Namely, our ability to excel at the process of product development and commercialization for financial gain.

Edison excelled in this arena; at conceptualizing a new vision, at transforming that vision into a viable product, at fulfilling the entrepreneurial role of raising money, at arranging the legal rights-of-way and at cultivating the market. He created important ideas and he transformed them into commercial realities with enormous societal impact. We applaud this multi-disciplinary philosophy and we are convinced that these human characteristics should be emulated by our students upon entering the workforce because Michigan is currently struggling to survive in a rapidly-changing brutally-competitive global marketplace. Indeed America’s longstanding worldwide supremacy is being challenged as never before.

Each semester the T. A. Edison Undergraduate Design Award will be presented to the best ME481 student team. In this capstone course, teams of four students confront contemporary open-ended design problems presented by industry partners. Thus students must function successfully in an industrial setting by adopting the traits of Thomas Edison. There, teams create, fabricate, and subsequently test prototypical systems for small,

medium, and large manufacturers throughout the Midwest. They wrestle with complex “real world” issues not found on university campuses where lifestyles and motives are generally divorced from the pressing needs of society. It is this very real, practical, experience in Edison’s domain of invention and innovation that distinguishes our graduates from those of other universities, and why they are so highly sought after by employers.

The names of the Edison Scholars shall be announced at the Awards Ceremony on Design Day. The winning team shall receive \$2,000 and each scholar will be presented with a unique medallion and a certificate of accomplishment. Half of this financial award is provided by a generous gift from the *Shell Oil Company* and the remainder is from *The Leonardo da Vinci Undergraduate Design Endowment* plus assorted gifts to the Design Program. The 2006 Spring Semester winners were: *Mathew Carlson, Richard Humphries II, Dennis Suminski II and Nathan Ziegler.*

An independent panel of distinguished judges from companies unrelated to the semester’s industry partners shall visit campus to review the activities of each team before and during Design Day prior to determining the winning team. In the 2006 Spring Semester, the panel will comprise engineers from *The Boeing Company, The General Electric Company, and The Shell Oil Company* plus two professors from the College of Communication Arts & Sciences, and College of Arts & Letters.

With the Design Program’s inception of Thomas Edison Scholars from the ME481 course to complement the current cohort of Leonardo Scholars from the ME471 course, two legendary superstars have been strategically placed on pedestals to serve as role models for our students in the context of scholarship, character-building, service and leadership.

Leonardo’s talents are regarded with reverential wonder in every field that he contemplated, and his dreams of engineering marvels were often 500 years ahead of their time. He was the most versatile genius that ever lived, but he didn’t venture into the business world.

Edison’s visions were much more near-term and pragmatic, but he shrewdly melded the art of invention with the business of innovation. Herein lies the difference between them. Edison was an innovator: somebody with the relentless drive and determination to bring an embryonic concept to the bustle of the marketplace. Indeed, these Edisonian characteristics in the US population during the previous two centuries were the essential potent high-octane fuel that powered America’s engine of industrial reform to the lofty pinnacle of world dominance. Can we sustain the flow of this fuel?