

Naval Architecture and Marine Engineering

Nautilus

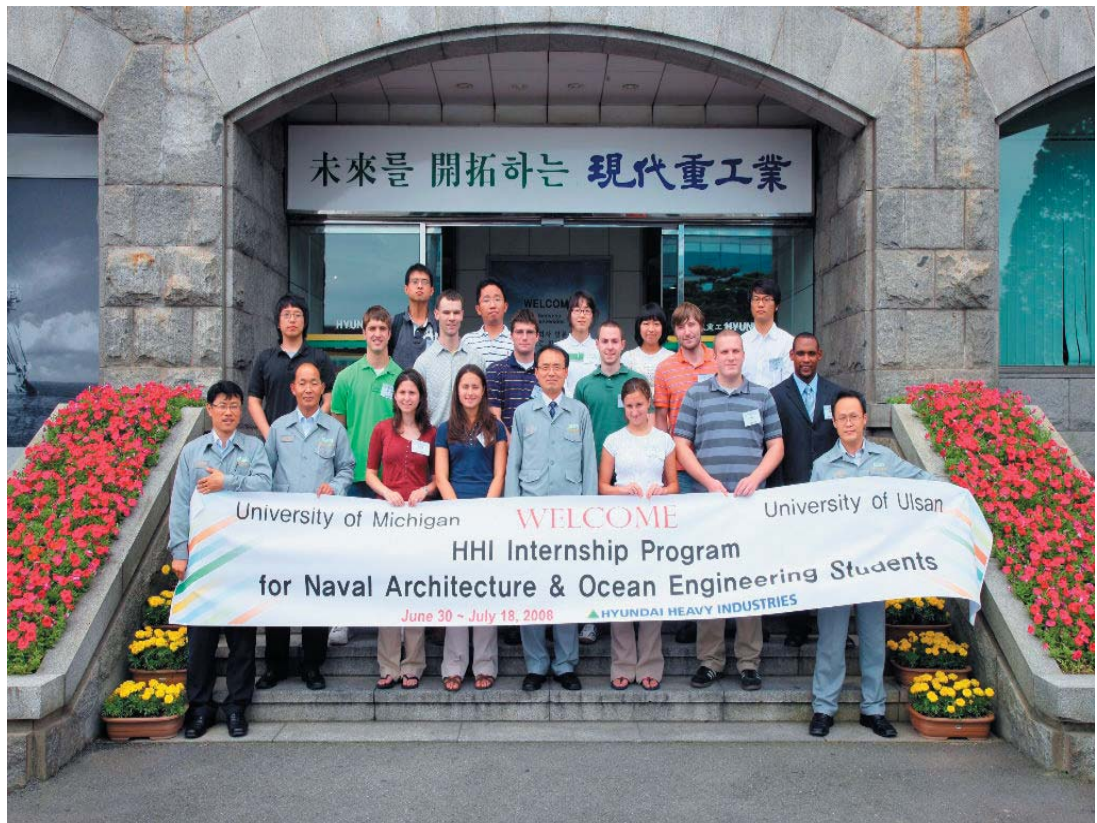
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The Summer Intern Issue

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Students at HHI

HHI Internship by Aaron McCloud

In July of 2008, University of Michigan's Naval Architecture and Marine Engineering Department and Ulsan University's Naval Architecture and Ocean Engineering Department collaborated to provide an amazing opportunity for ten Michigan students to travel to South Korea for a four week pilot program. The students were given the chance to visit South Korea's Hyundai

Heavy Industries (HHI) Ulsan Shipyard, which is currently the market leader in commercial shipbuilding delivering a new ship about every four days. Just as they have a reputation for being a world class shipyard, the same can be said for being world class hosts. The trip included a split between three weeks of tours and training at the Hyundai shipyard, one week of training at the University of Ulsan, and cultural activities throughout the trip.

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From the Desk of Armin Troesch, Department Chair



It is the middle of winter and temperatures in Ann Arbor are in the single digits (single Fahrenheit digits, that is). It therefore seems appropriate that

this edition of the Nautilus reports on summer activities; activities that our students participated in during the summer of 2008.

In these pages you will find students writing of their internship experiences, both in the United States and overseas. The department has an outstanding summer intern program, started by Professor Howard Bunch and later developed further by Professor Tassos Perakis. It is now managed by Kathy Stolurak through the chair's office.

In a program that is unique in the college, we are able to offer every NA&ME junior a marine

related industry placement and still have positions available for large numbers of seniors and sophomores. This program would not be possible if were not enthusiastically supported by many of our very loyal alumni.

This past year, the department had over 100 companies offering a similar number of placements for our students. The map below, with different colored flags denoting class rank, shows where 63 NA&ME students spent a better part of their 2008 summer.

In this issue of the Nautilus, you will also read about faculty research activities and Marine Hydrodynamics Laboratory (MHL) happenings. Enjoy and consider this an open invitation to drop us a line. You are part of the Michigan family and we would like to hear from you.



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The first portion of the program was the three week visit at the HHI shipyard facility. The students were embraced and treated as VIPs. They were provided full HHI uniforms and PPE gear and treated as if they were a part of the HHI team. The students were housed in first class accommodations at an offsite location called the Foreigner's compound generally reserved for HHI client representatives. Even though HHI staff intended for the students to fit in, their presence was definitely noticed across the yard and even in the Korean media. Throughout the time in the shipyard the students were constantly approached by employees who had never seen Americans except on television. In fact, on a few occasions students were approached and interviewed by on-site news reporters, who were interested in American college students visiting the HHI shipyard. The students were very popular amongst the staff and in the media. On one of the reports the headline actually stated that the students came from the best University in the world; the students made no attempt to dispute the claim.

Each day the students were picked up at 7am sharp by a bus that was used exclusively to transport the students to and from the shipyard. In the mornings the students ate breakfast with the HHI employees and then were greeted by a HHI liaison who directed the students to the day's scheduled training locations.

The students rotated through the various shipyard departments where they were provided with an in-depth understanding of HHI's shipbuilding operations from ship design and model testing to steel cutting to construction processes to sea trials. HHI is a vertically integrated company that fabricates a multitude of marine products including propellers, generators, propulsion engines, and pumping systems. Therefore, students were able to learn about and witness the manufacturing processes required to build those shipboard components.

The students would listen to a presentation given by a manager of the department. The power point presentations that were used included the same content that was used to train HHI staff translated in English. The presentations were extremely detailed and provided the students with practical knowledge that could be tied directly to the



UM students in a lecture on Korean shipbuilding

theories from their coursework.

After each presentation, the students were then taken on walking tours of the facility in order to reinforce and see first hand what they had learned in the lectures. The students boarded and toured a variety of ships including a 10,000

TEU containership and the inside of a membrane type LNG carrier.



UM Students in their HHI uniforms on the bridge of a 10,000 TEU containership



"I understand what it takes to build a ship. I can finally see how coursework relates to real life shipbuilding."

Doug Rigterink (sophomore)

The students were given an in-depth look at Korean shipbuilding practices. They were taken step-by-step through the design and building process. Doug Rigterink's statement (in the above picture) was reiterated multiple times by many of the students as the general feeling.

The students were exposed to the entire operation from the design and towing tank testing labs, the steel yard, the panel assembly lines, the dry-docks, and to the final testing for delivery. The students were graciously welcomed by each division and given the opportunity to engage with entry level staff and senior level management.

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Each day was another adventure and an opportunity to visit new places, such as the forging where they melted steel to fabricate the massive 25000 HP engines that HHI uses to propel the biggest ships in the world.



“The entire experience was amazing, there is no question why HHI is a global leader.” Jason Goldis (senior)

Another interesting experience was the opportunity to visit the Hyundai Marine Research Institute. The students were allowed to observe model tests conducted within the towing tank. This was where the students were also tested on their Naval Architecture expertise. For example, in one activity the students were divided into groups to analyze the natural frequency of a cylinder due to wave motion.

Another opportunity in which students were able to participate was in the Blast and Paint Department where students donned protective suits and blasted paint using a blasting gun. The students were given a presentation explaining several other business sectors in which HHI is involved, such as industrial robotic outfitting and manufacturing. The students were able to tour the ‘Robot

School,’ where they were given the opportunity to program robots to perform tasks, which was a big hit.

During the weekends the students were taken on cultural tours. The students had the opportunity to visit two separate Buddhist temples and also attend a soccer game. They were given a taste of traditional Korean culture. One of the HHI managers, Mr. Jin-Eun Moon, also took the students out for dinner on several occasions and presented the students with gifts that his children had made, further illustrating how the students were embraced and treated as honored guests. At the closing of the HHI internship portion of the program, HHI allowed each student to deliver a short speech during a wrap up ceremony. All the students



UM students engaged in activities at a Buddhist Temple

expressed their utmost gratitude for the program and explained how it had helped them with understanding how engineering principles are applied to shipbuilding in practice.

During the second portion of the program, the students were welcomed as guests of the University of Ulsan. The students were housed at the school’s

dormitory with other students from the university. This gave



Mr. Jin-Eun Moon and his son

the UM students the opportunity to meet similarly aged Koreans.

The students were given lectures on the history of shipbuilding in Korea, the founder of the Hyundai Company, and a basic history of Korea. The students were also taken on tours of the facility and provided with a lesson in Taekwondo. The students went on a few more cultural tours which included places such as a historic museum and an overnight stay at a Buddhist temple.



“I had a great time and I have learned a lot which will help me in my career.” Livia Cohen (senior)

Overall, the Michigan students were given an excellent opportunity to see theory put to

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action by getting a first hand view of advanced shipbuilding techniques and learning about shipbuilding from



“This program will be remembered and drawn upon throughout our lives.”
Lauren Kemink (senior)

a world class business management staff. In addition to engineering knowledge, the students gained a greater understanding of Korean culture. They were able to build relationships with the students from Ulsan University and with the HHI employees. The program



All UM and UofU students involved in the program

was a great success and has the foundation to be a great program that will continue to help build University of Michigan students into tomorrow’s maritime leaders.

Key Takeaways on Korean Shipbuilding

The Korean shipbuilding focus is to be the best and the most innovative. They constantly incorporate process improvements across the entire operation. The staff are sent around the world to find the best practices and encouraged to bring them back to the operation. The work spaces are very organized and people are well trained and motivated. Most departments staff at least one PhD level researcher to implement a scientific analysis about how to improve. The management at HHI were very proud of the fact their staff had made many contributions to global shipbuilding by patenting techniques and technologies.

The Koreans do not have the advantage of lower labor costs as commonly thought. In fact, they have higher labor costs than in the US. They also need to compete for skilled workers as many young people are turning from shipbuilding to other mainstream industries, such as the computer and automotive industry. The Korean shipbuilders leverage their competition as partnerships because each yard possesses an advantage in some aspect of shipbuilding that the other yard outsources. Since the Koreans have an enormous maritime complex that dominates the world’s commercial market, they have the advantage of a dedicated and robust supply chain.

In the face of growing competition by the Chinese to Korean shipbuilding dominance,

the Koreans are making sure they are well equipped to compete. They actively study shipbuilding companies across the globe to figure out how to stay at the cutting edge of technology and processes. HHI has made substantial investments in the future by providing state of the art facilities for the University of Ulsan.

Overall, the students were granted an opportunity to learn important business management lessons pertaining to competitive shipbuilding. As the students grow in their professional careers and manage similar issues or seek to develop strategies to be competitive, they will have an excellent business case and experience to reference.



Aaron McCloud (Grad) with Dr. Seok Cheon Go of HHI

The Korea Experience by Jason Goldis

The Korea experience was an extraordinary opportunity to gain practical knowledge. It was captivating and fun to see the concepts and theory that we learned about in class put to use in the shipyard.

Our first week was spent in the Shipbuilding division of HHI. Not only was this an incredible introduction to the shipyard, but also it was by far the most interesting to me. We were able to see the process of a ship being built going from steel in the stockyard, to block construction, to mega and grand block construction in dry docks, and then to ships in quay awaiting sea trials and receiving final outfitting. We were able to go atop the giant gantry cranes, in the manufacturing plant on the welding assembly lines, and inside places employees who had worked at HHI for fifteen years said they needed special permission for. The advanced technology of the LNG membrane tanks was very special to see, as it is prized technology that HHI has developed itself.

Also, in each division we were able to meet with the division Vice President. Listening to these individuals talk about the company they had worked at for more than 35 years was inspiring. Hearing them talk about their division's role in the company and its future path to success was one of the best parts of our experience.

The next week was spent in the Engine and Machinery division. Because of this experience, I was better able to understand how a pump worked and the complexity of all of the working parts of an engine. We learned about and saw the largest two stroke diesel engine in the world at 108,920 HP. We were at the foundry and got to see their casting operation for cylinder liners and the forging operation for their crank throws. I could have never imagined how large these engines actually were. Their four-stroke HiMSEN engine was also very interesting to learn about. It is so efficient that Cuba put it on their dollar bills for its revolutionary use in portable power stations.

The third week spent in Research & Development and the material we learned about

reinforced what we learned in theory. We toured the model fabrication plant, tow tank, cavitation tunnel, circulating water channel, the industrial research division, and paint and surface coatings division.

In addition to the educational experience, the cultural tours were enjoyable and gave us a chance to see a lot more of the country, which we all appreciated. There were always people at HHI wanting to talk to us and spend time with us outside of work.

One of our Korean friends from the University of Ulsan spent the entire weekend with us and was our tour guide. The best cultural experiences included spending time with our Korean friends and staying in the University of Ulsan dorms.

In conclusion, this experience was not only one that I will never forget, but one that I will use as an educational reference forever. I cannot describe how grateful I am to have seen real life applications of what I have learned in school and had my questions answered by world experts. I would highly recommend future students to be a part of the Korea experience.



Jason Goldis, Aaron McCloud, and Justin Gillespie overlooking one of the nine HHI dry docks.

Korea 2008: Hyundai Heavy Industries by Nicolas Gregory

The internship at Hyundai Heavy Industries this July was one of the best experiences of my college career.

A typical day consisted of waking up at about 6:15 each day and catching a bus at 6:50 each morning to a cafeteria. Breakfast normally consisted of vegetable or fish soup, as much white rice and kimchee as you can handle, and a helping of potatoes or radish. Nearby, HHI workers often laughed as a few interns struggled to trade in a fork for steel chopsticks.

Occasionally after breakfast we would join a group of about 50 workers standing outside getting ready for their morning exercise. Eventually we were put into single file lines and participated in jumping jacks, various kinds of stretches and ended with a chant that translated to “no waste” and a fist pump into the air.

At about 8:00, we would jump back on the bus and move to whichever part of the shipyard we were touring that day. Normally we were brought into a meeting room and offered drinks such as hot tea and aloe juice (which is very refreshing) and snacks like the very popular ‘Dr. You bar’ which was simply just chocolate cake. For the next couple of hours we listened to presentations given by a general manager and took as many notes as we could. After this, we would put on our steel toed boots and hard hats for walking tours of the facilities and the ships.

Some of the most interesting tours came from our tour of the shipbuilding division. The foundry and forging shop tour was a particularly interesting experience. We went inside the shop where they melted scrap steel and poured it into castings. Sparks would fly everywhere as the steel was dropped into the vat of melt. HHI’s motto was “Safety First,” so we were told to be very careful while touring each shop. Not only was the tour interesting that day, we were followed the entire morning by a UBC (Ulsan Broadcasting Company) news team. We enjoyed being interviewed and videotaped throughout the morning. Later that week, our segment was aired on TV during the local news.

The final week we were moved to dormitories

at the University of Ulsan. We toured their department, classrooms and research and development facilities like the model fabrication lab and tow tank. One day at the University, we took Taekwondo lessons for about two hours. I think everyone had a lot of fun with it. For about an hour they let us “practice kicking” on some of the newer students armed with a fair amount of padding.

The trip would have been much less fun and interesting and much more difficult without the Korean students from the University of Ulsan. We got to know each other very well; they even visited our apartments for a 4th of July party. Not only were they good friends, they were very willing to help us out.

Overall, I believe that this trip has strengthened my desire to become a Naval Architect and Marine Engineer. The size and complexity of the Hyundai shipyard was amazing. With over 25,000 employees it is more of a city than a factory, and as we found out, mostly everyone in Ulsan was somehow tied to the shipyard. This experience and knowledge will help me in my future career.



Nick Gregory on top of a HHI Gantry Crane

Summer Internship 2008 with Hyundai Heavy Industries Ulsan, South Korea by Justin W. Gillespie



The Hyundai Heavy Industries summer internship was a great experience to learn about ship and engine construction in a very tangible and hands-on manner. Our UM coursework does not allow us to experience shipbuilding in this way. Though our internship program is excellent, there

are limited opportunities to spend time in a shipyard, especially a large one, and there are no opportunities to witness shipbuilding on such a massive scale and with such rapidity. I feel the shipyard experience is vital to our students' education and provides the knowledge necessary for design that our students often would not otherwise receive.

I felt unprepared leading up to the departure for Korea. I knew very little about what I would be doing inside and outside the shipyard. Thus, I found it difficult to pack for the trip. Not until I sent an email with nearly a dozen questions 10 days prior to departure did I begin learning what the work and accommodations would be like. Having Dae-hyun with us for the first few days was indispensable as several people needed a translator at the airport in Korea to pass through security. (Dae-hyun Kim is a UM Ph.D. student who escorted the UM group from

Chicago to Ulsan). His experience was also helpful when transferring airports, particularly since we were traveling with a large group. Having a knowledgeable guide allowed our travel to proceed more smoothly.

The quality of the experience at HHI varied each day because some departments had an agenda and some did not. They always, however, showed us much of what we wanted to see during the tour and answered all questions we asked. A few speakers who struggled with the language still gave a wonderfully informative lecture and tour. Nearly everyone at the research institute and the engine shop communicated effectively, while the shipbuilding division had fewer people who spoke English well. To ease the communication barrier, even with the University of Ulsan students, many of the UM students felt instruction in the Korean language would be useful.

At the end of our visit, we rearranged our flight home so we could have a weekend to see Seoul. Three students (including myself) took advantage of being in Seoul to visit the DMZ. I think all three of us came away from the tour with a greater understanding of what the conflict meant to the two nations and to the people. Seeing the finished construction projects (empty warehouses, finished highways, completed train stations) that are the physical representation of the hope South Korea has for unity is moving.

I think the internship was beneficial to all who attended and we were able to have contact with parts of ships that are typically out of reach. The HHI staff was extremely friendly, helpful, and accommodating and spending time with the Korean students was one of my favorite parts.

The Student Global Experience

"As other nations emerge as economic powers and our society grows more international, so, too, must a student's education. There is so much to be learned from observing, from interacting, and from listening to people who live and work in different cultures than ours."

University of Michigan President Mary Sue Coleman, November 2007 Vision and Goals speech

Hyundai Heavy Industries by Thomas McKenney

Touring the Hyundai Heavy Industries (HHI) shipyard in Korea has been a once in a lifetime experience. HHI is a very unique company because of all the aspects of shipbuilding they can provide. I think that there is only one shipyard in the world that can give you all aspects from receiving plates to sea trials.

As the very first program of this kind for HHI, the organization and logistics were very well planned. The language barrier was difficult to overcome and some translations were needed. The Korean students were very helpful in understanding the material and I would have enjoyed the opportunity to see them more outside of the shipyard. The contents of all the presentations were very informative and helpful when trying to understand the topics. The interactive components of the internship were very helpful and the interactions with the HHI employees were even more beneficial to my learning. I have never met so many employees that were so excited and enjoy their company as much as HHI employees.

Because of some of the presentations to us, I have a good sense of the components and general arrangements of the ships built at HHI as well as the magnitude of the size and interior areas. Many of the components were explained in detail including engines and piping systems to welding and protective coatings.

The off-yard excursions were more great

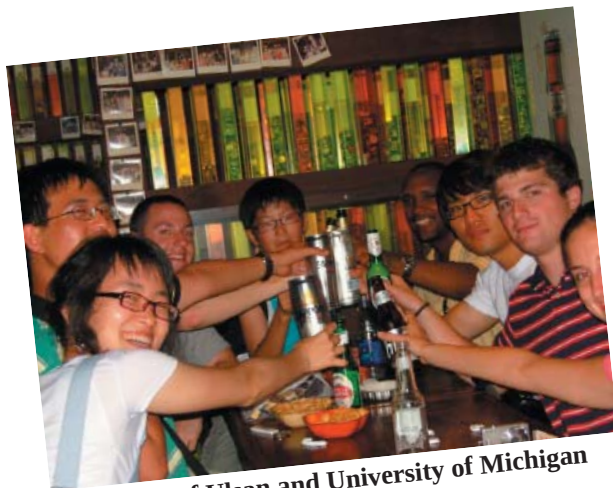
experiences that really gave me insight into Korean culture. It was also nice that the Koreans went with us on these trips. The overnight stay at the Buddhist temple was very interesting and I would recommend that any visitors to Korea experience this.

One of my favorite trips was right before we left Korea and was planned by us separately from HHI or the University of Ulsan. The weekend before we left we flew early to Seoul and stayed there for two nights.

This has truly been a life-changing experience for me and I plan to use this new gained knowledge to advance my career.



Thomas McKenney and University of Ulsan Student Yeon-Mee Suh



University of Ulsan and University of Michigan students enjoying cultural exchanges



UM Students on towing carriage in HHI Maritime Research Institute

HHI Internship by Douglas Rigterink

My trip to Korea was the first time I have ever left the US or Canada and it was a great experience. Although the language might be different and the food a little foreign, I still felt welcome and enjoyed my experience.

As soon as we arrived in Ulsan, we went straight to the Hyundai Heavy Industries (HHI) shipyard and began orientation. Each of the three weeks we spent in the shipyard was spent in three different divisions. The first week we toured the shipbuilding department. We started with the plate cutting and line welding, then block outfitting, all the way to final outfitting. The second week we spent in the engine and machinery division. We were able to view everything from the foundry to the final assembly of massive two-stroke diesel engines. When I first think of a foundry, I picture a cluttered, hot factory with soot and grime covering everything. The HHI foundry was hot, but I felt like I could eat off of the floor.

The final week, we visited the research and development departments. The test facilities at HHI are very impressive. They have a 2D wave tank, a tow tank that is a good bit larger than the MHL, a massive model shop, and many other resources for testing new hull designs.

The industrial research area was the most hands on part of the internship. They had prepared small scale tests for all of us to run so we could get a feel for what went into quality control for HHI ships.

The final week we spent at the University of Ulsan learning about Korean culture and touring the campus. The naval architecture school at UoU has a brand new building and a new testing facility along with a fairly new turning tank. They are committed to becoming a top naval architecture school.

We were at HHI from 7:30-5:30 Monday through Friday and took cultural tours on Saturdays, but the rest of the time was left to us. Some things to do in Ulsan include walking around downtown and going to Club Orange at least once. We also went to an Ulsan Hyundai Tigers soccer game.

One of my favorite memories from the trip

was doing morning exercises with the shipyard workers. Every morning, just before 8 AM, everyone, whether they were engineers, welders, secretaries, or vice presidents would gather with the people in their division and go through about a ten minute warm up routine. If I could bring back one part of the culture to where I work, this would be it. It helped get the blood flowing in the morning and also seemed to encourage company unity. Overall, I think my time at HHI was very rewarding and I had a great time.



Doug Rigterink at HHI

The Student Global Experience Challenge

In the wake of donors' enthusiastic response to the President's Challenges for Need-Based Undergraduate Scholarships, and Graduate and Professional Student Support, UM President Coleman has announced a new Challenge for international learning. Known as *The Student Global Experience*, the program helps donors leverage gifts that enable UM students to study and learn abroad--experiences that will help them succeed in a complex globalized world. Contact Kay Drake (kdrake@umich.edu) for details.

Hyundai Heavy Industries Internship **by Alyson Dunklin**

I enjoyed having the opportunity to travel to Korea with nine other University of Michigan Naval Architecture and Marine Engineering students. We spent one month in Korea learning about the culture and Korean shipbuilding. The first three weeks of the program were at the Hyundai Heavy Industries shipyard in Ulsan and the last week of the program was at the University of Ulsan.

Hyundai Heavy Industries Shipyard

At HHI, we spent a week in each of the following divisions: shipbuilding, engine and machinery, and research and development. We listened to presentations about HHI and the work that is done in each division. Then, we toured the shipyard where we learned that there are nine dry docks at HHI and that 90 ships are delivered each year. We also learned that HHI is a global leader in shipbuilding because their work is continuous and because they have become very efficient at building their main products including container ships, bulk carriers, LNG carriers, and LPG carriers. In addition, we learned that HHI's shipbuilding capability is limited by space and crane capacity.

My favorite experience

from the internship was being able to board the Cosco Africa, a 10,000 TEU container ship. We went in the bridge, learned about the instruments, and were even able to blow the horn. We also went in the engine room and saw the huge 12 cylinder Man B&W engine. In addition, we went in the steering gear room and were able to see the rudder stock rotate as we turned a knob for steering the rudder.

My second favorite experience from the internship was taking the elevator to the top of one of the Goliath cranes (900 t. lifting capacity). In addition to walking around on top of the crane, we were able to go inside of the crane operator's room.

In the research and development division, our time was divided between the Hyundai Maritime Research Institute and the Hyundai Industrial Research Institute. At HMRI we began our tour in the model shop. Then we went to the tow tank and were able to ride on the carriage for a model test. We also saw the cavitation tunnel and the water channel. In the cavitation tunnel, a strobe light made it possible to see the vortex coming off of the hub cap and the bubbles coming off the blade tip of a cavitating propeller. In the water channel, we participated in a team activity to see which team could achieve the greatest heave motion of a cylinder. While we were at HMRI, an inclination test was in progress and we learned

that it takes 2 to 3 hours to set the weights correctly on a model for an inclination test.

At HIRI we took a tour of the structure and vibration lab. Following this, we performed a Vick's hardness test, saw a tensile strength test, and saw a bending strength test. We examined the microstructure of steel: base metal, heat affected zone, and weld metal. We also listened to a presentation about blasting and coating. Then we put on protective gear and blasted and painted steel.

University of Ulsan

Our last week in Korea was spent in the School of Naval Architecture and Ocean Engineering at UoU. On Monday we took a tour of the campus and listened to a presentation about shipbuilding in Korea. We saw the school's square basin for maneuvering tests. On Tuesday we learned about the history of Korea in the morning and did Taekwondo in the afternoon. Wednesday was spent in Kyeong-Ju where we went to a temple and a museum.

On Thursday morning we learned about Chung Ju-Yung, the founder of HHI, and on Thursday afternoon we went to the temple, Tongdosa, for a temple stay. After orientation and a temple tour, we ate a formal meal. Then there was Buddhism worship. We went to bed at 10:00 p.m. and woke up at 3:00 a.m. There was more

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Buddhism worship in the morning including 108 prostrations. Following the Buddhism worship, we ate breakfast and learned about traditional tea time manners and making pottery.

Cultural Activities

Although most of our time was spent in Ulsan, we had the opportunity to travel to Andong, Busan, and Seoul. In Andong we saw a traditional Korean village called Hahoe Folk Village. The houses were still inhabited and had an open courtyard in the middle and rooms on the outside. We learned that 70% of Korea is mountains. In Busan we went to the Beomeosa temple. It has 360 rooms/buildings. There were many piles of small rocks underneath a tree at the temple. Koreans believe that if you stack stones up step by step, your dreams will come true. When we left the temple, we stopped

by Haeundea beach. Then we returned to Ulsan for the Hyundai Ulsan vs. FC Seoul soccer game.

At the end of our trip, we traveled to Seoul and stayed at the International Seoul Youth Hostel for two nights. We went to a couple of markets, the Seoul National Museum, the war memorial, and the Seoul tower. We also went to the Han River and to the Congress Building.

Internship Review

I learned a lot from the HHI employees through their presentations and shop tours. All of the presenters were very knowledgeable and willing to answer questions. I also learned a lot from the other UofM students and the UoU students. Having the UoU students with us in the shipyard was very beneficial. They were able to translate for us what the HHI employees were unable to say in English. The Korean students traveled to Andong and

Busan with us but I would have liked to spend more time with them outside of the shipyard.

My experiences in Korea have encouraged me to work harder to learn the material covered in my classes. Seeing the application of the material has been motivating and has given me a better understanding of what I am learning.



Alyson Dunklin with Thomas McKenney, Peter Bartlett and Doug Rigrterink



University of Michigan and University of Ulsan at HHI Internship

By Lauren Kemink

In July of 2008, University of Michigan's Naval Architecture and Marine Engineering Department and Ulsan University's Naval Architecture and Ocean Engineering Department collaborated to provide an opportunity for ten Michigan students to visit South Korea's Hyundai Heavy Industries (HHI), considered by many to be one of the preeminent shipyards in the world, delivering a new ship about every four days. The trip was split between three weeks touring the Hyundai shipyard and one week at Ulsan University, where the students participated in cultural activities and attended lectures.

The opportunity provided for the Michigan students in this program will be remembered and drawn upon throughout our professional careers and our outside lives. In addition to expanding our engineering knowledge, we gained a greater understanding of a culture very different from our own. By observing some of the best in the business produce a variety of ships using cutting edge techniques, we saw theory put into action and learned a great deal. Last but not least, we forged new friendships and crosscultural bonds in a way that otherwise would never have been possible.



UM Students taking in the cultural experiences



Taekwondo yellow belts: Lauren Kemink, Alyson Dunklin, and Livia Cohen



Some very nervous looking students, Jason Goldis, Thomas McKenney, and Justin Gillespie at the Dorasan train station, last stop before the DMZ

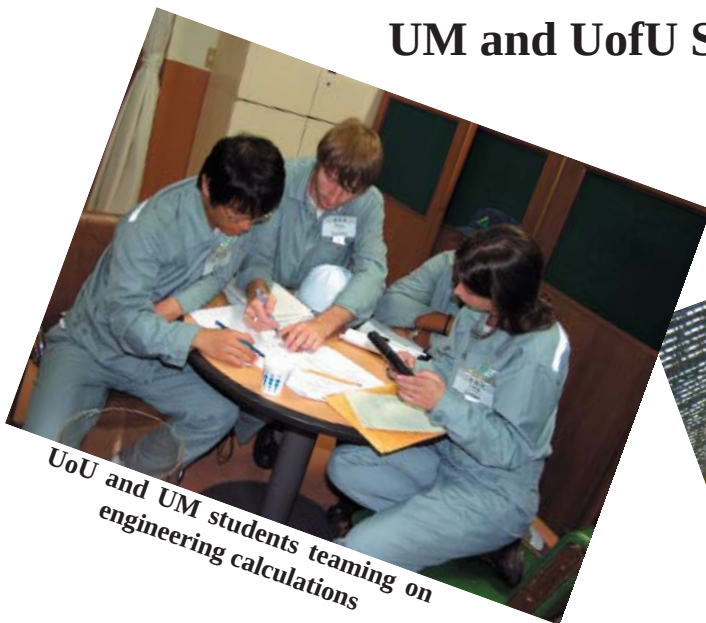


UM students on July 4th celebrating with HHI workers



Peter Bartlett, Livia Cohen, Lauren Kemink, Hwan Eui and Justin Gillespie on a weekend excursion

UM and UofU Students working at HHI



UoU and UM students teaming on engineering calculations



Faculty Advisor David Singer and Prof. I. Park of the University of Ulsan



UM Students on a container ship wheelhouse



UM and UoU students in HHI Maritime Research Institute

Halloween Pumpkins



The Quarterdeck Society organized a pumpkin carving contest for Halloween 2008. The creations were displayed in the department all day, and everyone was invited to vote on their favorite of the approximately 15 entries. It was a difficult choice, because they were all so creative. Here are the winners.

Gingerbread Boat

NA&ME staff entered the College of Engineering Holiday Gingerbread Contest. The results seen here involved approximately 30 woman-hours of work. Not bad for ladies who had never built a gingerbread structure, and who have no naval architecture education. The entry won a certificate for "Most likely to go with the flow."



Bath Iron Works by Nick Bradford



I was an intern for Bath Iron Works (BIW) where I learned about how the entire shipbuilding process works and how different companies must interact to integrate work into one final product. While I was there, I worked with other engineers focusing on performing tasks related to the LCS-2 Independence. The first month of my work was mostly related to completing shock and weight work orders coming from internal changes made to the ship. I was later asked to do naval architecture work related to the ship's fuel consumption and its stability in various damage stability simulations. I also helped support mechanical, safety, and electrical engineers for specific tasks.

During orientation, I heard that I would not be working at the shipyard, but instead at an offsite facility in West Brunswick. This location houses most of the BIW engineers and designers working on one of two variations of the Littoral Combat Ship. The LCS-2 had been launched a few weeks before I began work and was pierside at Austal's shipyard in Mobile, Alabama. In the first week, I learned that BIW was the primary contractor for the ship, and as such, has responsibilities for the other subcontractors: Austal, BAE, CAE, and GD-AIS. Austal had designed and produced the hull, BAE has installed packaged mission and communications systems, CAE integrated automation systems, and GD-AIS designed core mission systems and conducted testing of various systems. All of these companies are located in different states or outside of the US.

My first assignment (called weight or shock work orders) was weight analysis. Some of the work

orders I could complete in less than an hour, while some took a few days to analyze. I was given internal change work orders that involved adding, deleting, or relocating one or multiple pieces of equipment or foundations. I compared the described change to the Master Equipment List. I also completed similar work orders for shock analysis. Each piece of equipment on the ship is given a shock grade dependent on whether it is vital, in a manned space, or in proximity to something that is vital. In the event of an underwater explosion, something that is vital is required to function properly during and after the explosion. To complete a shock work order, I would check that it had been given the correct shock grade and that vital equipment was not too close to equipment that would cause it to fail due to a shock event.. I estimate that over the summer I completed 60 weight work orders and 85 shock work orders.

Also, I regularly helped two naval architects doing work related to the performance of the ship with calculating different displacements, damage conditions, and fuel ranges. My first work in this area was to confirm a computer program's results of the ship's fuel range, given a particular displacement and speed. Austal had developed this program and used model test results to determine its resistance and speed capability. The fuel efficiency was determined by the specifications of the generators and engines provided by the vendors. I used the same input conditions for displacement, speed, resistance, and fuel consumption to estimate the range of the ship and compared it to Austal's program.

I also conducted stability analyses. I used HydroMax to determine the stability of the ship in various damage cases and displacements. The Navy had previously received a damage stability report and was concerned that it did not take into account the diesel exhaust piping being flooded. This is a reasonable concern, since the exhaust is below the allowable flood line. I had to account for the added damage by using the 3-D model of the ship to estimate the floodable volume of the piping that they had specified. I then added the weight of water and its centered location into HydroMax and

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reran the damage cases. I later had to repeat this to meet additional concerns coming from NAVSEA.

Near the end of my internship, I had the opportunity to travel to Austal's yard in Mobile and see the ship. The week before, I compiled a list of electrical panels that had been installed. Some had not been installed as specified, so I had to compare

a build materials report to what was in the product specifications. This was a new experience for me since I had not previously done any electrical engineering analysis. I was also able to get onboard the ship. This was important to me because I was able to see the work that had been done on the ship and how I was contributing to its progress.

Summer Internship: Pacific Marine Environmental Laboratory (Seattle, WA) by Erin Bachynski

Through a Hollings Scholarship with the National Oceanic and Atmospheric Administration (NOAA), I spent twelve weeks working for the Pacific Marine Environmental Laboratory (PMEL) this summer. For the first two weeks, I participated in the summer mooring cruise aboard the *R/V Oscar Dyson* in the Bering Sea. During the rest of the summer, I worked at PMEL in Seattle, designing a system of moored instruments to obtain real-time bottom temperature measurements for the Bering Sea during the winter.

My experience on the *Dyson* provided background in the equipment and conditions for my design project and also made me realize the importance of engineering for the marine environment. Nothing, it seems, ever goes according to plan. After several days of delays in Dutch Harbor due to radar problems, we steamed north toward the

first of several mooring locations where we intended to collect the winter subsurface moorings and deploy the summer surface moorings. Chain moorings with one to three railroad wheels as anchors are lined with instruments to measure ocean characteristics such as temperature, salinity, current speed, chlorophyll, and some even listen for whale calls and look for schools of fish. During the winter, subsurface



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moorings without any real-time data communication are used; the summer moorings include surface floats that measure weather data and communicate real-time with PMEL via Iridium satellite technology. When we arrived within five miles of the first mooring location, the area was too ice-covered for the *Dyson's* reinforced hull to get there.

As the cruise went on, the schedule continued



to change based on new difficulties and weather conditions. We were able to recover some of the moorings, others weren't found (presumably they were dragged by ice or fishing vessels); some deployments took a few hours during daylight in calm seas, others took all night in rolling waves; finicky equipment would work fine for a day and then suddenly cut out due to the cold weather. Despite all the troubles, however, I enjoyed the sights and education I received at sea.

Upon returning to Seattle, I undertook the

project of trying to communicate real-time bottom temperatures from the Bering Sea during the winter. The fisheries and NOAA have an interest in knowing when the bottom water reaches a particular temperature during the early winter months because the timing of pollock development appears to vary based on the temperature. The first design went into the field this September (2008) and will be recovered by the fishing fleet before the ice onset in December. For the "quick" design, a subsurface mooring contains the measuring equipment and an acoustic modem. A surface mooring nearby is constructed from rope rather than chain and only holds an acoustic modem to receive the data and an Iridium Short Burst Data modem to send daily emails to PMEL. The fishing fleet will pick up the surface mooring by cutting the rope near the surface while the subsurface mooring will remain until spring, recording data internally. I helped identify the components for the mooring, budgeted and procured needed items, checked buoyancies and weights, and programmed the acoustic modem and Iridium modem system.

In the long term, NOAA cannot rely on the fishing fleet to pick up a surface mooring every December. I designed a second generation mooring system for future development depending on the success of this year's deployment. The same subsurface mooring with acoustic modem would communicate with a "master" buoy on a separate mooring. An initial surface float, connected to the master buoy by radio frequency cable, would communicate with PMEL until the ice rips the surface float away. The master buoy would continue to collect data and periodically release a "pop-off" buoy to communicate with the surface. These "pop-off" buoys were designed to knock against the ice until an opening would permit them to reach the surface. This design required considerations of cost, buoyancy, deployment and recovery, communication between the master and "pop-off" buoys, environmental forcing and fouling.

Although this design may seem unsophisticated, our experimentation and research determined that there is no good method of determining the presence of ice from below. In the end, this design proved

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to be the most economical and feasible option.

I truly enjoyed my experience this summer and feel that I learned a great deal about design for the marine environment – and all the complications of working in the real world. I had a terrific adventure in Alaska and the Bering Sea and I enjoyed working with the scientists and engineers at NOAA to come up with a feasible solution to a very interesting problem.



Erin Bachynski

Bay Shipbuilding Internship by Tera Herman



My first on site internship was at Bay Shipbuilding (BSC), located in Sturgeon Bay in northern Wisconsin. I had never been to a shipyard before, so I had no idea what to expect going into the summer. One question they asked me during my interview was if I was afraid of heights and if I could climb a ladder. I immediately knew this would be a great summer!

It was a great benefit to see all stages of the designing and shipbuilding process and also to become friends with several of the workers.

In the summer of 2008, Bay Shipbuilding had four contracts in all different stages of design and construction in addition to a constant stream of diverse repair jobs. Of the four barge contracts, the first (pictured below) was under construction when I arrived in the beginning of May, and was undocked

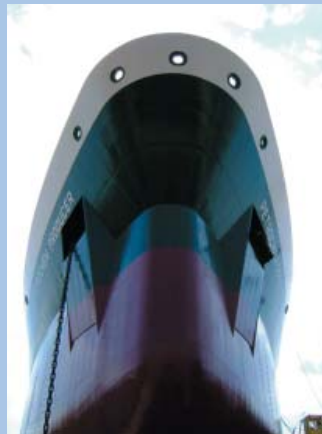


Figure 1. A barge built by Bay Shipbuilding for US Shipping, about to be undocked for the final finishing stages and testing.

and delivered to the owner by the end of August. I was able to see the entire building process of the second barge. The construction of the third barge began near the end of my visit. The fourth barge contract was

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Trinity Yachts Internship by Michael Policastro



I would highly recommend my internship experience to others who are interested in working in the superyacht industry or in the ship design field. Trinity is currently the largest builder of custom yachts in the United States and has two yards on the Gulf Coast, one in New Orleans and one in Gulfport, MS. They have the capability of delivering steel or aluminum yachts with sizes up to 110 meters and five decks. The larger of the two yards is in Gulfport, the location of my summer internship experience.

At first I was a bit nervous about living in Mississippi for the summer, however, I was pleasantly surprised with Gulfport. Both the engineering experience and the social experience were positive.

One of the nice features of my internship was that the engineering building is located in the same facility as the yard. This is a significant benefit because it allows the designers and engineers to walk down to the yard at any time, watch the

construction, and speak with the builders. The educational value of an experience like this is hard to overstate. The people who build these yachts have, in most cases, been working for the company for many years. They have the practical knowledge to confirm whether or not a design is producible. The office is medium sized, with approximately 40 people working in the engineering building. About 15 are engineers and the rest are designers.

Another benefit of working for a smaller yard developing a smaller product is variety. At Trinity, there were approximately 25 yachts under construction during the three months of my internship. The yachts were all at different stages of development ranging from preliminary design to sea trials and being prepared for delivery. Both semi-displacement and displacement as well as steel and aluminum vessels were represented. As a result, I was able to work on almost any stage of design or production, and had the opportunity to learn about several topics that interested me.

Interns at Trinity are generally encouraged to do a bit of work with everyone. I worked for one Project Engineer on a preliminary design for a brand new 16 ft. aluminum semi-displacement yacht. I was responsible for developing the hull lines and the body plan of the yacht, ensuring the machinery would fit into the envelope of the hull and enable the yacht to make speed, calculating hydrostatics, damage

and intact stability numbers. It was nice to get a chance to apply all the theory I learned in class. The design was almost completely in my hands from the very start, which was very exciting and a little intimidating at the same time. However, the engineers and designers were very supportive.

Under the guidance of the project engineer, I became comfortable in no time and learned a lot. I eventually developed the design so that I could present it to upper-management for the initial approval. Following this, the design was sent for tank testing at MARIN. It was extremely satisfying when I received an email from my boss with a video showing the hull that I designed achieving contract speed at MARIN.

In addition to the engineering experience, I had a great time socially during the summer. All the interns at Trinity live at the yard in air-conditioned trailers. Additionally, Northrop Grumman Ship Systems is only about 15 minutes away, and they generally have a lot of interns that are socializing and looking for nightlife in the same area.

Overall, I felt that this was an invaluable experience and I would recommend it to others.

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mainly in the design process with the beginning of some fabrication and will be erected next summer

Several of my assignments were to draw design updates: designs that had minor changes that I would update and redistribute. There were also opportunities for me to be creative and to make design suggestions and drawings. One of my larger projects was figuring out where lifting pads would go on each supersection that the giant 200T gantry crane could connect to and lift into the 1100' dry dock for erection. I also designed over 20 types of ballast pipe supports needed in various configurations to best fit the pipe.



Figure 2. This ramp, designed by intern Tera Herman, allowed for a method to move materials over a series of pipes.

Another design, shown above, was a grating ramp that crossed over a series of pipes which made it easier to traverse and wheel material over.

To fabricate a bow section, they have to put what will eventually be the top, face down, due to the rounded surface. But in order to do the necessary outfitting and to attach the bow, they must use cranes to flip it over. For this, the overhead gantry crane was assisted by a crawler crane, in the picture to the right.

Interning at BSC has been one of the most

unique and exciting experiences in my academic career. Learning about the entire building process has increased my knowledge in the naval architecture field.



An overhead gantry crane and a crawler crane are used to flip the bow section.

Football on the Waterfront

By David Cho, Candice Nickollof and Mark Van Wingerden, summer co-ops from University of Michigan, Code 250. Originally ran in the Puget Sound Naval Shipyard and Intermediate Maintenance Facility's publication, Current.

Personal Protection Equipment is standard on the waterfront, but it's not all that often you will find a football helmet in the Shipyard. This helmet, a gift for USS MICHIGAN (SSGN 727), became the focus of three of PSNS & IMF's co-ops' summer project.

The Co-Op Program helps to recruit college students by bringing them on as summer employees and in return helps with their college tuition costs. Co-ops come from multiple colleges across the country, one of which is the University of Michigan (U of M). David Cho, Candice Nickollof and Mark Van Wingerden are three of this year's summer co-ops from U of M working with Code 250. Cho is studying civil engineering and is entering his senior year; Nickollof and Van Wingerden are both studying naval architecture and are entering their junior year.

Cho, Nickollof and Van Wingerden were tasked to help MICHIGAN with a special project. The boat had been given a game day football helmet and autographed football from the U of M through a small group called the 727 Club, which was set up in the state of Michigan to help deck out the boat with a little taste of home. The helmet was signed by members of the U of M football team and presented to the boat's Commanding Officer, CAPT D. H. Kuhlmann, during one of his recent visits to the state. Along with the helmet and football, the boat was presented with other various memorabilia, including State of Michigan and University of Michigan flags, several banners and a hockey helmet from the university.

To show off and properly display the football gear, Cho, Nickollof and Van Wingerden were asked to design a display case on board the ship near the crew's mess. Those who tasked them with this assignment felt it only fitting that current U of M students design such a "school spirit" related display box. After visiting the ship several times to take measurements and get a feel for what was wanted, they went to work with Shop 17

under the supervision of Namon "Goldie" Singleton to design and build the components of the case.

The back of the case was cut from stainless steel and features bright yellow letters recessed into the steel proudly stating the phrase "Champions of the West" taken from the university's fight song. Shop 17 also built a false bottom out of aluminum that would display the helmet at an angle. They covered this aluminum in fake turf to mimic a football field. The Shop 64 Sail



MICHIGAN Commanding Officer, CAPT D.H. Kuhlmann, with Candice, Mark and David, PSNS & IMF summer co-ops from the University of Michigan, following the completion of the case they created on the ship to house the autographed U of M football helmet and football. (PSNS & IMF photographer Bill Sparks)

Loft also sewed together a removable cover for the case to protect it when the ship comes in for maintenance.

The case was presented to Kuhlmann by the co-ops Monday Aug. 4, in a brief ceremony held in the crowded hallway outside the mess hall.

"It's great when the ship gets to connect with its home state," said Kuhlmann. "Every time we go back to the Michigan area, they've just been wonderful. We have close ties with the athletic director from the University of Michigan—he's the one that actually arranged to have this stuff sent to us—then working with the Shipyard to actually get some interns from U of M to put them together in a display case really ties it all in nice."

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When asked if he was actually a football fan, he said absolutely he was. Though, as he went to the Naval Academy, Michigan does “stomp” his alma mater every few years; however, he added, “Everything Michigan is good.” Jim VanAntwerp, Code 200 Engineering and Planning manager and U of M alumnus, toured the ship and had the opportunity to view the display case.

“We’re hoping this project will enhance the summer experience for these students and help with their decision to return for long-term employment,” he said.

Aside from a sincere thank you to everyone involved in making this project happen, Cho, Nickollof and Van Wingerden feel the project was a great and impacting experience that allowed them the opportunity to represent their university “in a way most students never think about.”

This past fall, the 2008 Alumni Society Merit Award for Naval Architecture and Marine Engineering was awarded to Mr. Bruce Rosenblatt, past president of the firm established by his grandfather and father, M. Rosenblatt & Son, and currently President, Rott, Inc.

Bruce has been one of the most energetic supporters of both our department and the College of Engineering. In addition to being a 10-year member of our department’s National Advisory Board, he is a former member of the College’s Alumni Society Board of Governors and has served as Honorary Commodore for Quarterdeck.

We also want to thank him again for his funding of the Lester Rosenblatt Seminar Room in our department on behalf of his grandfather, father and NAME Professor Emeritus Harry Benford.

Four years ago, Bruce accepted an Alumni Society Merit Award from our department on behalf of his father. This is the first time in the College’s history that both a father and son have been awarded the Alumni Merit Award. Well done and well deserved, Bruce!

Professor Beck delivers the 31st Weinblum Memorial Lecture this past November in Hamburg

These lectures honor Georg Weinblum, a twentieth-century scholar and researcher, professor of naval architecture at the Technical Universit   of Danzig, of Hanover, and of Berlin, director of the Institut fur Schiffbau at the University of Hamburg. His scientific contributions covered wave resistance theory, maneuvering, ship motions, and hydrodynamics. In his work, he stressed the importance of hydrodynamic forces in evaluation of ship motions in a seaway.

Prof. Beck delivered his lecture November 2008 in Hamburg, under the title Seakeeping Computations in the Time Domain, and will repeat it in Spring 2009 at a site to be announced. Meanwhile, we acknowledge the distinction of the Weinblum lectures, and congratulate Prof. Beck on being chosen for the honor.



Esteemed Alumni, future and present:
Jim Bretl (PhD 2009), Steve Kemp (1969) Harry Benford (1939) Ashish Sarkar (1971) and James Sandison (1971)



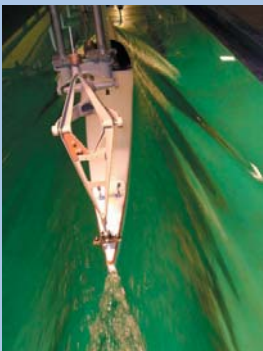
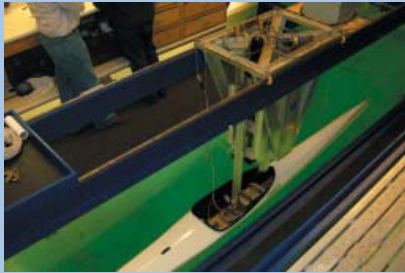
Bruce Rosenblatt, his wife, Jan, and son, Daniel, with Linda Troesch, and Kathy Benford

Olympics Come to Michigan Engineering

When Dr. Scott Riewald started scouting facilities in which to conduct drag testing on Olympic hulls, his father suggested he contact the University of Michigan's Marine Hydrodynamics Laboratories. Scott's father, who graduated from Michigan Engineering in the sixties, was aware of the MHL from his days on campus. Scott, who is a performance technologist/biomechanist with the Performance Services Division of the US Olympic Committee, works with all Olympic Sports to help identify "critical factors" that may be limiting their performance. The idea was to test whether an improvement could be made in the drag characteristics of rowing, canoe and kayak hulls by changing the surface characteristics of the hulls. With this in mind, Scott contacted Dr. Guy Meadows, the Director of the MHL, and soon after met with him at the USOC Facility in Colorado Springs to discuss the possibilities of testing in Ann Arbor.

Everyone involved, including an energetic group of NA & ME students and MHL staff, were enthusiastic about the opportunity to help the US improve their performance in the Beijing Olympics. In no time, a plan was in motion, and a student project was developed to test a full-size, racing kayak hull in support of the US Olympic team. Fourteen students from Naval Architecture and Marine Engineering volunteered their time for testing and a test matrix was designed by then Associate Director of the MHL, Hans VanSumeren, and executed by the MHL new Assistant Director, Tim Peters, with substantial additional input from drag reduction experts Professor Perlin, Professor Ceccio and graduate student Brian Elbing.

An Olympic class kayak was delivered to the



MHL and tested for over a week in the Physical Modeling Basin. The hull was drag tested with the

current "race finish" and nine separate additional finishes, some never intended for actual use according to the International Olympic Rules. The results of the tests were then relayed to Scott and the USOC.

The US "Men's-8" Rowing Team prepared their hull according to the best acceptable results found in the



MHL test report and captured a Bronze medal in Men's Eight. The team cut 4 seconds off their best time from the previous year's world championships in which they placed 4th. Congratulations to the US Olympic Rowing Team and all the staff and students at the MHL that helped with the testing!

The rest of the story.....Through this connection to the US Olympic Committee, University of Michigan's new Head Swimming Coach, Mike Bottom has become very interested in the MHL and its capabilities. Recognized as one of the finest swimming coaches in the world, Mike Bottom returned to the collegiate coaching ranks when he accepted the reins of the University of Michigan men's swimming and diving program on June 10, 2008.

Bottom brings a wealth of collegiate and international coaching experience to the pool at Michigan.

He has coached at each of the 11.5

Coach Bottom is also well connected to Speedo, the makers of the lowest drag swimming suits currently available.



Mike Bottom

Relating affordability and performance metrics in a multidisciplinary conceptual submarine design optimization. Chris G. Hart and Prof. Nickolas Vlahopoulos

(This next article describes a research project funded by the US Navy. This is a PhD/MBA student and ex-Navy Demolition Expert who earned a Bronze Star with Valor for service in Iraq Ed.)

A geometric model for the internal deck area of a submarine is created, and resistance, structural design, and maneuvering models are adapted from theoretical information available in the literature. Commercial cost estimating software is leveraged to create a sophisticated, automated affordability model for the fabrication of a submarine pressure hull. These five implementations are tested, validated, and compared using a commercially available gradient-based optimization algorithm, a particle swarm optimization (PSO) solver, and a simple sequential Monte Carlo model as the drivers for single discipline optimizations. The results from these tests represent the “best” of which are used as the benchmark optimization statements in the latter part of this research. The deck area, resistance, structural, maneuvering, and affordability models are then synthesized into a multidisciplinary optimization statement reflecting a conceptual submarine design problem. A multidisciplinary design optimization

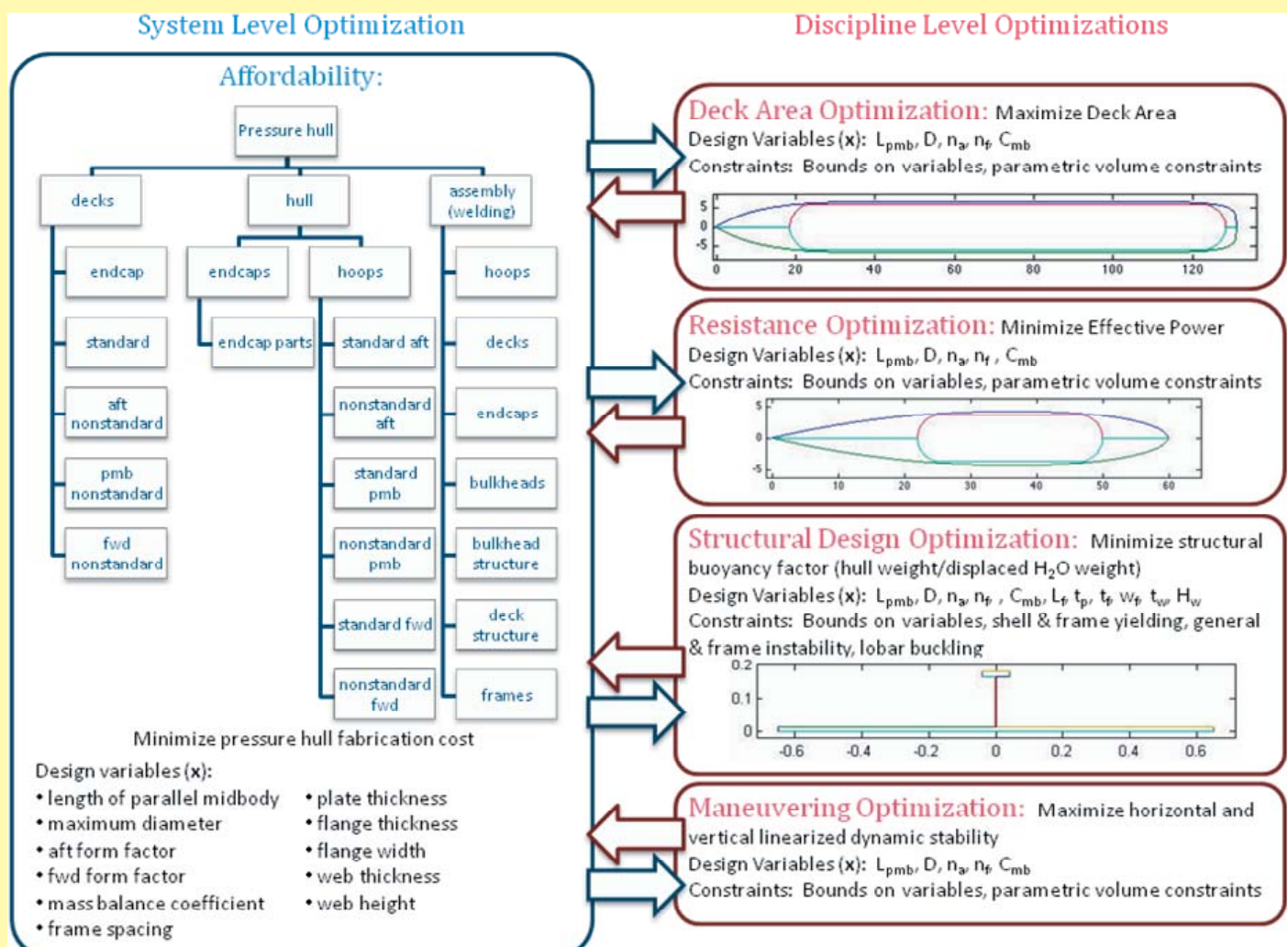


Figure 1: Schematic of conceptual submarine design MDO process for affordability

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(MDO) framework utilizing the Target Cascading (TC) method with integrated gradient and non-gradient based optimizers is then used to analyze the problem. The results, with emphasis on defining the complicated relationship between performance and affordability metrics, may be determined and related to conceptual submarine design.

The main objective of this work is to build a foundation for increasing the understanding of the multifaceted relationship between affordability and engineering performance in the conceptual design of a complex engineering system. Secondary objectives include creating a sophisticated, automated affordability model of the fabrication of a component of such a system using commercially available cost estimation software, investigating the integration of gradient and non-gradient based optimization algorithms in the solution of a MDO problem statement, and solving classical problems particular to the conceptual design of naval submarines.

The first model created in Chris' research calculates the internal deck area of a submarine defined by a set of design variables. These design variables—length of parallel midbody (L_{pmb}), maximum diameter (D), aft form factor (n_a), and forward form factor (n_f)—have been used for decades in the literature to represent a submarine hull form in the conceptual design phase. The deck area discipline uses parameters such as clearance between the hydrodynamic hulls, 'tween deck height, and bilge height to build the pressure hull inside the hydrodynamic hull and assign the number and location of decks within this pressure hull. The model then uses geometric relationships governing the shape of the cylindrical pressure hull and its hemispherical endcaps to calculate the area of each of these decks. The goal of the optimization of this discipline is to maximize the calculated deck area subject to two parametric volume constraints.

Classical, first order models are used in the resistance, structural design, and maneuvering disciplines. The same volumetric relationships that were created for the deck area discipline are used to constrain the minimization of the resistance and maximization of the linear dynamic stability in the horizontal and vertical planes. The structural buoyancy factor is minimized under constraints in five failure modes, i.e. shell and frame yielding, general and frame instability, and lobar buckling.

The affordability model created for this work engages commercial cost estimating software to produce a sophisticated approximation of the financial burden of fabricating the submarine pressure hull. The model is completely automated and takes as inputs only the eleven variables that define the conceptual design problem at a given iteration. As is illustrated in Figure 1, the model is broken down into the costs associated with fabricating the decks and the hull, in addition to those associated with assembling all parts into the entire pressure hull.

Once all models were created and tested using various drivers in a series of single-discipline optimizations, the sophisticated design tool known as multidisciplinary design optimization (MDO) may be brought to bear on the problem. Results from these tests are compared using two dimensional plots with an engineering discipline (i.e. deck area, resistance, etc.) and cost on the two axes. This method of comparison vividly illustrates the relationship between performance criteria and cost. The next step of this work is to replace the classic models for each discipline with higher fidelity models such as CFD, FEA, and arrangement optimization codes. Additionally, the affordability model will be expanded to include the fabrication of the entire system.



Chris Hart and Prof. Nick Vlahopoulos

Alumni News

Chris B. McKesson (BSE NAME 1979) has taken his career in a new direction. After 29 years in various design firms, McKesson has decided to spend some time with the academic community. He recently retired from his position with Alion Science & Technology, and is now dividing his time between the Pacific Northwest and the Gulf Coast.

During the summer Chris and his wife, Debbie, live aboard their 36-foot sailboat in the waters off Washington's Puget Sound. During the winter months Chris serves as an Adjunct Instructor at the University of New Orleans School of Naval Architecture and Marine Engineering. At UNO Chris teaches a senior level elective on Advanced Marine Vehicles – these having been the mainstay of his career. Chris also maintains a small consulting operation, (see www.mckesson.us).

Chris writes that “teaching as an adjunct is a lot of fun, and a great way to ‘give something back’ to a profession that has been very good to me. I encourage any of my colleagues who are looking for a semi-retirement opportunity to consider this avenue.

“I am also very much enjoying being a member of the academic community. The intellectual stimulation is great – so much so that I may have to go to grad school myself, just to catch up!”

ExxonMobil Upstream Research Company **Robert E. Sandstrom**, an alum (1977 BSNAME; 1978 MSE NA&ME; 1979 MSE Applied Mechanics; 1980 Ph.D. NA&ME) and member of our department's National Advisory Board, has been appointed Chief Offshore Engineer by ExxonMobil, a well-known and well-respected firm where he began his career in 1982.

To quote the ExxonMobil announcement: “Over his 26-year career, he has provided a blend of technical and practical expertise in the offshore technology area. He brings an engaging and creative approach to resolution of technical issues and development in new technology.”

Back in Ann Arbor, there are those who know him as a member of the NAB (since 1996) and others who remember him from his career in Ann Arbor as our student. Congratulations Dr. Sandstrom!

Our alumnus, **Bryant Bernhard**, has become president of United States Marine, a Gulf Coast builder of fast patrol boats and other special operations craft for the US military services. The company is located in Gulfport Mississippi and New Orleans, and employs over 200 people.

Bryant has over 18 years of experience in the building of small craft, having held management positions with Wellcraft Marine, Genmar Corporation, and Swiftships.

He is a mechanical engineering graduate of the University of Houston, and was with us for graduate work and was awarded his MSE in 1990. We wish him well in his new position.



Professor Woodward receives Rosenblatt-Michigan Award at UM Alumni Banquet 2008 SNAME Annual Meeting, Houston, TX

If it were anyone else, we would be saying many praiseful words about his long career, his love of animals and small children, about the rose petals we would like to strew at his feet, and... well, there's always plenty of clichés that can be dredged up when a situation calls for them. In this case a daunting conflict: he's also the Nautilus editor, ablush with modesty as he gropes for nice words about himself. So skip all that BS, okay? What we print, following, is simply the brief biographical sketch that he recited when the award was given.

His justification for talking about himself was the realization that he has never said anything about his career at Newport News Shipbuilding, 1949 – 1960. He also claims significance in that story beyond his personal adventures in that he is one of the very few survivors of an attempt to introduce atomic power to the American merchant marine.

An edited version of his account follows:

I enjoyed a satisfying career of approximately 35 years as a professor of NA&ME. But that followed an earlier career that began in 1949 at Newport News Shipbuilding, and reached its climax when I received a PhD degree in Ann Arbor, 1965. That earlier career, of which I suspect you know nothing, is my topic, offered because it featured some significant activities that I would like to publicize.

1. Building the great transatlantic liner United States. I spent every working day aboard that ship for two years, with the climax being the delivery voyage to New York.
2. In 1952, I, with five comrades, was sent by Newport News to a school in Oak Ridge, Tennessee, to learn the essences of what I'll call "Atomic Power Engineering." One year, no degree, but the equivalent of a MSE.
3. The shipyard intended to become a builder of A-powered naval vessels, and it indeed became quite successful in that field. Toward the end of my Newport News career in 1960, I worked at the building of nuclear submarines. There are some tales from that adventure — but not to be repeated here.
4. My most remarkable experiences came during NN's brief fling with the then-popular concept of an atomic powered merchant marine. A ridiculous idea, that, but it was one quite at home among the then-current notions of atomic locomotives, atomic airplanes, and out on the really lunatic fringe, the atomic automobile. Idiocy! Fatuous Folly!

Even though the Navy made a success of nuclear power, those words describe the efforts to apply that success to commercial ships.

Yas, idiocy and fatuity! By 1960 I saw those words being written against my name, and not wanting to retreat to a career of being a slave chained to the Navy's nuclear oar, I quit, all to surface on the saner

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(continued from page 29)

planet called “Ann Arbor.”

Since then, however, a hobby: compiling a history of that idiocy and fatuous folly: i.e. the effort by our Maritime Administration to introduce atomic power into the struggling American merchant marine.

Tidbits of A-power’s history:

First. A president of SNAME, speaking in the late fifties: The atom is so potent that propellers cannot be used, and so we’ll have to employ some form of jet propulsion. (not verbatim)

Second. A president of SNAME, speaking in the late sixties: I recommend that MARAD build a stockpile of at least 50 atomic reactors so that it will be able to meet the coming demand for atomic ship propulsion plants. (not verbatim)

Third. An official of MARAD, speaking in the mid seventies: By the year 2000, 200 ships of the American Merchant Marine will be atomic powered. (close to verbatim)

All of the above are condensed and paraphrased from published literature. I can furnish journal citations upon request.

And fourth: Enough! Weren’t there any voices of reason? My research finds only three names of men whose published work expresses doubt about the blessings of the Atom upon our merchant marine.

Men, yes, they were all men. And lo! They share another thing: their faces look out upon us from the walls.... Walls, where? A familiar hallway, and within 35 feet of the door to Armin Troesch’s office! Holders of degrees in NA&ME, earned through arduous study at U-know-where!

So who were they? You might guess two of the three, but.... Come to Ann Arbor, ask me, and I’ll take you on that 35-foot tour to point out all three. (Never mind. Their names are given a few paragraphs hence.)

And entertain you with the 10,000 or so additional words that I know you would enjoy hearing.

So spoke the professor at the Houston affair. For readers of Nautilus, the identity of the three doubters follows, with references to their published doubts

Mark Ireland (BSNAME 1927). House Committee on Merchant Marine and Fisheries, hearings on Vessel Replacement Program, May 10-13, 16-18, 1955.

Harry Benford, Nuclear Tanker Economics, a report of the University of Michigan Engineering College Industry Program, Ann Arbor. (But his most critical remarks came later in discussions of papers by other authors. See the 1960s SNAME Transactions for many examples.)

John B Woodward, in a discussion of Cecil B Ellis, 1957, Fluid-Fuel Reactors for Nuclear Merchant Ships, Transactions, Society of Naval Architects and Marine Engineers, vol 65.

Recent Happenings at the Marine Hydrodynamics Laboratories (MHL)

(From Guy Meadows, Director of “The Tank”)

Tim Peters replaces Hans Vansumeren as Associate Director of the Lab. Tim has a BSE in NA&ME (2008), and a BS in ME Technology (2006).

Field work continues in Alaska as part of the North Slope Science Initiative, a consortium of oil companies, government organizations, and native peoples. It's purpose is to investigate the effects of mineral extraction and natural change on North Slope fresh water lakes.

The Grand Traverse Bay Observing System (GTBOS) continues to expand with a new MHL-designed-and-built buoy to be launched this fall. Buoy #2 will be launched in October at the entrance to the bay, and also will be fully automated. (Buoy #1 is near Traverse City).

A new coastal survey vessel has arrived at the MHL in a joint effort with LS&A. Our trusty Grady White 22-footer has been replaced by a new Parker 25-ft survey vessel with enclosed cabin for housing computers. The new vessel will be used in the Great Lakes Archeology Project funded by NSF with Prof. John O'Shea of LSA, looking for remains of the Great Lakes Ice Age natives who occupied this region 8,000 years ago as the last glaciers were retreating. Their hunting grounds are now under 150 feet of Lake Huron water.

MHL, in the persons of Prof. Ryan Eustice and Dr. Lorelle Meadows, continues to teach an intensive two-week summer course on advanced aquatic sensors. The site is the UM Biological Station on Burt Lake (near Petoskey).

Model testing continues at a feverish pace, concentrating on pleasure boats in the 30 to 200 ft range.

A new DARPA project on Autonomous River Reconnaissance with Michigan Technical University with Dr. David Lyzenga, Dr. Chris Romans of the University of Rhode Island and Prof. Ryan Eustice. This project has investigated the possible development of a fully autonomous vehicle to map above and below water regions of tropical rivers.

Testing of the U S Olympic kayak with student involvement during the summer of 2008.

Dr. Apoloniusz Kodura, a visiting scholar from Poland, worked at the MHL last summer on cavitation research, with the objective of treating ballast water by that phenomenon.

Visit of Christine Sadler (granddaughter of founder Herbert O. Sadler). (A social visit — no professional implications)

Confessions of a word wedger

Fresh back from the annual SNAME meeting (Houston this year) the recipient of the Rosenblatt-Michigan Award uses his power as *Nautilus* editor to print his pontifications as pronounced when he was given that award. Like his words were somehow important because the Rosenblatt-Michigan Award was invented solely for him. Actually, he was 17th in line for the award, and a review of the files shows that all of those previous recipients have gotten the shortest of shrifts from Mr. Present Editor. Curse his careless ego!

Anyhow, hoping to make up for the neglect of earlier years, we give you the following list of the previous recipients of this honor:

1992	Lester Rosenblatt - '42
1993	Harry Benford - '40
1994	Hugh Downer - '39
1995	Robert Geary - '63
1996	Thomas Mackey - '63
1997	Michael Parsons - '63
1998	Robert Scott - '59
1999	Edward Comstock - '70
2000	Jeffrey Geiger - '83
2001	Robert Keane, Jr. - '70
2002	James Fein
2003	Robert Sandstrom - '77
2004	John Daidola - '72
2005	Joseph H Comer, III - '80
2006	William L Hurley, Jr - '76
2007	William H Garzke, Jr - '60

Letter to the Editor

Dear Editor,

The Spring/Summer 2008 issue of the *Nautilus* arrived recently. It brought back many memories of my time there before graduating in 1960. I thank you very much for the opportunity to reminisce a bit about the two giants in the NAME Department, Benford and Couch.

I arrived as a transfer student from a small Midwestern college in the fall of 1957. Dick Couch arrived about the same time and started off teaching some of us, and alternating with Harry Benford for some classes dealing with hydrodynamic aspects. For my next three years they were a constant presence in the high ceilinged drafting room on top of the building. George West was my helpful advisor, but I think Harry and Dick added even more useful comments into my developing mind. H.C. Adam's strong personality was tempered by Harry's gift of humor. John Couch was there too, with his father nearby watching him develop his skills.

Later on in my career as a Marine Engineering Supervisor at General Dynamics Quincy Shipyard who should appear but Dick Couch as my boss

and friend. We were designing a floating military supply ship called FDL. One day Dick toured my team of draftsmen's boards and arbitrarily increased the size of the propeller by a foot. That caused havoc among 200 engineer's paperwork and calculations. I was pretty upset. But he was the boss and I knew he was probably right. We lost that bid, but not because of a propeller that was too small.

Jim Moss, from my class, developed under Dick Couch's guidance, into a leader in the Towing tank revitalization. I paid for time in the tank for tests on another General Dynamics design of a destroyer. Dick helped on that project too. Jim and I remained friends for many years until his untimely death on business in New Zealand. George West also died early, in a plane crash in Long Island Sound while enroute to General Dynamics Groton for a meeting.

But Benford is still at it, and I offer my congratulations to him for his work and inspiration. I can still recall him saying "Brockman! what are you up to?" . Thank you Harry.

Dan Brockman BS NAME 1960.
Barrington Illinois

CALLING ALL ALUMS AND FRIENDS OF NA & ME

-Do you have news to share? career? family?
your latest adventure?

We would love to hear from you.

-Would you like to be a guest columnist in the
Nautilus?

We would love to discuss your ideas.

-Would you like to receive the
Nautilus electronically?

Please contact Kay Drake at kdrake@umich.edu
or 734-936-7636



Jing Sun was promoted to Professor of Naval Architecture and Marine Engineering, with Tenure, Department of Naval Architecture and Marine Engineering, and Professor of Electrical Engineering and Computer science, without Tenure, Department of Electrical Engineering and Computer Science, College of Engineering. Prof. Sun is recognized

widely among the automotive, aerospace and marine industries as one of the leading experts in the country in the area of adaptive control. She has demonstrated an exceptional capacity and productivity in all areas of teaching, research and service. Congratulations, Jing!

Paris Genalis



We do love to print personal news of/by/from our alumni, but not obituaries. Nonetheless, this sad duty arises.

To the infinite regret of those who knew him, Paris died at age 66, on June 30, 2008 in Annapolis, Maryland, of natural causes. His time at Ann Arbor was the 1960s: he marched through the decade to BSE, MSE, and PhD, the last coming in 1970. He also earned a professional degree in NA&ME from MIT.

A scholar, indeed, but your editor — who was also a student in Ann Arbor during the sixties — remembers him as handsome, jovial, friendly, and the word “dashing” also comes to mind (though I can’t really define that last term).

Sixties... good grief, we’re talking half a century here, a circumstance I’ll have to use as an excuse for not being able to cite any anecdotes from my association with Paris in those ancient days.

My diversions in the sixties were centered on canoeing, often in the northern reaches of the Lower Peninsula. Maybe he was one of my enthusiastic followers, but... But again, I just can’t remember the details of those happy days. (Happy days? Maybe we’re just talking weekends here.)

Yes, maybe. I would be greatly pleased if any reader can remember such revels, and can refresh my memory. Paris was a happy person in happy days, and even if details never turn up in our behonored *Nautilus*, I would like to be reminded of them.

Our condolences go to the families and friends of our recently deceased alumni

Ralph G. Bauer, BSNAM 1948, passed away 10/17/08

John Robert Taylor, MSE NA&ME 1972, passed away 12/1/05

Roger G. Kline, BSNAM 1957, passed away 10/30/08

Dan Henry Walters, BSNAM 1950, passed away 3/2/08

Robert B. Matson, BSNAM 1948, passed away 11/21/07

John E. Bodkin BSNAM 1947, passed away 2/7/08

Louis Occhetti, Jr., BSNAM 1940, passed away 8/15/08

Walter C. Cowles, BSNAM 1942, passed away 7/28/08

Robert Paul Werner, BSNAM 1951, passed away 3/8/08

Heino Oskar Valvur, BSNAM 1951, passed away

Donald Rae Hudson, BSNAM 1949, passed away 6/14/08

Paris Genalis, BSNAM 1963, MSE 1965, Ph.D. 1970, passed away 6/30/08

(also a valued member of our National Advisory board)



Mule Loop 12-08

Who's thinking about Nautilus when he's out on the mountain top with Bisbee's Mule Team, a bunch of... well, you're looking at them, and if JBW is pleased to run with them, they must be okay, dontcha think?

Yas, it's a hike in the Mule Mountains, a bit of high-and-lumpy terrain that surrounds the town of Bisbee AZ, and the leader, who is always a fast man with his camera, says "Hey everybody, we gotta take a group picture in front of the Christmas Tree."

Meanwhile, it really is Christmas Eve, even in the shadow of the Mule Mountains, so be Merry and happy, and all that stuff.

Jack Woodward

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