

CHALMERS

TraineeReport 2006

Chalmers Engineering Trainee Appointment Committee

41th Annual Issue



THE CETAC 2006 MAP

André Kelkkanen
ROTHENBUHLER
ENGINEERING

Henrik Toss
JDSU

Fredrik Ohlsson
CORNELL UNIVERSITY

Anders Sandberg
RODALE ELECTRONICS
INC.

Marcus Johansson
FAST SEARCH &
TRANSFER

Marcus Christiansson
SUNNEX INC.



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SEDRO WOOLEY, WA

BOSTON, MA

ITHACA, NY

NEW YORK, NY

ST. AUGUSTINE, FL

SAN FRANCISCO, CA

Dan Härdfeldt
VMWARE INC.

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ATOOS, LLC

Johan Gustafsson
AUSIM INC.

Johan Bengtsson
RO ASSOCIATES INC.

Andreas Lidholm
NET

Rikard Larsson
AMERDEN INC.

Ahmad Amer
AMERDEN INC.



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CETAC WAS FOUNDED IN 1966 and is a student committee at Chalmers University of Technology in Gothenburg, Sweden. The goal of the committee is to make practical training in the United States possible for students in the fields of Computer Science & Engineering, Electrical Engineering, Engineering Physics and Information Engineering. During the school year preceding the summer of training the members of the committee contribute in different ways to finance and plan the trip, find trainee positions, and obtain visas, etc.



In the beginning of June this year the plane with the members of CETAC 2006 finally left Sweden for the big adventure. After a first stop for a week in New York, they scattered for their different trainee positions all over the United States. A period of interesting projects and new experiences followed. Some stayed just for the summer while others will stay for up to eighteen months. This summer was the start of many new friendships and an exposure to another way of life. Before going back to Gothenburg to complete their studies many of the members travelled to see other parts of the enormous and diverse American continent.

Per Hjortsberg, one of the appointment managers in the committee was sadly in last minute unable to join the other members on the trip. He would like to thank Rodney Alvarez and Andrew McKay at FAST for their understanding, and he hopes to be able to join the company next summer instead.

The Trainee Report that you are now holding in your hand is a summary of the experiences made by the members of CETAC during the summer of 2006.

Happy reading!

Johan Gustafsson
Editor-in-cheif



The board of CETAC 2006, from the left:

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- André Kelkkanen, Treasurer
- Henrik Toss, Director of Advertising
- Per Hjortsberg, Appointment Manager
- Dan Hårdfeldt, Appointment Manager
- Johan Gustafsson, Editor

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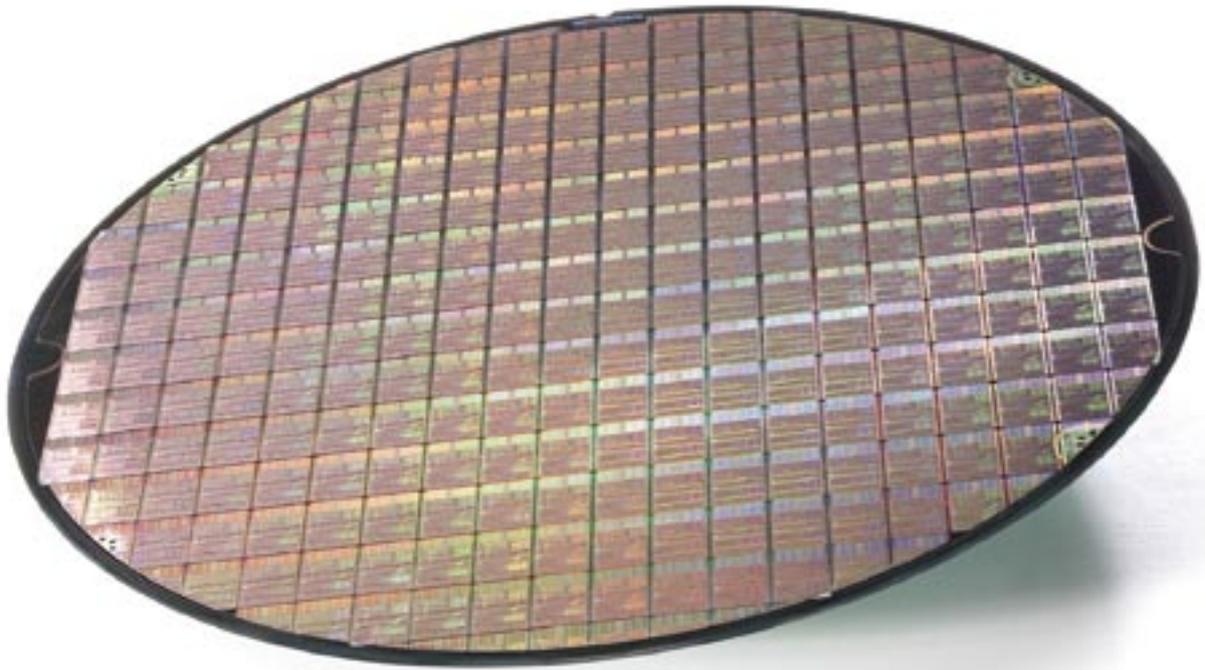
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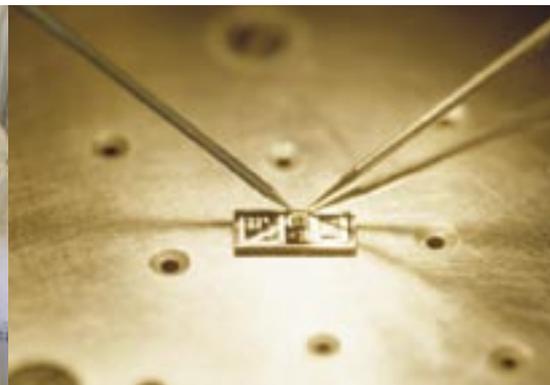
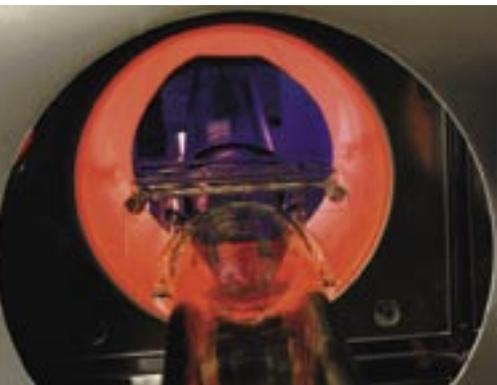
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Vill du praktisera en sommar i USA?

Varje vår antas en ny styrelse och nya medlemmar till CETAC. Är Du intresserad av en erfarenhet och upplevelse för livet? Håll då utkik efter anslag om antagningen till CETAC 2008!

CETAC

CETAC är en ideell kommitté vars syfte är att ordna kvalificerade praktikplatser i USA för studerande vid civilingenjörsprogrammen Datateknik (D), Elektroteknik (E), Teknisk Fysik (F) och Informationsteknik (IT) på Chalmers Tekniska Högskola. Kommittén har funnits sedan 1966, och sedan dess har hundratals chalmerister fått möjligheten att åka iväg till nordamerika för att göra praktik. Medlemmarna i CETAC har alla studerat i minst tre år på Chalmers då de reser över till USA, vilket garanterar de amerikanska företagen en hög kunskapsnivå hos teknologerna. Själva kommittén består endast av teknologer, som både förmedlar praktikplatserna och ordnar med alla praktiska detaljer i samband med resan. För detta samarbetar vi med The American-Scandinavian Foundation. Vår verksamhet är helt beroende av ekonomiskt stöd från svenska företag.

Praktik i USA eller Kanada

Våra amerikanska arbetsgivare är av skiftande storlek och natur. Medlemmar i CETAC har under åren arbetat hos företag som till exempel Siemens, NASA, Apple, Intel, Microsoft, Silicon Power Corp, Merlin Engineering Works och SUN Microsystems. Vi lägger stor vikt vid att praktikplatserna är kvalificerade ingenjörsarbeten. I regel varar praktiken åtta till tolv veckor men en del stannar i upp till ett år. Är man i slutskedet av sin

utbildning så kan man till och med få möjlighet att göra sitt examensarbete i USA. Praktiken ger inte bara goda arbetslivserfarenheter, utan dessutom ett värdefullt kulturellt utbyte.

Medlemskap

För att bli medlem i CETAC skall du studera på D, E, F eller IT, samt vara svensk medborgare eller ha permanent uppehållstillstånd i Norden. Vid ansökningstillfället måste du även uppnå minst 50 poäng på din utbildning, och under det kommande året uppnå sådana studieresultat att du är studiemedelsberättigad. CETAC är föreningen för dig som är motiverad och beredd att lägga ned tid och engagemang för att få ut något extra av din studietid.

Att söka styrelsen

CETAC 2006 kommer under läsperiod tre att söka medlemmar till styrelsen för CETAC 2007. Den nya styrelsen antar sedan ungefär 25 nya medlemmar under period fyra. Styrelsen består av sex personer. Ordföranden organiserar arbetet, håller kontakten med the American-Scandinavian Foundation och hanterar visumansökningarna. Kassören lägger upp en budget, deklarerar och fakturerar företag vid annonsförsäljning. Efter vistelsen i USA skriver alla var sin reseberättelse. Dessa sammanställs sedan i vår tidning, Trainee

Report, som du nu håller i din hand. Redaktören har till huvudsaklig uppgift att utforma tidningen men framställer även broschyrer, affischer och andra trycksaker. I styrelsen ingår också en annonschef som administrerar bidragsinsamling och annonsförsäljning samt två jobbchefer som kontakter amerikanska företag och letar efter lämpliga arbetsgivare.

Att vara medlem i CETAC

Medlemskapet i CETAC bygger på såväl personliga arbetsinsatser som arbete i grupp mot ett gemensamt mål. För att kunna finansiera resan till USA och andra omkostnader samlar man som medlem in bidrag och säljer ett antal annonsplatser i Trainee Report. Annonsförsäljningen inleds på hösten med en resa till Stockholm. Under denna resa besöks intressanta företag där medlemmarna får presentera både sig själva och CETAC. CETAC har ett brett kontaktnät med företag, vilket medlemmarna kan utgå ifrån under annonsförsäljningen. Under hösten anordnas även en säljkurs och en CV-kurs för CETAC:s medlemmar. Att vara medlem i CETAC är ett stort engagemang men det ger samtidigt en unik möjlighet till en givande avlönad praktik i USA eller Kanada och många nya vänner från både den egna och andra sektioner. Så ta chansen och sök du också!

Tag gärna kontakt med oss om du har några frågor!

www.cetac.se - info@cetac.se

The logo for CETAC, consisting of the word "cetac" in a stylized, lowercase, orange font. The letters are rounded and connected, with a slight shadow effect.

A BITE OF TH



People say that you have not really been partying, dining or shopping until you have done it in the city of cities, New York. So when the well-known illuminated skyline slowly emerged in the night through the hazy windows of an airport bus, time had come for the members of CETAC to do all that...



THE BIG APPLE is a city of constant change. Thousands of restaurants and stores open and close every year. New people move in and others move away at an incredible pace. What a few years ago was a back street with junkies might now host a trendy sushi restaurant. When you walk between the high skyscrapers you feel small and let's face it: you are. New York is like a world of its own and you can find all kinds of people here.

EXPECTATIONS WERE HIGH when we arrived in the big apple a rainy day in the beginning of June 2006. Traditionally the CETAC members always spend about a week together in New York before spreading all over the United States for their different trainee positions. We all stayed at the Gershwin Hotel, at the corner of 27th and Fifth, just a few blocks from the Empire State Building. It was a bit expensive like most things in New York. The rooms were somewhat worn down and it took three engineers to get the shower to work every time but the place also had its advantages like the great location and the cool 60's and 70's party pictures that covered the walls.

THE FIRST DAY started off with an American breakfast at one of the delis that you can find in almost every street corner. You immediately felt as if you stepped into a scene from Seinfeld. After breakfast our exploration of the city began. Walking is a great way of experiencing the city as most things are crammed together on the narrow southern part of

Manhattan. If you would be a bit short of time you can always just stop one of the yellow cabs and go for a cheap taxi ride. The first day we saw the bright gigantic billboards of Times Square and relaxed for a while in the lung of the city, the huge Central Park. We also had time for some lunch on the Upper East Side before returning to the hostel.

FOR THE FOLLOWING DAYS we split up into smaller groups and all explored the city from our different interests. Some went shopping and others to do sight-seeing. Most of us went to one of the numerous Broadway shows. I saw the long-runner Phantom of the Opera, which was a great musical. The beautiful décor and the scene changes that took place in a split second were also very impressive.

THE GUGGENHEIM MUSEUM is another thing that I can recommend to check out while in the city. This is a well-known modern art museum that usually hosts



THE BIG APPLE

BY JOHAN GUSTAFSSON

some interesting exhibition, but just the building itself is worth a visit for its bold architecture. It looks like a pile of white cylinders stacked on each other, larger at the top than at the bottom.

ANOTHER MUST-DO is of course the Empire State building, the highest building in New York since 9/11. Watching the sunset and the breathtaking views from the observatory on the 86th floor was amazing. Floodlights illuminate

the top of the building at night, in colors chosen to match seasonal and other events, such as Christmas and Hanukkah.

WHEN NIGHT HAD FALLEN it was time to check out the night life. A couple of nights was spent in the meatpacking district, known to currently be one of the best club-spots in the city. This was always a good time and some of the guys somehow even got into PM one night. This is known to be the best club in meatpacking and many celebrities are known to hang out there.

A GOOD WAY TO START the day after a night out was to have a walk through China town and have lunch at one of the restaurants. There you got a cheap and usually quite tasty meal although the waiters were not always sure about what they were serving.

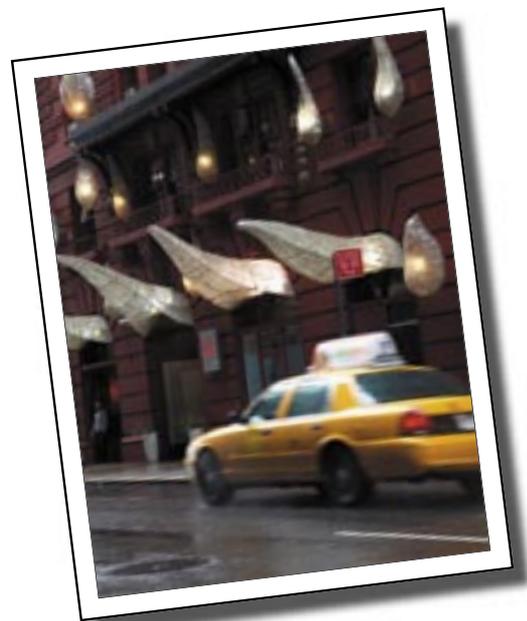
ANOTHER THING YOU MUST NOT MISS if ever visiting the big apple is to go to a talk show. Someone found out that if

you walk casually on one of the side streets close to Times Square you might be asked if you want free tickets to the recording of the Late Show with David Letterman. The word soon got around and by the end of the week almost everyone had been to a show. This was interesting and the night I went Elvis Costello was performing. Although the view we had from the balcony was more of spotlights than of the stage.

AT THE END OF OUR NEW YORK VISIT CETAC and our sister-committee USAk had a meeting with the American-Scandinavian Foundation at the classy Scandinavia House on Park Ave. We were informed about all practical things regarding our internships. Tony Svensson from Invest in Sweden Agency had an inspiring speech and we finally had a great lunch. The afternoon was spent on a Circle Line boat going all the way around Manhattan.

THE THING THAT I got to appreciate the most about New York is definitely the diversity of the different neighborhoods. You literary got everything within walking distance. You could be in pulse at Wall Street in the morning, having lunch in China town and catch a jazz concert in Harlem at night. After a few days you had already found your own favorite spots, like hanging out at a small cozy café in little Italy.

THE WEEK WAS OVER WAY TOO QUICKLY and we all soon had to leave for our different destinations in the United States and a summer filled with new experiences. But I am sure many of us soon will be back to take another bite of the big apple. ■



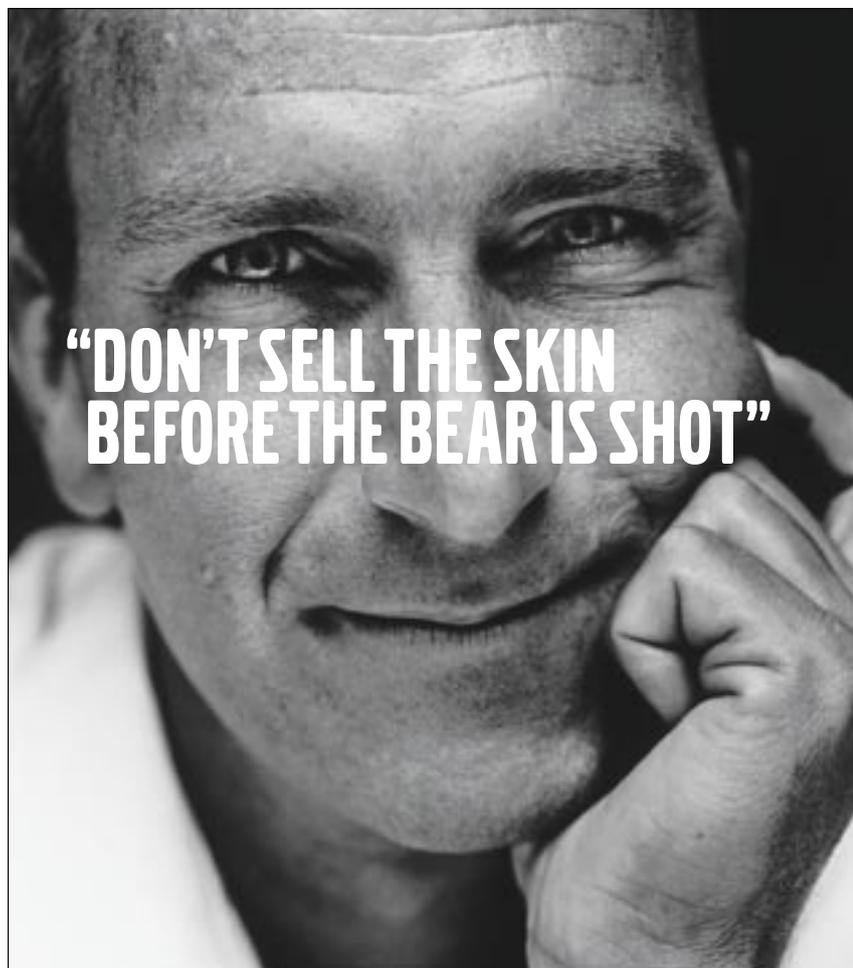
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Även om uttrycket kom till i en helt analog värld har det aldrig varit mer relevant. Vi om någon borde veta, vi arbetar med såväl etablerad som den senaste och mest avancerade teknologin för hantering av komplexa informationssystem. I vår helt digitala värld vet man inte om man löst ett problem förrän man sett att det fungerar i praktiken. Och försäkrat sig om att man inte skapat ett nytt problem någon annanstans.

För att lyckas med detta behöver man en hel del kunskap. Det hjälper också med en stor mängd erfarenhet. Inte bara av datorer, utan även av den industriella process som man är ute efter att effektivisera. Det vet vi, våra kunder är ofta globala, tillverkande företag. Inom det området är vi en ledande IT-leverantör.

Men hur – kanske du undrar – kan vi vara så själv-säkra? Bra fråga, med tanke på att vårt svenska ursprung manar till fullständig ödmjukhet. Tja, det råkar vara så att skinnet hänger på vår vägg.

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Coordinator: mikael.fogelstrom@mc2.chalmers.se

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Coordinator: piotr.starski@mc2.chalmers.se

Microtechnology

The area of Microtechnology represents one of the future industrial growth fields in Europe. In this programme students acquire a knowledge base demonstrated by the possibilities to design and package micro-devices and systems in the MC2 cleanroom facility. This knowledge is crucial for bridging between research results and the design of new products. The students will upon completing the programme understand fundamental challenges and issues in physics, electrical engineering, mechanics and materials science related to this subject. The programme is manifested by a large degree of hands on laboratory work and "design and build" exercises in many courses throughout the programme.

Coordinator: johan.liu@mc2.chalmers.se

Further information

Master's Programmes at Chalmers:

www.chalmers.se/en/sections/education/international_master/programmes

Dept of Microtechnology and Nanoscience, MC2: www.mc2.chalmers.se





ME AT WORK

Both work and play in California

I am currently working as an intern at NET (Network Equipment Technologies) in Fremont, CA, which is a city in East Bay, south of San Francisco.

NET IS A COMPANY that makes products for telephoning. The group I am in is working on a product called VX. This product is a gateway from regular telephone signals to various Voice-Over-IP (VoIP) systems. The idea behind this is that, when you are using a regular phone, the VX collects the call and translates it to VoIP packets. These packets will then be sent via Internet to another VX node somewhere else in the world. This node then translates the packets back to a regular phone call and sends it to the other person's phone. The user can not tell the difference between this way and the regular way of telephone calls, except that it will be cheaper, all you have to pay is for the In-

ternet connection which almost everyone already has anyway. This product is mostly intended for companies since you can use one node for an entire company and it is going to route all calls.

AS I STARTED AT NET, the first tasks I got to do was to fix some bugs and to add some new features for some of their different programs. That was a useful assignment since it gave me an overview of what kind of product it was and how the programs worked. NET is a company that goes well along with my line of education, since it is programming tasks and program development that I am working with here.

ALTHOUGH I REALIZED that the courses that we take in school is not enough to learn everything you need to know when you start working at a real company, but you have a good base to start from. Another interesting part of working here is to see how people are working with software engineering in a team and what they do to optimize the quality of the products.

FOR EVERY UPDATE of the product, two persons have to review the code and accept it if it looks good or reject it or make a comment if it is not clear how that code is supposed to work. This is

something that I was not used to since I had not worked in a larger software development team before. But it is easy to see why this is necessary to do.

NET IS AN INTERESTING COMPANY since it has many qualified people working here. People here know a lot about everything that is work related and also almost everything in the technology world. One thing I was not really expecting was that so many of the employees were from other countries than the US. Here are people from countries like New Zealand, South Africa, India, Canada and Great Britain. But so far I have not noticed any big cultural difference. ■

ANDREAS LIDHOLM

Age:
24

Majoring in:
Computer Science & Engineering

Best US experience:
Visiting a friend in St. Louis

NET

Employees:
~230
Hosting Trainees:
2002, 2004, 2005 and 2006
Business Area:
Network equipment vendor

Web site:
www.net.com

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Aros Electronics utvecklar och producerar kundanpassad industriell elektronik. I dag är vi 75 anställda och omsätter ca 95 miljoner kronor. Aros ingår i IRO-koncernen som är världens ledande tillverkare av garnmatare till textilmaskiner. Vår kundkrets består av ett antal större svenska och internationella industriföretag.



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WORKING ON A DC TO DC CONVERTER TO FIND AND PREVENT EMI (ELECTRO-MAGNETIC INTERFERENCE).

6 months on Long Island

After one week in New York City with the CETAC crew it was time to leave Manhattan and proceed to Long Island, that would be my neighborhood for the next 6 months.

I PICKED UP MY RENTAL CAR and drove to West Islip, that is located one hour east of Manhattan. I was amazed by the heavy traffic, but it got better as I got further away from Manhattan.

I RENTED a very nice, just renovated, studio from my landlords Stephen and Susan. It was located on the first floor in their house. The house turned out to be in a nice and quiet area, a typical American middle class residential area. The first thing I did was to visit the not so unknown furnishing store in the area – IKEA, since the studio was only par-

tially furnished. I bought a bed, a wardrobe and two chairs without thinking how I would get the things home with me. The bed mattress turned out to be a bit too large for my SUV, but with a lot of help from an IKEA worker I did manage to squeeze it into the car.

ON MONDAY MORNING it was time for my first day at work. Because there is no public transportation I needed to drive there which usually takes about 15 minutes in rush-hour traffic. The company I would be working for the next 6 months is Rodale Electronics Inc. It is a rather small company, about 20 employees of which 4 are engineers. The rest are purchasers, accountants, assembly staff etc. They develop and manufacture electronics warfare systems, mostly for the US Department of Defense but also a number of foreign governments including Canada, UK, NATO, Norway, Australia, Thailand, Switzerland, and Sweden. Rodale electronics works with a lot of different solutions involving radar related systems. They have for example developed and manufactured radar jamming pods, threat radar simulator pods and also radar simulators.

RECENTLY THEIR MAIN TASK is to produce a handheld display/keyboard unit, which is manufactured for the US Army. With the handheld unit troops are able to send/receive coded text messages to each other. When I arrived at the company they had just started to develop an AC to DC converter for the US Army. It must be able to manage 120 VAC, 220 VAC or 24 VDC as input voltages and at the same time hold the output voltage constant at 28.5 VDC. The US Department of Defense has formulated a very specific and comprehensive specification that our solution must conform to. The specification contains for example difference tolerances for the different voltages, tolerances at different load changes and efficiency tolerances.

THE FIRST DAY I got a quick tour around the company by Vince Maida, and then I got my first task from Don Ellison. It was to construct a switch that automatically switches over between two states depending on whether the input voltage is 120 VAC or 220 VAC. We tested a few different solutions as the AC to DC converter project proceeded, to determine which was the most suitable for this specific application. I performed a lot

ANDERS SANDBERG

Age:
25

Majoring in:
Electrical Engineering

Best US experience:
The road trip to Washington DC
and Niagara falls.



ME AT SIX FLAGS GREAT ADVENTURE, NEW JERSEY. FAR AWAY IS THE 139 METERS TALL ROLLER COASTER - KINGDA KA.



ME BY NIAGARA FALLS.

of the measurements for the different solutions, with the help of digital oscilloscopes and a digital spectrum analyzer. We have also developed and manufactured two test sets, which will be used in the development phase, and also for testing of the finished AC to DC converters. As I am writing this, the development phase is almost finished and soon the next phase will begin – to produce the first items. Those items in the preproduction phase will be thoroughly tested in accordance with the specifications we have received from the customer. The serial production starts after the testing is successfully completed. Manufacturing, assembly and serial production testing are all performed by Rodale electronics own assembly staff.

I OWE all at Rodale Electronics a great thank you, not only for giving me the best work experience yet, but also giving me a chance to discover the American lifestyle.

WHEN I WASN'T AT WORK I tried to see as much of the surroundings as I could, I would often take the train to Manhattan. At first I was surprised about how much the culture changes between different areas in Manhattan. Manhattan offers a large variety of things to do; walk among thousands of tourists at Times Square, taking the elevator to the top of Empire State building, relaxing in Central Park etc. A nice beach on Long Island was a comfortable place to be at, especially when I felt like getting away from the summer heat. Long Island is well-known for its beaches that stretch along the entire 160km length of the south shore.

I TOOK A ONE WEEK vacation when my girlfriend visited me and we decided to take a road trip. We packed our things and headed down to Washington DC. We arrived at our very centrally located hotel by midnight, it was located only 3 block away from the White House. The following

days we spent by walking around and visiting different monuments and some museums. The hours proceed very fast in places like the National Museum of Natural History, National Museum of American History and National Air and Space Museum. We were amazed over how large everything was both the houses and the monuments. In the evenings we took the bus to Georgetown, since the downtown area consists almost only of museums and monuments and closes early. Georgetown is a picturesque district of Washington with a lot of nice restaurants.

AFTER A FEW DAYS in the capital of the USA it was time to continue our road trip. We then headed for Niagara Falls. The American highways are boring, so we decided to drive on the smaller and more interesting roads towards Niagara Falls. We learned the hard way that the roads we had chosen would make our journey take longer than we had expected, but the landscape was very nice. We passed both farming districts and the Appalachian mountain ridge. When we finally entered the town of Niagara Falls we did manage to smuggle the rental car over to Canada. It is from the Canadian side that the falls really show how impressive they are. The falls are a lot larger than I expected. It is a powerful feeling to stand only 2 meters away from the edge and both see and feel the water as it passes over the edge of the falls.

ONE IMPORTANT STOP on the way back to Long Island was Woodbury Common Premium Outlets, which is the largest outlet village in the New York



VIEW OF THE WHITE HOUSE SEEN FROM THE WASHINGTON MONUMENT.

area, with over 220 stores, including brands such as Tommy Hilfiger, Calvin Klein, Polo Ralph Lauren and etc.

TO BE GIVEN THE CHANCE to work and live abroad is a great experience. If you have the chance, don't hesitate to take it, it will be a time that you never forget. ■

RODALE ELECTRONICS INC.

Employees:

~20

Hosting Trainees:

2003, 2004 and 2006

Business Area:

Development and manufacturing of electronics warfare systems

Web site:

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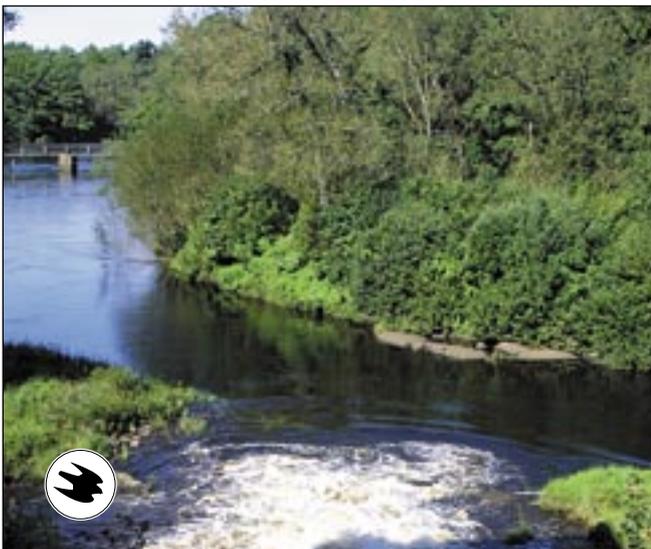
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DEBUGGING THE SOFTWARE IN MY FINAL PROTOTYPE. SOME SAY THE DOG IS MAN'S BEST FRIEND, IT'S ACTUALLY ALLIGATOR CLAMPS.

Trying my wings amongst the eagles in Sedro Woolley

What defines a star? What are its intrinsic abilities? Why are there so many of them on the American flag, and how well does a flag relate to its people?

IT WAS WITH MIXED FEELINGS that I boarded flight CO69 to New York on an early Saturday morning in the beginning of June. Leaving behind the peoples and perspectives known to me, entering the new and unfamiliar, but also the exciting. But how new could it be? In a way, didn't we all grow up in Hollywood? Surely the United States would be second nature to me.

ANDRÉ KELKKANEN

Age:
21

Majoring in:

Electrical Engineering

Best US experience:

Back flipping out of an airplane, for seventy seconds of free fall

ALTHOUGH I KNEW MY PROJECT for the summer would be to construct an antenna, details had been pretty scarce and I was eager to be briefed for further details. It turned out that things weren't particularly specified yet and that I was very welcome to come up with ideas on an antenna that was supposed to fit in a new radio for the logging industry.

A FEW FEATURES WERE MENTIONED, among others the concept of an auto tuneable antenna. For those not familiar with the term, imagine a scenario where you try to tune in to your favourite radio station: You tune the radio and get good reception; they are even playing your favourite song. When you walk across the room, you realize that you can hardly hear the song because of the noise. You go back, just to realize the reception now is great again; the problem might be that you tune your radio to include yourself as an active element in it which we usually don't

want. My mission this summer was to solve that problem for you.

TO DO THIS, I anticipated a need for three parts: one part that tells us about the situation, one part that is able to change our situation and one part that can relate to this and tell us how to get to the

best situation; the need for an ear, an arm and a brain to relieve you in your struggle with the radio if you will. After some research, I found a nice way of constructing a good artificial arm, it is

called an L-network and they are pretty common in adaptive networks. It wasn't very difficult to simulate and after a few days, I had an artificial arm for my project. The next thing to do was to find a way to replace the need for your ears. Here I also managed to find a circuit on the internet that could do the trick; a directional coupler, and things were looking pretty good.

” Doing backflips for 70 seconds in a free fall just beats most things.”

THIS WAS WHERE I SET SAIL for unknown soil. Despite my search for a brain part to relieve you in your struggle, I just wasn't able to find anything useful. After some consulting with my mentor, Rich, I decided this might be done with a microcontroller. In order to program a microcontroller, I dedicated almost a week relearning assembly programming; now I knew assembly, but what would I write? After some days of serious thinking, I managed to get a program to do something somewhat interesting. I now had an arm, an ear and a brain, lying on the floor, doing nothing.

FROM HERE, my project evolves from something anyone would find on the internet to a rather unique circuit. During the rest of my stay, I worked to assemble three different systems into one. I dare say this almost got the best of me, and there were times where I just wanted to turn to the last page and see the right answer. Since this was new ground however, certain chapters hadn't been written yet and there was no page to turn to.

WITH ONE WEEK LEFT, I could proudly test my assembled circuit and finally get some results worth something. Granted it had some ghosts left in it and it sometimes behaved rather strange, but at least it did what I wanted quite often. Since some of the steps in my project are new, the project will hopefully be patented when all those annoying ghosts are removed, and I have been promised to be the author of it.

I WAS ALSO ABLE TO launch quite a few adventures during my stay here. I managed to get quite lost in the woods of Acme once when I was out biking. I climbed a peak called Winchester with Dan and I watched the return of the tide from a shore in Birch bay. I went to Canada with my girlfriend Sanna and enjoyed the greatness of Stanley Park. I enjoyed a concert with my favorite band, Counting Crows, and will probably remember the day I went parachuting for the rest of my life. What can I say? Doing back flips for 70 seconds in a free fall just beats most things.

WOULD LIKE TO THANK RICH for his constant support. Don for his high expectations and for demanding results every week. I want to thank Neal for his support and for providing me with a stage this summer. Finally I would like to thank Kriss and Dan for showing me that there is no need for a chasm between Americans and Europeans, and that most of you are just like us.

"I managed to get quite lost in the woods of Acme..."



MY GREATEST MOMENT IN THE USA, PARACHUTING.



ON TOP OF WINCHESTER PEAK.

SO WHAT'S WITH THE STARS in the "stars and stripes"? Why not circles, squares, smileys or bananas? One thing about Americans is that they treasure their independence. An independent American is a successful American who can pay his insurance, his college and his medical bills. A star is its own system, it provides its fuel, and it doesn't need anything or anyone else. It is the only object in the universe that is truly independent. ■

ROTHENBUHLER ENGINEERING

Employees:

~35

Hosting Trainees:

1999, 2000, 2001, 2005 and 2006

Business Area:

Radio equipment for the logging and mining industry.

Web site:

www.rothenbuhlereng.com



MY WORKBENCH FOR TEST OF PHOTONIC POWER CONVERTERS.

Exploring the power of light in sunny California

Working with Photonic Power, what place could be better than the last place for the sun to set – California?

GETTING OFF THE PLANE at San Francisco International, together with two of the Johans of CETAC, I pretty soon got the feeling that California was my kind of place. A few of us, who would all be working in the San Francisco Bay area, had decided to rent a house together and had found one on the website “Craigs list” just before we left. Our new landlord, Tal, was nice enough to arrange so that we were picked up at the airport by a friend of his and then took the day off to show us around Palo Alto, the city where our new home was located.

IT DID NOT TAKE US LONG to get settled and Tal helped us get the basic furniture, like beds and a refrigerator. Our new neighbors were also very

nice and took good care of “those crazy Swedes” that had just moved in by making sure we had enough furniture and inviting us to a block party.

JDSU IS A pretty big company that has a large variety of products. They are e.g. making a fluorescent color for currency to make them more difficult to forge. They also make different lasers and I would be working in the Commercial Lasers Group, more specifically the Photonic Power Business Unit. As far as I know Photonic Power was, when I started, the newest addition to JDSU having been bought only a year earlier. What Photonic Power is could be described as a solar cell which is constructed to work and be optimal for only one specific wavelength of light. This does not make it a very good power source since the sun has a very wide spectrum. What you use it for instead is to shine a laser with that specific wavelength on it and thereby get a very good effectiveness. Photonic Power has managed to make so called Photonic Power Converters (PPC) with more than 50% effectiveness. On its own, this does not give you anything; you basically put in power into the laser and get half of it out again from the PPC. The twist is when you realize that you can shine the laser through a fiber optics cable and thereby transport power through light instead of the usual copper wire. The advantages of this are many. Through the fiber you get a distortion- and,

almost, loss free power transportation. Where you can have problems with electromagnetic fields and such when using copper, there is none when using fiber. Economically the fiber also presents a better alternative.

OVER LONG DISTANCES I think that this means of transporting power could, and maybe even should, be the future. This opinion is most definitely (and obviously) one I have developed this summer here at Photonic Power. One of my ongoing projects during my first time here was to calculate and look into the differences between using the PPC and the old, conventional method. This was a fun project which gave me insight in both our product and the competing alternatives. It also gave the opportunity to see even more aspects of the matter than just the engineering part since in the real world economics and price seems to always be making the last call.

CALIFORNIA IS NOT only about work though. The San Francisco Bay Area is a very friendly place and the people I have met have all been very helpful. It seems like it's impossible to make a fool out of yourself and making new acquaintances is as easy as walking up to someone and just say hi, no matter where.

HENRIK TOSS

Age:
24

Majoring in:
Engineering Physics
Best US experience:
Venice Beach



GRAND CANYON

A GOOD THING TO KNOW OF, if you ever get an uncontrollable desire to throw a few Scandinavian words out there, is the Young Scandinavians Club (YSC). It is basically a club for people who are young or have ever been young and are Scandinavian/Scandinavian descendants/people who feel Scandinavian. It is a very friendly club, all about having fun (with a Scandinavian twist of course) and they organize events almost every week for the whole summer. It took us a while to discover them (and join) so during the time we were all here in the US we only managed to attend one of their activities. That one was at their cabin by Clearlake, a couple of hours north of San Francisco. We had a great time with happy hours, water skiing, sleeping under the stars, swimming and partying. We also met some really nice people and got to hear about “this drink, they have in Basque country, it’s called Kalimotxo” and that the safest means of transportation is an elevator. Needless to say, whoever of us that stayed longer in the US off course took the chance of hanging out more with the people from YSC.

OTHER THAN LIVING the good life at beaches, bars and Bodeguita (favorite restaurant and Friday night hang out) with my fellow roommates, I took the opportunity to explore the southwest with my girlfriend Anna as my wingman as we rented a Ford Mustang convertible and drove into the sun. When she came to visit I took two weeks off from work and we went on a road trip with Las Vegas as our goal. On our way to and from there we had time to see a lot of stuff. Something I will never forget is the heat in Death Valley, where the air was so hot the wind burned you. The Grand Canyon was also an amazing and fascinating place.



WE HAD A SUPERHERO THEME FOR OUR HALLOWEEN OUTFITS.

Las Vegas is hard to explain, but one way to do it is that it’s like all the playgrounds in the world combined in one place and you will never grow too old to appreciate the fun. Leaving Las Vegas (in a less dramatic way than Nicolas Cage) we went on to San Diego and had time to take a day trip over to Tijuana in Mexico. Going north from there we made a stop in Los Angeles visiting relatives of mine. After that we started to make our way home to Palo Alto taking the famous Highway 1 along the beautiful Californian coastline.

FINALLY I WOULD LIKE to give a great, big thank you to Jan, Marlette, Toral, Ako, TC and the rest of the Photonic team for taking such good care of me during my stay here, making sure I had a good time, not only at work but in my spare time too. ■

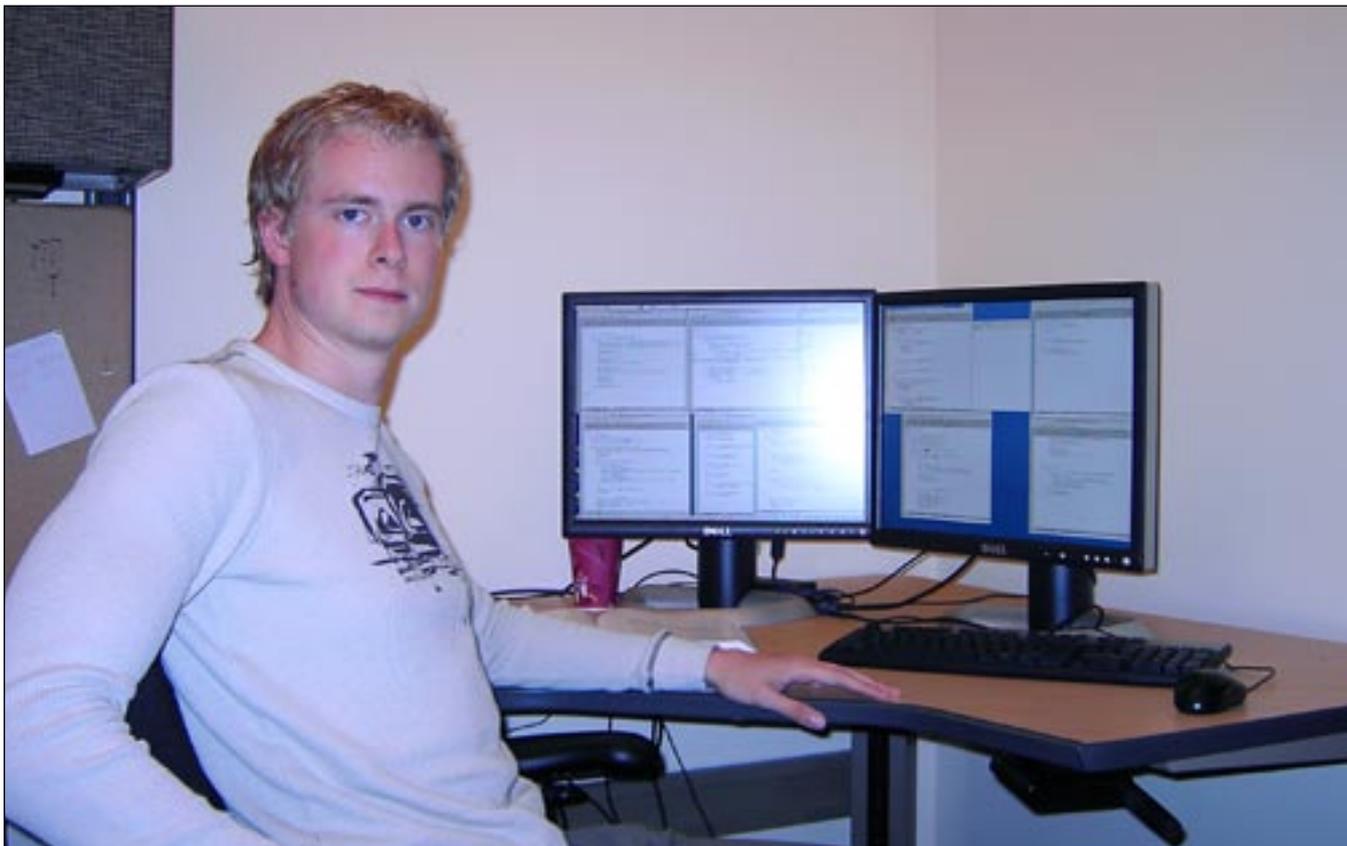
JDSU

Employees:
~7000

Hosting Trainees:
2006

Business Area:
Lasers, Semiconductors, Photonic
Power etc.

Web site: www.jdsu.com



WORKING FOR A WORLD LEADING COMPANY, WHAT CAN I SAY, AWESOME

A California Memory For Life

With great expectation I left Sweden for U.S.A the first time in my life. The first week I was going to spend in New York City.

I HAD HEARD SO MANY beautiful things about this city, but actually it was one of the biggest disappointments this summer. Most likely since I never liked the rush that is often seen in big cities. But sure, it was a nice stay and I don't regret that I visited New York; I just felt it was enough with a week there.

THE VIEW FROM Empire State Building was absolutely fantastic, especially after the sunset with all

DAN HÄRDFELDT

Age:
23

Majoring in:

Electrical Engineering

Best US experience:

River rafting in Yosemite National Park.

the lights from the city – both from the buildings and the many cars. This was definitely a memory for a lifetime. Another unforgettable memory from New York was my visit to 'Late Show with David Letterman'. It was fun to see how and where one of the biggest talk shows is actually created. So even if a week in New York was more than enough, I will most likely go there once again in a few years – since there is a lot of fun to do!

AFTER A SIX HOUR flight to San Francisco and California the time had come to actually start working. It was in eager expectation I entered the Deer Creek office, one of five VMware buildings in Palo Alto, the 12th of June 2006. This building is located a bit outside Palo Alto and the nature here is just lovely. It does not feel like you are in the center of Silicon Valley, it rather feels like you are in the country side. It was in this building I got about half a day of introduction together with compulsory paper work and photographing.

NOW THE TIME HAD COME to visit the Hillview office, or in other words the building were my office

for the next few months was going to be located. This office is quite crowded and many people have to sit in cubicles or in open spaces. But I was lucky and got to share an office! I just had a short introduction with my boss before I was introduced to my mentor. He is one of three members in the subgroup I am part of at the quality assurance department. I was showed around in the building, which seemed like a labyrinth, at least the first few days. The server room was one of the more interesting parts of the building, since I have never been in a full scale server room before.

THE FIRST WEEK I tried to be early at work, about 8 am. But I soon found out that to adapt to the Californian working way, or at least to VMware working way, I had to be no earlier than 10 am. That was when most people actually come to work. And speaking about my first week, I could not have had a better one. VMware was celebrating a huge product release and it was Champagne one day, a movie, 'Cars' at a nearby cinema, another day.



IF THIS TREE IS THIS WIDE, JUST IMAGINE THE HEIGHT OF IT...



LOOKS NICE, BUT JUST A FEW SECONDS LATER THE RAFT IS ALMOST UPSIDE DOWN

BUT EVEN AFTER the celebration week, VMware have provided activities to bring people closer and opened the opportunity to make new friends. One weekly activity is the Friday Beer Bash. Other activities have been baseball, bowling, parties and much more. Foosball and pool is two popular activities that can be played any time of the day, as well as pinball and a few more things. Another thing I found interesting, has been the Tech talks that have been held for interns here at VMware. They have explained different things from products to marketing quite briefly, but it has still given me good basic understanding.

”We had to sign a paper, accepting the risk of being killed “

THIS LEADS TO THE question what I have really been doing here at VMware. I have been working in a group specialized on clustering. The task of the group is to verify that it is possible to run clustering on VMware’s ESX product. Initially much of the testing I performed was done manually. This is really boring in the long term perspective, but needed to verify different test cases – and most of all, it gives a good understanding for the product. I have since a while back started to work on automating things associated with the clustering testing, which requires a more in depth knowledge of the system.

WORKING IS DEFINITELY a great deal of my stay here, but I have also done other things. I have been to the Golden Gate Bridge, Twin Peaks (a

small mountain in San Francisco with a great view over the city) and Muirwoods to mention a few places. One day I went river rafting with 5 other VMware people, most of them summer interns. It was a really great experience. The first time in my life I was going to river rafting – so I didn’t really know what to expect from it.

AN EARLY SATURDAY MORNING we gathered at Hillview 3305 office, for the 3-4 hour journey to Yosemite were the river rafting was going to take place. We took two cars; I was traveling with two other summer interns. It was a really hot day, about 100 degrees Fahrenheit (38C). In the middle of nowhere the air condition broke down – turning the car into a sauna. A few hours later we arrived to a really beautiful place in insida Yosemite National Park.

THE RIVER DIDN’T look big, at that particular place, but they had a five degree system to mark the level of the current. This was going to be a class four trip, where five is the most dangerous they have. We had to sign a paper, accepting the risk of being killed. But they told us that most people did not get injured during the trip! So some paper work later it was time to start going down the river. It turned out to be a really nice trip. A few stops here and there for swimming was really appreciated in the heat.

SINCE THEN I have been to Yosemite once more, with Johan from CETAC and another friend of mine that is working for VMware. We went with one of Johan’s friends from his work. A really nice guy named John and his dog Duke. We arrived to John’s small house around midnight a Friday night. We went up quite early and spent Saturday at the Yosemite National Park. The views there are just absolutely fantastic!

SUMMER 2006 will definitely be in my memory for the rest of my life. California has given me so many different memories, from the beauty of the Golden Gate to the historical experience of Alcatraz. Then there were the fantastic views in Yosemite, together with the huge redwood trees, and not to forget, my work experience at VMware. Thanks VMware for hosting me as a trainee! ■

VMWARE INC.

Employees:
~2000

Hosting Trainees:
2004, 2005 and 2006

Business Area:
Virtual infrastructure software

Web site:
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ME WORKING ON THE TRANSIENT RESPONSE

A Summer in Silicon Valley

After one week in the great city of New York it was time for me to fly across the US to the West Coast where I would spend the rest of the summer. I worked at a company called RO Associates, they are a power supply manufacturer in Silicon Valley. They develop and produce power supplies in Silicon Valley but they also have licensees producing their power supplies in Asia.

MY PROJECT FOR THE SUMMER would be to develop a new 12 Volt version of their popular Microverter 300 series. The features of the series was higher output power, more efficient and hopefully cheaper. It would also have to be lead free and comply to the rest of the RoHS rules.

The specs for the unit was 220-400 V input, 12 V, 300 W output. The efficiency goal was 85% or higher. This would be an increase of the output power of 25% without any additional losses as-

sociated with it. The feedback loop would have to control the output ripple to be as small as possible. During the development I learned a lot and I also got to practically use the theory taught in school. The VP of Engineering at RO, Jack McDonnell, is among other things an expert in designing the magnetic parts of a power supply and he taught me how to apply the theory into practice when designing i.e. a choke or a transformer.

I SPENT A LOT OF TIME READING datasheets for different component to see if they met our electrical and mechanical demands. Even though this series isn't one of their most dense we still had some problems trying to fit everything on the board. There were some worried faces in the drafting department when I told them that we needed to put a few extra components in the most dense part of the board.

DURING MY TIME ON THE WEST COAST I stayed with Mark, who is one of the employees in the engineering department at RO. He has a house in Mountain View about 7 miles from RO, a short

10-15 minutes drive when the traffic isn't backed up. The house was a one story house with a great backyard and a pool, which came in handy especially during the heat wave when the temperatures could reach 110 degrees Fahrenheit in the shade.

ON INDEPENDENCE DAY, the 4th of July, I visited the Independence Day celebrations in San Jose. They had all the usual booths with food, crafts and merchandise. A few artists performed and as a finale, when the sun had set there was a 30 minute, music synchronized, fireworks display. They even had to close down the San Jose airport during the fireworks. The fireworks completely lit up the sky and the sound of the explosions must for sure have been heard all over the peninsula.

MY GIRLFRIEND SABINA came and visited me for three weeks, during these weeks we tried to experience as much as we could. In the end of July there was a Garlic Festival in Gilroy, and Sabina and I went there too see if all the things I had heard about it was true. The strangest thing I

JOHAN BENGTTSSON

Age:
25

Majoring in:
Electrical Engineering
Best US experience:
Yosemite



THE FAMOUS GARLIC ICE CREAM BOOTH



DINNER WITH THE ENGINEERING DEPARTMENT AT TIDI HOUSE

knew about it was that they had garlic flavoured ice cream there.

WHEN WE WERE A FEW MILES from Gilroy we could smell the garlic, and the scent of garlic did not exactly decrease as we got closer to Gilroy but at some point we got accustomed to the scent. To get from the huge parking lot to the entrance of the festival we had to take a bus. Not that it was very far but it was probably easy to get lost among all the cars.

AS WE WALKED AROUND all the different booths and watched as they prepared the dishes we saw just how much garlic they used and we were not surprised that it really tasted garlic when we tried it. After a while we found the garlic ice cream booth, the line was very long but this was an opportunity that probably would not come again, so we stood in line and finally got to taste the famous garlic ice cream. It didn't taste that much garlic but then again our senses were probably numb from the other garlic dishes we ate. We also visited Santa Cruz, their famous beach and the boardwalk, which is an amusement park right on the beach. The water wasn't as warm as one could expect but that didn't stop me from taking a short swim, even though the first wave almost made me change my mind.

ONE OF THE MORE SCENIC places we visited was the 17 mile drive in Carmel. Carmel is a small

town south of Santa Cruz where Clint Eastwood supposedly lives and have been mayor of a few years ago. Some of the things we saw there was the lone cypress, Point Joe and Pebble Beach.

I VISITED FREEMONT and the Indian Festival, Indians as from India, not native American Indians. They had all kinds of different Indian cuisine, art and merchandise. They also had dance and song performance in true Bollywood spirit. I even got to try a cricket batting cage. It was a bit strange to hit a ball at knee height but I managed to hit 3 out of 6 pitches at around 50 mph.

"...we found the garlic ice cream booth, the line was long but this was an opportunity that probably would not come again.."

ME, ONE OF MY FELLOW CETAC friends Dan and Olof, who is another Swede that works in silicon valley visited Yosemite one weekend in the end of August. Yosemite is a state park about 180 miles from Mountain View. We drove there after work Friday and stayed at one of the employees the Engineering department, John. Early Saturday we went to the park. The sheer size of the park is something that is hard to realize when looking at the map, but between the southern entrance to the viewing point of Glacier Point there is almost an hour drive.

WHEN WE ENTERED THE PARK we had been recommended to first stop by the grove where there were some really amazing redwood trees. One of them were the grizzly tree, named by the fact that

it looks like a grizzly bear standing on its hind legs.

THE VIEW FROM GLACIER POINT was magnificent; you could see the Half Dome, the whole valley and a few waterfalls. As we drove home from Yosemite we took a different route home and on the way we got to experience one of those really dead straight roads that seem to go on forever. I must have driven an hour and a half without the slightest turn of the road. This road was very much different from the roads in the park and highway 17 to Santa Cruz where it didn't go 100 feet without a 90 degree turn. After 3 months working in Silicon Valley it's time for me to return to Sweden. During this summer I have gained practical and theoretical experience and knowledge that will be invaluable for me in the future. I would like to thank everyone at RO Associates for making this summer a great experience for me both at work and in my spare time. ■

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THE AMERICAN-SCANDINAVIAN FOUNDATION

THE AMERICAN-SCANDINAVIAN FOUNDATION (ASF) is a publicly supported, nonprofit organization housed in Scandinavia House, which serves as the Nordic Center in America. Our organization strives to promote international understanding and cross cultural exchange between the United States and the Nordic countries.

THE CHALMERS ENGINEERING Trainee Appointment Committee (CETAC) and The American-Scandinavian Foundation began this fruitful relationship in 1980. Since then the Foundation has provided visa sponsorship for Committee members studying engineering physics, electrical, and computer engineering.

WHAT IS THE FOUNDATION'S ROLE you may ask? Well, the Foundation has been designated by the U.S. Government as an Exchange Visitor (J visa) program sponsor for on-the-job training. Any student who wants to train in the United States must have a visa and that is where we come in. The Foundation receives the student's application and the training plan from the U.S. Firm. Once we make sure that the training position is appropriate and meets program requirements, ASF issues the U.S. Government documents that make it possible for students to

come into the United States and obtain this on-the-job training and receive income. Once in the United States the students receive a meaningful training experience and in turn provide the trainer with a highly



motivated, skilled individual who is eager to learn and contribute to the particular company's growth. We at the ASF understand how much work and effort the members of the committee put into obtaining their assignments therefore we try to help in every way.

IT IS NOT ONLY THE PROFESSIONAL growth you experience during your summer in the United States it is also your personal evolution. Year after year, stu-

dents mention on their final reports how much they enjoyed themselves, how many friends they made and how many things and people they got to see and meet. It is fascinating to read about your personal and professional accomplishments during such a short time span. We anticipate this to be a natural consequence of this program and hope that the friendships you make last a lifetime.

IT HAS BEEN A GREAT PLEASURE to work with this particular group because of the infinite energy and zeal they bring to the program. The positive feedback we continue to receive at the conclusion of a student's training program is well worth the effort.

We at the Foundation wish you continued success in your future endeavors.

Tatiana Pashman
Training Program Administrator
The American-Scandinavian Foundation

KTH använder sig av Black Box Extender lösningar!

När KTH skulle bygga om en del av sina datorsalar bestämde man sig för ett nytt koncept. Samtliga datorer skulle flyttas ut från elevsalarna, på detta sätt kunde man serva och uppgradera datorerna utan att störa eleverna. Samtidigt eliminerar man även värmen och fläktljudet från datorerna i elevsalarna och på detta sätt säkras man även datorerna.

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CHALMERS

Chalmers University of Technology in Göteborg on the west coast of Sweden, was founded in 1829 and it is one of Sweden's foremost technology and engineering sciences universities. The university's annual turnover is SEK 2.2 billion (USD 280 million) (2004), two thirds of which is used for doctoral programmes and research.

10 000 STUDENTS

Chalmers offers undergraduate, graduate and post-graduate learning. The university has 6500 students in its MScEng and MArch programmes (4,5 years of study) and another 2000 in BScEng, BSc and merchant marines programmes (3 years of study), and 1000 in doctoral programmes leading to a PhD degree. There is also an extensive programme for continual professional development learning.

There is 2300 faculty, technical and administrative staff. Important research projects are carried out in the main engineering sciences as well as in technology-related mathematical and natural sciences. Chalmers has a good international reputation and 14 international MSc programmes are run in English, attracting students from around the world.

RESEARCH IN WORLD CLASS

Research at Chalmers ranges from mathematics and natural sciences through to engineering, industrial sciences and community development. Some of the main areas are environmental sciences, micro- and nanotechnology, information technology and bioscience. In some of these areas research is very strong and definitely world class.

TIES TO INDUSTRY

Since the start the university has close ties with the business community in west Sweden and beyond. Some twenty scientific centres are run together with industry as well as six national centres of excellence.

Chalmers also specialises in managing and developing know-how. Working alongside different organisations in its network Chalmers can help companies and individuals nurture ideas from conception to realisation. Together with its partners, the university offers development potential for products, technology and people. The university's assignment training and higher education courses are designed to increase the knowledge of professionals, and tailor-made solutions are possible. One example is a global Automotive Safety Engineering Course developed and delivered for General Motors' engineers.

Chalmers has its own science park, Chalmers Science Park, where

knowledge and the innovative drive from business fuses with academic expertise. The science park offers space to science-intensive companies for applied research and innovative product development in cooperation with Chalmers university research departments.

Chalmers is also closely connected to Lindholmen Science Park in Göteborg, where key players within automotive and transport, mobile communications and modern media technology like Volvo, Ericsson, Semcon and Caran have been brought together with higher education facilities and research at Chalmers.

The university also has a role as incubator - creating a tailored environment where young companies with new ideas from Chalmers research can grow into strong enterprises. The Chalmers Innovation Centre is charged with promoting this particular area of operations and several hundred spin-off companies have emanated from Chalmers.

DEPARTMENTS

Chalmers research and education programmes are carried out within 16 departments:

- Applied Mechanics
- Applied Physics
- Architecture
- Chemical and Biological Engineering
- Civil and Environmental Engineering
- Computer Science and Engineering
- Energy and Environment
- Fundamental Physics
- Materials and Manufacturing Technology
- Mathematical Sciences
- Microtechnology and Nanoscience
- Product and Production Development
- Radio and Space Science
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- Signals and Systems
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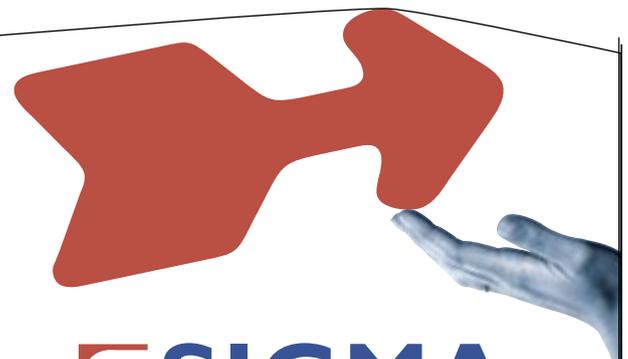
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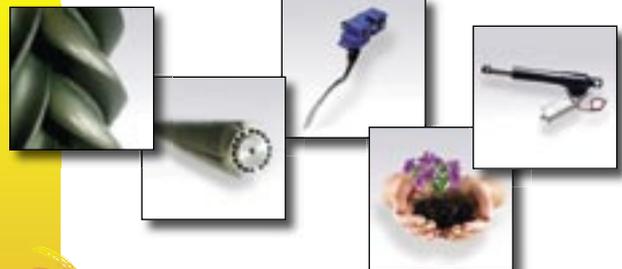
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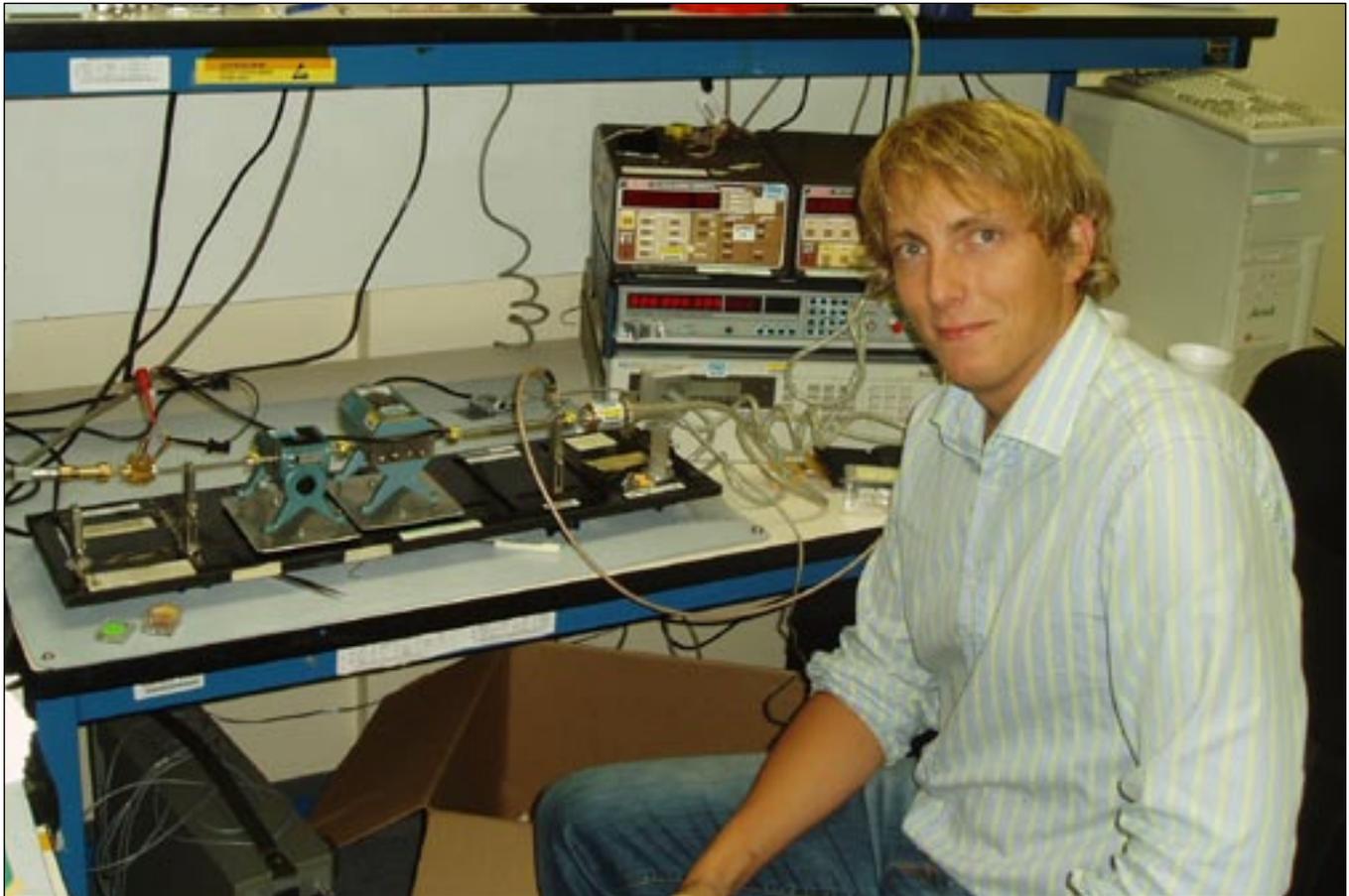
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A summer in Cali, start up in Silicon Valley

My expectations were high as I walked into the company's building on the 12th of June.

I WAS GREETED by a very well dressed woman in the reception of the American Executive Center in Cupertino, California. My employer had informed me that I was coming to a start up company and that I should be prepared for chaos, but so far outlooks were very good. The CEO and the general manager met up with me and we sat down and had a short introductory meeting followed by lunch at a nice Japanese restaurant on the company's expense. After the lunch I followed the general manager back to the company building and

JOHAN EDBLAD

Age:
25

Majoring in:
Engineering Physics

Best US experience:

Experiencing every day life in the US and learning what life is like for the average Silicon Valley resident.

spent the rest of the afternoon helping the general manager put the final touches on a lease for a location for the company's upcoming production.

THE SECOND DAY of work started when I was picked up at my house by the CEO and the general manager. We drove to San Francisco to attend the 2006 IEEE microwave convention. We walked around inside the convention center and I listened closely to the CEO discussing company business with different potential customers. Later that night when I got back to my house I was astounded by how smooth everything had gone the two first days. Everything seemed well structured and ordered and I had seen nothing of the chaos I was previously told about. On the third day, however, everything fell into place and I got the real picture of the company's situation and my own role for the summer.

ATOOS, THE COMPANY I worked for, was new, small and at the moment, really non-existent. I soon learned that the very new, glass covered building of the American Executive Center was a hotel for companies. During my first visit to the

American Executive Center I had totally missed the small wooden sign outside saying: "Small offices for lease". I would soon be sitting in one of those small offices myself.

THE REST OF THE WEEK I spent renting a small office and equipping it with furniture, computers, telephone, internet connection and various test equipment that I would probably need. I did not yet know exactly what kind of tests I was going to perform in the office and neither did my boss, but one way or the other we figured that we would find out.

ABOUT A YEAR AGO, the owner of the company had purchased a whole production line for making Indium Phosphide Gunn diodes along with a large inventory of finished Gunn diodes and chips to make more. Every piece of equipment was put into a storage along with a plan for future use. When I contacted my future employer in April 2006 looking for an internship I became part of that plan. My boss had all the company's equipment stowed away and wanted someone to start up the company at a small scale to see what the



ME AND MY GIRLFRIEND KATARINA IN OUR FIRE RED FORD MUSTANG CONVERTIBLE PARKED OUTSIDE OUR PALO ALTO RESIDENCE.



THUMBNAIL PICTURE OF GUNN DIODE. THE WHITE RING IN TOP OF THE SCREW IS THE INSULATION AROUND THE CHIP. THE ACTUAL CHIP IS ROUGHLY 1/20TH THE SIZE OF THE WHITE RING.

situation looked like and what possible business opportunities there were for Indium Phosphide Gunn diodes.

IN ORDER TO ATTRACT customers to our business we needed finished products to show. A good start would be to test the already finished diodes in the Company's storage. From the chaos in the storage with all the equipment mixed together I slowly started to create some kind of order. After identifying what different equipment was used for I put together a test set up to measure frequency and power of the diodes. Unfortunately some of the equipment was broken and had to be repaired. However, finding a way to repair the equipment proved challenging since most people that had previously worked with the equipment were unavailable. I started researching and after numerous phone calls and a dozen e-mails I had a better idea of what needed to be done. My work progressed and

GUNN DIODES

Gunn diodes are small semiconductor devices used to create electromagnetic oscillations at gigahertz frequencies. Most Gunn diodes that are used today are made with a Gallium Arsenide chip instead of a Indium Phosphide chip. What make Indium Phosphide Gunn diodes special is that they can be used to create electromagnetic waves with much higher frequencies and higher power than the Gallium Arsenide alternative.

I worked with setting up different tests and performing them to deliver useful diodes. Then in an instant, my weeks had passed and the summer was over. It was time to return to Sweden and reflect on what I had learned during my time in the Silicon Valley.

SO WHAT HAD I LEARNED? First of all; working with a small start up company gave me an great chance to see what it is like in the early stages of running a company. Being part of a start up process has

showed me that it is not as smooth as they teach in school. It has also showed me that I am going to have great use for many of my personal skills and qualities in my future career. Personal characteristics that I have developed during my time at the university will presumably be much more important than the text book knowledge I have acquired during my education.

STAYING AND WORKING in the US for a period of time has given me a chance to experience differences between countries that can be small but very important. For example; the business climate can vary vastly because of differences in population and politics. Those differences seems quite obvious, but it can be hard to grasp what effect they might have unless you have experienced them yourself.

MY TRIP TO WORK in the US has given me an opportunity to meet some great people and work closely with very successful companies.

Those meetings have showed me that my possibilities are more or less limitless. After graduation the world is my oyster and I can do anything if I just put my mind to it. I can do nothing but recommend everyone to take the same chance as I did.

TO MAKE THINGS even more perfect I ended my time in America by spending two weeks touring California and New York city with my girlfriend Katarina who flew in from Sweden. It was a wonderful vacation and a brilliant contrast

from working. We rented a brand new fiery red Ford Mustang convertible and cruised the roads of California. Like in a movie we rode top-down through Big Sur and Malibu, Santa Barbara and Beverly Hills. Later we left the US from John F Kennedy airport in New York after a few days on Manhattan spending the last hard earned dollar we had.

I LEFT AMERICA without a penny but I brought with me something so much more valuable; thousands of new memories and experiences. I left America on a grey and rainy day but the thing I will remember is the golden landscape of California and the once in a lifetime golden opportunity I had just been given. I left America just a few weeks ago but I can say for sure that I will return, or as I said to Arnold at the airport as I left California;

- See you later governor!

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ELEKTRA-programmet stödjer elkraftteknisk forskning

ABB, Areva T&D, Elforsk (elföretagens gemensamma forskningsbolag), Banverket och Energimyndigheten driver gemensamt ett elkrafttekniskt forskningsprogram benämnt ELEKTRA. Bakom Elforsk står de elkraftproducerande och elnätdrivande företagen i Sverige, som Vattenfall, Eon, Fortum, Svenska Kraftnät, Göteborg Energi mfl.

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Programmet finansierar för närvarande ca 35 forskarstuderande på ett antal institutioner på CTH, KTH, LTH, HVV, LTU och Uppsala Universitet. Avsikten är att långsiktigt stärka konkurrenskraften hos elföretag och tillverkande industri, och samverkan mellan industri och forskarstuderande stimuleras.

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ELFORSK



THE CETAC 40 YEARS PARTY

19th MAY 2006 was a stressful day for the board members of CETAC 2006. Not only did we tamper with arranging the last details regarding visas and trainee positions, we were also taking care of the preparations of the night's big event, the first happening by and for CETAC Alumni, a birthday party for CETAC which this year had existed at Chalmers in exactly 40 years.

AFTER SPENDING A YEAR looking for employers in North America that wanted to accept a trainee, calling plenty of Swedish companies asking for sponsorship, and hitting our heads to countless of tiny but notable problems, we all agreed that CETAC would gain enormously by aggregating old members' experience and networks into one big fellowship; CETAC Alumni.

NATURALLY, STARTING AN ALUMNI ORGANIZATION is much harder than it sounds. Our goal, except to dig up as many old CETAC members as possible, was to secure evidence of older CETAC organizations and to build a platform for prospering and continuous friendships between their members. Needless to say, this is something that will not happen overnight.

SO WHEN DUSK WAS CLOSING IN, and we were waiting for the first guests to arrive to the birthday party, we felt nervous about the night's outcome. When so finally old members were starting to show up, all our anxiousness blew away. The number of guests enjoying the evening at Café Bulten amounted to over 30, much higher than our expectations. What made us especially happy

was that lots of not very recent CETAC members showed up, as well as the newer ones.

LATER THAT NIGHT, when the last guests were heading home, we knew that the evening was a success. Many old and new friendships had been picked up, plenty of stories had been told, lots of cheerful pictures taken. In short, we were certain that the great outcome of the evening not only derived from the nifty combinations of free welcome drinks, trivia competitions, birthday cakes, and musical entertainment. Instead, the joyful crowd of CETAC members had proven to be the perfect guests, making the life of the party planners quite effortless.

text: Marcus Johansson
photo: Johan Gustafsson
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TRAINING AT PENN ALUMINUM. AHMAD, JONAS (LAST YEARS TRAINEE) AND RIKARD.

Robots on the rampage!

Rikard - A big smile, a friendly pat on the shoulder and a... "thumbs up". This HAS to be an ok answer, because I have asked him to repeat twice and I still can't understand a word he is saying. This Southern American accent is hard to follow, and combined with the loud noise from the machines... man! Ok, let me start from the beginning.

THE FIRST THING WE DID as we started our training at Amerden was to watch an ongoing installation that Amerden did in Illinois. I was amazed by the huge blue robot or AGV (Automatic Guided Vehicle) that traveled around a complex track, carrying this even bigger aluminum load. Soon I became aware that I was going to program robots similar to this one, on another job in Alabama later in the summer, wow!

A FEWDAYS TRAINING followed in Illinois, learning the robot programming basics and the software that was used for controlling the robots. This one week, and three additional weeks of training in Florida made us well prepared for the upcoming task in Alabama. Most of the programming for the Alabama job had already been done, though nothing had been tested yet.

AMERDEN has only seven employees which in my opinion make work more fun. We even had close contact with the customers and got directives directly from them. But one should know, with few employees comes more responsibility, and more responsibility means more work!

AN ATTEMPT TO INSTALL ROBOTS in this factory had been made once before, by another company. But eventually, those robots were crazed and ended up running into each other, damaging each other. Both vehicles were taken out of service. That's when Amerden came to rescue. The installation team that went to the factory in Alabama was my boss Mr. Roland Anderson, Ahmad Amer and I. The robots themselves were shipped on a truck to the factory. The purpose of the AGV:s in the factory was to load on pallets of plastic buckets from a conveyor, then drive them to a wrap-

per machine where the AGV would unload the buckets. The pallets with buckets would then be wrapped with thin plastics.

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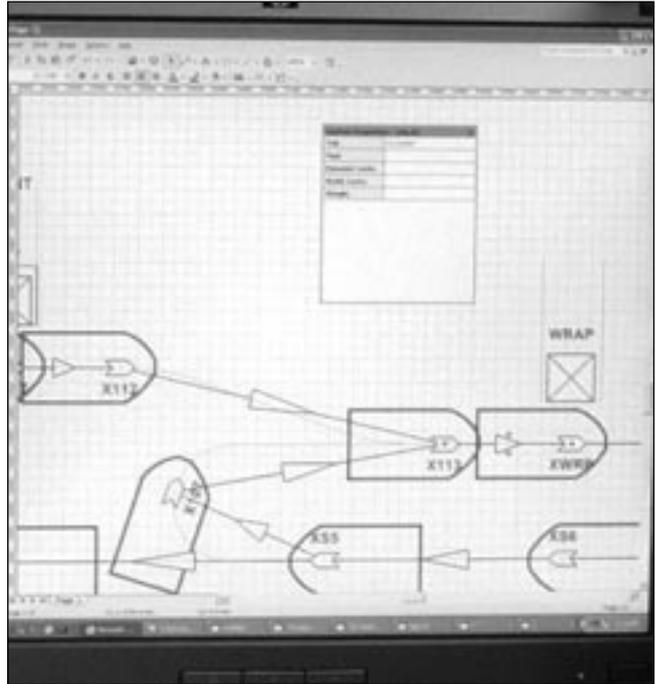
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AHMAD, RIKARD AND COLLEAGUE MR. DICK SMITH IN THE MIDDLE.



ROBOT PATH

AHMAD - INSTALLING AN AGV system in Alabama, a life changing experience! After all training and preparations made at Penn Aluminum in Carbondale and at Amerden in St Augustine I had a picture of what kind of work was awaiting us at the Letica plant and what kind of problems that might arise. Of course much of the problems I expected never happened and problems I never thought about occurred.

IN THE BEGINNING, very little was going our way. The floor cutting was delayed. Floor cutting is needed in order to put in a frequency cable, which serves the purpose of a "track" for the robots. In addition the customers had some last minute requests just a couple of days before the actual installation, this we would learn further down the road involved changes in hardware as well as software which would become time consuming.

THE AGV SYSTEM (for this specific job) in brief, when a pallet of buckets is ready to be picked up

by a robot (AGV) the machine operator at the conveyor pushes a button. This sends an electrical signal to one of the inputs on the Opto22 unit, where it is converted to a digital signal and sent to the server and the offboard control demanding a pick order from the specific conveyor. The offboard control, De Carté, then calculates which free AGV is closest to the given conveyor and after that sends the pick and drop order to that specific AGV through the wireless network. In order for the robot to get from point A to point B the offboard control chooses pieces of code, tables, in the onboard control (ACE2000).

THE FIRST DAY ON SITE at the plant we spent on setting up the server, the wireless network and establishing communication with the AGV:s, Opto22 units and wireless access points. The network cables had been drawn long before we came so this I thought would go fast and smoothly. All set and done we could only establish communication between our server and one of the access points. After troubleshooting the network cables, the access points and the Opto22 units, we found out that it was the clips used on the network cables that were no good. The floor cutting was now finished and the oncoming days Rikard and myself spent on testing the prewritten code and writing new code where it was needed while Roland took care of the electrical wiring from the pushbutton placed on each conveyor to the Opto22 units.

WITH THE ORIGINAL PLAN the robots were always loaded with a pallet from the left hand side. The customers' last minute changes resulted in a final emplacement of the machines in the plant, which meant that the robots now needed to be loaded

from the right hand side as well. Solving the problem with loading the robots from the right hand side involved getting new basecode that was not accessible to us but after a couple of days we received it and with a little work on our own code, and some rewiring on the inputs to the CB12 control board it worked. Things were starting to look a lot better!

THE INSTALLATION was shaping up and the two robots could now access all the conveyors in the plant, load on a pallet of buckets and then transport it to the wrapper machine. It was a feeling of satisfaction seeing the robots "cleaning" the conveyors from pallets. With a working AGV system there was now time over for training of the employees. It is a funny feeling giving training to a group of employees who are almost twice your age and have many years of working experience. The training involved an overall exposition of the AGV, startup procedure of the AGV if it for some reason would stop and how to trouble shoot some of the more common problems. We also gave a more thorough training in the offboard control, De Carté, to the maintenance manager that was going to have the utter responsibility for the robots. During the entire installation I also had close contact with the plant manager and the plant owners giving them feedback on how the installation was progressing.

DURING THE LAST DAYS at the plant, Rikard and I spent on small adjustments and preparations for the 24hour test. This is a test conducted in order for getting the installation approved and signed by the customer.

AHMAD AMER

Age:

24

Majoring in:

Electrical Engineering

Best US experience:

The jetski joyride in St: Augustine



RIKARD NEEDS AIR

RIKARD – YES, THE 24-HOUR TEST. I took on the night shift starting 23.00 and I remember thinking... OK, it's not so bad! The robots will run smoothly during the night, and in the mean time, I can do something else... But what @!# now?! One of the customers showed up at 02.00 in the morning. That was unexpected. He was very creative and suggested several improvements e.g. if the AGV had parked at a conveyor and was waiting for someone to load a pallet with buckets on, the AGV shouldn't wait forever. The guy at the conveyor should only have 30 seconds to load the pallet on the vehicle. When 30 seconds had elapsed without anyone loading on, the vehicle should discard the active order and move on to complete the next order. A programming task, at 05.00 in the morning, I usually have my best REM sleep at this hour. Later in the morning we also found out that some of the buttons that were used to give an order to the AGV:s, didn't work. Some troubleshooting made it clear that someone had accidentally cut the wires to these buttons. At 09.00 my caffeine kick wore off and I went to get some sleep.

A WEEK AFTER the 24-hour test, we left the factory at night, feeling good about things. Everything looked alright. Both AGV:s were completing orders the way they should. And we were going to finish our jobs in the coming two days and leave for Florida. However, when we went to work the next day, one of the AGV:s had stopped working. The front wheel was steered to it's maximum left position and the maintenance people had been unable to steer it back. We were afraid that there might be something wrong with the chopper that supplies the drive with pulses of current. Ahmad

and I spent the last days of work on troubleshooting the steering. We decided that the best way to find the error was to compare measurement values between the both AGV:s and move parts from the AGV that didn't work to the one that did. We found out that the chopper was ok but that the impedance of one of the switches was incorrect. The purpose of the switches is to stop the steering action if the wheel has been steered to the end limit. We had now pinpointed the error, and a new switch was needed. Unfortunately this was our last day at work and we had to leave the factory with one AGV broken down. But a couple of days after we had left the factory and gone to Florida, both AGV:s were up and running again, and they still are!

AFTER WE HAD QUIT our job, we took two weeks of vacation in Florida. Surfing, scuba diving and alligator safari were some of the activities we did. There are several sites to go on alligator safari, and the most popular and characteristic way of transporting oneself in the swamp is by "air boat", as you probably know. But we were unlucky and went straight into a bona fide tourist trap. We became suspicious of that when the air boat took as many as 12 people. Later, when our guide called the animals different names like -"Say hello to Joseph the turtle!", the scam was a fact.

THE SCUBA DIVING was better. The warm, clear water and the rich animal life by the largest living coral reef in the U.S. It was great! We came to realize that tempering with the inflating device on the diving west wasn't such a good idea, especially not at 8 meters depth.



SHARK BAIT

AHMAD - OOOH YEAH the inflating device! I agree, diving was great! Except for the first dive when I went up and down like a yoyo between the bottom and the water surface while the diving inspector was making "no no" signs as if I was doing it for fun. Well I blame the teacher not the student. And the day we rented the jet skis. Those toys were a lot of fun, flying over the water surface looking quickly at the speedometer that was reading 50 mph which is about 80km/h! And what at first looked like sharks swimming along the Jet Ski was fortunately for us in fact wild dolphins, a really cool sight. Afterwards I came to think of the dish Mahi Mahi I had ordered at a restaurant, which is grilled dolphin and felt a bit bad but then again it tasted great.

WE WANT TO THANK all the Swedish companies that have supported CETAC for their generosity, making this great summer possible! ■

RIKARD LARSSON

Age:

25

Majoring in:

Electrical Engineering

Best US experience:

Avoiding rip currents, sharks and gators.



TWO GIANTS.

Search for a living

After spending almost an hour weaving through traffic, trying to get out from a jammed New York City, the bus is finally steering up through New England. We are soon to arrive to Boston, not only the location of my employer, but also the ultimate destination of a year-long journey full of obstacles – and achievements.

WHAT I DID NOT REALIZE when Joachim, my roommate-to-be for the next twelve months, was sight-seeing me around Boston in his suspiciously fast-going Golf GTI, was the magnitude and impact of the adventure that laid ahead of me. But just as hundreds of CETAC's members had done before me, I was about to find out.

GOOD FOR ME, my housing arrangement, and especially the people who came with it, turned out

to be as nice and friendly as I could possibly expect. Not only did Joachim grow to be a very good friend of mine, and indeed a very helpful tourist guide, he also happily introduced me to all kinds of people and activities, rendering my early worries about finding friends and social events in Boston completely unnecessary. During the summer, I also got to spend many late nights and weekends in the good company of my two young landlords, Adam and Ragnhild. They taught me everything from the proper way of celebrating 4th of July, to how to fully appreciate a 60" high-definition TV, in combination with the surplus of 600 channels.

AFTER A WEEKEND of getting to know Boston, the first work day was closing in. Nine o' clock, sharp – with well-ironed slack pants a neatly tucked-in shirt, and loads of enthusiasm – I waited at the reception desk at FAST Search & Transfer's office in Needham, a suburb to Boston. After meeting with the charismatic Mr. Rodney Alvarez, the director of the company's university relations, I was introduced to a seemingly endless row of people, many to whom I would end up discussing algo-

rithmic decisions, abstract design patterns, regular expressions, and other computer-science related details to – over and over again.

SO WHAT KIND OF COMPANY is FAST Search & Transfer? Most people do not have a clue. To be honest, I did not know very much about the company before I got here either. Sure, I had read through their web site, glanced over plenty of marketing PMs, and even paid a visit to their Swedish sales office in Kista. Nonetheless, I was not very confident in my understanding of what they really did – and specifically, how they did it.

IN SHORT, FAST'S BUSINESS AREA is Enterprise Search. Many people tend to think that Google's achievements in the field leaves little room for other contestants. On the contrary, FAST and Google is not competing about the same customers, and Google does not even have a viable competitive line of products to most of FAST's. In opposite of Google, FAST has its focus on companies that wish to use a high-end search platform incorporated into their services. This includes

MARCUS JOHANSSON

Age:

22

Majoring in:

Computer Science & Engineering

Best US experience:

Watching Big Papi make home runs, and the audience go berserk, at a crowded Fenway Park.



AT FENWAY PARK, AFTER WATCHING BOSTON RED SOX BEAT MINNESOTA TWINS.



LINE OF TOMBSTONES AT ARLINGTON NATIONAL CEMETERY.

both embedding of search as an IT infrastructure component, and using search as a mission critical part of new services.

IN MARKETING TERMS, FAST is recognized by Gartner in the 2005 Magic Quadrant as the leading provider of information access solutions for enterprises, and it has been ranked the 14th quickest growing European technology company with an astonishing 6300% growth the last five years. One of FAST's many outspoken goals, which does not seem very unlikely, is to become Europe's third biggest and most influential software company in 2009.

TO SUM UP, FAST's product line, including the current flag-ship product Enterprise Search Platform (ESP), enables companies to easily make use of state-of-the-art search technologies to either just spice up already existing web applications or, as often is the case, lay them as the very foundation of their whole system. Customers of FAST's include lots of well-known companies such as CNET, Dell, Reuters, Citigroup, CareerBuilder, TV Guide Online, and roughly 90% of all Yellow pages-related web sites around the world. One of the latest phenomena to conquer the net, the video-sharing community YouTube, is also powered by a FAST backend. As of today, YouTube's video library expands with around 2 million files per month, and is serving an incredible 100 million views a day, all seamlessly handled by FAST ESP 5.0.

SO, WHERE HAVE MY PART BEEN in all this? I work at the Customer Solutions department; meaning that most of my projects consist of developing custom-

ized search solutions to FAST's various customers. I have, among other things, been a member of teams working for Citigroup, the world's second most profitable financial institution, and CareerBuilder, America's biggest online job agency, soon to be introduced on the European market. One of the most important things I have been doing for these customers includes building so-called document processors, an integral part of any modern search platform. To be specific, a document processor looks at certain properties at a document that is intended to be searchable, and indexes it accordingly. To construct a usable index, and to construct it fast, several document processors are lined up both in sequence and in parallel, making the platform scalable, efficient – and complex.

”nine o'clock sharp - with well-ironed slack pants, a neatly tucked-in shirt, and full of enthusiasm”

MY INTERNSHIP AT FAST has been well-administered and systematic; making the time I spent here very rewarding. We were continuously evaluated on a wide range of criterions, we attended weekly meetings with interesting people from the management team – I even got a chance to talk to John Lervik, the company's CEO

– and we also had the opportunity to attend lots of scheduled out-of-office activities. To cut a long story short, FAST is very caring of its employees, and it shows.

WHEN I HAVE NOT BEEN WORKING, I have – sometimes unintentionally – taken every opportunity to embrace the American way of living. Except from becoming a devoted Boston Red Sox fan, and leveraging my barbeque know-how to a new level, I have visited New York, Philadelphia, and Washington D.C. I have cultivated myself with American history and mindset through literally

days of monument-watching, museum-visiting, and – I must admit – some extensive day-drifting. Another highlight of the summer was looking up against the mighty Niagara Falls – letting the water steam soak our clothes and the roaring falls cause us temporal hearing loss – a thunderous experience I will never forget.

THIS SUMMER'S EMPLOYMENT at FAST, in combination with a vibrant city and a whole bunch of new friends that provided me with everything from late-night parties to the perfect housing arrangement, I cannot be happier about the outcome of my internship. For making the last three months an amazing experience, I owe a great deal of gratitude to plenty of people, but especially to my roommate Joachim, my landlords Adam and Ragnhild, my inspirational manager Matt King, my four good Norwegian friends Magnus, Eivind, Mari, and Tor-Arne, and – of course – Olga and Ester, my always enthusiastic tour guides in Boston's surprisingly exciting Russian community. Needless to say, this fantastic summer would not have been possible without the tremendous effort from each and every one of my dear friends in CETAC 2006. Thank you all! ■

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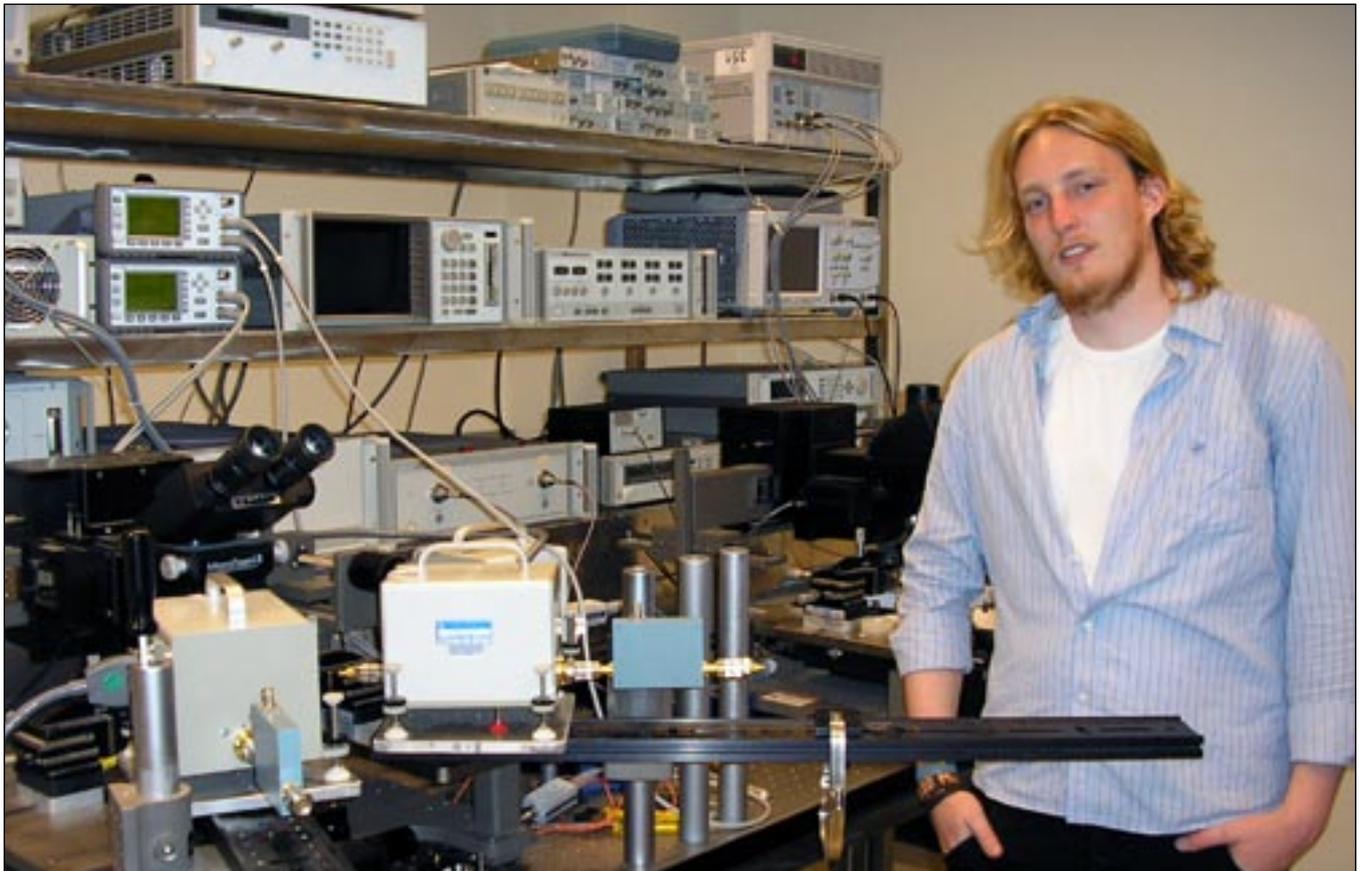
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ME AT THE LOAD PULL POWERBENCH

Power Transistors at Cornell University

On a warm Saturday morning in June, after spending a fantastic week in New York City with the rest of the members of CETAC, I got on the bus that would take me to the city of Ithaca, NY, where I was going to spend my summer.

AFTER 5 HOURS of travelling through the beautiful countryside of upstate New York, I arrived and was welcomed by my landlady who helped me get set up in the apartment I had sublet for the summer. It was a small, one bedroom apartment in the centre of Collegetown, a part of Ithaca populated almost entirely by students at Cornell University, where I was going to work at the Department of Electrical and Computer Engineering. After spending my first weekend getting familiar with

the surroundings, walking around in the pleasant summer weather and getting everything I needed for the apartment it was Monday morning and time to get to work.

I WAS WELCOMED by the staff of the ECE department who guided me through the process of getting registered as a graduate student and as an employee of the university for the summer. I am very grateful for their patience in explaining the sometimes complicated process of registration to me and for their continuous support in dealing with the many different parts of the university administration throughout my stay. After getting registered it was time to meet the people I was going to be working with. I was introduced to Professor James R. Shealy who was going to be my supervisor and to the people in his research group at Duffield Hall where I had been designated to work.

PROFESSOR SHEALY and his group were currently working on the development of AlGaN/GaN transistors. Both GaN and AlGaN are what is

known as polar materials, meaning that their crystal structures have one uniquely defined direction in space. This causes a displacement in the conduction electrons in the materials and the formation of a two-dimensional electron gas at the interface between the two materials. The current through this channel can then be modulated with a gate voltage forming a FET-transistor.

THE ELECTRON MOBILITY in the channel is high compared to devices using other materials as is the electron concentration which means that high current densities can be obtained. Devices constructed using these materials are therefore known as High Electron Mobility Transistors or HEMT for short. The wide band gap of AlGaN/GaN means that the breakdown voltage is large which combined with the high current density results in a very high output power density. The high electron saturation velocity also result in a very rapid response in the device, creating a high power and high frequency transistor with applications in high power microwave amplifiers and switch devices.

FREDRIK OHLSSON

Age:
23

Majoring in:
Engineering Physics

Best US experience:
The road trip to Boston and Niagara Falls.



THE CORNELL CAMPUS ENTRANCE



ME AT THE CANADIAN HORSESHOE FALLS

MY WORK DURING THE SUMMER was concerned with testing the transistors manufactured by professor Shealy's group. This meant I had to get familiar with both theory and equipment for microwave measurement which took numerous hours of studying manuals and textbooks. My main project was to get a system for load pull power measurements up and running. The technique used in this system is to connect a variable load to the output of the transistor and measure the response as the load is varied. The PC used to control the hardware had just been upgraded to use a new OS, and getting the system to work took a complete reinstallation of the software and calibration of all the components in the system.

ANOTHER SIGNIFICANT PART of my work was to maintain and add to the technical documentation for the power measurement system and write instruction manuals for the calibration of the different instruments in the setup. This detailed approach was, I felt, a good way to understand how the different components worked as well as the system as a whole, and at the end of my eight weeks at Cornell the measurement setup was well on its way to be fully functioning with all major problems solved.

WHEN I WASN'T WORKING I got a chance to enjoy the city of Ithaca and its surroundings. The last ice age shaped a dramatic landscape with waterfalls and gorges that contributed to the atmosphere

and natural beauty of the Cornell campus. On a couple of occasions I hiked some of the nearby gorges, which was a great experience, and got to try gorge swimming at the foot of one of the waterfalls. On a couple of occasions professor Shealy invited me out on his boat for a refreshing swim in the nearby Cayuga Lake, which was a very nice way to get some relief from the sometimes relentless summer heat.

DURING MY FIRST DAYS AT WORK I got to know Tom who was a PhD student in professor Shealy's group. He introduced me to the Chapter House, a Collegetown bar with a long history of CETAC

regulars. We ended up spending a lot of time there, especially at the foosball table. It turned out Tom was a foosball enthusiast and he immediately undertook the task to pass his skills on to me.

The Chapter House was also the natural choice for watching the soccer world cup, especially since it was just round the corner from my apartment.

A COUPLE OF WEEKS before the end of my internship I rented a car over the weekend and drove to Boston to meet Marcus and Marcus, the two CETAC members working there. We enjoyed the city and the night life, both in downtown Boston and at Harvard Square, and had a great day even though our plans to go to a baseball game rained away. The next day I continued the road trip to

Niagara Falls, together with one of the Marcuses, where we spent the rest of the weekend sightseeing at both the Canadian and American side of the falls, taking the Maid of the Mist boat ride and enjoying the spectacular sceneries before returning home.

MY SUMMER at Cornell and in Ithaca was fantastic and I am very grateful to everyone who made this possible. I would like to thank Professor James Shealy for letting me work for him, all the people at the ECE department who helped me during the summer and Jiali and Rick, who also worked in Professor Shealy's group. My special thanks go out to Tom for always answering my questions around the lab, entertaining me with riddles, for his patience at the foosball table and a lot of good times in general. Finally I would like to extend my thanks to everyone else who contributed in one way or another to my great experience this summer. ■

"It turned out Tom was a foosball enthusiast and he immediately undertook the task to pass his skills on to me"

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Education & Research

Web site :
www.cornell.edu



Simulating 3D sound for a summer

When I was touching down at a sunny San Francisco airport in early June the questions had piled up. What was life in the Silicon Valley area I had been told so much about really like? Was the sun always shining in California? I would get at least some of the answers to my questions while doing my internship at AuSIM.

AUSIM, INC. WAS FOUNDED in 1998 and is a small startup company. The company develops solutions for audio simulation, positional (3D) sound, and audio measurements. Their office is in Palo Alto, the heart of Silicon Valley. Luckily, I only have a convenient bike ride from the house I rent with some friends through the beautiful tree lined streets of residential Palo Alto to work every day. The rush hour traffic around Palo Alto can be crazy.

THE PROJECT I was assigned to work on was to develop a mathematical model and software to run an auditory display of multiple loudspeakers. I was going to base my work on the theory

of Vector-Based Amplitude Panning. VBAP was developed by Ville Pulkki at Helsinki University of Technology, back in the late 1990's. The idea is to make a multi-loudspeaker display that has a large sweet spot (optimal listening position). A VBAP-system can have as many as hundreds of loudspeakers to simulate 3D sound.

I STARTED OF making a program that generates the gain levels for each speaker for every given virtual sound location in the room. Until now the AuSIM3D engine that processes the sound signals has only been set to work with two outputs, one for each ear in a pair of headphones, but now when we were going to use this engine for a loudspeaker display we needed it to be able to have an arbitrary number of outputs channels, one for each speaker.

MAKING THE NECESSARY changes to get this to work was going to require some C++ programming. When I started I was only a beginner at C++ so the company decided to pay for a class at the University of Santa Cruz. Although I spent many hours with class assignments for a couple of weeks I really felt that it paid off and I am glad I got this opportunity to develop my programming skills.

THIS CLASS WAS one example I got of the diversity of immigrants to Silicon Valley. There were only two Americans in the class. The other ten people, including the teacher, were either from India or southeast Asia, except the Swede of course. Engineers come here from all over the world and they all bring some new experiences and knowledge. The proximity to the famous Stanford University has of course also spawned many of the high-tech companies in the area. From what I have been told one thing that makes this area special is the sharing of ideas. People meet a lot and keep in touch with many others. The area is also very dynamic. People often change jobs and a lot of companies come and go every year.

JOHAN GUSTAFSSON

Age:
23

Majoring in:
Engineering Physics

Best US experience:
Bodysurfing the powerful, chilly swell of the Pacific Ocean at Half Moon Bay.

AuSIM Inc

Employees:
~7

Hosting Trainees:
2000 and 2006

Business Area:
Audio simulation solutions for mission-critical and research applications.
Web site: www.ausim3d.com

I ALSO HAVE to share some of my impressions of the California lifestyle. People do not wear watches here and if you get to work at 9.30am you are usually the first one to arrive. To wear sandals, a Hawaiian shirt and shorts for work is no problem at all. In other words the work environment is quite relaxed. Do not get me wrong though, at times when it is needed and at some companies people work very long hours.

HEAD-RELATED TRANSFER FUNCTIONS (HRTF:s) are one of the key techniques used to simulate 3D sound. Before reaching the listener's ears, the acoustic waves emitted by a source are affected by the interaction with the listener's head, torso and ear. This results in a directionally dependent spectral coloration of the sound. To measure the HRTF of a person small microphones are placed in the ears. Then a sound signal is played from different locations and the microphones record the different HRTF filters. To store this information AuSIM uses a format called Acoustic Head Map (AHM). Some of my time this summer I was also working on adding new features to this format and developing new functions for saving and reading AHM:s.



MY GREAT ROOMMATES ARE STARTING UP THE GRILL FOR ONE OF OUR BBQ'S THIS SUMMER.

WHEN I AM WRITING THIS it is October and I have another month and a half left of my internship here at AuSIM. I experienced the first rain in California just a few weeks ago so the sun is not always shining although it did for about four months. I have been able to test my system with about twenty loudspeakers now. Even though some work remains to be done I believe I will be able to finish my work on AuSIM Vectronic™ which is the name of the system before I go back to Sweden. The first installation is planned for a flight simulator next year.

IT HAS NOT ALL BEEN WORK at AuSIM though. Once a week we have company lunch and try out a new restaurant from the huge selection along El Camino Real. Another thing I appreciate a lot is the Friday afternoon wine or beer tasting we usually have. Sometimes we even have the opportunity to taste someone's home-brew, which can be, let's say, interesting. This was always a good time. The summer here in Silicon Valley has really been an invaluable experience and I would like to thank all the people here at AuSIM for giving me such a great time. ■

 An advertisement for Tarkett flooring. The top left shows a couple embracing. The top right shows a close-up of a brick wall with a circular pattern. The bottom left features a stylized panda face. The bottom right shows a black and white polka-dot pattern.

Lamin'art!

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Det avgör bara du. För vågar du, så vågar vi!
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 An advertisement for Rücker Nord AB. It features a list of services and a photograph of a person working at a computer workstation.

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IN THE OFFICE AT SUNNEX

Digging big in Boston

Staring out the airplane window when flight LH425 departs from Logan International Airport outside Boston. It has once again become clear to me that we are living in an eternally changing world. A world that is not always the safe home that most people wish it to be, but at the same time a world that offers unlimited opportunities.

IT IS THE DAY AFTER the revealed terror plans in London, and I am sitting on the flight back to Europe. Thousands of thoughts are fluttering by my mind, and even though I know it is impossible I am trying to summarize all my impressions and thoughts from this summer. However, some thoughts seem to be more subject to reflection than others. Getting to know the USA is getting to know a country that is loved by so many and that all other nations have taken impressions from, at the same time as it stirs up so many people's

minds. That is definitely an extraordinary experience when you are a Swede, but despite the fact that I am from a much more unnoticed part of the world my overall impression from this summer is very clear. Even though it took a lot of work and effort, this was an opportunity to experience something very special. Something that is a dream to many people, and for most of us a dream that will never come true.

JETLAG, overwhelming impressions and some homesickness. These are the words that best describe the first thoughts about the great country in the west, and more exact New York City. The time spent there meant lifelong memories, but I have to admit that the negative ones actually outnumbered the positive. One learning experience was at least not to take a cab without a sign from the JFK airport. The price can then easily increase, the closer one gets to the desired destination... After almost a week in "the world's capital" it was time to go to Boston. This time we chose a cheaper transportation alternative, namely the Lucky Star buses that departure from Chinatown. An interesting experience as well.

AFTER HAVING spent the first day in Boston with Marcus J, my supervisor came directly from a business trip in Sweden to pick me up. I was invited to stay with him and his family at their house in a smaller pleasant town called Milford, located about 45 minutes southwest of Boston. To see what it can be like in an American home and compare that with Swedish traditions and thoughts was really interesting and instructive.

I WAS AFRAID my first day at work would include a feeling of being superfluous, but this was definitely not the case. After a short introduction in the office and in the shop I was given some smaller projects to start with, something that felt great. These first tasks included creating some easier drawings in the 3D design program SolidWorks. During the following two weeks most of the projects included a combination of introducing new implements in the shop, and to create drawings of them. It was really satisfactory that I, at least felt that I, did something that made sense to the company already at the beginning.

MARCUS CHRISTIANSSON

Age:

24

Majoring in:

Engineering Physics

Best US experience:

The amazing Niagara Falls



FROM LEFT: TECHNICAL ENGINEER MAYUR PANGREKAR, ME, AND THE MANAGER OF OPERATIONS BRIAN JACOBSON

BEFORE MY ARRIVAL my supervisor had created a detailed project list that included both underlying assignments and more essential bigger projects. One of the more extensive ones was to create 3D drawings of almost all the standard lights that the company shows in their brochure. This definitely took a lot of time, and at the beginning it felt as if I got stuck with drawing details all the time. However, this really improved my knowledge about the SolidWorks program. Something that did the work full of variety was that I continuously got breaks by being involved in smaller tasks that needed to be sorted out. It was surprising how many things the Technical Engineer Mayur had to take care of at the same time, and how varying the assignments could be. For instance I got involved in a tryout of a new soldering machine, as well as assisting in a high voltage test and creating tables of existing equipment.

WHEN MY GIRLFRIEND arrived at the end of June I met her in New York City. As I now was an experienced Big Apple visitor I had sorted out some of the not so impressive sides of the city, which resulted in three wonderful days in the city. The lesson this time was that a tour to "Top of the Rock" is better than the Empire State Building, due to the different view and much friendlier atmosphere. As the 4th of July fell on a Tuesday the Monday was as well a day off. We took these days to get back to Boston from New York City, and just relaxed and visited some big shopping malls.

THE RECOVERY seemed to have been a good idea, because on the following Thursday we took the Greyhound bus to my aunt, who lives six hours west of Boston. After having passed through some not so attractive cities we could enjoy the beautiful scenery of upstate New York. The first day we made a full day trip to the Niagara Falls, where we

visited both the American and the Canadian side. This was just astounding, and something I will remember for the rest of my life! The second day was dedicated "at home" which meant to the surroundings at the Finger Lakes, where we also went for a sailing trip.

THE LAST weekend my girlfriend was in the USA we went into Boston. It is really a pleasant place, and in my opinion it has much better mixture of the life in a big city together with a smaller city's geniality, than New York City. We had time to enjoy a savoury dinner down at the harbour, as well as going on a whale watch cruise. The last-mentioned was a special experience when coming so close to these huge animals.

WHEN I FINALLY had finished the drawings of the standard lights, I mostly assisted in different important projects outside my actual tasks. This flexibility was something that I really appreciated. Two main projects that occupied almost all of my remaining time were to examine a loose lamp stand, and to come up with a new design for a light called MR-16.

MY MAIN GOAL with this trip was to get a feeling for what it could be like working as an engineer in industry. At the same time I wished to get more assured about what method and what kind of tasks I would like to work with in the future. One could accordingly say that I was digging for knowledge and experience, and I can not imagine a better way to get this than Sunnex. I also really



ME AND MY GIRLFRIEND AT THE FABULOUS NIAGARA FALLS



THE "MR-16 LIGHT". A CHANGE IN HOW IT WAS MOULDED LED TO A DEMAND OF, AMONG OTHER THINGS, NEW SPRING DESIGN.

hope that my "dig" will be more sustainable and true to life than the more famous Big Dig.

A SUITABLE SUMMARY of my American impressions would be to connect to the world of drinks. As USA really is a mixture of everything it has now become clear to me that when the Swedes have their vodka, and the Scots their Whiskey it is not surprising at all that it is the cocktail that originates from the USA. An attendant question then concerns what size, but the obvious answer to that is of course super size! ■

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~20

Hosting Trainees:

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Business Area:

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Web site:

www.sunnexonline.com

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THE CHAIRMAN IS SPEAKING...

FAR AWAY IN THE DISTANCE, New York's skyline is starting to fade into shape through the clouds. Even for frequent flyers, this must be an impressive sight. We are all getting restless. Anxious to get out. Out through the immigration control. Toward something new. Something else.

A MEMBERSHIP IN CETAC comes down to this very moment. Where all the blood, sweat, and tears shed during the year are encapsulated and turned into something else. It is a strange feeling, and what you are doing now is really shaping your future – this is not sitting in a dusty library studying for an exam, this is not watching a laboratory experiment for hours, this is not banging your head against a wall since you can not find the bug in your code. This is how it feels to abandon something old, and take some courageous steps into your own future.

ALTHOUGH THE TRANSATLANTIC FLIGHT is certainly nothing to worry about, the year-long journey taking place back home in Gothenburg is much more difficult. Starting from May last year, we have been working hard to glue together all the bits and pieces that make up a year with CETAC. All members have put their will power – and spare time – to the test. Without any doubt, the enthusiasm and industriousness it takes to carry out the continuously demanding work of raising money, finding internships, arranging events, and getting all the visa documents ready, are an integral part of CETAC. In combination with the solid education at Chalmers University of Technology, this will assure our American employees that we are all very motivated and qualified to come and train for them.

DURING THE YEAR, we have often walked in the footprints of earlier CETAC organizations. Relying on stories and helpful advice told by old members, we have been able to keep up the spirit and the confidence that is needed to get through the year. Another encouraging factor, and a fine measure of the ability of CETAC, is that American host companies often has been so satisfied with their CETAC trainees that they choose to accept members from us over and over again.

EVEN THOUGH THE RELATIONSHIP between our generation of CETAC and earlier generations has been both good and rewarding; CETAC has up to this spring been missing a crucial necessity, namely a formal social network of members from earlier organizations. By not gathering, and thus failing to keep old members connected with each other, CETAC has run the risk of losing both experience and individual enthusiasts. In order to cope with this problem and to give something back to the CETAC community, we have started up yet another organization, the eagerly awaited CETAC Alumni.

IN LATE MAY, just a couple of weeks before we took off toward America, CETAC Alumni arranged its first event, celebrating both the 40 years of CETAC's existence at Chalmers, and also the start of the alumni organization. Even though the invitations were sent out late, the happen-



ing was a success, gathering plenty of excited old members. Needless to say, CETAC Alumni will provide upcoming CETAC generations with a fruitful platform for further expansion and achievements. It will also expand a CETAC membership from something just used to get an internship, into a society of good friends and historical evidence of a truly successful organization.

TO MAKE ALL THIS COME TRUE, each and every one of my fellow members in CETAC 2006 has made an extraordinary effort. And on behalf of all of us, I would like to bring forth our sincere thanks to every individual and organization that helped us on the way to our American internships. Without the enthusiasm of our host companies, the generosity of our Swedish financial contributors, and the dedication of the American-Scandinavian Foundation we might never have gotten the chance to see those skyscrapers taking shape from our airplane's windows, that very special day in the beginning of June. Thank you all for making CETAC 2006 possible!

A handwritten signature in black ink, which appears to read "Marcus Johansson". The signature is fluid and cursive.

MARCUS JOHANSSON
CHAIRMAN, CETAC 2006

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and it's amazing
what you save.



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