

**CHALMERS**

# TraineeReport 2005

Chalmers Engineering Trainee Appointment Committee

38th Annual Issue



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ENGINEERING



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CETAC was founded in 1968 and is a student group working to bring highly motivated Swedish students and American hightech companies together. Each summer, CETAC members go to North America to gain practical experience in their fields of study with American companies, for a period of 8 weeks up to 12 months. This magazine is a summary of their efforts.

All members of CETAC are students at Chalmers University of Technology in Gothenburg, Sweden, and have completed at least three years of the coursework towards a MSc in either Computer Science & Engineering, Electrical Engineering, Engineering Physics or Information Engineering.

CETAC's function is to support the members with all the practical details concerning insurances, visas, etc. In this we are helped by the American Scandinavian Foundation.



THE BOARD OF CETAC 2005. FROM THE LEFT:

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**CARL LUNDSTRÖM**, EDITOR TRAINEE REPORT  
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## CETAC 2005

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**Editor-in-chief:**

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**Editor:**

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**Cover:**

Empire State Building, New York  
Photo by Daniel Roth

**Printed by:**

Sandstens Tryckeri

**Paper:**

Multiart Silk 115 g

**Copies:**

2000



# A testament to success!

This year was the 38th year a group of ambitious students from Chalmers University of Technology in Sweden was given the opportunity to travel to the United States for on-the-job training with american companies through their engagement with CETAC. And this, the 38th issue of Trainee Report, and the 37 preceding it, is, I believe, a testament to the decades of success and achievements for CETAC!

When reading the older issues of Trainee Report I am sure that the experiences brought back from the United States by members of the very earliest incarnations CETAC have continued to be valuable for them over the decades, and when looking back on our own experiences from the past summer in this Trainee Report, I have no doubt that they will prove to be very valuable to us for decades to come. That is the continuing success of CETAC!

In other words, the Trainee Report you are holding does not mark the conclusion of the experiences and endeavours of CETAC 2005, but only the first chapter. And over the coming years and decades, I hope and believe that there will be many more CETAC success-stories, and many more issues of Trainee Report to chronicle them.

Happy reading!



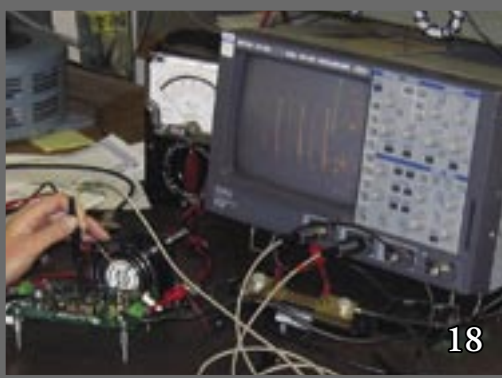
**Carl Lundström**  
Editor-in-chief

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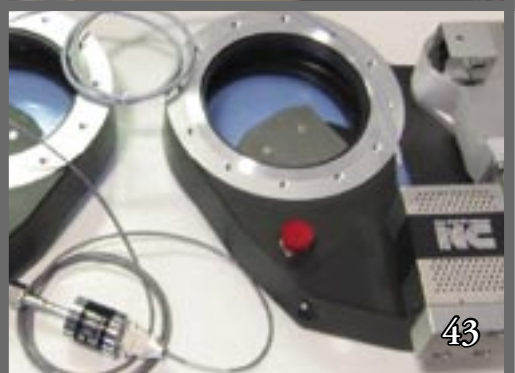
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# Teknologi för en värld i ständig förändring

Saab bedriver en kunskapsintensiv verksamhet där medarbetarnas samlade kompetens är företagets främsta konkurrensmedel. Att utveckla morgondagens produkter, tjänster och system inom områden som försvar, flyg och rymd kräver kunskaper inom några av teknikens mest

avancerade områden. Saab är ett av få företag i världen som har den kompetens som krävs – inom exempelvis systemintegration, datafusion, simulerings- och sensorteknologi – för att möta den här typen av utmaningar i teknikens absoluta framkant.

Vill du veta mer om "Möjligheternas Saab" och de tekniska utmaningar vi är engagerade i är du välkommen att besöka oss på [www.saab.se](http://www.saab.se)



**SAAB**

# Praktisera i USA sommaren 2007!

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 2007!

## 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 1968, och sedan dess har hundratals chalmester 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 ingenjörarbeten. 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 uppnått 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 företaget vid annonsförsäljning. Efter vis-

telsen 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](http://www.cetac.se)

[info@cetac.se](mailto:info@cetac.se)

**cetac**  
CHALMERS ENGINEERING TRAINEE  
APPOINTMENT COMMITTEE 2006





AMONG THE CROWDS, CARS AND COMMERCE AT TIMES SQUARE



SKYSCRAPERS OVERLOOK THE TREES AND SUNBATHERS IN CENTRAL PARK



JONAS ON THE BROOKLYN BRIDGE, WITH LOWER MANHATTAN'S BUSINESS DISTRICT TOWERING IN THE BACKGROUND.



LEFT: RIDING THE NEW YORK CITY SUBWAY IS BY FAR THE MOST CONVENIENT WAY TO GET AROUND, ALTHOUGH YOU MISS EVERYTHING YOU CAN SEE ON WAY WHEN GETTING BY ON FOOT. THE SUBWAY IS NOT THE CRIME-RIDDEN PLACE IT USED TO BE, BUT A CLEAN, SAFE AND MODERN TRANSPORTATION SYSTEM.

RIGHT: PETTER AND DANIEL AT A NEW YORK METS HOME GAME AT SHEA STADIUM.

# Going to

# G O T

BY CARL LUNDSTRÖM

**GOTHAM**, The Big Apple, The City That Never Sleeps, The Empire City, The Capital of the World. New York City has many names. Perhaps this is because so many have lived in or passed through the city, all of them possessing a unique view of it. As the saying goes: There's eight million stories in New York.

**EVEN THOUGH ALL CETAC MEMBERS** without a doubt were terribly excited about going to the United States and start their work at their respective trainee positions, what probably excited us the most was visiting New York City. Traditionally, this is the last thing CETAC does as a group every year, before members are scattered all over the American continent. It is a well-deserved vacation after a full year of hard work to make our journey possible, and before a summer of hard work at our final destinations.

**CONSIDERING THAT WE HAD BEEN TRAVELING** for some 12 hours and across six time-zones, one would have expected us to be exhausted when we landed at JFK airport. But the thrill and excitement of finally having arrived was far great-

er than any desire to go to sleep. As the taxi approached the silhouette of skyscrapers as the sun was setting behind them, we felt that we had to go out and start exploring the streets the second we had dumped our bags at the hotel.

**IN THE COMING DAYS** we scattered a bit, as the city has so much to offer. There was of course no time to do what everyone wanted, so we split up in smaller groups for most of our time in the city. That way everyone got to see and do what they wanted, whether it was sight-seeing, shopping, museums, seeing shows, or just relaxing in Central Park, soaking in the sun and the city's atmosphere.

**WE USUALLY REGROUPED** in the evening though, and after some much needed resting hit the town again, this time determined to explore the various aspects of Gotham's nightlife, such as comedy clubs, bars, night clubs or simply the lights from the massive neon signs of Times Square.

**OUR FINAL DAY IN THE CITY** we spent together with the USA committee, our sister committee from Chalmers, for a meeting at the





# H A M

Scandinavia House, home of the American-Scandinavian Foundation. Besides helping groups like ours with visas and other practical matters the ASF has many events at the Scandinavia House open to the public, such as exhibitions, film-showings and concerts, everything with a Scandinavian connection.

**WE WERE THEN TREATED TO** a very popular cruise around Manhattan, courtesy of Circle Lines Cruises. A great way to end our stay in Gotham!

**ONE OF THE MANY INTERESTING ASPECTS** of New York is the different characters of the many different neighborhoods. In the past couple of decades many Manhattan neighborhoods have undergone gentrification, i.e. the process where a poor community is converted to a more upscale and affluent neighborhood.

**WHILE THIS HAS REDUCED** crime and led to many hip bars, restaurants and stores opening in

the area, most of the original residents have been forced out due to exponentially increasing property values, and some argue that the original atmosphere have been lost. Nowadays pretty much all of Manhattan have been gentrified, and the process have moved out to nearby areas, such as Williamsburg in Brooklyn and Hoboken in New Jersey, but there is still a lot of difference in character between Chinatown, Soho, Greenwich Village, Harlem and the other neighborhoods in the city.

**ONE OF THE MAJOR REASONS FOR THIS IS** of course that many immigrants from one country or area have settled in the same neighborhood after coming to New York. Between 1892 and 1954 some 20 million immigrants caught their first glimpses of America in the New York harbor when arriving to the immigration station on Ellis Island. Today, you arrive by air, so one usually only sees Ellis Island and the nearby Statue of Liberty from tourist fer-

ries coming from the other direction. And when you arrive to one of the big airports you may feel intimidated by the Homeland Security Officers inspecting you, but the short minutes this take is little compared to the often day-long inspections and procedures the immigrants went through a hundred years ago.

**NEVERTHELESS, THE IMMIGRATION IS** to a large extent what made America what it is today, contributing their skills and efforts to build the burgeoning country. While the CETAC members spent only a few short months in America, hopefully we made some useful contributions to our training companies, we certainly felt we got valuable experience and great appreciation for our work.

**AND WE COULD NOT HAVE** gotten a better welcome to America than being greeted by New York! ■



**PEIMAN: 1.85 METERS, NO ANTENNA. THE EMPIRE STATE BUILDING: 381 METERS PLUS A 67 METER ANTENNA STRUCTURE.**



**PETTER CAUGHT IN A RAIN AT TIMES SQUARE. FORTUNATELY IT IS ONLY A MATTER OF MINUTES BEFORE STREET VENDORS APPEAR AND START SELLING UMBRELLAS FOR A COUPLE OF DOLLARS.**

## New York Numbers

Number of inhabitants:  
**8 168 388**

Number of yellow cabs:  
**12 187**

Height of tallest building:  
**448 meters including antenna**  
(The Empire State Building)

Number of boroughs:  
**5**  
(Manhattan, Brooklyn, the Bronx, Queens, Staten Island)

Year of first European settlement:  
**1613**

Years as capital of the United States:  
**1 (1789 - 1790)**

Median sale price of a Manhattan apartment:  
**\$670 000**

Number of passenger trips per year on the New York City subway:  
**1 400 000 000**



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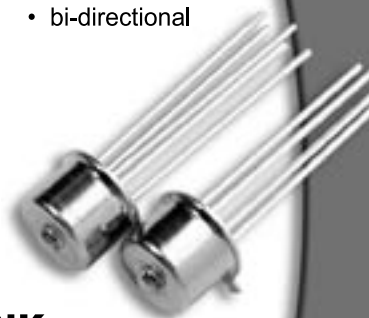
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## A small taste of engineering

The time had come and I finally arrived in NY with my two friends Anna and Daniel. We were going to Union Hotel in Manhattan. Even the getting to the hotel was exiting after all there were these suspicious looking shuttle drivers who were arguing about which one of them were going to drive us there. Slowly the New York sky-line emerged and I felt like being in a movie or something.

AFTER A FEW bedazzling days, lots of stand-up comedy, parties and David Letterman it was time for me to leave the Big Apple and arrive in Seattle, WA. Washington is the state where big companies like Microsoft, Boeing and of course Starbucks thrive. At the airport Mr Neil Rothenbuhler, the owner and Vice President of Rothenbuhler Engineering was waiting for me. He really made me feel welcome, took me to dinner and gave me a ride to my host family. The place I arrived at was the definition of “the country”. I was living in a

white villa with a cat and a dog plus two horses as neighbors. Another neighbor of ours was the company I was going to work for starting the next morning. As you can imagine I wasn't quite in my “natural” habitat. I was really fortunate with my host family who became more like my room mates and later on dear friends.

**ROTHENBUHLER ENGINEERING** is a small company and has been around since 1946. It started with new electronic devices for the logging industry and later on the making of remote firing devices for the blasting industry and also security systems for banks etc. The location is in the North Cascades town of Sedro Woolley, Washington. The company consists of three buildings, a manufacturing and office building, the engineering and parts procurement building and a complete metal shop.

**THE NEXT MORNING** I woke up, really nervous about working as an engineer for the first time. As I was introduced to all the employees, I saw a lot of electronics and as

I love electronics, I was really enjoying the sight. Also the people seemed really nice and I started to think that this was going to be as I imagined and calmed down a bit. When I got to the engineering department I got a very short briefing of what I was going to do, a ten minute guided tour of the building and devices and then my supervisor wanted me to start working. My job was to construct a vibration sensor to the existing remote firing devices (RFD). The RFDs were used, as mentioned before, by the blasting industry and their function is to ignite the fuses that are connected to the explosives. With the RFDs you can do this remotely. I started from “scratch” and made some research about which sensor to use to detect the

vibrations from the blast. My budget was \$100. After I got my first sensors I had to test them and also make some readable data out of the signals from it. This wasn't an easy task considering I wasn't sure that the sensor I had chosen was right for the job. I will not go in to further details but I can say that the job was hard, especially because it was the first time I was

**“bring your walking stick because mine saved my life once”**

### PEIMAN KHORRAMSHAHI

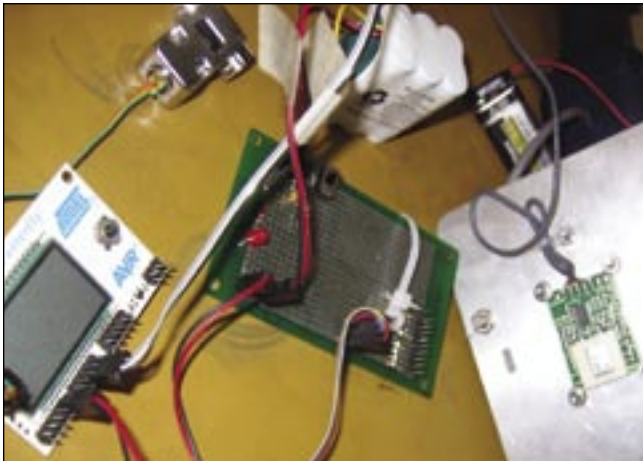
**Age:**  
24

**Majoring in:**  
Electrical Engineering

**Best US experience:**  
Standing on mount Sahali with Dan, Kevin and Christel.



**MOUNT SAHALI, WA**



**MY PROJECT.**



**MOUNT SAHALI, WA, ONE OF THE MANY STREAMS WE HAD TO CROSS.**

working professionally and I got very little help. I learned a lot in the slightly less than three months of my training. I experienced small town America and got a whole lot of new friends that I never would have found if it wasn't for Rothenbuhler Engineering.

**HIKING IS A** common word in Washington state. I think everybody there has at the very least hiked once and you can't blame them. The nature there is really astonishing. The more I hiked the more I wanted to go to the next one. My roommate Dan is a photographer and a hardcore hiker and climber. He took me to some of the most beautiful places I've ever seen, and also to some of the most dangerous. If you ever go to Washington don't forget to bring a pair of good hiking boots and a walking stick if you want to be kind to your knees. Actually absolutely bring your walking stick because mine saved my life once. I'm going to tell you more about a specific hike I made. The weather was all right and everyone in the hiking party was satisfied with the fact that it was going to be a sunny and cloudless sky. I had bought a good pair of shoes and Dan provided me with the rest of my gear. Me, Dan, Kevin and Christel were going to make a two day hike on Mount Sahali. The trail that was supposed to be an easy one, turned out to be the trail of evil. Was it even a trail? I

don't know. It was steep, had lots of streams that crossed the path, big fallen trees and really narrow paths with the mountain on your right side and nothing on your left. It didn't get easier after hearing a whole group of climbers had died there the week before. After hours of climbing we finally arrived to the camping site in the dark. After a cold night we went towards the top but not to the summit as it was getting later and riskier. The scenery was just amazing and every second of my stay up there was characterized with joy (besides loosing my camera which amazingly was recovered a week after the hike).

**SEDRO WOOLLEY** wasn't the best place if you like to party but some of the nights were really fun. Kriss and her friends took me to a karaoke night and after a couple of drinks I had to, of course, sing "a wonderful world" with a frog voice. It was also fun to play pool in a place with a real old saloon feel to it with a bunch of drunken rednecks. The third of July was fun too, the employees of Rothenbuhler Engineering all gathered and enjoyed a night with a big fireworks show and good home made food. The fourth of July I got stung by three thousand nasty mosquitoes in another town called Bellingham. Of course when it comes to Independence Day there were a lot of fireworks and we soon forgot our mosquito-paranoia.

**I SPENT THE** last week in California, explored San Francisco and went to a three day trip to Yosemite national park with one of the other CETAC members, Anna. We went to Alcatraz, had cheesecake in Union Square, drank pearl tea in China town and lots of other stuff. I warmly recommend a trip to this city, it is really unique.

**THANKS TO ALL** the nice people at Rothenbuhler Engineering, especially those who helped me, you know who you are. All you guys in Seattle, you made it worth the trip. Special thanks to Dan and Kriss. I hope I will see you all again. This was truly one of the greatest summers in my life and I will never forget it. ■

## ROTHENBUHLER ENGINEERING

### Employees:

~35

### Hosting Trainees:

1999, 2000, 2001, 2005

### Business Area:

Electronics for the blasting and logging industry.

### Web site:

[www.rothenbuhlereng.com](http://www.rothenbuhlereng.com)



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## Working at Goddard Space Flight Center

After having spent a couple of days in New York City, and having a blast there of course, I found myself more than a little nervous as the Amtrak train bound for Maryland, my new home for the summer, rolled out of New York's Penn Station.

I WAS SUPPOSED to be picked up by John Gipson, the president of NVI, Inc. and he had also very generously offered to let me live with him and his family over the summer. Only thing was, I had only spoken to him on the phone, so neither of us had any idea what the other person looked like! As I made my way off the train and onto the platform with two heavy pieces of luggage, in the sweltering heat, I started to wonder just what I had gotten myself into.

### CARL LUNDSTRÖM

**Age:**  
23

**Majoring in:**  
Engineering Physics

**Best US experience:**  
All three visits to New York City

**BUT AFTER A COUPLE** of minutes a smiling man approached me and introduced himself as John. He took me out to lunch, and then to Goddard Space Flight Center, the NASA campus where I would work for ten weeks time. There was a bit of paperwork to deal with when I got there, and the security guards even had to get my fingerprints to give me a NASA badge. After all that, and meeting most of the people working with our group in the Earth Sciences Building, John took me home to meet his family. They had arranged a room for me in the basement, and almost right after I had begun to unpack my bags I was called upstairs for dinner by Carolyn, John's wife. I had dinner with the family almost every day during my stay there, which was really nice and it made me feel very welcome.

**GODDARD SPACE FLIGHT CENTER** is located about 20 kilometers outside downtown Washington, D.C. and was the first NASA center to be built. I was impressed with the size of the place! About 10 000 people work at Goddard, but less than a third of those are civil servants, i.e. NASA employees.

Most people there work for contractors or sub-contractors, and NVI has a contract to support the Very Long Baseline Interferometry (VLBI) group at GSFC. VLBI is a technique which employs a network of radio telescopes around the world that makes simultaneous observations of quasars, and thereby very precise measurements of the relative distance between telescopes can be made. The data can be used to determine the Earth's orientation and rotation, and to detect tectonic plate motion, something VLBI has been very successful in measuring.

**MY MAIN PROJECT** at NVI has been to write a Graphical User Interface (GUI) for an old text-based program, sked, used to schedule the VLBI sessions. I used Tcl/Tk for this, which is a scripting language that proved to be great for this type of task. I started out writing test programs to learn Tcl/Tk and it proved to be pretty easy to pick up. Using Tcl/Tk, it was easy both to design a usable interface and to get it to interact with the old program.





WORKING AT GODDARD

IN ADDITION to this, I did some studies of data from old schedules. There are many parameters to consider when scheduling VLBI sessions, so being able to automate as much as possible is something that is desired. For this reason, I compared existing schedules with modified ones where the program was set to optimize for different parameters, or automatically selecting what sources to observe, etc. Doing this I gained insight in using sked, which was instructive for designing an interface for it.

IT WAS VERY NICE to participate in the work in the scientific environment that NASA is. And even though my program was limited in scope, it was rewarding to see how it evolved as the days and weeks passed. Not to mention my nice co-workers, with whom I had lunch almost every day. Our building was located in one end of the campus, and the Goddard Cafeteria was in the middle, which made for about a 20 minute walk one way, and we usually did walk, despite the temperatures being well above 30 C. I got used to the heat much faster than I had expected, and the others complained about the weather just as much as me, if not more!

ANOTHER CONVENIENCE of living with John was that I could get a ride with him to and from work every day. As I don't have a driving license it would have been very tricky otherwise.

From the suburb where I lived the commute to Goddard was about 30 minutes, depending on traffic, but public transport would have taken well over two hours one way. The D.C. area has a good public transport system, the Metro, but it's limited to getting into and out of downtown. For getting from one suburb to another, there is really no other option than the Capital Beltway, the eight-lane highway around the District. In Sweden I've never really felt that I've needed a driv-

**"It was very nice to work in the scientific environment that NASA is"**

ing license, but it's easy to understand that if you are living in an American suburb, it is one of life's necessities.

FORTUNATELY, though, during the weekends I was able to make good use of the Metro, and I spent almost all of my weekends exploring the District. Being the nation's capital, there are of course many famous monuments, memorials and buildings one has seen countless times on TV, but there are also the museums of the Smithsonian Institution, all of which I found to be really good.

AT ONE TIME in D.C. I suddenly found myself among a crowd and lots of police and Secret Service-men. Turned out the president was on the move! It was sort of amusing to me to see the enormous security arrangements just because one guy is going a couple of 100 meters! This was only a couple of blocks from the White House!

OVER THE FOURTH OF JULY weekend I flew up to Boston to visit a few other CETAC trainees, and during that weekend we also drove up to Niagara Falls, which was very awe-inspiring to see. And I liked Boston a lot too, in fact I returned there after the end of my stay at NVI, and ended up staying for over a week, it is really a nice city filled with nice people!

IN SWEDEN at least, Americans have a reputation of being very friendly and hospitable. I found this



ME WITH LARRY, ELIZABETH AND ALICE IN THE GIPSON'S BACKYARD.



GETTING WET ABOARD THE MAID OF THE MIST IN NIAGARA FALLS

to be true indeed! Thanks to everyone who has helped me in one way or another: first of all John Gipson and his family: Carolyn, Larry, Elizabeth and Alice for being so kind to me and letting me live with them and helping me out with whatever I needed, everyone else at NVI and the VLBI group at Goddard, especially Ed and Dirk for giving me rides when needed, Jonas, Natalie and Megan, thanks for letting me stay in your guest room for so long! This has been a great summer! I really must recommend everyone that gets the opportunity to experience something similar to take it! ■

## NVI INC.

**Employees:**  
~20

**Hosting Trainees:**  
1995, 1997, 1999, 2002, 2005

**Business Area:**  
Scientific Consulting

**Web site:**  
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ME AND THE OSCILLOSCOPE

## Sunny, sunny, Sunnyvale...

Living and working in Sunnyvale, in the San Francisco bay area, was a wonderful experience. RO Associates, the company I worked for, is in the power electronics business with a long history of Chalmers trainees. During the summer I worked a lot of course, but I also had time for a lot of fun like exploring California, river rafting and lots of partying.

**ARRIVING TO SAN FRANCISCO** airport, my roommate Christina picked me up and took me to what would be my new home for three months time. The apartment complex was very fresh and had a big pool, like a resort in the Mediterranean. I couldn't have chosen a better place to stay at and my roommates – Alex and Christina - were awesome! They were really funny and friendly

and they both always asked me if I wanted to join them when going somewhere. After a couple of days I realized that I really needed to get a bike so I went to the closest store and found a nice mountain-bike for 80 bucks! Having a bike I took it to work everyday which was a trip of about 7 km one way, but for me it was the most convenient way to get there since I didn't have any car.

moved and therefore a smaller sized unit can be made. My part of this project has mostly been focused on the new driver and its operation working on a modified QV48-12-12-1 unit (48V input, 12V output, 12A output). One of the first steps was to make efficiency tests and create pictures of switching characteristics of the QV48-12-12-1 unit I got. These pictures were later compared to the modified unit using the STSR2.

### ANNA VON ZWEIFBERGK

**Age:**  
24

**Majoring in:**  
Electrical Engineering

**Best US experience:**  
Clearlake, Yosemite and Lake Tahoe

**I STARTED WORKING** already at day two in Sunnyvale. After being welcomed by all my co-workers my boss, Jack McDonnal, introduced me to the project I was set to work on. I was going to be involved in the development and designing of a new converter which is to be used at 300V input and with a family of different outputs.

**THE NEWEST THING** about this design is the use of a smart driver, called STSR2, to drive the mosfets on the secondary side. With this new driver the converters will hopefully be a lot cheaper, more efficient and a lot of components can also be re-

**SOME WORK HAD** to be done before connecting the STSR2 to the main unit. I had to change and remove components, e.g. the old driver system. Also, some work had to be done to the circuit connected to the eight pins of the STSR2 before it could be connected to the converter. After having my values calculated and having soldered the components to a "surfboard" I connected this to the QV48-12-12-1 unit. I soon realized that everything does not work as you hope. There were a lot of changes to be done before the unit worked somewhat satisfying and after a lot of failures I



**ME VISITING GRAY WHALE BEACH**



**RIVER RAFTING WITH MY ROOMMATE ALEX**



**CRAYFISH PARTY AT CLEARLAKE CABIN**



**MOUNTAINBIKING AT LAKE TAHOE**

had learnt to trouble-shoot and find the blown components. I worked a long time on trying to get the jittering outgates from the STSR2 stable, by changing values for the clock signal of the STSR2. After a while we found out that it was normal to by some extent have this jitter on the outputs!

**THE UNIT FINALLY** worked satisfying with an efficiency which was a little bit lower than without STSR2. Though, there were problems at the border to discontinuous mode where I got unstable output which is due to pulse skipping and irregular pulse modulation of the PWM when entering discontinuous mode.

**A DEVELOPMENT LIKE** this is projected for about a year and there is a lot of work that has to be done. Circuit improvements, a turn off signal for the STSR at discontinuous mode and the connection between 300V primary side and 48V secondary side are just a few examples of what needs to be accomplished.

**WORKING DURING** the weeks I really tried to spend my weekends doing as much as possible! I spent a lot of the time shopping and exploring San

Francisco, but I also made longer trips like going to LA and visiting wine yards in Napa Valley. By the end of my stay in the U.S I started spending time with YSC (Young Scandinavian Club) during the weekends. It's an association for Scandinavians in San Francisco area which arrange really cool things every weekend during the summer! I went river rafting one weekend, went mountainbiking to Lake Tahoe another weekend and to the annual Crayfish Party on a third weekend. The Cray Fish party took place at Clearlake a couple of hours away from SF and we stayed at YSC's own cabin. I really had a blast the whole weekend where I (except from eating cray fish and partying) did some water skiing, wakeboarding, tubing and played a lot of volleyball.

**AFTER ALMOST 11 WEEKS** work it was time for some vacation before going back to Sweden. My CETAC-friend Peiman came over from Seattle and we had a lot of fun during his one week stay! For example, we rented a car for a week and went to see the beautiful Yosemite National Park.

**SPENDING A SUMMER** in California, I found out that I really love San Francisco! It's a wonderful

city and I really hope to go back there some day and maybe live and work there.

**I HOPE THAT RO ASSOCIATES** will be able to use this smart driver even though it was not working perfectly when I left. I had a great summer at RO and have learnt a lot about working as an engineer! Thank you for having me and for all the friendly help I've got! I would also like to thank all the companies in Sweden making this summer possible for me and my friends in CETAC. ■

## RO ASSOCIATES INC.

**Employees:**

45

**Hosting Trainees:**

2000, 2001, 2004, 2005

**Business Area:**

Power Electronics

**Web site:**

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Genom vår kunskap, kapacitet, och ödmjukhet är vi en flexibel och pålitlig partner, för dig som trivs i strålkastar-lyset.

Idag och sedan drygt trettio år tillbaka samarbetar vi med en rad kända, och en del mindre kända, företag och varumärken världen över. Samarbeten som sträcker sig över de mest skilda branscher, som alla har olika behov och arbetssätt. Allt från stora serier som ska produceras snabbt, till långsiktiga partnerskap som sträcker sig från utveckling via prototyp till färdig produkt. Och det rör sig om allt från mobiltelefoner till gräsklippare via fartyg och bredband.

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## Virtualizing a dream!

In 2002 I came into contact with one of VMware's products, VMware Workstation. Although majoring in computer science, I never thought that less than three years later I would enter an office in Silicon Valley as an intern at the world leading virtualizing company. Virtually, a dream come true.

VMWARE'S PRODUCTS aren't very easy to explain to a general audience. The easiest way is to describe their Workstation product. What it enables you to do is to run almost any operating system within your current operating system. So, if you for instance use Microsoft Windows, you could use VMware Workstation to run Linux simultaneously. This is quite cool, but if you expand this software to run on dedicated powerful servers, that's when it becomes very interesting for large companies.

### DANIEL ROTH

**Age:**  
25

**Majoring in:**  
Computer Science & Engineering

**Best US experience:**  
The road trip with my girlfriend.

MY TIME AT VMware has been really pleasant so far. The company cares about its employees and there is always something happening. One event I often participate in is soccer during lunchtime on Thursdays, but still running is the sport I do most often. It didn't take me long time to find people to run with and after winning the San Francisco Marathon 5k run at a new race record, 15.43, I became quite well-known among the people interested in sports at VMware. I am also a regular in the pinball room.

VMWARE HAD approximately 60 interns this year, where I have gotten to know Chris Chu Lin and Srinivas Dandu, the most. Srinivas was an intern last year, this year mentoring Chris, who is doing a half year internship. These two guys have been really nice, and are the two people I have spent most of my spare time with; rafting, golfing and going to the cinema.

I GOT ASSIGNED to the Quality Assurance department. The main goal for us is to make sure that

there are no bugs in the VMware products. This is done by testing all different configurations and features. Since this is not something you can do very easily, and it would take too many resources and time to test them by hand, QA mostly implements automated tests. When new products are about to get released they go through intense testing. However, scheduling all the different tests for the different configurations in an optimal way is not easy. Actually, it has proven to be impossible within a reasonable time.

NATURALLY, SINCE MY STUDIES at Chalmers have been focused on algorithms, I was given the assignment to implement a distributed test system which could solve the problem as effectively as possible, but within a reasonable time. The plan was to have a pool of hosts and a centralized server managing and running tests on them. This might sound easy, but was difficult enough to be accepted as a master thesis project at Chalmers.

**"Virtually, a dream come through"**

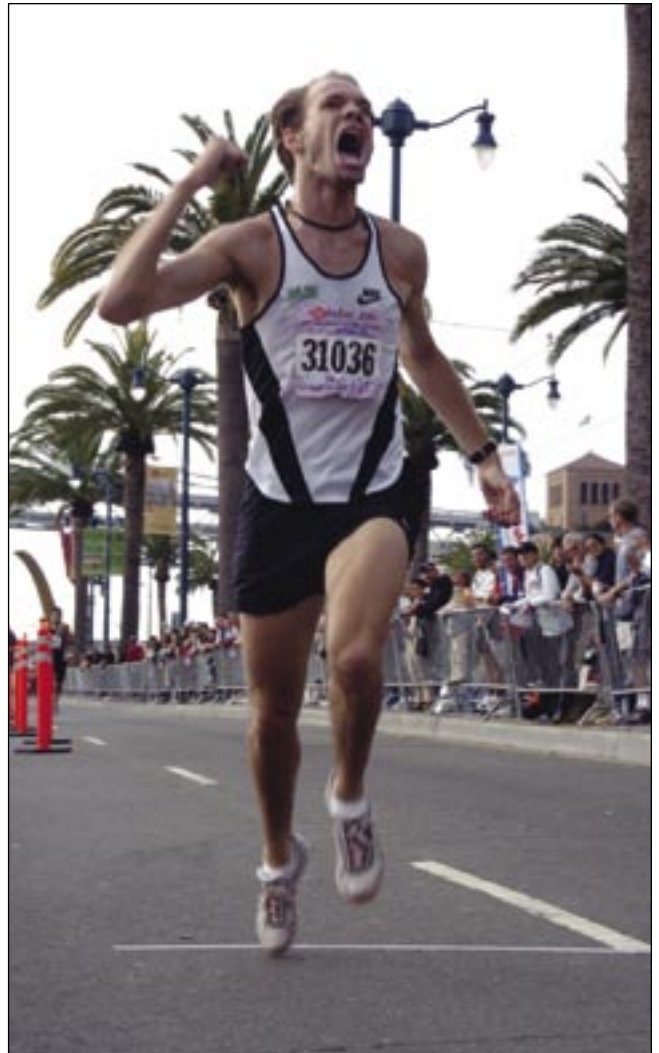




**SOMEWHERE HERE IS MY SERVER. I JUST WONDER WHERE...**



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**QUITE HAPPY WINNING THE SAN FRANCISCO 5KM RACE AT NEW RACE RECORD**

**BUT LONG BEFORE** being able to start with that I had to learn about how VMware works, which is why I got a mentor, Spiro Kourtessis. Spiro is head of the automation group, which was the group I was placed in. The automation group automates tests which makes it possible to run a test with just a single command. Then the test itself will do all the setup and monitoring of the running test. That's really neat!

**AFTER APPROXIMATELY** two months I got assigned another task, BAT testing. BAT is short for Build Acceptance Tests, and these are the tests which are run automatically on every new build of a certain product. For this task I got another mentor, Elena Gorvitovskaia. Combining BAT with the distributed test system is still what I am working on, four months into my training. We'll see which tasks I will be assigned to do later!

**"after winning the San Francisco Marathon 5k run, I got quite well-known"**

**HALFWAY THROUGH MY** internship I got my well-deserved vacation. A road trip was set up taking me and my girlfriend to Las Vegas and Los Angeles. From Las Vegas we took a small airplane to the Grand Canyon. Once there, we had a chopper waiting for us, which flew us down to the Colorado River for some speed boating. Then up again with the chopper, a bus tour to the most famous viewpoints where we also had dinner. After that we went back to Las Vegas on the plane and saw Mamma Mia at Mandalay Bay. What an amazing day!

**IN LOS ANGELES** we visited Venice beach, "Universal Studios" and the roller coaster park "Six Flags Magic Mountain". Of course we also went to see the Hollywood sign and the stars on the "Walk of Fame".

**FINALLY I HAVE** to thank the whole system test group for all their help, Director Henrik Amren

for having me as an intern, Spiro Kourtessis and Elena Gorvitovskaia for all their help, guidance and support. Ole Agesen and Kit Colbert for all the nice runs and finally my girlfriend for putting up with me being away. ■

## VMWARE INC.

**Employees:**  
~1400

**Hosting Trainees:**  
2004, 2005

**Business Area:**  
Virtual infrastructure software

**Web site**  
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Av Peter Tell, PIAB AB, uppfinnare av principen för flerstegsejektorer och COAX®-tekniken.



**COAX®-tekniken ger flerstegsejektorn en helt ny dimension och ger industriella tillverkare möjligheten att uppnå vad som tidigare ansågs vara omöjliga vinningar i produktivitet och sänkning av energiförbrukning.**

I en alltmer konkurrenskraftig värld måste alla industrier maximera effektiviteten och flexibiliteten och samtidigt minimera kostnader och det utrymme som maskiner kräver. Vakuum, eller negativt tryck, används i ett stort antal industrier t ex förpackningsindustrin, fordonsindustrin, transportindustrin och den grafiska industrin. De existerande vakuumsystemen är emellertid inte alltid optimerade för sina ändamål på grund av fysiskt format och systemens komplexa beskaffenhet.

## Historiskt sett förbättrar miniatyrisering och decentralisering effektiviteten

Genom tiderna har miniatyrisering och decentralisering använts för att förbättra kostnadseffektiviteten i många olika industrier. De första datorerna som introducerades var, till exempel, konstruerade som centralenheter (stordatorer) – stora, dyra och centraliserade datorer.

När mindre och kraftfullare processorer utvecklades blev det möjligt att distribuera datorkraften till användarens närhet för att optimera funktionalitet och reaktionstid.

På samma sätt har telefonnätet utvecklats från komplicerade, centraliserade växelutrustningar till moderna, mobila nätverk i vilka det mesta av funktionaliteten ryms i handburna telefoner i nätverkets periferi.

## Vikten av avståndet från användningsstället

Det ovan nämnda illustrerar hur decentraliserade arkitekturer, som distribuerar hanteringskraft närmare användningsstället, till sin natur är effektivare eftersom de eliminerar problem med avstånd och ledningsförluster. Genom att eliminera avståndet som en faktor förenklas den totala konstruktionen och reaktionstiden förbättras avsevärt, vilket bidrar till förbättringar i produktivitet och funktion. Att eliminera hanteringsavstånd är särskilt relevant vad det beträffar vakuumsystem, eftersom ju längre avstånd mellan vakuumpumpen och användningsstället, desto större energiförbrukning för att övervinna ledningsmotstånd och ökad evakueringsvolym.

## Traditionella vakuumsystem och energibesparing

Typiska vakuumsystem är ofta centraliserade, mekaniska pumpar. Vakuumpumpen är ofta monterad på en avlägsen plats, ibland ganska långt borta från användningsstället, på grund

av brist på utrymme, underhållsproblem, eller det ljud och värme som pumpen genererar. En pump kan vara avsedd att driva en maskin med ett antal vakuumpumpar t ex sugkopp, eller så kan ett centralt vakuumsystem ibland förse en hel fabrik. Dessa pumpar är vanligtvis elmotordrivna. En mekanisk pump använder i princip samma pumpningsmekanism som en kompressor. Så kallade "Vingpumpar" är mekaniska pumpar och är mycket vanliga. De har rotor placerade runt en axel som är excentriskt placerad i ett koncentriskt hus.

## Centraliserade pumpar förbrukar mer energi och är mindre kostnadseffektiva

Traditionellt sett är centraliserade vakuumsystem mindre effektiva på grund av bl a den större volym som skall evakueras och det större ledningsmotstånd som skall övervinnas. Pumparna måste också dimensioneras för att kunna klara av "värsta driftsfallet". På grund av dessa faktorer är dessa pumpar ofta överdimensionerade, vilket resulterar i högre anläggningskostnader och högre energiförbrukning.

Genom extra volym och ledningar som måste evakueras begränsas evakueringshastigheten. I maskiner med mycket snabba cykler så måste ledningshastigheten vissa fall överskrida ljudhastigheten, vilket är teoretiskt omöjligt, för att konkurrera med ett decentraliserat system.

## COAX® optimerar användningen av energi och förkortar cykeltiden

I och med den nya tekniken "COAX® Technology", baserad på en integrerad flerstegs ejektorer, kan mycket små vakuumpumpar placeras direkt vid användningsstället.

COAX® flerstegs vakuumejektorer i cartridge-format finns i storlek ned till mindre än en penna, vilket gör de tillräckligt små för att integreras direkt vid förbrukningsstället som t ex kan vara en sugkopp. Genom att eliminera vakuuledningar mellan vakuumpumpen och användningsstället kan prestandan förbättras avsevärt och samtidigt spara energi.

## COAX® ger mätbara resultat

Möjligheten att använda vakuumpumpar intermittert i direkt anslutning till användningsstället reducerar dessutom energiförbrukningen ytterligare. Ett sätt är att använda en s k "Vacustat" som stänger av pumpen när inställd vakuumnivå erhålles. Om vakuumnivån faller på grund av läckage, aktiveras pumpen åter för att upprätthålla den inställda vakuumnivån.

## Exempel på materialhantering inom fordonsindustrin

En mätbar illustration av fördelarna med energi- och kostnadsbesparingar genom att använda COAX® förverkligades i en oberoende studie av materialhantering hos en biltillverkare i USA. Kingman Yee, Professor i maskinteknik vid Lawrence Technological University, gjorde en studie där han jämförde ett traditionellt vakuumsystem med "COAX® vakuumpump" försett med en "Vacustat". Elförbrukningen minskade med nittioåtta procent, en "häpnadsväckande besparing".

Docent Yee fann att vakuumpumpen i en decentraliserad konfiguration kan reducera den årliga energikostnaden hos en enda sugkopp med ~US\$200. För en tillverkande industri som i detta använder hundratals eller tusentals sugkopp kan besparingarna bli mycket stora.

## Nya integrerade styrutrustningar sparar ännu mera energi

Till allt detta har introduktionen av COAX® gett liv till nya uppfinningar av olika integrerade energisparande styrutrustningar, såsom PIAB Cruise Control (PCC™) och PIAB Automated Vacuum Management (AVM™). Dessa vakuumpumpar och kontrollutrustningar möjliggör stora energibesparingar, vid olika typer av industriella applikationer.

Sådana energibesparingar, tillsammans med förbättrad produktivitet och reducerade underhållskostnader, utgör påtagliga fördelar med miniatyrisering och decentralisering av industriella vakuumsystem.

Förutom att spara energi och öka produktivitet i fordonsindustrin är dessa nya koncept för konstruktion av vakuumsystem också effektiva för annan industri som förpackningsindustri och grafisk industri m fl.

Avslutningsvis, så måste industriella tillverkare vara beredda att dra nytta av de fördelar som miniatyrisering och decentralisering ger.

*Den som är intresserad av ytterligare information bör besöka [www.piab.com](http://www.piab.com) för att läsa mera om "Optimized Vacuum Management (OVM)," en serie av schemalagda kurser i konstruktion av vakuumsystem som erbjuds av PIAB Vacuum Academy.*





ME DOWNLOADING NEW SOFTWARE TO ONE OF THE AGVS AT A CUSTOMER

## A warm summer in Florida!

After a fantastic week in “The Big Apple”, my destiny was a flight south to USA’s oldest city, St. Augustine. I entered the airplane wearing two sweaters and a jacket. A couple of hours later I left the same plane wearing the same clothes. This was certainly not needed. Outside the temperature was over 35 degrees Celsius. A shock for me coming from chilly Sweden. This was just the beginning of the best summer of my life.

**I WAS PICKED UP** at the airport by my roommate Dick Fast, who also works at Amerden Inc. We drove directly back to his house to get me situated in my room. Any worries that I had before the trip were now gone. Five minutes after I carried in my suitcases in my room I sat on the deck out in the warm sun with a beer in my hand. I don’t think I could have gotten a more perfect start in St. Augustine. After a while my boss Mr. Roland Anderson showed up. Together the three of us went

down to a local café at the beach for dinner.

**THE NEXT DAY** was my first at Amerden Inc. I got introduced to all coworkers and installed in my own office. All administrative things when you begin at a new company were taken care of also before lunch. The rest of the day I spent with Mr. Mark Collins. He gave me an introduction to all the main components and software they used. Amerden Inc. is specialized in designing custom Automated Guided Vehicle Systems, AGVs, for material handling needs. It is a small company with only seven employees. Perfect for me since I got to know everybody well after just a week or two.

**I SOON GOT** involved in a big project that almost took the whole summer to complete. Baxter, a healthcare company in North Carolina, had bought an expansion of their existing AGV system from us. In this particular system the AGV’s were guided by four wires in the floor containing different frequencies. My first task was to figure out how to cut the floor for the wires to connect

the two old systems with a third new one. This was a task that seemed easier in the beginning than it really was. There are a lot of things you have to think about what you can and cannot do that I learned the hard way. But after a couple of days I had come up with a good solution to the problem.

**IN THE END** of June Roland and I got into his car and drove up to North Carolina to install the system on spot, my very first business trip. A 500 mile drive one way from flat and hot Florida up to not so hot and hilly North Carolina. Driving on the interstates here is something completely different from driving the E20 to Stockholm. Here you can drive for hours without even touching the steering wheel. Not the funniest thing you can do in this country.

**AT BAXTER I HAD** the first couple of days make sure that the guys cut the floor and put in the frequency cables actually did exactly what they suppose to do according to what I had come up with before back in Florida. No matter how good instruc-

## JONAS OHLSSON

**Age:**  
24

**Majoring in:**  
Electrical Engineering

**Best US experience:**  
Watching the space shuttle launch from Kennedy Space Center.



**ME AND ALL MY COLLEGES AT AMERDEN, DAVID, STEVE, DICK, PATRICIA, MARK, ROLAND, CHRIS AND ME**



**MY OWN OFFICE AT AMERDEN**

tions you have put together there is always room for errors. But after a couple of days the floor finally got the correct cables at the correct places and I could move on to my next assignment. I had to program all the AGVs' so that they went where they were suppose to, stopped at the right locations, did not crash into each other etc. After a couple hours of practicing with AGV's running amok and crashing into each other I started to get the hung of it and from there on it only got better. A week later I had finished programming the whole system with plenty of time left for testing the system before live production.

**DURING MY VISIT** to North Carolina I got the chance to do some sight seeing in the mountains. Near the plant is the Blue Ridge Parkway pass, one of USA's most scenic highway. Unfortunately had the mist also founded its way to the road when I drove on it which limited my line of sight to 3 feet ahead of my car. But at least I can say that I did drive the highway.

**THE REST OF THE STAY** at North Carolina contained supervision of the system in live production and documentation. I got to go back to Baxter in middle of August to make some follow ups and fine tuning of the system. I has been great to be involved in a live, full scale project like this one because it gave me an insight in how an engineer actually works and what different parts that are involved in a real project. It gave me a lot of good experience for the future.

**SINCE WORK TIED UP** most of my times on weekdays I used my weekends to explore the surrounding parts of northeast Florida. I drove up to Jacksonville to watch a NFL game in pouring rain and hit the beaches the next day with clear blue

sky and almost 40 degrees Celsius outside. This is an example of how different the weather can be here in Florida. It can pour down rain for on hour and then 10 minutes after that the sky could be clear of clouds and the big yellow sun once again start to burn my body. I also got the opportunity to drive down to Kennedy Space Center and watch the launch of the Discovery Space Shuttle. This was an extraordinary experience to actually see and hear the huge rocket leaving the face of the earth for space. A moment I will remember forever.

**"actually see and hear the huge rocket leaving the face of the earth for space"**

**IN USA EVERYTHING** is suppose to be done fast. You got tons of fast food chains, some that almost never closes, fast oil changes on your car, fast credit approval etc. But one thing amazed me more than the other, they got fast banking. Drive through banking was a completely new concept to me. You pull up your car to a box with a tube leaving it. Then you put your bank errands in a container and put the container in the box and push a button. Then the container travels into the bank via the vacuum tube and after a couple of minutes you get the container back with receipts, money etc. A nice service that can be done even on Saturdays.

**ONE BIG PROJECT** during the beginning of the summer was buying a car. This was not as easy as I had hoped. In order to own a car I had to have insurance. And to get insurance I have to have a Floridian driver's license. So I went to the City Hall and took the written and practical exam, paid \$25 and got my license and a couple of days later a car of my own. This gave me much more freedom to explore Florida. I drove down to Daytona Beach one day and walked on the famous beach looking at the huge Sheraton and Hilton hotels basically constructed on the beach. In the end of the sum-

mer I drove down to Orlando to meet up with a fellow CETAC member Jonas Fast and his girlfriend. We visited Universal Studios and Island of Adventures together. It was a very fun weekend and the attractions in USA are not only bigger, steeper and faster than I have ever seen before, they are also wetter. When you are supposed to get wet you get soaking wet. Luckily the Florida sun took care of that "problem" quick.

**THANKS TO EVERY ONE** at Amerden for making this summer the best summer in my life. Roland for giving me the opportunity to come to Amerden and all your help and guidance in my work, Patricia for all the administrative help both at Amerden and in the life outside work, Chris for my computer troubles, Dick for letting me stay with you and helping me get settle in St. Augustine, Mark for explaining how everything works and guidance in my work, Steve and David for your patience with me out in the shop working hands on at the AGV's. When I am writing this it is the beginning of September and the summer is over. I have completed 3 great months and looking forward to my next 9 here as a trainee in the paradise in the northeast of Florida where the summer never ends. ■

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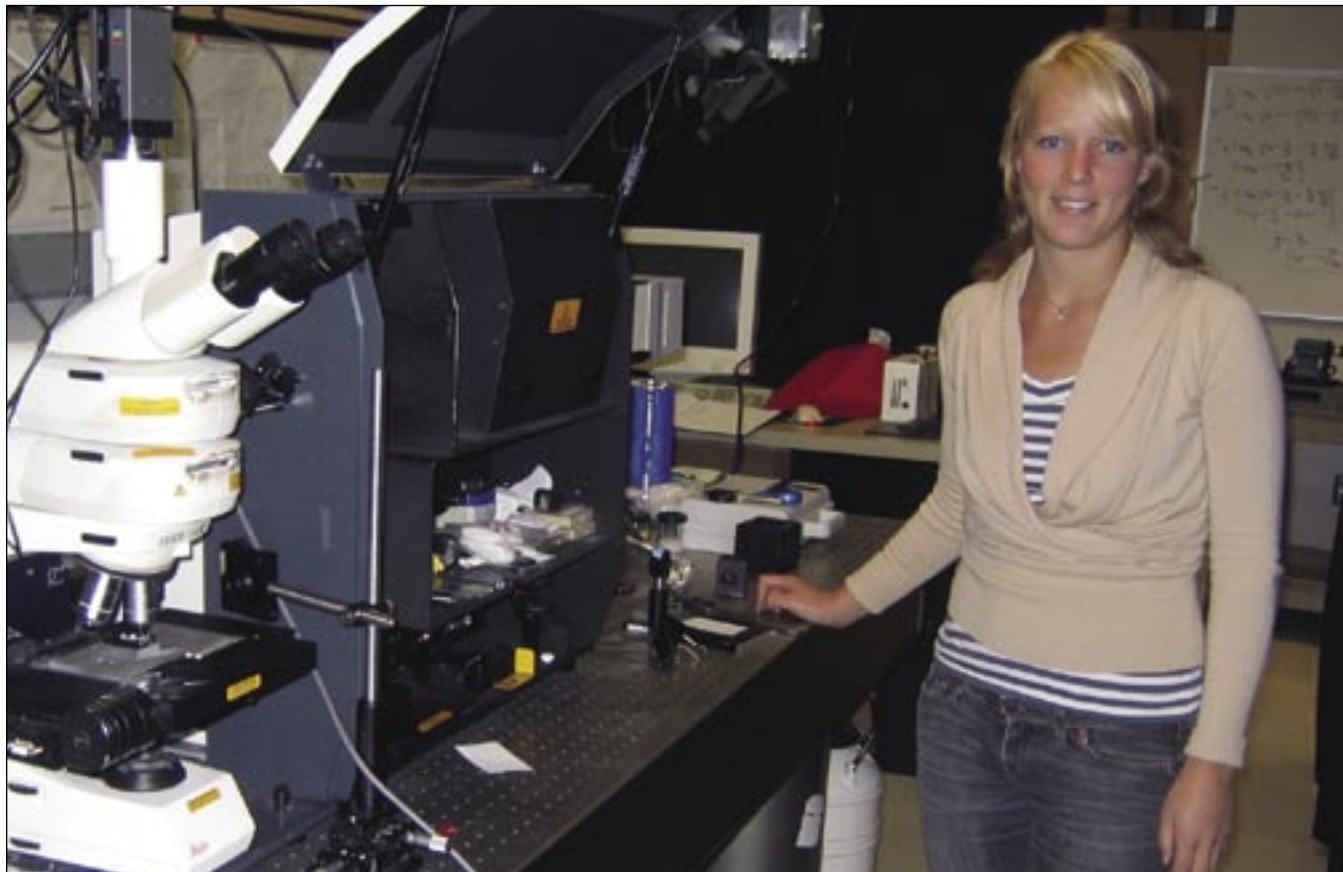
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ME NEXT TO MY EQUIPMENT IN THE LAB

## Best of Boston

The Greyhound bus was approaching Boston, the place where I would spend the following two and a half months. People had told me a lot of good things about Boston so I was looking forward to get there.

I WAS GOING to do my training in the Photonics department at Boston University on a project in optics. My mentor Professor Anna Swan had once been an Engineering Physics student at Chalmers, the same program I am in now. I had spoken to her over the phone but did yet not know really what to expect. I was excited, how would the work be, who was I going to work with, would my project be as complicated as the research papers I had read? When the bus drove into the city, I could see

all the high buildings rising towards the blue sky and the wide Charles River with sailing boats and people strolling next to it. I had a feeling I had a real good summer in front of me.

MY PROJECT AT BOSTON UNIVERSITY was to improve a method to get higher resolution for an existing self interference microscope. Self interference appears when light is emitted close to a reflecting surface. In this case we used fluorophores as light emitters. The fluorophores are excited with laser light of a certain wavelength and as they deexcite they emit light of greater wavelengths than the laser light. The fluorophores were attached to a very thin glass layer above the reflecting surface. When the fluorophores emit light, the rays can either get to a certain point in the room directly from the fluorophore or by first being reflected on the reflecting surface. The direct and reflected rays from the emitting fluorophores

interfere with a certain phase difference and contribute to an interference spectrum. The interference spectrum is a plot of intensity over a range of wavelengths. When self interference exists, fringes appear in the spectrum. By studying the fringes in the spectra, the distance between the fluorophores on the glass and the reflecting surface can be determined.

**"It is a never ending story, the more I get to know, the more I know that I do not know"**

A SELF INTERFERENCE MICROSCOPE can give us axial positions to precision of nanometers and by looking at different heights of the glass layer the lateral resolution can be found. My project was to minimize the spot size of the microscope and in that way get a higher lateral reso-

lution. The spot size of an objective is dependent on the collection angle. To get a small spot size a wider collection angle must be used. The bigger the collection angle, the bigger is the collection area. That is, more signals are collected from a

### ASTRID EDSTRÖM

**Age:**  
24

**Majoring in:**  
Engineering Physics

**Best US experience:**  
Being able to have a Dunkin' Donut on each and every street corner.





**ME AND EMRE IN THE CLEAN ROOM. HE WAS HELPING ME ETCHING A SAMPLE WITH A LETHAL CHEMICAL THAT I DID NOT WANT TO GET TOO**



**ME AND SOME FRIENDS ON A WINDY WHALE WATCH IN THE BAY OUTSIDE BOSTON.**

certain point on the sample. This contributes to an indistinct signal because the collected rays all have different phase differences and therefore their interference spectra are shifted compared to each other. The sum of all the spectra contributes to an indistinct signal without clear fringes and can not give us any information of the height of the glass layer. To get a distinct signal, light has to be collected from a small collection angle but to be able to keep the spot size small enough the sample had to be illuminated with a big collection angle. The purpose of my project was to find the ultimate way to do this.

**THE FIRST WEEKS** in the lab I spent time on understanding the task and reading about the theory. One thing I have learnt about researching is that it is impossible to be able to learn everything. For every new subject I studied, I discovered many new subjects that I did not know about. It is a never ending story, the more I get to know, the more I know that I do not know. When I finally had learnt about the subjects that I needed for my project, I started to do experiments with the microscope. It was encouraging having my own project to work on, and exciting to try different theories, but also disappointing when a theory failed. Then I had to re-think and step back to review or ask one of my coworkers, who could help me with a new idea. Especially one coworker, Mehmet, who was familiar with the project, helped me those times when I felt that I had tried everything that could be tried but he always showed me that that was not the case.

**THE PROJECT INVOLVED** other areas than just optics, such as biology and chemistry. This gave me the chance to get a glance at a few other areas at

the university. We needed biology to be able to find a way of applying the fluorophores on the samples and chemistry to etch the samples to different shapes.

**EXCEPT THE INTERESTING WORK** at Boston University I was very fortunate to be able to spend the summer in such a great city as Boston. It was just as nice there as people had told me. Boston is not like any other city I have been to in the United States. First of all it is a city where you can walk all over. There is no need to have a car; one can

easily get around by the underground trains called the T, or even better by walking. The city is located at the ocean and it has a beautiful harbor where it is lovely to watch the boats by the sound of screaming gulls. In the touristy areas there are street performance

such as break dancers doing somersaults over five persons and clowns juggling with chairs. There were bars and restaurants and it seemed as it was something going on there every night of the week. Boston could also offer shopping, night clubs, baseball games with the home team Red Sox and parks where people relaxed during the nice summer days and watched outdoor theater when the dark fell.

**THE AREA AROUND BOSTON** was also worth visiting. Up the coast all sorts of beaches could be found, empty, packed, exploited or hidden. During the weekends me and my friends sometimes took the car, drove north and stopped whenever we found a nice beach which we had not been to before. On the way home we stopped in fishing resorts and had seafood dinner in the small family owned restaurants. We also visited some amusement parks; I believe America's amusement parks

have to be the best in the world. There was Water Country with slides in all different shapes and angles and Six Flags with some crazy roller coasters. One sunny afternoon we went whale watching in the bay outside Boston. The expectations of the trip was not very high when we left Boston and guess if we were surprised when a 30 meter long sei whale came up to the surface in front of the boat and dove down right under us. It was as though the whale knew what the people on the boat wanted and did a private performance for us.

**THE WHOLE SUMMER** ended with a road trip with some friends from Chalmers on the west coast and that put an end to a great summer in the United States. I want to thank my mentor Anna for making my visit in Boston possible, Mehmet for always being able to answer every question I possibly could come up with, Andy for his happy laughs, all the other people in the lab and the funny guys in the lab on the seventh floor for always making my lunch breaks enjoyable! I hope to see you all again sometime, either in Boston or in Sweden. ■

**"Boston is not like any other city I have been to in the United States"**

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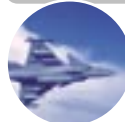
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## Experiences for a lifetime in the city of champions

Boston, home of Boston Red Sox and New England Patriots, last season's baseball and football champions, was to be my home for the following 12 months when arriving there on a beautiful summer day on a Greyhound bus from New York City.

HOWEVER, THOUGH GLAD and full of anticipation, I was a bit worried. I instantly needed to get a car to be able to get to work the next day, since my host trainer Alpha Software Inc. resided in Burlington, which is located 25 km north of Boston and not really accessible via public transportation. Also, the girls I was going to stay with were out of town and I had no idea of how to get in touch with the guy who had my apartment keys, or where to buy a mattress for my unfurnished room...

THE PREVIOUS WEEK in the awesome city of New York together with the rest of CETAC had been

### JONAS FAST

**Age:**  
25

**Majoring in:**  
Computer Science & Engineering

**Best US experience:**  
Snorkeling in the world's third-largest reef outside Key West, Florida.

great, and I had been very lucky. I was chosen to participate in a commercial in Central Park, and I won tickets together with CETAC treasurer Peiman Khorramshahi to go see the Late Show with David Letterman. It was a great show and we even got to hear Letterman sing! And fortunately for me, my luck followed me to New England, after 3 hours in Boston I had bought a cheap second-hand car and spoken to the guy with my keys, who also happened to have a spare mattress to give to me for free!

THE NEXT DAY I drove my new car the 30 min drive to Burlington and Alpha's office. I had been told the traffic wouldn't be a big problem since I would commute out of Boston and reverse to the heavy traffic into the city. I was glad to find out this was true, I had a smooth ride to work but on the other side of the highway the cars hardly moved at all during my whole drive. When I arrived at Alpha Software I was greeted by the co-President Selwyn Rabins, who showed me to my office and introduced me to the staff. I felt that this was the start of an unforgettable experience!

ALPHA SOFTWARE IS a company aiming to build cutting edge database software that enables any-

one to build custom applications and solve database management problems quickly and easily. The company's award winning flagship product Alpha Five is a sophisticated database management and application building tool with a clever user interface that makes the program very intuitive and easy to use. By using Alpha Five, anyone - programmer or non-programmer - can build complex database driven web or desktop applications in a brief amount of time without having to write any code.

MY FIRST TASK was to get to know the versatile program Alpha Five, and to learn XBasic and XDialog, Alpha Software's own programming languages. XBasic is a powerful programming language similar to Visual Basic, with lots of built-in functions, and XDialog is a fast way to build dialog boxes. They both turned out to be easy to learn and very convenient to use. After this introduction, my time at Alpha has consisted of working on several different projects, mostly on the client/server part of Alpha Five. Alpha Five has its own built-in web server and works with almost whatever database server one might have. I have for example been working with database connections and SQL queries, developing parts of new





**PARTS OF THE STAFF AT ALPHA SOFTWARE**



**ME AND MY GIRLFRIEND JOSEFIN AT THE SOUTHERNMOST POINT OF CONTINENTAL USA IN KEY WEST, FLORIDA**



**LAUNCHPAD 39B AT THE KENNEDY SPACE CENTER, WHERE SPACE SHUTTLE DISCOVERY WAS LAUNCHED A MONTH EARLIER**



**ASTRONAUT ENCOUNTER! MEETING ASTRONAUT JON MCBRIDE AT THE KENNEDY SPACE CENTER**

functionality for the next version of Alpha Five, and doing research for new features to support. The work has been great fun and my knowledge in database management, SQL and programming gained at Chalmers has certainly been very useful.

**LIVING IN BOSTON** and owning a car turned out to be two really good premises for having fun on the off-work hours. Boston is a fantastic city with a nice harbor and a charming city center, and with a beautiful (but not especially clean) river, Charles River, dividing Boston from Cambridge. Boston feels like a small big town; it is geographically pretty small, the whole city is more or less within walking distance, but it has all of what a big city has to offer. And apart from all the things to do in the city, like going to movies, pubs, concerts and sports events, there are also lots of things to do just a quick drive away, like whale-watching, exploring New England's best beaches, amusement parks, outlet malls etc. I guess there is a reason why Boston is called "the Hub". Special highlights of the summer are the road trip to Niagara Falls, visiting Ocean City in Maryland, winning the

summer soccer league I joined, the astonishing fireworks above the Charles River on July 4th, the wonderful shores of Cape Cod and of course the luxury of living close to New York City, my new number one favorite city. Just a ridiculously cheap bus ride away from Boston, the City is a perfect weekend destination.

**IN THE BEGINNING** of September I went to Florida for two weeks for some vacation together with my girlfriend Josefin who had been spending the summer as a riding instructor at a summer camp in New York State. We were worried about the hurricanes but were lucky, arriving two days after Katrina and leaving two days before Ophelia. We traveled all over Florida and spotted celebrities in Miami Beach, snorkeled in Key West, encountered alligators in the Everglades (what an amazing place!), were guided in rocket science and met astronauts at the Kennedy Space Center (what an amazing place!) and finally went amusement park-hopping together with fellow CETAC-member Jonas Ohlsson in Orlando. It was an awesome trip, Florida is fantastic!

**FINALLY I WOULD** like to say thank you to every one at Alpha Software for the support and pleasant surroundings at the office, and especially to Mr. Selwyn Rabins and Mr. Richard Rabins for agreeing to be my host trainer and making this whole experience possible for me. What more can I say than that it is a dream that has come true. I have had a great time and it almost feels like what I have experienced in the U.S this year is more than enough for an entire lifetime. ■

## ALPHA SOFTWARE

**Employees:**

~15

**Hosting Trainees:**

2005

**Business Area:**

Database Software

**Web site:**

[www.alphasoftware.com](http://www.alphasoftware.com)

# ELEKTRA-programmet stödjer elkraftteknisk forskning

ABB, Elforsk (elföretagens gemensamma forskningsbolag) och Energimyndigheten driver gemensamt ett elkrafttekniskt forskningsprogram benämnt ELEKTRA. Programmet omfattar såväl traditionella krafttekniska frågeställningar såsom elkrafttekniska material och elmotordrifter som tillämpning av ny kunskap från andra områden, till exempel informationsteknologi, bioteknologi, rymdvetenskaper, komplexa system mm.

Programmet finansierar för närvarande ca 45 forskarstuderande på ett antal institutioner på CTH, KTH, LTH, MdH och Uppsala Universitet. Avsikten är att långsiktigt stärka konkurrenskraften hos elföretag och tillverkande industri, och samverkan mellan industri och forskarstuderande stimuleras.

Programmet beviljar också stipendier för elkraftteknologer för att täcka de merkostnader som uppstår vid examensarbete utomlands, speciellt inom det elkrafttekniska området.

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**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, students 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**



THE CETAC MEMBERS VISITING ASF AT NEW YORK CITY'S SCANDINAVIA HOUSE



## California Dreamin'..

During my so called hiatus, year off from school I traveled to the States amongst other places, mainly to California to visit friends and family. This experience influenced me to participate in CETAC 2005. The year was turbulent to say the least, but to finally enjoy the fruits of our labor made it all worthwhile. I got to work with a group of talented people who I now consider my friends and got to experience the best summer of my life.

IT ALL STARTED with the annual trip to New York, practically just to finalize our papers but I can say without any hesitation that it was the last thing on my mind. To walk through the streets of Manhattan, beneath the beautiful high rises and amongst the many people you truly sensed that you were in one of the greatest cities in the world.

### NAVID HARIRI

**Age:**  
24

**Majoring in:**  
Electrical Engineering

**Best US experience:**  
The many friends I made

I DECIDED TO stay on the east coast for another week visiting the beautiful state of Massachusetts and Cape Cod. Me and my friends, who accompanied me, visited families of theirs and we had a fine time, enjoying the weather and beaches. After a couple of weeks of well deserved vacation it was time to travel to my main destination, San Diego and to start my internship with Nor-Cal Products Inc.

NOR-CAL WAS A company mainly involved in the stainless steel industry designing and manufacturing vacuum pumping stations for the dairy industry. In response to the demand for vacuum applications from the semiconductor industry the company underwent a change during the 1960s and has since then been developing high-end vacuum

products for the semiconductor industry.

NOR-CAL PRODUCTS INC. corporate headquarters and production facility is located in Yreka, a small town in northern California although I spent my summer in beautiful San Diego, located by the Mexican border in southern California. I arrived in San Diego on a Monday and straight away, my supervisor, Sr. Product Manager Per Cederstav informed me about our trip to Yreka the next

**"the Americans are generally very nice and outgoing people and I made lots of friends"**

day. Although I was kind of unprepared I ended up having a blast during the three days we spent up there. We managed to squeeze in a short trip to a small town called Ashland in southern Oregon, world famous for there Shakespearean festivals held every summer. I also got the chance to visit the production facility where Nor-Cal produces the



ONE OF THOSE RARE WINDY DAYS DURING MY VISIT IN CAPE COD



THE PENDULUM VALVE, ONE OF THE PRODUCTS CALIBRATED WITH THE CALIBRATION PROGRAM



ME AND MY FRIENDS, PREPARING FOR A NIGHT OUT IN DOWNTOWN SAN DIEGO

vacuum chambers and received some of the tasks which I were to complete during the summer.

**GETTING USED TO** the lifestyle in San Diego is an easy thing to do, the beautiful weather is certainly one of many contributing factors. Work took up lots of time; I was supposed to implement improvements on the calibration program that last year's intern had left behind. The program was written with a graphically based language called LabView, a program I had briefly touched on before. What was kind of confusing at first, getting familiar with the code already written and some of the more complex aspects of LabView soon became a piece of cake. I was tasked with more improvements to be made and that work occupied me for first couple of weeks.

**BESIDES WORK,** there is no shortage of things to do while living in San Diego. Most of my pastime was spent entertaining friends that visited me

from Sweden and getting familiar with the night-life of San Diego. Even while living there alone, surprisingly, friends aren't hard to come by, the Americans are generally very nice and outgoing people and I made lots of friends. These people include my colleagues which made going to work

**"After a couple of weeks in San Diego you could say I was getting used to the lifestyle"**

such a fun and rewarding experience, I will not forget our usual Mexican hangout during lunch hours and their tasty burritos.

**AFTER A COUPLE** of weeks of LabView Per decided it was time for me to try on something else. Knowing my interest for marketing and sales, considering I have studied business administration he let me work on a project involving internal sale and customer protocols which was greatly appreciated by the concerned departments. The protocol would help them achieve a lower percentage of errors concerning sales with higher customer satisfaction in mind.

**OVERALL I GOT** to experience a highly diverse and rewarding working environment; I would like to thank Nor-Cal for their ongoing support for CETAC and for giving me the chance to apply what I've learnt through the years at Chalmers to actual use. Most of all though I would like to thank Per Cederstav and my fellow co-workers in San Diego who made it easy for me to excel and do my best. ■

## NOR-CAL PRODUCTS INC.

**Employees:**  
200

**Hosting Trainees:**  
2002, 2004, 2005

**Business Area:**  
Supplier of vaccum equipment

**Web site**  
[www.n-c.com](http://www.n-c.com)

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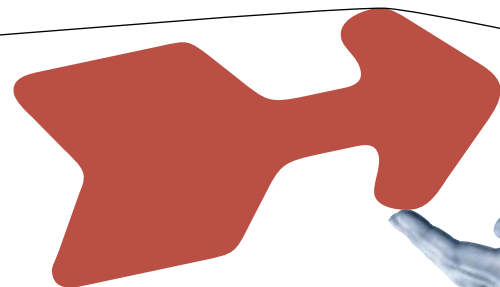
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# CHALMERS

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.

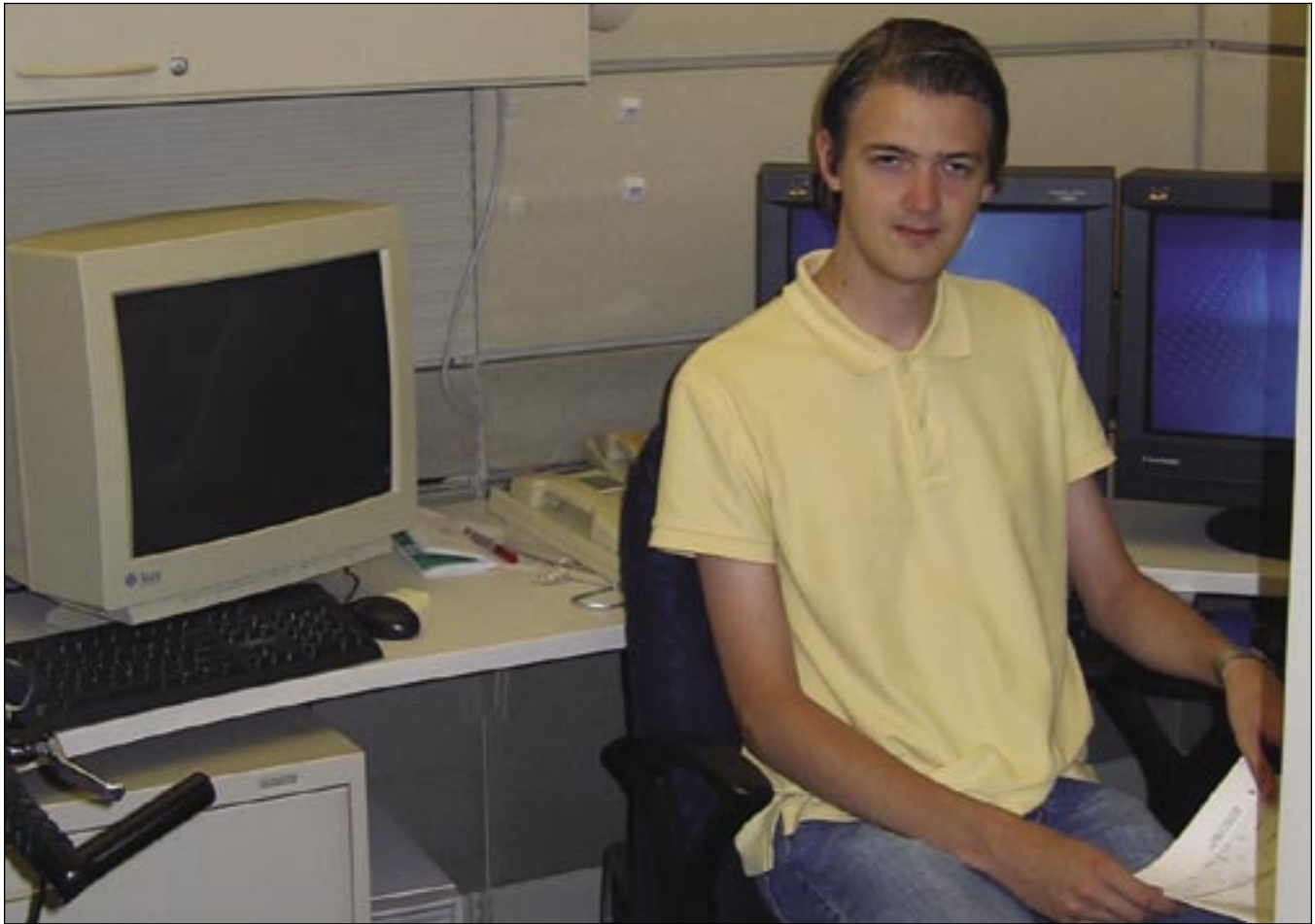
The university also has a role as incubator - creating a tailored environment where young companies with new ideas from Chalmers research can grow into strong enterprises. The Chalmers Innovation Centre is charged with promoting this particular area of operations and several hundred spin-off companies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





HENRIK IN HIS CUBE

## Engineering at NET.com!

This summer, I've been working in engineering at NET.com in Fremont, in East Bay of the San Francisco Bay Area. NET.com makes various kinds of advanced communications equipment, but the current flagship product is the SHOUT.

SHOUT IS A very advanced gateway between traditional telephone systems and modern voice-over-ip (VoIP) networks. It can also be used for many other things. VoIP is a technology for running phone calls over computer networks, either internal or over the internet or both, which has obvious cost advantages, especially for interna-

tional calls. A company with two offices and traditional telephone systems in each could buy two SHOUT boxes, put one in each office and run all internal calls over the internet, resulting in zero cost for these, other than the payment for internet connection of course, which is necessary anyway these days.

ting, even writing a complete music program for the PocketPC in my spare time and have been selling it online. By working at NET.com, I've learnt a lot about how large-scale software development really works in practice, and that you have to un-

learn a lot of habits that you get from solo programming done mostly as a hobby.

### HENRIK RYDGÅRD

**Age:**

22

**Majoring in:**

Computer Science & Engineering

**Best US experience:**

Halloween in the Castro

**MY PREVIOUS C++ EXPERIENCE**

has made it possible for me to work on the real SHOUT code base. I have been working on various small product features, and gotten to know the entire development team. It's been incredibly cool to be a part of the development core of the company. Some code that I have written will be shipping in the next version of the SHOUT firmware, 3.9.

**IN THE PAST,** I've done a lot of hobby program-

**"It's been incredibly cool to be a part of the development core of the company"**

Every line of code that I, and any other developer, check into the source control system is reviewed by a portion of the team in a weekly session, looking at the code that has changed since last week.

**SOLID SOURCE CONTROL SYSTEMS**

and code review procedures are essential to prevent bugs from getting into products that are used by a lot of big customers, such as Microsoft and the Department of Defense.





ENTRANCE OF THE NET COMPANY BUILDING



SANTA CRUZ BEACHFRONT



ALMOST AS TALL AS THE SKYSCRAPER :) (SAN FRANCISCO)

**BUT OF COURSE**, this summer hasn't been only about code. The San Francisco Bay Area is absolutely huge, and there are tons of things to do. San Francisco itself is the pearl; the surrounding suburb-cities aren't half as interesting. There are the standard (somewhat boring) tourist attractions like Fisherman's Wharf, the notorious Alcatraz (actually interesting, and what a view you have of the city and the bay from there!) and all kinds of eclectic pubs, weird restaurants, comedy clubs and shows. San Francisco could along with New York be used as the definition of a Real City.

**WHEN I GOT HERE**, I tried to get around on bike for quite a while, but it was a pain. Not only are there not nearly enough bike lanes, but there's also an interesting plant around here somewhere that has seeds that appear to be designed to puncture bike tires. Because of the sprawling way the cities around the Bay are built, except possibly for San Francisco

**"seeds that appear to be designed to puncture bike tires"**

itself, you really need to have a car. Public transit exists but other than BART it's badly coordinated, too sparse and simply doesn't work very well. It has almost made me appreciate the oft-hated Västtrafik, the company that runs public transit in Gothenburg back in Sweden. Fortunately, it wasn't hard at all to find a cheap old Toyota in good condition on [www.craigslist.com](http://www.craigslist.com). If you need anything in the Bay, it's there.

**CALIFORNIA'S FAMOUS SUNSHINE** isn't very visible during the workweeks when you're working indoors in a cubicle landscape and a dark lab, other than tanning my arms biking to and from work when I was still doing that, but there are many ways to take advantage of it in the weekends. Santa Cruz for example is a really nice coastal town with an enormous beach. The Pacific's water is a slightly too cold for my taste even at the height of the summer though but the beach is nice, and there's even an amusement

park complete with bumper cars and roller coasters just above the beach.

**ALL IN ALL**, it's been an amazing experience, and I look forward to coming back to California in the future, either for work or just vacation someday. ■

## NET.COM

### Employees:

~400

### Hosting Trainees:

2002, 2004, 2005

### Business Area:

Network equipment vendor

### Web site

[www.net.com](http://www.net.com)

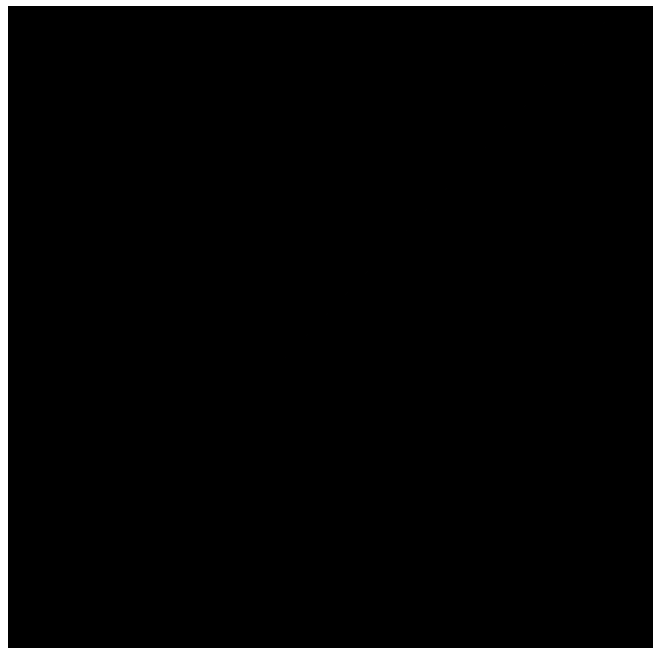
## Radar Performance Measurement Applications and Instruments

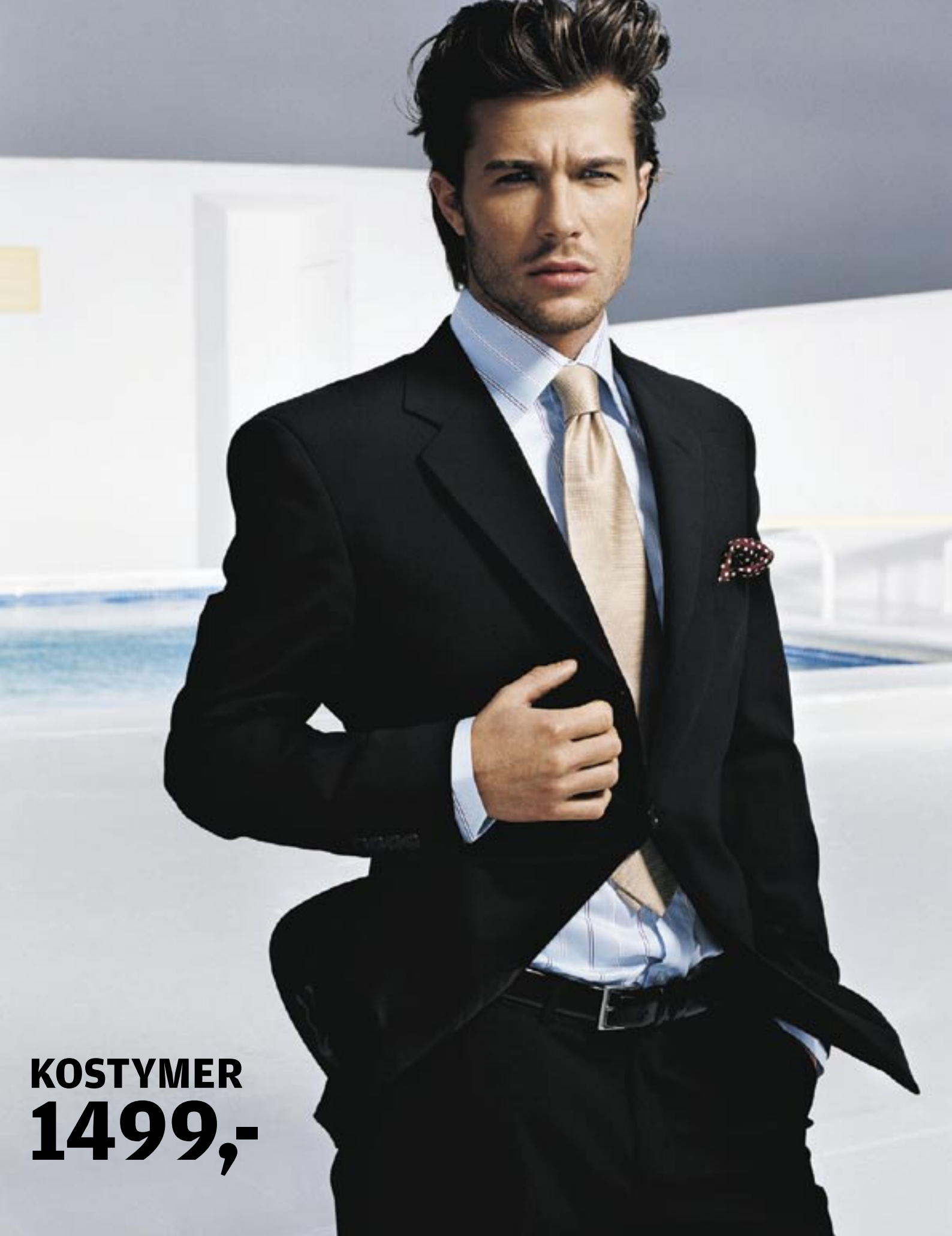
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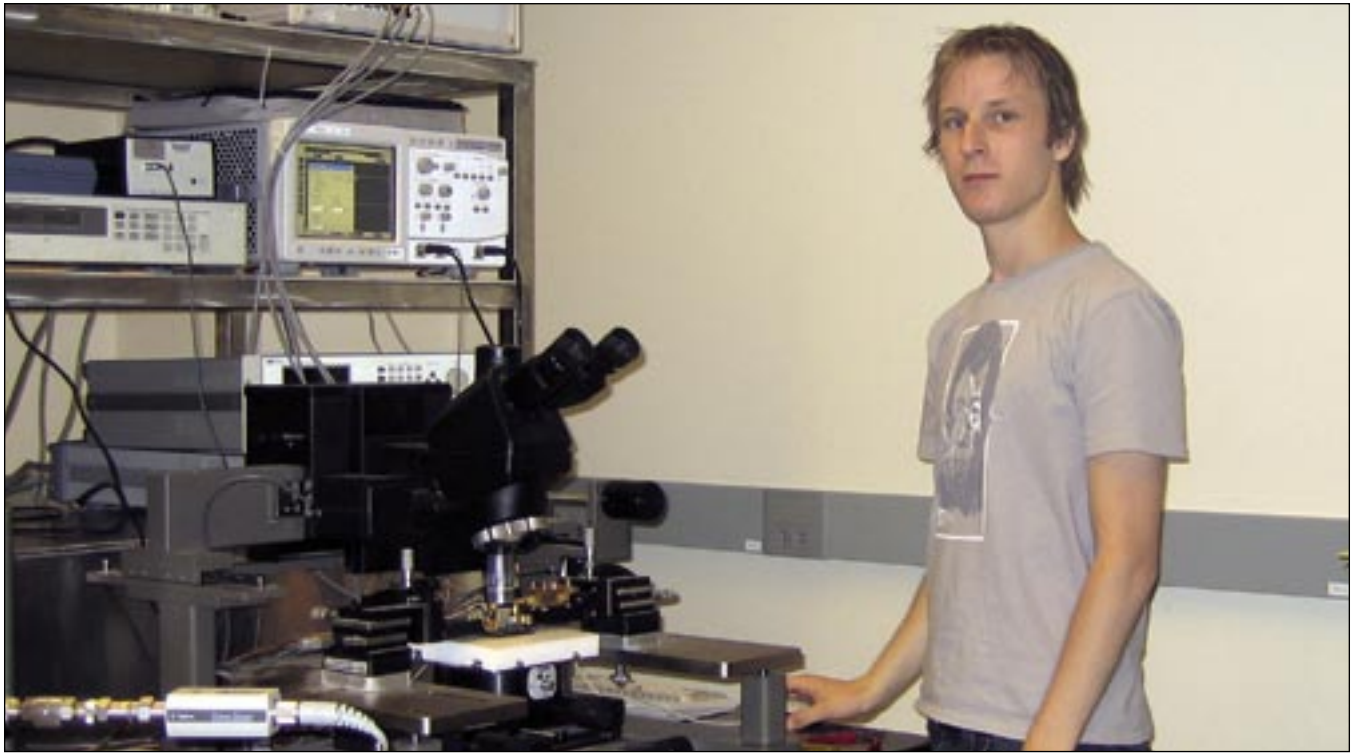


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## Semiconductors in Ithaca

I was very excited when I found out that I was going to spend the summer of 2005 at Cornell University in Ithaca, NY. From what I had heard from Erika, who spent last year's summer at Cornell, I was going to have a great summer, and she was right!

**EVEN THOUGH** I had pressed Erika for as much information as I could before leaving for the US, I was not quite sure what to expect when I arrived in Ithaca by Greyhound bus from New York City one scorching hot day in June. My home for the summer was going to be a student apartment on Dryden Road in a part of Ithaca called Collegietown. All the worries I had about finding housing via the Internet were blown away when I met my roommate Ross, who turned out to be a great guy and with whom I had a lot of good times during the summer.

### PETTER WESTBERGH

**Age:**  
24

**Majoring in:**  
Engineering Physics

**Best US experience:**  
The entire summer of living and working in beautiful Ithaca.

**AFTER TWO DAYS** of getting familiar with the new surroundings and learning that Gothenburg isn't the only city with steep hills, it was time to start my work at the university. I was going to spend the summer in Professor James R. Shealy's group at the department of Electrical Engineering. Professor Shealy and his group of graduate students are currently working with semiconductor crystal growth and in particular with Gallium Nitride (GaN), which can be used in high power microwave transistors and circuits as well as in optoelectronics. The most common compound semiconductor in use today is Gallium Arsenide (GaAs) due to its good optical properties, high mobility and high electron saturation velocity. There is, however, a significant interest in wide bandgap compound semiconductors such as GaN, which unlike GaAs is applicable in the blue and ultraviolet wavelength regions as well as for high power/temperature electronics.

**PREVIOUS SUMMER STUDENTS** working in Professor Shealy's group had been doing their projects at the OMVPE facility, located near the Tompkins County Airport and not on the Cornell campus.

This year, however, the situation had changed since the Professor's group was moving all their activities to the recently completed Duffield Hall on campus, a convenient five minute walk from my apartment. My work for the summer was going to be concerned with the characterization of semiconductors, more specifically pulse measurement characterization. As the semiconductor technology evolves and the dimensions of the devices becomes smaller and smaller, measurement techniques other than DC-source measure are necessary to effectively characterize the devices due to problems such as self heating of the device under test (DUT), and this is where I came in.

**THE PROFESSOR'S GROUP** had recently started using a new software for the characterizing of semiconductors: IC-CAP 2004. Unfortunately, however, the software did not support pulse measurements and it was my job to make it work with a pulse generator and a digital oscilloscope. This posed some problems for me, since I had never used IC-CAP before, and it took some time to familiarize myself with the program as well as the experimental setup with the probing station

**"All the worries I had were blown away when I met my roommate Ross"**



**ME AND MY ROOMMATE ROSS IN FRONT OF HIS TRUCK, WHICH WE LATER DROVE TO ST. LOUIS**



**WAKEBOARDING ON CAYUGA LAKE**

and the instruments. After some correspondence with Agilent support on how to best solve the problem at hand, and after numerous hours studying programming manuals for IC-CAP and the different instruments needed for the experiments, I could start making some progress with my task. I ended up using existing IC-CAP gpib functions and Programming Extraction Language (PEL), a programming language utilized by IC-CAP to let the user build his own extraction methodologies directly into the program, to communicate with the instruments and do the measurements. Once I got the hang of it, working with IC-CAP wasn't so difficult anymore and when my eight weeks at Cornell were up I had completed a model file designed to make pulse measurements on DUTs, plot the results (output curves, transfer curves and the different waveforms), and store the measured data on the computer.

**MY TIME AT CORNELL** and in Ithaca wasn't all work though. On a couple of occasions, we took the afternoon off and Professor Shealy would take me and some other summer students out to his boat on Cayuga Lake to go swimming and wakeboarding. As I mentioned before, it was scorching hot when I first arrived in Ithaca. This kind of weather was actually typical for the entire summer and from what I heard later, Ithaca experienced the warmest summer ever recorded while I was there, something that made the trips out to the lake even more appreciated!

**ITHACA AND ITS SURROUNDINGS** are filled with natural beauty. This is much thanks to the last ice age some ten thousand years ago that created the Finger Lakes and over time resulted in the numerous gorges in the region. Cornell itself sits on a hilltop overlooking Cayuga Lake, the largest of

the Finger Lakes in central New York State. Two sides of the campus are bound by gorges filled with creeks and waterfalls and no matter where you are on campus you are never far from the sight and sound of falling water.

**"Ithaca experienced the warmest summer ever recorded"**

**LIVING IN COLLEGETOWN** together with an American turned out to be a lot of fun. Ross introduced me to a bunch of different people and I made many new friends over the summer. Collegetown was the perfect place to live with restaurants and bars at almost every corner. I did not stay the entire summer in Ithaca, however. Over the Fourth of July weekend I rented a car and met up with Calle, Jonas and Astrid, the other CETAC-members working in the north east, in Syracuse, and we made a road trip together to Niagara Falls, a must see attraction while in New York. We took the Maid of the Mist, did a bunch of sight seeing and spent the night in Canada. On the following day we got into the car once again and this time we headed towards Boston, where Astrid and Jonas were working, to attend the Fourth of July celebrations and fireworks. This was truly a spectacular show and I have never seen such amazing fireworks before. All together I drove about 1200 miles that weekend, but it was definitely worth it!

**DURING THE SUMMER** my roommate Ross got a scholarship to Washington University Law School in St. Louis, MO. He accepted and it turned out that he was going to move there just a couple of days after my time at Cornell was up, so he asked me if I wanted to come along for the trip. Of course I did! Ross, being from Texas, obviously had a big truck which we packed to the limit and then we were on our way. First we went to visit his brother in New York City for a couple of days, and then we started driving westwards. Two days later we had crossed the Mississippi and were in St.

Louis. I stayed there with Ross and his new roommate for a couple of days and we had a lot of fun trying out some of the numerous bars and clubs the different parts of St. Louis has to offer, as well as seeing some of the sights such as the Gateway Arch and the shady area of eastern St. Louis by night (by accident). After this last adventure, it was time for me to head back to Sweden.

**THEY SAY THAT** time flies when you're having fun. They were right! I had a wonderful time in Ithaca and I will never forget all the people that helped me and made my summer unforgettable. I would like to thank Professor Dick Shealy for letting me work in his group and for all the trips out to the lake when the weather was so hot. My thanks also go out to Jiali who helped me out at the lab and hooked me up with Xiaodong so that I could get a ride to NYC. I would also like to thank Tom, who I unfortunately enough didn't meet until my last week at the lab, but we still managed to squeeze in some bar visits with foosball, bowling and pool. And a big thanks to Ross who is the one responsible for my newfound passion for country music and National Geographic (the only TV-channel we had during the summer), among other things. Without the help and company of you all, my summer wouldn't have been as great as it was. Thank you! ■

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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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I allt väsentligt bedrivs standardiseringen på elområdet för elektriska system och produkter i internationellt eller europeiskt samarbete i IEC respektive CENELEC, i vilka organ SEK är svensk medlem.



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## Sun Resort + Innovative Big Business = Palo Alto

It all begun with a wonderful week in NYC. The city is absolutely amazing and I had a great time with all the other members of CETAC 2005! But enough about NYC and back to business!

I WAS SUPPOSED to have an internship at VMware Inc. in Palo Alto (also known as "The heart of Silicon Valley", located 50 km south of San Francisco). The plane from NYC departed very early one morning and I somehow forgot my map of how to get to Palo Alto from San Francisco International Airport. It was quite a struggle to find my way down to Palo Alto, but after taking a cab, subway, train and walking 1 h in 30 degrees

Celsius with my suitcase I was finally there. I and my friend Daniel Roth had already got an apartment and everything was absolutely perfect (120 m<sup>2</sup>, swimming pool, you name it). My girlfriend, Helen Södling, was also going to stay with us during the whole summer and she arrived a few days after my arrival. She bought a Chihuahua puppy named Bosse when she was here in California. Bosse is a really nice dog and I hear that he doesn't like the cold weather back home in Sweden. Let us hope that Bosse finds his way back to Palo Alto pretty soon.

VMWARE WAS FOUNDED in 1998 to bring main-frame-class virtual machine technology to industry-standard computers. Virtual Infrastructure introduces a new category of capabilities to the data center enabling businesses to reduce their IT costs through increased efficiency, flexibility and responsiveness. The world's largest companies use VMware solutions to simplify

their IT, fully leverage their existing computing investments and respond faster to changing business demands. The company established itself as the thought leader in the newly emerging virtual infrastructure marketplace.

EVERYTHING WAS SET and I started my internship at VMware, sharing my office with Daniel Roth. The first month was a pure ramp up, consisting of learning VMware's products and processes. I was placed in the Quality Assurance department and developed tests in the early stage of the internship. After two months I was given the assignment of developing a Product Requirements Document

for a new Test System which should be used throughout the whole company. I performed 25 interviews with a total of 30 people, ranging from Managers to Vice Presidents. The draft of the PRD is still in the pipeline and is currently going through reviews from Engineering Managers and QA Managers. The PRD will also

**"It has been raining one time since I got here"**

### CHRISTIAN WIKLUND

**Age:**  
24

**Majoring in:**  
Computer Science & Engineering

**Best US experience:**  
Las Vegas and Lake Tahoe

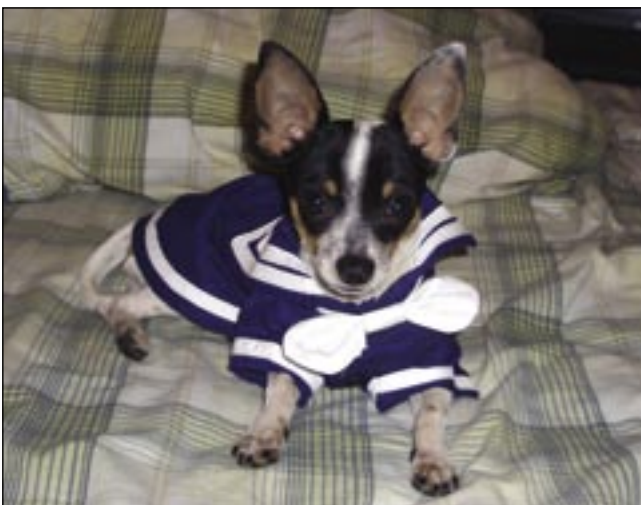




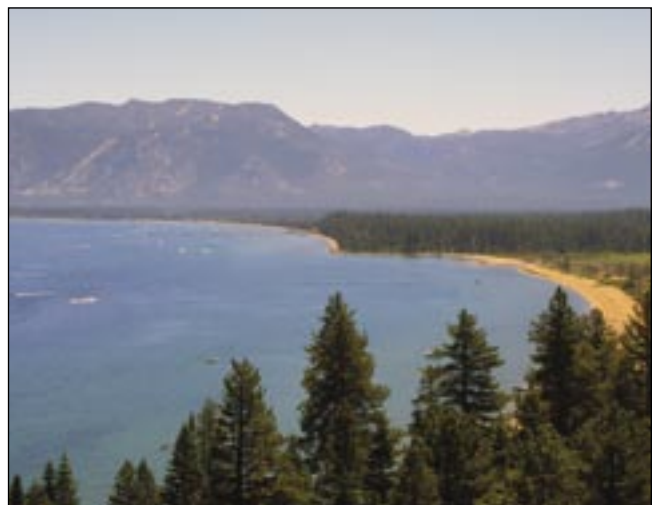
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OVERLOOKING LAKE TAHOE, WHICH IS A GREAT SKI RESORT DURING THE WINTER

be part of my Master's thesis at Chalmers, with Professor Hans Björnsson of Systems Management (Technology Management and Economics) as my supervisor. VMware has created a new group which will be responsible for Process Management within the whole Engineering department. I have been transferred from the QA department to that group and we have a lot of new and exciting tasks, like overlooking current Development Cycle and trying to refine it. This suits me very well since I also have a degree in Business and I believe that this is the perfect opportunity to get use of both my Chalmers and Handels educations. The group will also be responsible for implementing or buying the system which is described in the PRD I have been working on lately.

**"The dynamic economy combined with all the nice people and outstanding weather makes it to be one of the best places I have ever lived on."**

I MUST NOT FORGET to mention the outstanding weather in Palo Alto. It has been raining one time since I got here (4 months ago). Except from work we have been doing a lot of fun things! We have been to Los Angeles, Las Vegas and enjoying the magnificent nature here in California. I must say that I really like the Bay Area. The dynamic economy combined with all the nice people and outstanding weather makes it to be one of the best places I have ever lived on.

WHEN YOU ARE READING this I'm still in California working at VMware and experiencing more of the US. This wouldn't be possible without CETAC, and I really encourage everyone who is looking for a great experience and adventure to get involved in CETAC

or USAk. Special thanks go to QA Director Henrik Amren at VMware who keeps accepting interns from Chalmers through CETAC. Finally, I couldn't ask for more out of this experience in the US and I'm more than satisfied. Who knows, I might stay here for some time... ■

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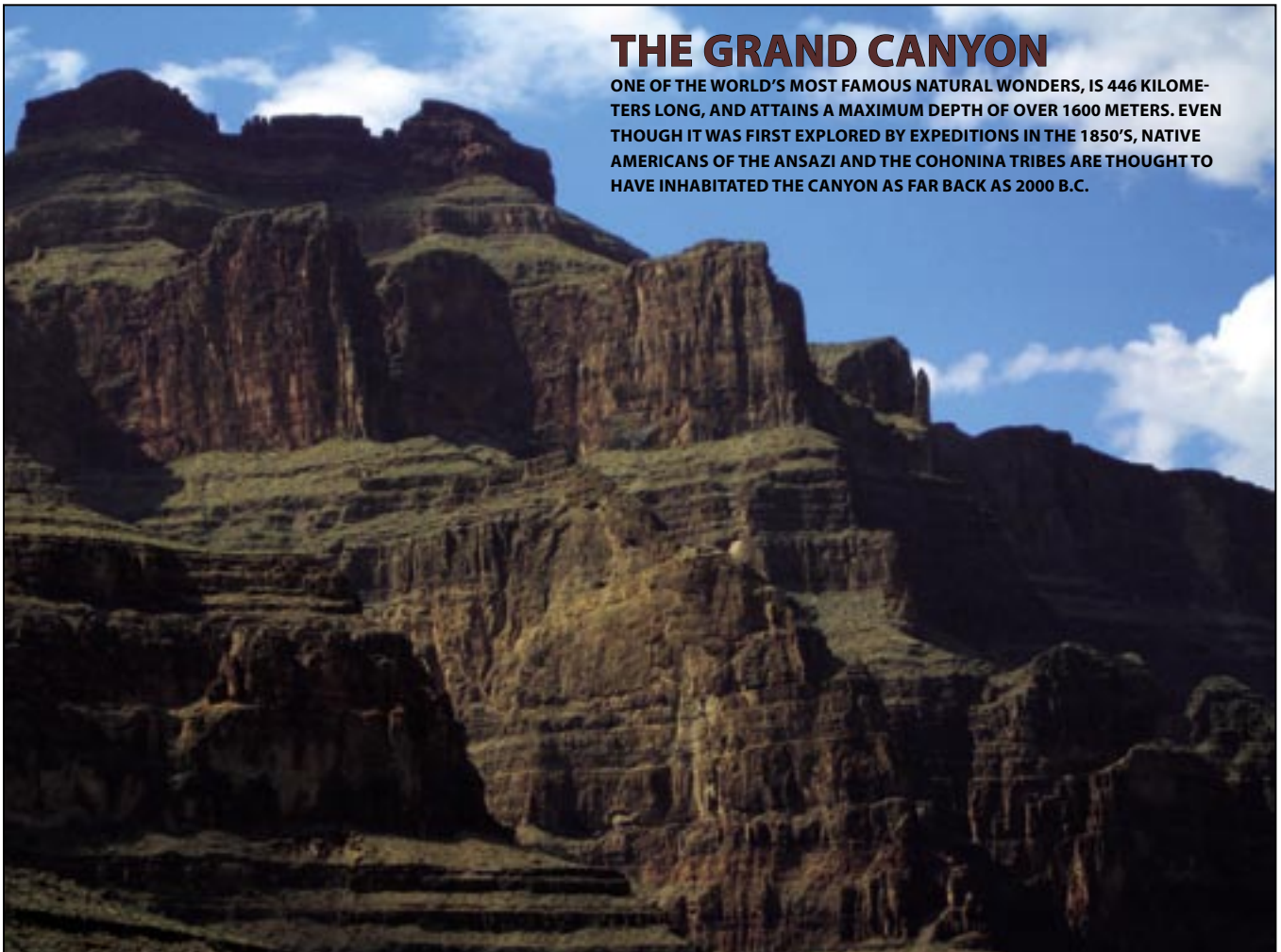


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REIJO PALOLA IS GREETING US AT ABB

# The Stockholm Tour 2005

In september it was once again time for a new group of CETAC members to make the traditional journey to Stockholm, the capital of Sweden. The purpose of this annual journey is to get to know one another in the committee but also to meet with swedish companies in the area that are interested in supporting CETAC.

TEXT & PHOTO: JOHAN GUSTAFSSON

**THIS KICKOFF TRIP** began an early morning in September 2005 when we left Chalmers and Gothenburg in a caravan with our rental cars from Sixt. The first stop on the trip was at ABB in Västerås where we were welcomed by ABB's student contact Reijo Palola. He turned out to be very charismatic and with the ability to swiftly solve any problems that might arise. Reijo immediately took us with bus for a nice lunch at the waterfront of Mälaren. During the lunch we got to talk to members of the ABB trainee program that formerly had been studying the same thing

as we do now. It's always interesting to hear what people really are working with. I think that many students at the end of their education feel a bit lost and don't really have any ideas as to what they will be working with in the future, then opportunities like this are always rewarding.

**AFTER THE LUNCH** we had a guided tour at ABB Robotics, where we got to see the building and testing of the well-known orange industrial robots. This was followed by a short tour through the city of Västerås which ended at the Aros fortress. It was now time to have some fun. The members had before the trip been divided into groups and now their teamwork abilities would be tested. The fortress contained a number of cells. In each cell there was a different task to solve, this could be everything from working out a tricky picture puzzle to climbing on the walls. For every cell that was accomplished within the given time the team was awarded a number of points. It was a fearsome fight and the winning team had a margin of a mere 25 points. It was a great event and I do believe that all CETAC members appreciated it.

**TIME WAS GAINING** on us and we decided to continue our journey towards Stockholm and the accommodation at Bredäng hostel, south-west of the city. Before leaving Gothenburg we got a map from the web service the yellow pages, which pointed to the address of the hostel. After driving for some time, late in the evening, through a maze of Stockholm's suburbia, we finally found the address, but still no hostel. We searched around the apartment blocks and asked people, but no one knew anything about Bredäng hostel. Luckily for us, all of a sudden, a taxi driver showed up. As he was not quite fluent in Swedish he had big problems explaining the way to the hostel and instead decided to show us the way by driving. We just had to keep up with him like we were some kind of car thieves on a heist. Finally we reached the hostel and thanked the friendly taxi driver for his helpfulness. Just a word of advice, don't always believe what you see in the yellow pages.

**AFTER A VERY QUICK** check-in at the hostel, the manager was in rush to get home in time for the new episode of Lost, we had a bit of late-night

## THE STOCKHOLM TOUR

**When:**

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**Members:**

22

**Means of transport:**

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**Next opportunity:**

September 2006



**LUNCH WITH ABB TRAINEES AT THE MÅLAREN WATERFRONT**



**DINNER AT THE CHINESE RESTURANT HANG CHOW**

snack. Most people decided that a good night's sleep would be the best preparation for the challenge ahead, although some stayed up a bit longer to enjoy a few card games.

**THE NEXT DAY** was the first day of meetings with companies and it started with a large breakfast of cereal or porridge. Together the different groups of members had made appointments with companies to meet with in Stockholm. The different groups took off with their cars and the members of the board stayed at the hostel, maintaining a headquarter, so the groups could contact them if they needed help with phone numbers, directions or other information. Our two appointment managers grasped the opportunity and visited some of the potential American employees with offices in Stockholm. The Swedish capital is considerably larger than Gothenburg, something all of us painfully realized after driving around for a while. Take a wrong turn once and you might have to go for a long detour.

**WORKING AS A SALESMAN** can be a tough job, but of course satisfying when you succeed. It is also a valuable experience in making business contacts. The income that the advertisements in the Trainee Report generate covers the members' airmiles and living expenses until they get their first paychecks in the US. This is obviously a very important part of the work in the committee.

**WHEN ONE OF** the groups was looking for a contact on a company they were informed that he was at the Swedish ICT Show. This is a Sweden's biggest exhibition with companies related to network, internet and telecom. Fortunately they all got free

tickets to this event by the company and had an excellent opportunity to meet a lot of companies in CETAC's target group.

**IN THE EVENING** when everyone was back from a hard day's work we prepared a big meal of pasta and meat sauce. After the dinner we agreed it was time for a bit relaxation so we decided to try the sauna at the hostel. It was a really big sauna with more than enough room for everyone and we had a jolly good time.

**THE NEXT DAY** also consisted of meetings with interesting companies. Hopefully everyone felt a bit more self-confident and experienced than the day before. In the evening we all decided that it was about time to check out the Stockholmian nightlife. A group of expectant CETAC-members headed for the subway. Our first stop was at the Chinese restaurant Hang Chow. We all felt quite adventurous and tried a range of different dishes and I guess that the discussion whether it was shark or just chicken in the shark fin soup is still going on. After the tasty dinner the exploration continued to a few different pubs and clubs in downtown Stockholm.

**THE NEXT MORNING** it was a group of satisfied but tired people that were heading back for Gothenburg. Everyone had gotten to know each



**A GROUP OF CETAC MEMBERS READY TO HIT THE ROAD**

other a bit better by both working and having fun together. Even though we could have been a bit luckier with the selling of advertisement spots hopefully we all lost a bit of nervousness towards contacting companies. I truly believe that everyone had a good time on this road trip and now we have a number of common memories to share while working towards our goal, a great summer in the US. ■

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# Thank you!

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## OUR TRAINERS:

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Cornell University  
net.com  
Nor-Cal Products  
NVI, Inc.  
R.O. Associates  
Rothenbuhler Engineering  
VMware, Inc.

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ABB High Voltage Cables  
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Institutionen för Fysik och Teknisk Fysik, CTH  
Jokab Safety AB  
CA Mätssystem  
Digsim data AB  
Televäst AB  
Sixt Rent-a-car

## AND:

Jan-Eric Sundgren, President of Chalmers  
Jörgen Sjöberg, Advisor to the President, Chalmers  
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Martin Cederwall, Head of the Engineering Physics Program  
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Percy Barnevik, Former Chairman, ABB  
Bengt Svensson, United States Embassy, Stockholm  
Tatiana Pashman and Jean Prahl, Exchange Division,  
American-Scandinavian Foundation  
Karl Andrén, New York Cruise Lines Inc.  
Håkan Thorell, WM-data  
Reijo Palola, ABB Human Resources  
USA Summer Trainee Program 2005  
CETAC 2004  
CETAC 2006



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# The Chairman is speaking...

**THE CATALOGUE YOU** are now holding in your hands marks an end to the work being done by CETAC 2005 for the last one and a half years. It all started in May 2004 and after more than a year of preparation with finding trainee positions and funding and getting all the necessary paperwork in order, 11 happy CETAC members sat on an airplane to New York City in the beginning of June 2005 with the mutual feeling of satisfaction that we really made it happen. All glad and relieved that we were finally on our way, but also excited and full of anticipation for the experience that lay ahead of us, the main reason why we were here: To get highly qualified practical training in our fields of study at American high-tech companies. The year of preparation to make the journey possible had been full of obstacles, challenges and doubts but we all kept the spirit up with the help from previous CETAC members ensuring us that it would all be worth it in the end, and the minute we spotted the skyscrapers when entering Manhattan, we knew that they had spoken true.

**BEING A MEMBER** of CETAC is great fun and an amazing experience, but certainly not just a walk in the park. A lot of effort is needed both during the year of preparation and during the time as a trainee in the U.S, and this is one of the most important concepts of the organization; the motivation required to be a part of CETAC combined with the high standard of the education at Chalmers University of Technology ensures highly qualified trainees. This underlies high quality of the trainee positions acquired, and is what I believe has made the committee so successful. The continuous trainee program since the birth of the committee in 1968 has also given CETAC trainees from Chalmers a very good reputation among the American host trainers throughout the years, and it is very gratifying when companies want to host trainees over and over again year after year. That is one of the best acknowledgements we can get of that what we do is highly appreciated.

**TO ALL CHALMERS** students interested in joining CETAC; catch the opportunity! I promise you will not regret it. It may be a cliché but joining CETAC is really one of the best things I have ever done. You will have an unforgettable year and the experience is invaluable. It is not just about the experience of getting qualified practical training and the experience of living alone in a different country, but also the experience of working for a long time together as a group towards achieving a common goal, and eventually accomplishing something valuable together. Other benefits worth mentioning are all new acquaintances and friends you make in another part of the world, and meeting fascinating

new people and seeing fascinating new places. In these restless times one cannot clearly enough stress the importance of travel and cultural exchange to counteract prejudice.

**THANK YOU EVERYONE** that made CETAC 2005 possible! Thank you all American host trainers for your interest in CETAC and for your professionalism. Thank you American-Scandinavian Foundation for all the work you put in for CETAC. It has now been 20 consecutive years of successful cooperation and CETAC hopes for a successful continuance in the future! Thank you all Swedish contributors for your financial support and for your willingness to contribute to cultural exchange and to future Swedish industry. CETAC is dependant on your support! Thank you members of CETAC 2004, 2003, 2002, 2001... etc for your support in hard times and for your great stories to encourage us.

**LAST BUT NOT LEAST**, thank you everyone in CETAC 2005 for your remarkable effort and for all the memories. It has been a pleasure and an honor being your Chairman.

Jonas Fast

Chairman, CETAC 2005

