

Taylor Vision

First semester 2015-2016



About us

Board

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Stijn ten Pas - Chairman
Wouter Schinkel - Secretary
Bram van den Brink - Treasurer
Joep Nijssen - Education
Olivier Potma - External Affairs
Stijn Koppen - Taylor Trip

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Edition

First semester 2015-2016

History

Taylor is the study association related the Precision and Microsystems Engineering department of the Technical University of Delft. It was founded in 1988 to enhance the study experience of the students. The Taylor Foundation, its legal form, was subsequently founded in 1992, making it an official organ in the TU Delft. During this time, the department has changed from “Production Engineering” to the PME you are all familiar with.

In contrast to what many people think, Taylor is not named after the famous mathematician known for the Taylor expansion. It is named after the mechanical engineer Frederick Winslow Taylor, who was active in production engineering and industrial efficiency.

The logo of Taylor was inspired by the tip of an Atomic Force Microscope, an instrument that requires technology from all the divisions of the department.

Taylor aims enhances the study experience of the students by: trying to improve the relation between the students and the department staff, bringing the students into contact with the industry, providing the department with student feedback about courses and, last but not least, organizing recreational events to de-stress from the hard working life as a PME student.

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From the board

Dear reader,

A warm welcome to everybody, the people who are just settling in, the people who have been here a while, the staff and all the phds. This is the first vision from the new Taylor board for this academic year and we are very excited with how things are shaping up. We have already reached our first milestone in sponsorship.

During this time, we have organised 2 lunch lectures, 2 receptions, one workshop and an evaluation. We are now in the second quarter, and we have many more exciting events planned for you throughout the year which means it's going to be a pretty busy year for all of us. Do add the calendar from the Taylor website to your schedule for the upcoming events.

Coming soon we have excursions, more lunch lectures and receptions, and within this month we are going to reveal the location for the grand Taylor Trip. So buckle up.

In this edition of the Taylor Vision, we cover the interesting things that have been happening in PME. We also feature a couple of personal accounts of the students doing their internship and semesters abroad. Winners for this times 'Olivier's Brain Teaser' (on the last page), are eligible for a cool gift from Taylor, so send in your solutions.

The Taylor Board,

Thej (not present on picture), Dineau, Wouter, Stijn, Joep, Bram and Olivier



PME news

Solution Rolfs Riddle (may 2015 edition)

Did you manage to solve the puzzle given to us by former board member Rolf? Here are the answers in case you were curious.

1. Poster in PME meeting room, of an ant assembling a watch.
2. Not just any fire alarm (blue background), but the one near the coffee machine.
3. The Mechanical Engineers' Handbook, which can of course be found in the PME library.
4. This disco ball is the pride of the Taylor office, operates on Friday afternoons.



We would like to congratulate Paul van Woerkom with solving this riddle some time ago! He created a nice summary of where to find all these puzzle pieces and did not miss a single one. He will be rewarded with some cinema tickets!

Recent graduates

The following students have recently graduated from PME, congratulations to all!

M. van der Kolk, specialisation: EM

Structural Design Optimization of Vibration Isolating Structures

T.A. Nooren, specialisation: MNE

Modelling of the Initial Deformation of TriPleX Based Bimorph Actuators Used in Alignment of Optical Waveguides

S.L. Pensioen, specialisation: EM

A NURBS based Galerkin Projection Method for the Numerical Computation of Nonlinear Normal Modes using Invariant Manifolds

C.S.M. Sombroek, specialisation: EM

Bridging the Gap between Nonlinear Normal Modes and Modal Derivatives

S.J. Habib, specialisation: MSD

Design of a Three Degrees of Freedom Planar Precision Stage using a Single Position Sensitive Detector

Y. Wang, specialisation: MSD

Optimization and Controller Design of an Integrated 6-DoF Lorentz Actuator with Gravity Compensator for Vibration/precision Positioning

M.A. van Beek, specialisation: MSD

Electromagnetic Force Pulse Actuator for Positioning at Nanometer Level using Stick-Slip Friction

N.J. Zaanen, specialisation: MNE

Magnetic Based Micro-Indentation Catheter for Soft Tissue Characterization in Minimally Invasive Surgery

N.K. Teunisse, specialisation: EM

Maximization of the Geometric Non-Linearities of a Thin-Walled Structure in Resonance

DENSO



For a Future Where Cars Are Part of the Solution

Driving DENSO's cutting-edge commitment to environmental and safety technologies is a sense of urgency. By 2025, global output of carbon dioxide will exceed the amount that the Earth can absorb by more than threefold. And traffic accidents are increasing at an alarming pace as vehicle ownership increases worldwide.

DENSO's engineers want cars to be part of the solution to environmental and safety issues. They are working around the clock to put the

brakes on global warming—helping improve combustion efficiency in conventional engines, for example, while pursuing advances in hybrid power and exploring possibilities in alternative energies. They are also achieving improvements in safety—active safety features for preventing accidents and passive safety features for protecting driver, passengers, and pedestrians when accidents occur. DENSO is bringing greener and safer technologies to you.

DENSO is a leading global supplier of advanced automotive systems and components for thermal management, powertrain control, electronics, information and safety



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QR Code originated as a production control innovation at DENSO

FACTS

You already know all recent additions to the PME staff, but did you also know these facts about them?



Alejandro Aragon

Alejandro, who joined PME in December of 2014, was born in Argentina. Regarding hobbies, Alejandro loves going to the movies, he plays video games (yes, still!) and he's also an Argentinean tango dancer and teacher!



Luigi Sasso

Luigi joined the PME team last year. Aside from the role of nanotechnology in healthcare, he's also interested in reading nerdy books, exploring the world, and hugging trees. The top 3 most listened to artists on his iPhone are David Bowie, Fleetwood Mac, and Belle & Sebastian.



Hassan HosseinNia

Hassan is an assistant professor at PME department where he is teaching "mechatronic system design" course. His research interests are in distributed actuation, sensing and control. He is developing high performance distributed actuator to be used in small/large scale monolithic devices. To do so he is taking the advantage of mechanical mechanism and advanced control such as fractional-order control and reset control.



Ivan Buijnsters

Ivan Buijnsters ('ageless' by the way) started working as assistant professor in the section Micro and Nano Engineering of PME from November 2014. One of his core interests is synthetic diamond, and surprisingly, he do not focus on the production of large gemstones; instead his research involves the development of nano-sized diamond jewels for advanced engineering applications like electrodes, MEMS and heat spreaders. In my free time, he likes to play the double bass and get lost on techno live sets (Karenn, Jeff Mills and the ones alike).

Introweek

Last summer we applied for the master Precision and Microsystems Engineering. Jan Neve sent us an enthusiastic e-mail with the schedule for the introweek attached. The week started quite good; we had a day off on Monday.

On Tuesday we had to gather at the art centre, which is situated further away than the faculty of Aerospace Engineering(!). After we learned how to learn during the introduction of Physics for Mechanical Engineers, it was time for lunch. We got well treated with a lunch consisting of salads, sandwiches, grilled vegetables, meat, cheese, and all kinds of juices. It created the perfect atmosphere to talk to our new fellow students. Jan Neve took us on a walk to prevent us from having an after-lunch-dip. After we got an introduction of Mechatronic System Design we had some drinks with the staff.

When returning to the art centre on Wednesday, a more interactive program was prepared. First, we had to do an optimization exercise. It went quite well. Other groups, were doing quite better.. But, we took revenge during the second exercise on cell structures. We got four sheets of paper from which we had to make a structure. Our structure was able to withstand 20 kg! We were very happy with this result because we won a box of chocolates. In the afternoon we had some 'hands-on'. We had to let a droplet move up a slope, investigate vibration modes and harvest energy via piezoelectric material. This intense day ended with a nice barbecue.

On Thursday we had the opportunity to have a look in the labs of PME. We got some insights in graphene, compliant structures, stages and the Atalanta project. On the end



Introweek

of the day we already had to choose our personal study program. Because of the many different electives, it was hard to choose. Luckily, Jan Neve told us that it was possible to switch electives (multiple times).

In our sport outfit we gathered at the culture centre on Friday, because it was sports day! Curious for all the different sports we could try, we went inside. What turned out? Mind games! We played, card games, chess, monopoly and the settlers of Catan. During the second part we played table tennis, darts and table football.

The introweek definitely was a great success. We want to thank Jan Neve for the organization and of course our fellow students and the staff for the fun.

Lili Maxime Hauzer & Niek van Hoek



Activities

October reception

The first reception of the year was a huge success with approximately 100 attendees!! The reception was held at the cleanrooms and mechatronics lab because the PME square was being refurbished, but that didn't spoil the fun. The students got acquainted with each other and the staff while enjoying a good beer and some snacks. This was an exciting and chaotic event for us, but the end result was worth it.

Bram van den Brink



COMSOL workshop

All students at our department have some basic experience with finite element theory and software, but what about multiphysics?! COMSOL Multiphysics is a finite element analysis, solver and simulation software package which is able to analyse problems where multiple domains of physics interact with each other. Apart from being able to couple multiple domains of physics it also supports the ability interact with MATLAB real-time, making it a powerful simulation tool. The workshop focused on exploring the capabilities of COMSOL and after the pizza break the students worked on an example problem. It was a great experience for future projects and a lot of fun!

Bram van den Brink



Philips lunch lecture

Activities

Every year Taylor organises a lunch lecture with Philips and this year, Walter Aarden, Technologist Dynamics, Mechatronics, Philips Innovation Services, came to 3ME to give the second lunch lecture of this academic year, for a staggering 102 people. As usual we had our sandwiches from leos and everyone was seated by 12:45 with their sandwiches, some fresh fruits and juice.

The response of a high dimensional system is (approximately) contained in a low dimensional subspace. So we solve a simpler problem that is cheap to compute. Such is the idea behind model reduction techniques. This lecture was on the advanced model reduction techniques used in high-tech industries. Mr. Walter presented a case that he had been recently working on. In order to compensate for the thermo-elastic deformations in precision systems Error Compensation Models (ECMs) are used to predict these deformations based on measured temperatures. This is basically a huge matrix relating the temperature readings from a number of sensors on a structure and the position shift of the point(s) of interest. The key to obtain the optimal sensor selection/location was the use of advanced model reduction techniques. This lecture presented these model reduction techniques together with the achieved experimental results by incorporating the ECM.

Philips Innovation Services has an exceptional cover of the width of competencies in the innovation process from development and engineering to industrialization and supply chain. Their competencies range from micro and nano technologies, mechatronics, electronics, material analysis to Product quality & reliability and Software products. With 60 services, 90 competencies and over a 1000 experts, they can support innovation process end-to-end, driving first-time-right designs and thus improving your time to market.

Thej Kiran



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Angle Encoders + Linear Encoders + Contouring Controls + Position Displays + Length Gauges + Rotary Encoders



In the end of August 2015 I moved to Sweden for my Erasmus exchange semester. Already from my first year in Delft I wanted to study abroad someday. As I did not go in my bachelor this was the last moment to do it. And I did! I decided to do part of my electives for PME and some extra courses at Chalmers University of Technology in Göteborg. At the moment I am still studying here and I enjoy every moment of it.

First weeks

Unfortunately I was not able to find a room in advance, but luckily I could stay with Niek (also PME) for a couple of days. The first day I immediately went to SGS, which is the student housing office, to see if there were any last-minute rooms available. They kept my contact information and a few hours later I had a room offer. I got extremely lucky! The first weeks were full of activities. There is a committee (CIRC), which organizes many different events for international students like sauna trips, parties, international dinners and sports events. A great way to get to know the university and to get to know other students.

Göteborg

Sweden is quite similar to where we live, but probably it is raining here even more than it does in the Netherlands. The country is beautiful with a lot of nature, which can be found everywhere. Göteborg is close to the lakes on one side and the islands (Archipelago) on the other side. Both are easily reached by public transport, which is really good here. The city is about the size of Rotterdam but feels smaller somehow. Everything is well connected by public transport, but as a real Dutchman I got a bike of course. Another good thing about the city is the location. It is situated at the coast and relatively close to many nice cities in Scandinavia. Perfect for some nice weekend trips!

So far I really enjoyed my stay abroad. It is nice to experience another country, to notice the subtle differences between here and the Netherlands and to meet people from all over the world. I can only recommend it.

Jelle Snieder



The ASML Scholarship

Every year ASML offers 25 motivated technology students a chance to embark on a Masters degree with an annual scholarship of € 5,000. The ASML Technology Scholarship is a program that supports students and encourages them to gain a highly sought-after Masters in Technology.

Why issue scholarships?

Needless to say, a company such as ASML depends on talented technology professionals. However, in practice this talent is increasingly difficult to find. The introduction of the student loan system has done little to help in this respect. A survey commissioned by ASML reveals that one in three students who consider doing a Masters abandon the idea because of the student loan system. Students are also far less likely to undertake (expensive) elective options, such as an additional work placement and foreign study. This is unfortunate. It is also a waste of technology talent.

Peter Wennink, President and Chief Executive Officer at ASML, explains: “We hope these scholarships will encourage top technology students in the Netherlands to pursue a Masters degree. This is important not only for the future of high-tech companies such as ASML, but also for the innovativeness of Dutch society as a whole.”

What is an ASML Technology Scholarship?

ASML launched the Masters scholarship program in 2014 in line with the commitments of the ‘Technologiepact’. The program was an overwhelming success from the start. The scholarship students receive:

- € 5,000 a year for a Masters programme for two-years.
- A mentor in their area of expertise at ASML who provides support in the form of coaching, personal development recommendations and contacts.
- A two-year personal development and training program.

2014-2016 scholarship student Max Klaassen is doing a Masters in thermal mechanical engineering: “This is a tremendous opportunity. It also looks great on your CV! ASML’s innovative approach in the rapidly changing world of high technology makes it a very interesting company. And the training courses have been especially helpful. My studies are primarily technology oriented. So training in areas such as communication and leadership is a valuable asset.”

Of course it sounds great, but we can hear you thinking, ‘What’s the catch?’ Actually, there is no catch. Or very little. Scholarship students are not obliged to do a work placement at ASML, nor are they obliged to work for the company. All we ask in exchange is that students undertake to promote technology-related careers among young people. The way in which you do this is flexible. You agree with your mentor how you are going to promote a future in technology.

For more information and to register for the scholarship mailing list so we can inform you when the application for the 2016-2018 scholarship opens, please visit:

www.asml.com/scholarship.



Germany

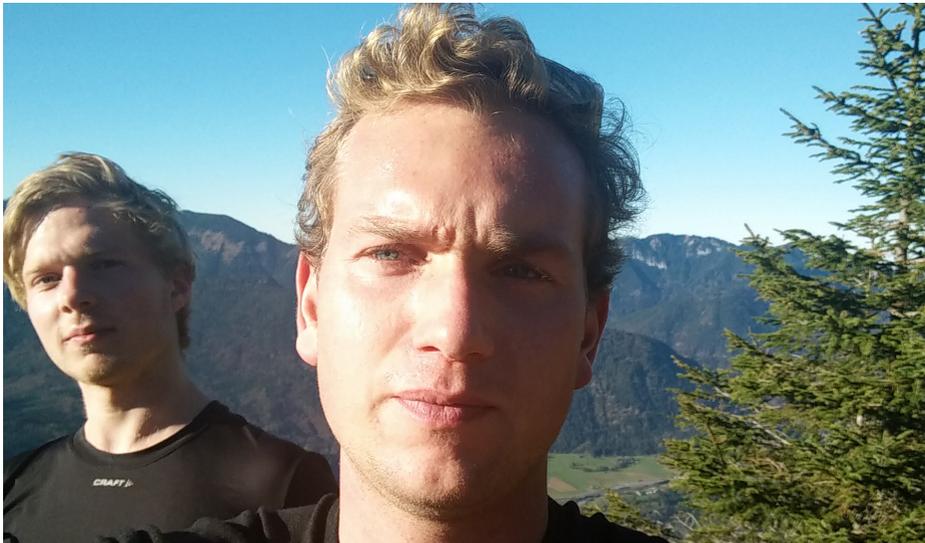
Study abroad

In 2010 we both started with the bachelor Mechanical Engineering because of our broad interest in dynamics. A few years later though, the possibility of doing a research project in the dynamics field has become slim in Delft. For this reason we decided to try our luck and move to Munich

Due to our perfect planning we arrived on the first of October, just in time to participate in the Wiesn (tourists know this as Oktoberfest). We had already arranged a living accommodation beforehand (which was not easy) and upon arrival could immediately move into our apartment. However, after a first week of pleasure, things got serious. Mathieu joined the TU Munchen, where he is working on the research of Real-Time substructuring, whereas Sebastian joined the company Muller-BBM VibroAkustik Systeme. Here he is working on creating a dynamical model of a reverberation chamber. We have started our projects as being an internship, with possibility to extend to a master thesis.

Before moving to Germany we had the prejudice that Germans were fond of hierarchy and strictness. However, at this time of writing, this prejudice has not been confirmed. At both the TU Munchen and Muller-BBM the communication can be done in English, however, German is preferred. Spending your free time in Munchen is quite easy. The city centre is very easy to reach by U-Bahn (subway), and there are almost 200 hundred Biergartens spread all over the city. When you are done with the busy city life, it is also possible to go to the Alps. These can be reached in just over an hour by train. During the summer period you can go hiking there, but in the winter skiing is the better option.

Sebastian Wezenbeek & Mathieu Wernsen



Riddle

Vision riddle: This visions riddle will be the classic riddle formulated by Einstein. He famously quoted that only 2% of the population can solve it. If you haven't solved this one yet it is a nice tease for a couple of hours.

The situation:

1. There are 5 houses in five different colors.
2. In each house lives a person with a different nationality.
3. These five owners drink a certain type of beverage, smoke a certain brand of cigar and keep a certain pet.
4. No owners have the same pet, smoke the same brand of cigar or drink the same beverage.

The question is: Who owns the fish?

Olivier Potma

Hints:

- The Brit lives in the red house
- The Swede keeps dogs as pets
- The Dane drinks tea
- The green house is on the left of the white house
- The green house's owner drinks coffee
- The person who smokes Pall Mall rears birds
- The owner of the yellow house smokes Dunhill
- The man living in the center house drinks milk
- The Norwegian lives in the first house
- The man who smokes blends lives next to the one who keeps cats
- The man who keeps horses lives next to the man who smokes Dunhill
- The owner who smokes BlueMaster drinks beer
- The German smokes Prince
- The Norwegian lives next to the blue house
- The man who smokes blend has a neighbor who drinks water

