

Taylor Vision

Second semester 2015-2016



About us

Board

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

Second semester 2015-2016

History

Taylor is the study association related to 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 enhance 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.

Contents

From the board	5
Recent graduates	6
PME news	8
Taylor trip 2016: Canada	8
New master coordinator	9
New curriculum	10
Departure Jan Neve	13
New board members	14
Riddle	16
Activities	17
VDL workshop	17
ASML lunch lecture	18
Python workshop	20
Huisman lunch lecture	21
Shell drinks lecture	21
CCM lunch lecture	23
ASML excursion	24
Cosine excursion	25
Study abroad	28
America	28

From the board

Dear reader,

Nearing the end of this academic year, we are looking back on the past months with a lot of fun for us as board. During this time we organized four lunch lectures, a drinks lecture, three workshops, two excursions, two course evaluations and off course the well visited receptions. A busy but rewarding time!

In this period Taylor also lost her Godfather, Jan Neve, who is enjoying his well-deserved pension. You can read about Jan's goodbye party in this edition of the Vision. In return Taylor now has her own Godmother taking over most of Jan's responsibility's, Eveline will explain how.

One of our board members has moved on and is now studying in the USA. He will tell you all about his adventures and hopefully he can visit us during the climax of the year, the Taylor Trip to Canada. Read about the coming adventure in Canada or Joep's story in America in this Vision.

A big thanks for to everyone who wrote material for this edition of the Taylor Vision and we hope you enjoy reading this Vision!

The Taylor Board,

Joep, Dineau, Wouter, Stijn, Bram and Olivier



Recent graduates

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

S. van der Wurff, specialisation: EM

Change of Loads Envelope for Wing Stiffness Modification, in the Frame of Multidisciplinary Design Optimization Purposes

T. Xu, specialisation: EM

Topology Optimization of Lithium Ion Batteries

S.G.E. Lampaert, specialisation: MSD

Planar Ferrofluid Bearings; Modelling and Design Principles

E.C.A.S. Theulings, specialisation: EM

Improving the Correction Quality of Deformable Mirrors with In-Plane Boundary Actuation

T.M. van der Linde, specialisation: EM

Fast topology Optimization for Transient Mechanical Problems

D.N. Roethof, specialisation: AUT

Influence Of Active Camber Control On Steering Feel

J. Wessels, specialisation: MSD

Reciprocating Geared Mechanism with Compliant Suspension

H.W.R. Houwers, specialisation: MSD

Closed-loop Two-fold Tape Spring Transmissions

A.M. Driessen, specialisation: EM

Overhang Constraint in Topology Optimization for Additive Manufacturing: A Density Gradient Based Approach

M.L.C. de Laat, specialisation: MNE

In situ Stiffness Adjustment for AFM Probes

J.T. van Omme, specialisation: MNE

Optimized MEMS-based Tensile Devices towards the Generation of Extreme Strain in CVD Graphene

S.M. Hekner, specialisation: EM

Optimal Experiment Design for Improved Parameter Estimation in Thermo-Mechanical Feedforward Models

F. Klein Horsman, specialisation: MSD

A Hybrid Inertial Sensor for Measuring Absolute Displacement

M.H.J. te Wierik, specialisation: EM

The Behavior of High Speed Rotors on Fluid Film Bearings

J.J. Tchai, specialisation: EM

Vibration Analysis of a Front Suspension System using Dynamic Substructuring

N.N. Gandhi, specialisation: EM

Load Estimation and Uncertainty Analysis Based on Strain Measurement with Application to Load Sensing Bearing

K. van Leeuwe, specialisation: EM

Identification of Parametric Resonances in a Geometrically Exact Rotating Blade Model

M.F. Knol, specialisation: EM

Thermal modelling of Selective Laser Melting: a Semi-analytical Approach

Recent graduates

X. Huang, specialisation: MSD

Actuation System Design for a 3DoF Contactless Wafer Stage

C.A.J. Hanselaar, specialisation: AUT

Evaporative Two-Phase Micro-Flow Modelling

J.W. Feitsma, specialisation: EM

Feasibility of Alternative Finite Element Formulations within Topology Optimization



Taylor trip 2016: Canada PME news

The greatly anticipated study trip is approaching where we will visit companies, universities and cultural sites abroad. For those who want, the trip offers the possibility to prolong the stay and discover other parts of the country. This year the sight has been set on the ever polite country of Canada. Starting in Toronto and ending in Montreal the trip promises to give a good impression of what Canada has to offer.

This year a great group of put together through a process of motivational students. All entries

With the last few the east we liked in the opposite



nineteen students have been rigorous screening proposals sent in by the passed!

trips having been in the idea of moving direction this year.

So to kick off the trip spirit, here are some fun facts about Canada:

- Canada was named through a misunderstanding. When Jacques Cartier, a French explorer, came to the new world, he met with local Natives who invited them to their 'kanata' (the word for 'village'). The party mistakenly thought the name of the country was "Kanata" or Canada.
- Canada has twice been invaded by the USA, first in 1775 and again in 1812
- Canada holds the record for the most gold medals ever won at the Winter Olympics, taking 14 Golds at the 2010 Vancouver Winter Olympics
- Roughly 30% of Canada's total landmass is occupied by forest
- 'Eh' is not placed just anywhere in a sentence. It's at the end used as a confirmation, agreement or question.
- The Canada/USA border is the longest international border in the world. It lacks military defence

Olivier Potma

PME news New master coordinator

Dear Master Students of PME,

As you have probably noticed, Jan Neve has retired after more than 36 years at the TU. He will certainly be missed!

As of now I will take over the daily Master Coordination of PME, so if you have questions about your study program, the new curriculum, electives etc. don't hesitate to come by my office or send me an e-mail. I am situated in room G-1-290 (Jan's old room).

Please keep me informed about your progress. If there are issues that influence your progress, like sickness for example, come by my office so we can discuss if your program needs to be adjusted. My door is always open.

Of course I will also work closely with the Taylor board and am very glad I can always count on their support. Furthermore, I will work closely with Hans Goosen, who is the Education Portfolio Holder of PME.

On a personal note, I am married and a proud mother of two boys, Jarett (10) and Jaycen (9). Next to spending time with my family I love watching series like House of Cards, Homeland, Bloodline, Law and Order etc. My second home is Curaçao, where I have lived for almost 4 years and spend most of my summer holiday's with family and friends. I am ambitious, outgoing & reliable. That's about all :)

Looking forward to work with you!

Eveline Matroos



New curriculum

PME news

As of the study year 2016-2017 a new curriculum will be followed. Biggest change is the fact that a couple of courses (the courses indicated in grey 2016-2017) are obligatory for all tracks within Mechanical Engineering, this includes two PME courses, a P&E course and a DCSC course. Furthermore the load per quarter has changed. The structure for PME students still consist of obligatory courses, recommended electives and electives. In order to get insight in the recommended courses for your specialisation (recommended by the concerning professor) please ask Eveline Matroos. The university is obligated to offer at least three possibilities for each course disappearing due to the curriculum change; e.g. for physics and E&M this means the exam, the re-exam and at least one extra opportunity. The newly presented mandatory courses (Heat Transfer and Control Systems Design) are not obligatory for the students who started in the 2015-2016 year.

Major changes:

- Physics (4 ECTS Q1-2) and Electronics & Measurement (4 ECTS Q3-4) are combined into Physics & Measurement (6 ECTS Q1-2) given by Urs Staufer and Hans Goosen (written exam only)
- Control Systems Design (DCSC) (3 ECTS Q1) is obligatory (was recommended course for MSD specialization)
- Heat Transfer (P&E) (3 ECTS Q1) is obligatory (new course, origin from bachelor course Heat & Mass Transfer)
- Mechanical Analysis (4 ECTS Q1) and Mechanics Fundamentals (4 ECTS Q1-2) are converted into the ME wide course Nonlinear Mechanics (4 ECTS Q2) and the PME course Fundamentals of Mechanical Analysis (4 ECTS Q3) (assignments + oral exam)

Minor changes:

- Engineering Optimization will be lectured in Q4
- Engineering Dynamics will be lectured in Q1
- MEMS will be lectured in Q3

Stijn Koppen

ME-PME 2015-2016				
1st year MSc programme				
activity	1-Q1	1-Q2	1-Q3	1-Q4
EC				
1	ME1611-10 Physics for Mech Eng Staufer		WB2303-13 Electronics and measurement Goosen (coord)	4
2		homework+ T		T
3	wb1451-05 Eng Mech Fund Ayas		ME1631 (ipv WB2428) Precision mechanism design Herder	4
4		homework+T		T+A
5	WB5452-14 Intro lab PME, incl introweek Neve + PME staff		WB1418-07 Eng. Dynamics Farbod Alijani	ME1640 Micro- and Nano systems design and fabricage incl MEMS lab Ghatkesar (ri), Staufer
6	WB5451-10 att stud coll and events			
7	wb1450-05 Mech. An for eng v Keulen	wb2414-09 MSD Hassan HosseinNia		4
8	4		Q1->Q3	2x report T?
9		4		
10	homework+oral			T
11	wb1440 Eng Opt Concepts & appli's Langelaar			
12	3			
13	R			

2015-2016
T written exam
O oral examen
R report
A assignment

ME-PME 2016-2017				
1st year MSc programme				
activity	1-Q1	1-Q2	1-Q3	1-Q4
EC				
1	* ME46005 Physics and Measurement (for Mech Eng) Staufer / Goosen a.o.		ME46020 (ipv ME1640) Micro- and Nano systems design and fabricage incl MEMS lab Ghatkesar (ri), Staufer	ME46060 (ipv WB1440) Eng Opt Concepts & appli's Langelaar
2		T		3
3				R
4	* ME42000 Control Systems Design DCSC	3	* ME46000 Nonlinear Mechanics Van Keulen	4
5			2x report T?	
6			ME46015 (ipv ME1631) Precision mechanism design Herder	4
7	* ME45000 Heat Transfer P&E	3		T+A
8			ME46105 (ipv WB5451-05) att stud coll and events	1
9			ME46070 Fund of Mech Analysis Ayas/vKeulen	4
10	ME46055 (ipv WB1418-07) Eng. Dynamics Farbod Alijani		ME46085 (ipv WB2414-09) MSD Hassan HosseinNia	4
11			homework+oral	
12	4			
13	Q1->Q3			
14	ME46110 (ipv WB5452-14) Intro lab PME, incl introweek Neve + PME staff			2

2016-2017
T written exam
O oral examen
R report
A assignment



business units

- hightech systems
- product development
- industrial automation
- construction technology

locations

- Eindhoven
- Delft
- Lummen
- Gent

Departure Jan Neve



On the 13th of April we said goodbyes to our beloved Jan Neve during his farewell reception. Below a quote from the Faculty's Newsletter is shown, written by the Communications department.

“We kunnen hem bijna niet bij de faculteit weg denken. Maar toch gaat het gebeuren. Jan Neve gaat met pensioen. Op 13 april was het afscheid van deze zeer gewaardeerde collega die lang onderdeel is geweest van de afdeling Precision and Microsystems Engineering. Na een carrière van meer dan 36 jaar gaat hij nu meer tijd aan hobby's besteden. Mensen kennen misschien zelfs wel het 'Neve' effect; op een collega afstappen (maakt niet wanneer en/of het uitkomt), hem/haar op iets aanspreken en uiteindelijk gelijk krijgen. Jan is iemand met veel kritiek en een gezonde dosis zelfspot. Hij heeft zich hard gemaakt voor de student en voor de organisatie, om procedures zo goed en overzichtelijk mogelijk te laten verlopen. De echte werkzaamheden van Jan worden overgenomen door Eveline Matroos en Hans Goossen, maar wie neemt het kenmerkend kritische en persoonlijke stokje van hem over? Nee, dat gaat niemand lukken... Een man als Jan Neve is niet te vervangen. Het gaat je goed Jan!”

Communications department 3ME



New board members

With the departure of Thej as chairman and busy times ahead we were in dire need for a new board member. We found two suitable candidates who made our choice so difficult that we decided not to chose. We have no regrets! Their effort made it possible to create an awesome Taylor trip and organize many events.

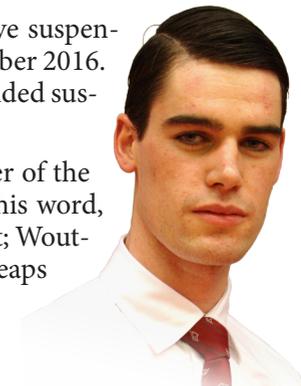
Wouter Schinkel – A man who gets the job done!

Wouter Schinkel joined the Dispuut Taylor board as of January 2016 in order to fulfil the function of Secretary and provide manpower for the organization of the Taylor Trip.

Wouter obtained his love for technology at the Bonaventuracollege Highschool in Leiden whereafter he started his Bachelor of Science in Mechanical Engineering at the TU Delft. Besides being an excellent student (e.g. participation in Honours Programme) Wouter developed special interest in the automotive industry demonstrated by his minor in active suspension systems and BEP about a four wheel steering system for the NUNA. As being a thankful human being for being able to study at the TU, Wouter gave back some energy as a student-assistant during his bachelors. As a follow up Wouter started his Master Precision & Microsystems Engineering in 2014 with his focus on Automotive. At TENNECO, located in Sint-Truiden Belgium, Wouter identified an electromagnetic active suspension system for automotive applications; both design and experimental tests were performed resulting in a Simulink model.

Currently Wouter is graduating in the field of active suspension systems and is aiming to graduate around October 2016. His target is to assess driving comfort using an extended suspension model and a MS-Swift tire model.

As soon as he performed his first tasks as a member of the Taylor Board it was clear that Wouter is a man of his word, can be trusted, is structured and straight to the point; Wouter fits perfectly in his role as secretary. Besides it is heaps of fun to work with him; he is not afraid for a proper joke once in a while. As far as I can tell; Taylor is blessed with the addition of Wouter in the team: a man who gets the job done!



New board members

Stijn Koppen – a man of legendary quotes

Stijn Koppen joined the Taylor board as commissioner of The Taylor Trip 2016, one of the key positions which was created particularly for Stijn. Stijn rescued the board by taking responsibility for the Taylor Trip and making sure everybody did their part. Soon it became clear that Stijn also has talent for designing posters and creating beautiful one-liners with an American touch.

Prior to starting with the PME master, Stijn did his pre-university education at the Kaj Munk College in Hoofddorp, a school already focused on the field of science and technology. He proceeded with the Bachelor Mechanical Engineering at The Hague University, but it didn't took long before he realized he wanted to do more than just use some basic equations and a whole lot of CAD software. Therefore he did a pre-master during his bachelor, still managed to graduate Cum Laude and did an excellent graduation project at TNO. During his graduation project Stijn was part of a team designing a high accuracy lithography measurement tool for the semiconductor industry. The aim of the project was to design a system which ensured the possibility for the measurement tool to measure the topology of microchip structures on wafers providing total wafer coverage and a positioning within the required accuracy. At the moment Stijn is thinking about his graduation project while finishing his last courses. Either self-folding of polymer sheets using local light absorption or yet another graduation project at TNO.

It can definitely be stated that Stijn is a unique expansion of the Taylor board. Using his creative mind he creates legendary quotes, which are used by the board members as well as the rest of the PME students. In addition, he is excellent in bringing in companies for the Taylor Trip and making sure everybody will have the best time possible. His role of commissioner of the Taylor Trip really suits Stijn. He is responsible for most of the companies we visit and is keen on making sure the visits will be interesting and involved. Best part: we finally get to see him wearing a suit!



Riddle

If an engineer isn't busy with equations he will stare good amount of time at numbers. That's why this issue we have a nice numbers riddle. Below is a list of number equation. If you understand the equations you should be able to answer the one with the question mark.

Email your answer to taylor-3me@tudelft.nl and if it's correct you can win a nice prize!

Olivier Potma

8809 → 6
7111 → 0
2172 → 0
6666 → 4
1111 → 0
3213 → 0
7662 → 2
9312 → 1
0000 → 4
2222 → 0
3333 → 0
5555 → 0
8193 → 3
8096 → 5
7777 → 0
9999 → 4
7756 → 1
6855 → 3
9881 → 5
5531 → 0

2581 → ?

Activities

VDL workshop

On the 6th of January, a partnering workshop from the companies VDL ETG and 3DSystems was given by the gentlemen Gerrit Oosterhuis and Raph Alink, respectively. Together they showed the practical implications of additive manufacturing, or 3D printing technology.

The gentlemen started off well by impressing the students with a display with a wide variety of products, demonstrators and testers made with additive manufacturing which the students could play with. With a presentation the speakers explained the unique way one must think in order to use the manufacturing method to its full potential and for which cases additive manufacturing would be favourable over other methods. With 3D printing they envision that it will probably not make allot of products cheaper so they mainly focus on designs that are otherwise impossible to produce with conventional methods. Products like complex cooling devises or topology optimized designs.

After a short break with some nice wok meals the workshop continued with a fun assignment. In the assignment CAD models, sent in by the attending students, had to be analysed and determined whether they should and how they could be produced using additive manufacturing. This led to some funny results seeing as the designs ranged from simple chess pieces to the jaw of a robot. The designs were then run through 3D printing software to show how support structures are added.

The evening was a wonderful and inspiring event that has given insight on the opportunities of this upcoming production method and the companies who are leading the way with it.

Olivier Potma





Following up on his presentation last year, Wijnand Harmsen, project lead at ASML, returned to Taylor at Thursday 18th February for another lunch lecture.

“Be part of progress; what being a project lead within ASML entails”

Wijnand presented about the challenges and possibilities he encountered at the lithography machine manufacturer and the next steps in his career. Starting as a specialized engineer he moved to a management position after just a couple of years and now combined his skills as a project leader. Wijnand shared his experience of what it is like to be a young project lead in a high-tech environment as well as the advantages and disadvantages of a management function. Insight was given in the project organization structure of ASML projects; an average project consists of a project leader, an architect for conceptual design and five additional teams to elaborate the concept (namely the mechanics, electronics, software, mechatronics and industrialization teams). Furthermore the responsibilities and tasks of a project lead were explained with a day-to-day schedule as example.

The almost 70 interested students, while enjoying their sandwich, had diverse opinions about the full day-to-day scheme. Additionally Wijnand spoke about an example project and went more into depth of the difficulties during the design. The lecture ended with interesting internship possibilities and heaps of questions. The students received some internship and company information in the form of a brochure as well as bicycle lights to ensure their safety. This certainly was a good insight in the working life of a young project leader within ASML; the ones who were especially interested will definitely join the ASML excursion at June 2nd !

Stijn Koppen



How do you stop thermal expansion... even by a nanometer?

Join ASML as a Mechanical Engineer to find out.

We bring together the most creative minds to develop lithography machines that are key to producing cheaper, faster, more energy-efficient microchips. Not surprisingly, Mechanical Engineering at ASML is rather special. For example, temperatures must be controlled to within an incredible +/- 10 mK, necessary to prevent a silicon wafer from expanding even by a nanometer. If it does, catastrophic misalignments will happen.

If you're up for the challenge, we'll put you in a multidisciplinary team and give you freedom to experiment and learn new skills.

ASML

www.asml.com/careers

For students who think ahead

 /ASML  @ASMLcompany

Python workshop

Activities



Python, a general-purpose, high-level programming language that was designed with the emphasis on code readability and which is widely used as a scripting language. Python is used increasingly by the scientific community as an alternative to MATLAB. The scientific Python ecosystem is maturing fast and Python is an appealing alternative, because it is free, open-source, and becoming ever more powerful. Python uses scientific libraries for specific tasks like linear algebra, optimization, plotting, symbolic math, etc. In MATLAB all these libraries (toolboxes) are always imported automatically. In case of Python you only import what you need. At the university, the faculty of Aerospace Engineering already adopted Python as their main scripting language.

This year, in contrary to the year before, the Python workshop was given by Alejandro Aragon and Jaap Kokorian from our own department. Alejandro Aragon is involved with the Hybrida project, the advanced finite element analysis program that is being developed by the university. Jaap Kokorian is a PhD student from the MNE department. He created his own python module for a curve fitting procedure with which in-plane displacements in MEMS can be detected using a conventional microscope and camera.

The workshop started after everybody got a meal and something to drink. After a short introduction the word was given to Alejandro, who was assisted by Jaap. Quickly their enthusiasm started to infect the students, creating a nice atmosphere. The presentation was given in an interactive way and adjusted depending on the questions. The event was concluded by Jaap with a live demo of pandas, a Python library for data analysis, time series, and statistics.

If you missed the event but would like to learn more about Python, the files that were used during the workshop are available on the Taylor website.

Bram van den Brink

Activities

Huisman lunch lecture

The first visit from an offshore company this year to the PME department was a great success. David Roodenburg working at Huisman gave an interesting lecture about automation and control in the offshore drilling, lifting and subsea solutions.

David explained why it is so important to study PME. Multidisciplinary projects are very common in industry and when you also know the basics of other study's communication is made easier, resulting in a safer and faster solution.

He showed that the offshore industry has to offer a lot of high-tech problems that need solving. With low oil price in mind these high-tech solutions need to be expanded even more to make the production more cost efficient, faster and safer. David made sure there was a lot of room for questions during the lunch lecture resulting in a very interactive hour.

Thank you David and Huisman for this great lecture.

Stijn ten Pas

Shell drinks lecture

For the second time Taylor organized a drinks lecture together with Shell. Joris van Lith made sure that there were five employees from Shell in total. During the lecture a short introduction about Shell was given, followed by an inspiring story about additive manufacturing which is currently intensively used in Shell's innovation centre in Amsterdam. The technique is used in the innovation centre because it is a good way to make complex structures which are mostly used for one-off test set-ups.

After the lecture there were drinks so all the students could ask questions and interact with all the employees of Shell who joined for the drinks. We think this is the best way to start a good discussion and get to know each other. The atmosphere was great and all students went home well informed with no more questions left.

Thank you Joris and colleagues, we all had a great evening!

Stijn ten Pas





centre for concepts in mechatronics

CCM, onderdeel van Sioux, ontwikkelt hightech producten en productiesystemen van ontwerp tot en met productie van kleine series. CCM beperkt zich hierbij niet tot het ontwikkelen van inventieve concepten, maar maakt deze ook waar. Mechatronica vormt hierbij de kern van de ontwikkelprojecten.



CCM ontzorgt klanten met slimme, innovatieve oplossingen op maat. Door haar rijke ervaring in verschillende domeinen kan CCM hierbij putten uit eerder ontwikkelde (deel) oplossingen. Ook bestaande producten kunnen van de kennis van CCM profiteren: om kosten te verminderen, om de robuustheid te verbeteren of om de capaciteit van een product te verhogen. Controle, assemblage en testwerkzaamheden worden in house in gescheiden projectruimtes uitgevoerd.

CCM bestaat uit hoogopgeleide technici uit de fysica, mechatronica, mechanica, software en elektrotechniek. Talentvolle mechanici, die in een multidisciplinaire en uitdagende hightech omgeving willen werken, zijn altijd welkom bij CCM.

Kijk voor meer informatie op www.ccm.nl

Activities

CCM lunch lecture



On April 26 CCM visited the university. CCM, which is an acronym of Centre for Concepts in Mechatronics, handles projects from companies such as ASML and Océ and also develops its own unique products. CCM offers a wide range of services, for prototyping to small series production. The company was established in 1969 and located in the Eindhoven region. Since 2014 they have merged with the Sioux group, which specializes at IT and electronics.

The topic of the lecture was the Generic Substrate Carrier, and specifically the control of the device. The carrier is designed for the printer industry to very accurately transport printing paper or films at high speeds. This is achieved by using a flexible metal conveyer belt. This belt is punctured to enable the films to be fixed to the belt by vacuum. To accurately control the belt is critical to final print quality and was done by controlling the angle of the rollers and using not 2 but 3 sensors to measure the position of the belt. If 2 sensors were used it would not be possible to differentiate between a belt that does not move up and down the rollers and a belt that does move, but is a bit wavy. Think of 2 points, separated by a certain wavelength, moving up and down a sinusoid.

The speakers from CCM included multiple opportunities to ask questions during the presentation which was well received by the students. The result was a great lunch lecture from a company that showed that there is more to the Eindhoven region than ASML and Philips.

Bram van den Brink

Earlier than most of the students were used to we went with an enthusiastic delegation towards Veldhoven in the morning of 2 June; full of expectations. Luckily, those were, according to the students, more than fulfilled. Arriving at ASML is a thing on itself, what an area! Finally arrived we were treated with enough caffeine to not only stay awake but also ask critical questions. The group consisted from students all over the Netherlands (up to Groningen), which was admirable.

First thing to do was listening carefully to a series of presentations: first a brief introduction to ASML, including some extraordinary fact, secondly a more in-depth explanation about the chip-fabrication process and machine working principles, next a short but strong presentation by our colleague, currently graduating at ASML, Sanidhya; who is working on stepping piezo-actuators for lens alignment, and last, but not least, an interesting talk about the organisational structure of ASML, incl. the opportunities for starters.



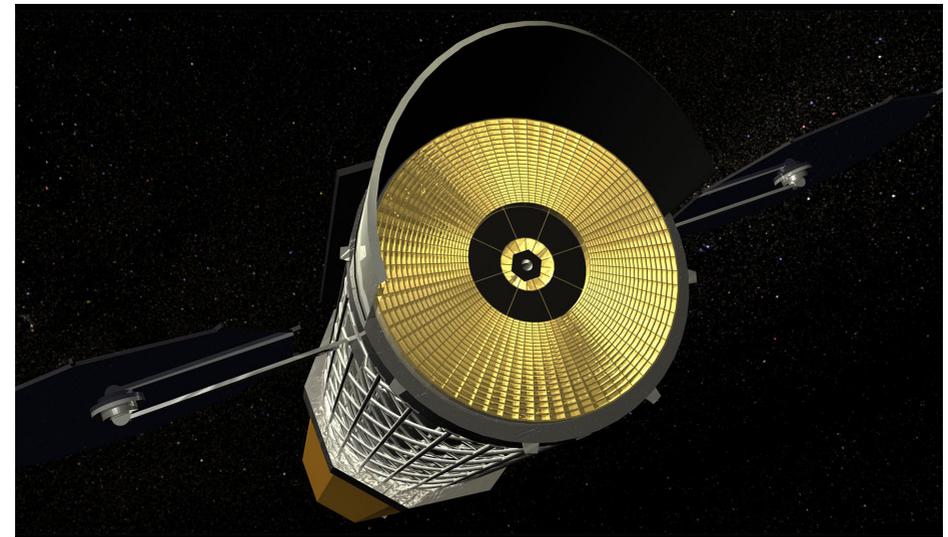
After all this information and long seat the students were ready to grab some delicious sandwiches and head out of the college room to check out the ASML campus. Shocked by its hugeness and the amount of people, the tour guide, a former TU Delft student, explained about the campus, the organization, the type of jobs and responsibilities and his personal opinion about working at ASML.

Once headed back from the campus tour the real deal began. The group was split up in groups of five in order to solve an interesting case, which had to do with the expansion of the machine while remaining it's throughput. The students had to, step by step, come up with some 'back-of-the-envelope' calculations in order to back up their ideas and concept. Each group gave a small presentation of about five minutes in order to pitch their idea; the winners were determined by a critical jury.

A long but very interesting day; ultimately ended in some informal drinks in order to chill out and talk to the personnel, including those from human resources for students interested in an internship or graduation project.

Watching 'Finding Nemo' on the way back was the perfect manner to let the information sink down in our heads, what an interesting day!

Stijn Koppen



Our last excursion this study year was to the company Cosine, and boy was it a delight. It might only be occupied by about thirty employees, but the experience we received was parallel to what you would normally expect from big companies like ASML.

Cosine specialises in the field of measurement and has contributed a lot to the Space industry, imagery development, crime scene investigation and food inspection. Possibly the biggest current project they have is the X-ray telescope 'Athena'. For this telescope they developed and produce the 'lens', made out of layered silicon with channels to bend X-ray radiation onto the sensor. We went on a tour to see the cleanrooms where these silicon parts are made and we saw other parts of the company where numerous other project are being developed.

After the tour it was time for the workshop. We were tasked to think of a way to test the silicon lens parts on whether they could survive the impulses that arise with launching the telescope into space. As bright minded master students we envisioned complex machinery to meet with the criteria, only to be amazed by the sheer simplicity of the actual testing rig that they used.

Finishing with a nice reception afterwards I can only say that I was very pleased with the excursion and would like to thank Marlies Bonnet, Gijs Hijmans and the other employees for their efforts in making it all work.

Olivier Potma



HEIDENHAIN

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How large is a critical difference?

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On the 21st of April, I started the long journey to get to a small private university in the centre of the state Pennsylvania. With more than a month gone by since that day, Taylor has given me a change to reflect and tell everybody about my time here so far!

Arriving in roughly the biggest airport in the world (JFK) I found one of my fellow American graduates students waiting for me at the airport. A (very long) drive through rural Pennsylvania showed me all the benefits of living here, including the “watch out for Amish people on horseback and carts sign”. The amount of woods and mountains here are staggering compared to our always so flat country. After a 5 hours drive, including a fast food stop, we arrived in the small town of Lewisburg. Lewisburg is a small borough complete built around the university of Bucknell. The university itself has a beautiful and huge campus, although there are currently only around 4000 students enrolled, roughly 5 times smaller the TU Delft.

I work together with 3 other graduate students and a varying (it is the holiday season here already) amount of undergraduate students in the Integrated design manufacturing and robots laboratory. Since the holiday season has already begun (the undergraduates receive their diploma on the 18th of may), it is a very quiet and hot campus. The average temperature during summer (which I didn't research properly) goes up to around 95 degrees Fahrenheit, oh the Americans and their funny units.

The lifestyle in the USA is completely different compared to what I am used to back home. Public transport is for instance non-existent, and people are completely dependent on their cars. Those cars are in general very big pick-up trucks, or raised Jeeps (as my roommate demonstrates on one of the pictures) in central Pennsylvania. Since Pennsylvania is closely situated (close is a relative word in the USA, for some reason they find a 3-4 hours drive close by) to big cities like Washington D.C., New York, Philly and others, I had the opportunity to already visit some of them. The visit to D.C. proved that Americans in general are very proud of their own country, proven by the amount of people standing in front of the gates of the white house (I was waving to president Obama, but unfortunately no response).

I am roughly on a quarter of my stay here, and already having seen multiple great cities and incredible nature, as well as meeting awesome people. So if you have the chance to stay for some time here, take it!

Joep Nijssen



Get involved!

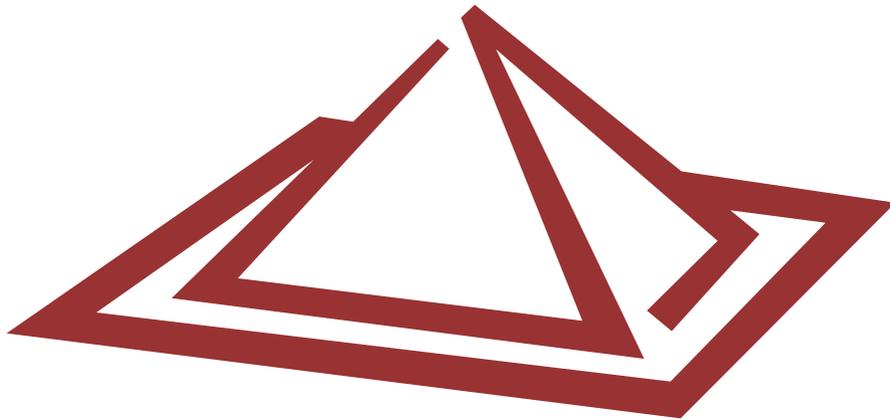
If you have any comments ideas or questions about Taylor and its activities, feel free to contact us.

Also we would be very happy to receive any comments or new content for the next issue of the Taylor Vision. For example: Articles on PhD work or on your graduation thesis, internship experiences, or quotes from your favourite teacher.

You can contact us at: taylor-3me@tudelft.nl

Check out the website!

Lots of information can be found at: www.dispuuttaylor.nl



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