

Taylor Vision



Happy FEMily





About us

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Edition

First Semester Edition

History

Taylor is the study association related to the department Precision and Microsystems Engineering of Delft University of Technology. The association was founded in 1988 to enhance the study experience of the students. The Taylor Foundation, in its legal form, was subsequently founded in 1992, making it an official organ in the TU Delft. During this time, the department changed its name 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 to enhance the study experience of the students by: trying to improve the relation between the students and the department staff, bringing the students in 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,

We have occupied the office a while ago, but we are very proud to present to you the very first Taylor Vision from the 2019-2020 board! Since the last edition contained a special report on the Taylor trip to South Korea, this time we'll go back to business and have a recap on the activities and news of the last semester.

It has been an exciting first semester this year, in which expansion has been an overall theme. For starters, this is the first year in which there were more than 100 students starting their first year at HTE, which is a great milestone and also shows the increase in enthusiasm for engineering in general. It was also great to see that with this increase in students, the activities of the past half year have been busier than ever and the interest in excursions, lunch lectures and even already the next Taylor trip is only increasing! Additionally, the board of the TU Delft has agreed that the increase in students should also be accompanied by an increase in staff, which is great news! More on that in the 'PME News' section.

The first semester has been a good warm-up with lunch lectures, an excursion and plenty of IntroLabs. The students have already survived their first exam week and the preparations for the next one are already fully in progress. Meanwhile, we have been preparing all kinds of activities with companies which are both already familiar and less familiar to the PME department. We can proudly announce that the second semester is packed with action, in which CONNECT 2.0 and our central Europe Taylor trip will be major highlights, so keep your eyes peeled for new activities both in this Vision and on our brand new website!

Cheers,

Bas Roulaux





Upcoming Activities

To stay warm during cold winter times, it is even more important to meet your family and friends regularly. To receive some of the warmth shared by the Taylor family, make sure to register through our website and attend the following upcoming activities!

Huisman company visit. January 8th, 12:20, Schiedam.

Huisman Equipment will open its doors to us just after the holidays for a tour around their facilities in Schiedam. Since their field of work includes crane development, drilling equipment and vessel design, this visit promises to be very impressive and interesting to every mechanical engineer!

New Year's reception. January 9th, 17:00, PME labs.

To celebrate the new year of 2020, a festive New Year's reception will be held at the PME labs. Wear your sparkliest outfit and have a toast on 2020 with your friends.

Sioux lunch lecture. January 15th, 12:30, 3mE lecture hall E.

The High-Tech company of Sioux will visit 3mE to share their knowledge and expertise on high-tech production systems. On top of that, a Nevepoint and free lunch will be provided!

Q3 activities

Prepare for a variety of activities such as case studies, lunch lectures and receptions to be organized in Q3! Among others, TNO, Philips, and ACE will give us insight in their companies and projects, and expect a reception to celebrate Lisanne's birthday!

Emma Hoes

CONNECT
A HIGH-TECH NETWORKING EVENT
6 MAY 2019
PME Labs & Lecture hall A @ 3METU Delft

SAVE THE DATE

Organized by Taylor and Young Instrumentation Network
Powered by the province of Zuid-Holland and
the department of Precision and Microsystems Engineering





Recent graduates

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



Chuqian Zhang, MNE

“Design and fabrication of a dielectric elastomer actuator for Organ-on-Chips platforms”

Jan van Willigen, MSD

“Modeling of a compliant force distribution mechanism for deformable hydrostatic bearings”

Alok Bharadwaj, MNE

“Measurement of low contact angle droplet topography using optical interferometry”

Anirudh Narayanan, SOM

“Design of a flapping wing for application in Micro Air Vehicles”

Xin Hu, MNE

“Precision error in mass measurements using metal-coated microchannel resonators”

Matthew James, DMN

“Hamaker constant and tip radius determination in dynamics atomic force microscopy”





Recent graduates

Martin van Mierlo, MSD

“Design of an astigmatically neutral mirror using thermal path optimization”

Maarten Theulings, SOM

“The derivation of foldable finite plate elements for mesh-independent fold modeling, using enriched and mixed/hybrid methods”

Jaïr van den Broek, DMN

“Modal derivative based reduced-order modelling in parametrically resonating structures”

Arnold Smolders, OM

“Fiber coupling enhancement in optical communication terminals”

Geert Blokland, SOM

“Mechanical metamaterials by topology optimization”

Karoen van der Wal, MSD

“Ferrofluid rotary seal with replenishment system for sealing liquids”

Tom Spoel, DMN

“Equivalence in experimental source characterisation”

Derk Kappelle, SOM

“Pareto Set Extrapolation: an efficient solving technique for multi-objective optimization problems”

Rico Hooijschuur, MSD

“Air-based contactless wafer precision positioning system, contactless sensing using charge coupled devices”

Marc van Vliet, DMN

“Steel weight reduction in offshore wind jacket structures by wrapped FRP joints”





PME News

As you might have noticed, the number of students at our department has been increasing over the past few years. Where we had 45 first years' students starting at PME four years ago, over 110 students started this year! Of course this is great news for Dutch engineering, the TU Delft and the PME department, but this also comes with added pressure on the staff and the facilities of the department. This is why the PME board (not the Taylor board) has been working very hard to get extra funding, to create the additional space for the extra staff that is necessary to keep the department up and running. Luckily, this article contains some great news, since the negotiations for the additional funding have led to 16 positions for new staff becoming available at the faculty of 3ME. Of these new positions, a total of 6 positions will eventually go to the PME department, so we can look forward to welcoming a lot of new talent to our department!

Since the aim of the department is to create a group with a diverse look on the ongoing and future projects, there are several changes happening. One of them is looking beyond the 'classic' PME industries like the semiconductor and precision industry, and also look into the medical, bio- and food industry for new assignments. As a result, this will widen the scope of our current staff and students since they will be able to engage in this new field of projects. Additionally, future staff and students who have interest and/or experience in this field will be more likely drawn to our department, which will add some more diversity to the department as well. Maybe we will even reach the goal of a 35/65 female/male ratio, time will tell!

Of course we wouldn't be talking about expanding our department, if our staff would not be doing such great work. And as a result of their great work, the following staff members were recently offered a permanent position at the PME department: Alejandro Aragón, Can Ayas, Hassan HosseinNia, Ivan Buijnsters and Murali Ghatkesar. Congratulations to all!

Bas Roulaux



Activities

Lunch Lecture: PM

The first Taylor lunch lecture of this academic year was held on September 17th. This day the company PM Bearings came all the way from the small village of Dedemsvaart in the east of the Netherlands. Upon entering lecture hall B, I was amazed at the great turnout for what is this Taylor board's very first event! Many faces, both familiar and new, were all eager to learn what PM Bearings is all about.

To start off we got introduced with the origin of the company. PM (Precisie Metaal or Precision Metals in English) was established in the 1960's as a workshop manufacturing precision bearings. Since then it started growing rapidly and creating its own designs. These designs are mostly for both rotational as well as linear bearings that are used in the semiconductor, medical and optical industries. These are either picked out of a catalogue or designed custom to fit the requirements of their customers. All bearings are made in house, this includes the hardening and grinding of the bearing surfaces. These surfaces can be grinded up to 2 microns flat and parallel in the distance of 1 meter, very impressive!

One of the other activities that PM Bearings got involved in at a later stage is that of the actual design of high-tech systems. An example given in the lunch lecture was that of a high precision wafer stage for use in lithography machines. With all their years of experience in the manufacturing and application of high precision bearings, the decision was made to start an R&D department. Although this department of about 10 people is relatively small compared to the workforce of over 100 people working in the manufacturing plant, this does not affect their ambition. This small team has set out to develop a 4 DoF stage for demonstration and learning purposes in about one and a half years. For this great feat, a special type of engineer is needed; the High Tech Engineer. During the presentation multiple design aspects were shown. For each one a connection was made to one of the courses taught in our master, which was interesting to see and shows the real world application of the knowledge gathered at the TUDelft.

I personally really enjoyed the interesting presentation of PM Bearings and got more insight in their company.

Dirk Ulijn



Activities

Excursion: PM

After a short night sleep the alarm goes at 6:30 to go on the Taylor excursion to Precision Metal. The evening before I quickly borrowed my housemates coat to meet the strict taylor dress code. And after cleaning off some unidentified stains I'm ready.

When I'm at the location next to the aula we leave almost immediately and once on the highway almost everyone falls asleep and doesn't really notice the rush hour we are in. Upon arrival in well known Dedemsvaart, next to less well known Slagharen, we get the needed coffee and the day starts.

We get a presentation about PM's main business which is making precise linear bearings. They tell us the different steps in creating linear bearings in different sizes and shapes, and their way of making them as precise as possible. At this point in time I'm still in the illusion that precision machining is mainly a computers job, but during the presentation it slowly becomes clear to me there is a lot of manual labour and experience involved in making precision parts. Mainly in the heat treatment and hammering part of the process, this is more of an art than an exact science. When the parts are heat treated, they will warp and making them straight again is necessary for the next step. This is done by hammering certain spots on the parts. When a piece of metal is struck with a hammer this spot expands ever so slightly. This tiny bit of expansion can be used to straighten out the parts of the bearings. For this an experienced worker is needed and it is quite labour extensive.

When the presentation is done we get to see the manufacturing process in detail, the group is split into smaller groups and we go to the production steps separately. We see some small CNC mills, grinding machines, lathes and of course the ovens. But some machines definitely stand out. One is the biggest CNC mill I have ever seen, this was in a new production hall which was mostly empty, apart from this one machine. It had a milling table of 8 by 3 meters, and two huge gantries running over it. And next to it, on some pallets there were some big parts for ESA's ariane 6 rocket, which where machined out of a solid piece of aluminium. So next to the main business of producing bearings, PM does a lot more.





After this tour we moved on to a small case study they gave us. The case was as follows, what function could you add to a linear bearing for high end applications. Team: “stop met dat geklager, en koop onze lager” won this case study with a variable measurable stiffness bearing and a good team name.

At this point it was just past 3 and because we had a long drive ahead of us, we had to leave. On our way back we talked a bit about all we had seen at PM, and played an nail biting round of 30 seconds which came down to a single point. After this round we were back in Delft and just in time for dinner at home.

Joep Meij



Activities

COMSOL course

One of the staff members of COMSOL came all the way from Zoetermeer to teach a COMSOL introduction course to me, and other interested HTE students (over 50!). In this course we started from the basics of COMSOL and gained a lot of hands on experience with the program. COMSOL can do a lot more than you think, and for example the knowledge gained in courses such as advanced heat transfer, can be put into practice using COMSOL, in a clear way. After gaining a basic knowledge of COMSOL, we also learned how to use COMSOL in combination with MATLAB. Altogether, it was a very useful workshop and an afternoon well spent. Thanks again to the Sander Bezuijnen for his clear explanations.

Wietske Maas









Taylor trip 2020

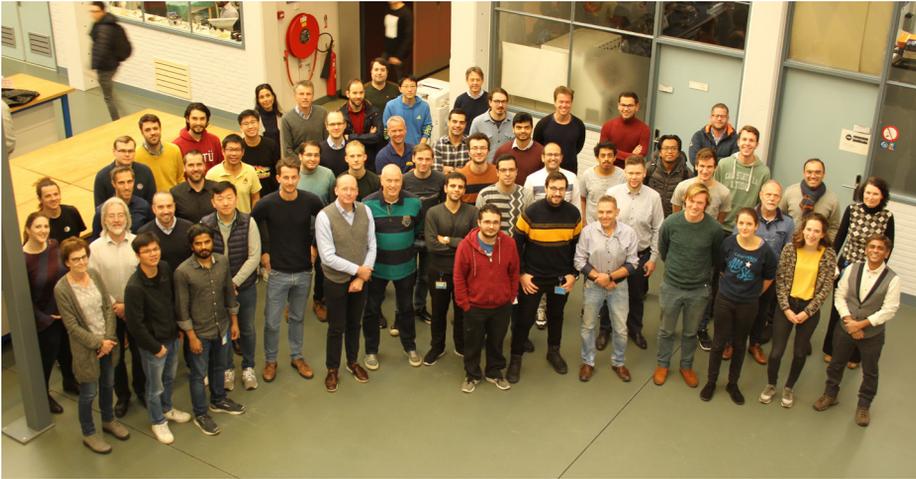
- A scenic roadtrip through the Alps area
- Visit numerous tech companies leading in the automotive, aerospace and precision industry
- A good balance between company visits, nightlife, citytours and adventure
- Big discount provided by Taylor
- Departure 6-8 July
- 11-14 days
- Bring your suit and lederhosen

How to apply:

Send your motivation letter or motivation video to taylor-3me@tudelft.nl before January 12th. See your TU Delft email for more details.



PME Staff



Prodrive football team

A new academic year also means the Taylor football team continued for a new season! Last year was the start of a tradition when the Taylor football team was established. After a thorough selection by coach Guido a new motivated and skillfull team was ready for the 2019-2020 season and started in their brandnew Prodrive sponsored shirts. Last half year the group has grown to a team and more and more matches were won. Keen to see Taylor competing for the trophy? Come by to cheer us at X from 7-8 pm every Monday.





The mug mystery

At the beginning of the year, everyone of the Taylor board ordered a personalized tea mug. Printed on these mugs is a photo of a weird or funny picture of its owner. The idea behind these personalized mugs is to reduce the risk of another employee of PME grabbing these beautiful mugs for their own use. Of course, the owners of the mugs try to take the utmost care to keep their mugs in a safe place. However, after Lisanne placed her mug in the shared PME dishwasher in september and started the cleaning schedule, she found out afterwards that her mug had disappeared. No worries at that time, normally the favorite cups, plates and cutlery show up after a few days in the dishwasher (after their users find it time to properly clean it). However, not this time. The mug remained missing and did not show up for months. An unknown professor, phd-er or employee used a mug with Lisanne's funny face on it for months and kept it secret for a very long time. Months passed by without any sight of the mug in PME square surroundings. But against all odds, just before Christmas holiday, an anonymous person had placed it back on the kitchen counter of PME square like nothing had happened. However, its journey in the meantime remains an intriguing mystery.

Did Alejandro use it as experimental validation for his crack propagation models? It could also have served for a nice pencil box in the corner of Hans' office desk. Farbod could have been interested in finding its first and second eigenfrequency, but that would have taken minutes instead of months. Maybe Fred was just thirsty.

It is of great importance to solve this mystery to prevent these terrible disappearances in the future. If anyone has a clue or trace, please report (anonymously) to taylor-3me@tudelft.nl. We can only speculate about it in the meantime.

Guido Mous



Mugshot



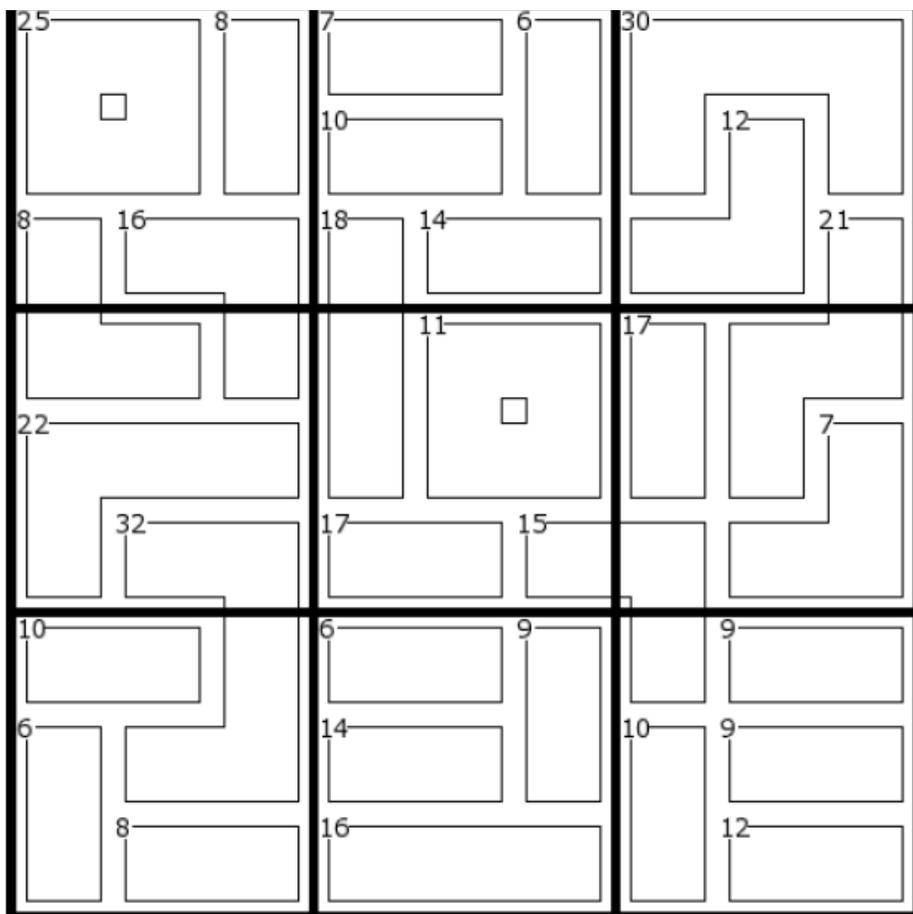


Jorans Puzzle Paradise

A new year a new puzzler, this year to truly test your mettle we will start with something known as the 'killer sudoku'. What are the rules you might ask? They are very simple and as follows:

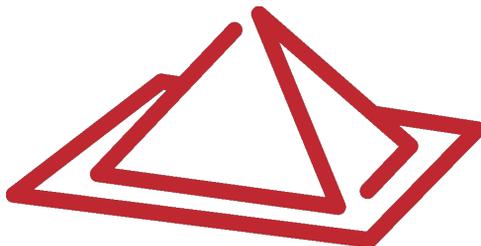
- Regular sudoku rules apply, so you have to fill in the numbers from 1 to 9 in every row, column and nonet. Every row, column and nonet therefore also cannot contain any duplicates.
- The small subsections denoted by the thinner lines have to add up to the number denoted in the top left of said subsection
- The subsections also may not contain any duplicates.

So without any further ado, here is your first puzzle by the new board:



Mail taylor-3me@tudelft.nl with your solution to win a prize!





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