



PDEng Newsletter

PROFESSIONAL DOCTORATE IN ENGINEERING

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PDEng Individual Design Project at SABIC

Carlos Daniel Villalobos Martinez— Process & Equipment Design

Editorial

With the end of summer and the starting of autumn, here we present the summer edition of PDEng newsletter, highlighting all the activities of PDEng trainees during the season.

We hope everyone enjoyed their summer and are fuelled up once again for the upcoming challenges.

I carried out my Individual Design Project (IDP) at SABIC in their European Technology Centre, located in Geleen. I was part of the Aromatic Derivatives team of the Technology and Innovation (T&I) division.

SABIC is a public company based in Saudi Arabia, specialized in four strategic business units, which are petrochemicals, specialties, agri-nutrients, and metals. SABIC Technology Centre in Geleen holds the T&I hub of the company in Europe where scientists contribute to the ongoing development of new processes and products and continuous improvement of existing assets. The Aromatic Derivatives team focus on the development of SABIC's technology for the production of diverse aromatic compounds, including benzene, styrene and phenol.

Sustainability represents one of the company's principles, so that in the T&I division, improvement of energy efficiency and reduction of carbon emissions are key aspects considered in the development on new processes. As a part of my project work at SABIC, an energy-integrated process in the polycarbonate value chain was designed using pinch analysis. A heat exchanger network that makes efficient use of heat was developed, which demands lower utility consumption and therefore has a lower carbon footprint, contributing in the achievement of sustainability goals.

SABIC employees represent the company's strongest asset. During the course of the project, I was able to learn from experts in diverse fields who were also very open to guide me through this one-year journey. I had the chance to collaborate with people from different geographical locations. I fully appreciate the opportunity the company gave me to grow professionally and develop the skills I will apply in my future career.



Current Edition's Content:

IDP highlight: A Project at SABIC

GDP highlight: Be aware of gastrointestinal issues!

The most anticipated study trip 2019: Spain and Portugal

PDEng summer BBQ: Join us in the heatwave

Ice breaking event: Welcoming the new trainees

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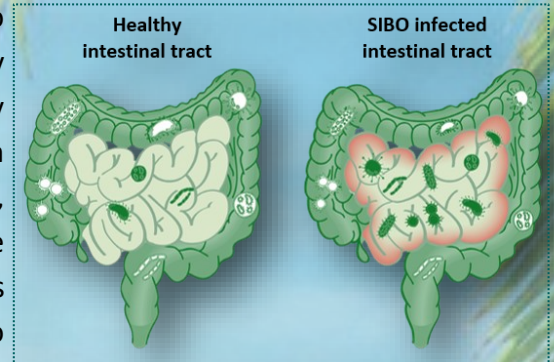
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Group Design Project of Chemical Product Design

A Strategy to Improve Intestinal Health

Bhavya Goyal, Gabriela Hadiwinoto, Kleopatra Papamichou, Yuyang Tian, Zerui Zhang

Do you know that gastrointestinal issues can lead to Alzheimer's? In fact, when the small intestine is invaded by bacteria, not only the digestive system is ruined, but the whole body is affected. This challenging topic was addressed in the Group Design Project of 5 trainees from Chemical Product Design track: Bhavya, Gabriela, Kleopatra, Yvonne (Yuyang) and Zerui. The initiator was the B12 Institute, a Rotterdam-based non-profit organization which helps patients with vitamin B12 deficiencies. The aim of the project was to provide a comprehensive treatment plan to improve the intestinal health of B12 deficient patients. The project focused on the small intestine bacterial overgrowth (SIBO), a condition where the small intestine, which is normally almost sterile from bacteria, gets overpopulated.



The diagnosis of SIBO is difficult since it is not so openly accepted as a disease. The direct sampling of the intestinal fluids is also difficult, so one has to rely on indirect evidence. SIBO appears to be the most important cause of irritable bowel syndrome (IBS, a symptom-based diagnosis) since it was found that they are related in

80% of the cases. The trainees, using chemical engineering logics, found that SIBO results in production of bacterial toxins and leads to vitamins and nutrients deficiencies, which could be used to identify its presence.

The proposed treatment consists of 3 parts: 1) suppress bacterial overgrowth, 2) reduce bacterial toxins production and 3) restore the balance of gut microbiome. Diet was found to have a strong effect on the production of bacterial toxins. To suppress bacterial overgrowth, antibiotics were recommended, together with

supplements of multifunctional natural substances. Throughout the project, the trainees found traces of other disorders such as oxidative stress, which is responsible for Schizophrenia, Parkinson's, diabetes, and others. In conclusion, the project could be extended to those directions, to provide more solutions to other important disorders.



BBQ, Sun, and the PDEngs

It's grilling time! On 26th of June, the PDEng hosted the traditional barbeque for the master students of the faculty of Applied Science at TU Delft. On that day, Ir. Pieter Swinkels, the managing director of PDEng, gave a presentation to the master students enrolled in the event. The presentation included the details on the objective of the PDEng programme, the preparation it needs, and the description about the three tracks. Following his speech, the then chairman of DIDEA organization, Ricardo Baltazar, shared his own experience as a PDEng trainee at the end of his first year, commenting on the courses and projects he underwent over the year as well as the activities of DIDEA. After a question and answer session, the rest of the PDEng trainees, who were in the meanwhile preparing the barbeque, joined the event. Thus, coordinators, trainees, and master students joined all together outside the building on a sunny summer afternoon, sharing their experiences together with drinks and food. The event was indeed successful in involving many master students and some of them expressed their strong interest in joining the program in the future.

Study Trip 2019: Spain and Portugal

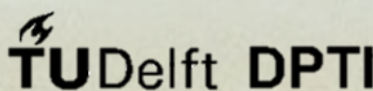
As per the tradition every year, DIDEA organised a week's trip in July where 16 PDEng trainees with diverse technical backgrounds, from chemical and industrial engineering to chemistry, biotechnology, and material science went to Spain and Portugal for a study tour. The trainees visited five chemical companies in a span of 5 days, with the purpose of strengthening and extending the bonds between the PDEng community and industry.

The trip started by visiting Parque Guell and Sagrada Familia in Spain, where everyone had some relaxation time and enjoyed the famous Spanish cuisine, tapas with some sangria. Next day was the time for first company visit, where the trainees visited Corbion in Montmeló, Spain on Monday. The whole day they spent at the company included interventions from both the plant director, Mr. Nájara and the PDEng trainees, which included the plant visit and solving a design challenge. Next day, the trainees had a visit to Cargill plant in Martorell as well as the one on the Barcelona port. In Martorell, they got an opportunity to see the production process of starch from corn, while at Barcelona port, they learnt about the soya bean extraction process. On third day, the trainees visited Ercros plant in Vila Seca which produces polyvinyl chloride (PVC). On their last day in Spain, the trainees visited two plants of LyondellBasell producing polyethylene terephthalate (PET) which are located in Tarragona complex. The same evening the trainees flew from Barcelona to continue their visit in Lisbon, where they were joined by few more trainees and they all together visited the last company on this trip. After enjoying a pleasant morning in Setúbal, the group visited the cement production plant of Secil.

The unforgettable week concluded with a whole weekend exploring Lisbon and enjoying its beauty. Overall during the trip, the PDEng trainees were satisfied as they grasped a better understanding of the process and product industries, created new opportunities for future collaborations between the university and companies, and they were able to visit different places and experience new culture.



Study Trip Sponsors:



Ice breaking event

New place, new people, and new culture. The new PDEng trainees may experience unfamiliar feelings in the first few weeks of joining the program. Therefore, an ice-breaking event is important to give a warm welcome to the new trainees, as well as to bridge the gap among the new and the existing trainees. This year, the ice-breaking event was held in the 2nd week of September, which gave the new trainees some time to settle all administrative works and to get to know their fellow trainees.

During the event, trainees started with speed-dating where every trainee interacted with another trainee for one minute to learn new things about each other. Afterwards, a “truth or lie” game was organised for them to know others even better. The games were followed by a pizza party. Later that evening, they moved to ‘The Hangout’ bar where everyone enjoyed lots of drinks, talks, and laughter.



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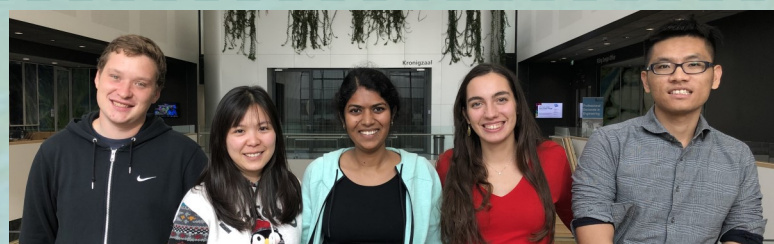
PED Representative
Jeremy Mantingh

UPCOMING EVENTS

International dinner

Halloween

Sinterklaas



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