



M.Sc. Air Quality Control,
Solid Waste and Waste Water
Process Engineering

(WASTE)

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NEWSLETTER

IFAT Excursion 2018 - MSc. WASTE

This year, our waste generation had the opportunity to visit the World's Leading Trade Fair for Water, Sewage, Waste and Raw Materials Management known as the IFAT fair. The fair was held in the city of Munich, Germany, between the dates 14th and 18th of May 2018. The course director of the Master Program of Environmental Engineering, Mr. Dipl. -Biol. Andreas Sihler, together with the help of our MSc. WASTE Office; they organized an excursion to assist the trade fair as it would be a valuable experience in networking and exchanging knowledge for students. Also, it may positively impact our professional careers through expertise discussions and live demonstrations.

In fact, the fair was divided into numerous field sectors such as hydraulic engineering, water supply, plant engineering, waste management, recycling, technology transfer etc. There were diverse exhibitors from 58 countries expanded with their stands over 260.000 m² of exhibition space.

Visitors could easily access the sections where they were welcomed by the representatives for potential business deals or just for presenting information about their projects, achievements, partnerships and future goals.

In addition, students from universities had the chance to attend these exhibitions, conferences, demonstrations and were able to establish contact with companies as a reference for their professional development in internships and jobs.

In summary, this platform takes place every two years in Germany. It represents the entire range of environmental technology products and offers challenging deals for students, employees, and employers. We would highly recommend it to every generation to expand their visions and set their goals effectively.

Roua Labbaoui and Maria Paula Aparicio
MSc. WASTE students, Generation 2017

IFAT Munich 2018 - Recilec Picture Gallery



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INTRODUCING Dr. -Ing KRISTY PEÑA

Dear all, my name is Kristy Peña and I am originally from Mexico. I have been living in Germany for 10 years, but 12 years abroad! I am an Environmental Engineer and Scientist who actively promotes environmental projects with a multicultural and interdisciplinary touch. Life has taken me to work at Mexican, German and Norwegian companies as Environmental and Occupational & Health Engineer, WWTP designer and operator, and Process Engineer, respectively. My undergraduate background is Environmental Engineering from UPI-BI-IPN (Mexico).

In 2006 I came for the very first time to Germany to experience "the one in a life time" MSc. WASTE. After that, I went back to North Mexico to work for Daimler A.G. A challenging time since the company was building up a new truck production site and I was responsible for all Environmental issues on site. After 2 years, I felt like I was missing German cold weather, Maultaschen, Schwäbisch and of course my friends and the freedom of this country.

Therefore, I decide to start a PhD at ISWA. The core of my thesis was on Anaerobic Digestion Technology and elements required to implement such technology in Mexico. Through that I met many people on my actual business career. I also would like to mention, that during my Master and PhD studies I had the great pleasure to hold scholarships from DAAD-CO-

NACYT, ICYT and Alexander von Humboldt. After ending my "Career as a student" (By now! Because you never end up learning), I went back to business as a Process Engineer in Cambi A.S., a great fantastic Norwegian Company. Here I focused on anaerobic digestion and thermal pre-treatment for sewage sludge and bio-waste. Cambi gave me the chance to put in practice my multicultural and interdisciplinary abilities, not to mention my language skills (I should earn extra as multitasker and translator).

However, after almost 4 years working for them, I have decided to take a sabbatical and re-focus on some other priorities. One of those priorities is to actively work as a founding member of "Red Global Mx - Capítulo Hessen" a civil association who networks Mexico with Germany for science, social, political and environmental exchange. It is really a great pleasure to see how science meets social awareness, while developing small projects with big social impact. Life has giving me one more interesting task: be back at "home zone", here in WASTE, where the adventure started 12 years ago.

Dr. -Ing. Kristy Peña
Course Director - MSc. WASTE



Dr. -Ing. Kristy Peña

"It is really my pleasure to be substituting Dr. Carolina Acuña as she takes important commitment in life. I will be accompanying you at least 2 semesters. Please feel free to drop by and say hi! I will be glad to listen to your life story and surly help you with the administrative work and other issues that you might encounter as you are part of the WASTE family. See you soon!"

MSc. WASTE GRADUATION CEREMONY 2018



On behalf of the Students of the MSc. WASTE Generation 2016, I am pleased to invite you to our upcoming Graduation Ceremony. It will take place on the **17.11.2018** at Pfaffenwaldring 47.03 at 16:00 (Official Part) and 20:00 (Unofficial Part). International buffet, dance, and music performances will make this a memorable occasion for all the guests.

We are looking forward to seeing you there, **SAVE THE DATE!**

Nelson Rincón
Class Speaker Gen. 2016, MSc. WASTE

STUDENT EXCHANGE STUTT GART UNIVERSITY

The University cooperates with foreign universities for research and teaching. Participation in research alliances, exchange programs or dual-degree study programs throughout the globe means an institutional internationalization since the year 2011.

The main goals are distributed in these 5 areas:

1. Strategic partnerships
2. Research
3. International oriented studies
4. Raise attraction for international students
5. International engagement.

The university is involved with 320 educational institutions around the world and encourages students to study abroad for multiple reasons such as having a multilingual formation for jobs application as well as having a good experience.

For more information, you can visit the International Office located in Campus Vaihingen, Pfaffenwaldring 60.

Maria Paula Aparicio
MSc. WASTE student, Generation 2017



Wikipedia Files - International Center

WORKING AS A HIWI IN THE CORROSION LABORATORY AT IFK

In September 2017 I got to experience one of the most exciting opportunities in my student life; working as a HiWi (Wissenschaftliche Hilfskraft) in the Corrosion Laboratory at IFK. Going to the interview, I already knew that this HiWi job would be interesting. It would allow me to apply my knowledge in Materials Engineering (a one-year course that I had studied during my bachelor in Peru). Marta Escoto and Eva Miller, who both work in the Firing Systems Department at IFK, explained the tasks required from me and emphasized the importance of being patient and accurate in this job.

During the first two months of working with them, I learned how to operate two important machines in the Corrosion Laboratory – the cutter and the polish machines. In the beginning, the work was challenging due to the several steps and accurate procedures required to prepare the metal and ceramic samples. But after two months, I was able to prepare batches of samples by myself.

My job consists of preparing cooled and uncooled ceramic and metal pipe samples, that were exposed to high temperatures in chimneys, for a certain amount of time (for example, 100 hours or 1000 hours). The aim is to analyze the deposition of ashes and other substances produced during the combustion of different types of fuels such as coal, coal with additives, a combination of bio-fuels, and others. The process to prepare the samples is long, with a batch of 3 samples requiring at least 2 weeks to prepare. The first phase of preparing the samples starts with the sectioning process

and finishes with embedding, using resin. After four days of rest inside an oven, the samples are ready for the second phase of the preparation that consists of grinding and polishing. During every process, accuracy and patience play an important role. In addition, part of my work also includes helping Marta and Eva in certain administrative tasks such as the statistical analysis of results, writing reports for every batch that is done, and organizing files.

I am very appreciative of this HiWi work experience, which has taught me a lot. Marta and Eva are great mentors who guided me during the last nine months. I am thankful for their trust and for giving me the opportunity to work with them.

Grecia Solís Castillo
Class Speaker Gen. 2016, MSc. WASTE



Ms. Grecia Solís at the IFK

MY HIWI JOB AT FRAUNHOFER INSTITUTE

First of all, Hiwi is the abbreviated form of *Hilfswissenschaftler* which means research assistant. To whomever it may concern in the future, every student can spontaneously apply to any institute requesting a Hiwi job even if he/she doesn't have previous experience or expertise in a specific field.

As soon as I came to Germany, I got the opportunity to land a job with the Fraunhofer Institute in the department of AkustikIBP. I have planned my working hours according to my academic schedule and I started my experience.

The working atmosphere was very appealing. In addition to my flexible working hours, I met with international students who held part-time jobs as well as professional employees. My supervisor was leading multiple multinational projects and he introduced me to the European project: EcoLamb, which taught me many new assets such as problem-solving, project management, communication, research and work ethics in Germany. In this job, I learnt many tasks and gained profound knowledge that helped me set future goals more clearly. Also, I have got to network with those who are in the field. This opportunity offered me new perspectives which can be applied in waste

management, that might not be offered during the studies of our master program.

Working and studying is challenging in terms of timing. I honestly believe it is a great experience because it boosted my will to learn more and enrich my CV. Nevertheless, having an income is highly self-assured to cover our monthly expenses with more appreciation and balance.

"I find it extremely delightful and enthusiastic to work here. I hope I can get more work experiences as memorable as this one in the future"

Roua Labbaoui
MSc. WASTE student, Generation 2017



MSc. Roua Labbaoui at the Fraunhofer Institute

STUDENT RESEARCH PROJECT AT THE IVK

I joined the Master Program WASTE in 2017 keeping few fields of studies in mind, which I desperately wanted to work with. Having mechanical engineering background and having worked for some years in the automobile company in India, I was always interested in research areas such as combustion, thermodynamics, computational fluid dynamics and turbulence modelling. Considering the vast horizon that the MSc. WASTE curriculum provides, it had met with my expectations and provided me with the appropriate opportunities that I was always searching for.

After going through some theoretical studies in the 1st semester, I was looking for some practical experience, which will strengthen my understanding. I must say theoretical and conceptual guidance provided by valuable professors like Dr. Kronenburg and Dr. Laurien were immensely helpful to set up the pre-requisite base before starting any practical work. On the 15th of February 2017, we had one introductory session organised by the MSc. WASTE Office, where professors and Ph.D. students from different institutes of our university approach the students and introduce them to the ongoing projects.

This is where the project of 'Turbulence modelling' by Dr. Schmidt caught my attention. He made it very clear in the first session that having 'interest' is the only pre-requisite to apply to work with him. He strongly believed that 'Interest' itself will motivate students to work hard and make the project successful.

When introductory work started in April, it was somewhat challenging, in the beginning, to align myself to the new working systems like 'Linux' and to operate simulation software like 'OPEN FOAM' which was a new environment for me. I looked at this challenge as an opportunity and worked hard to get the sufficient mastery in it. Self-study, literature survey, group

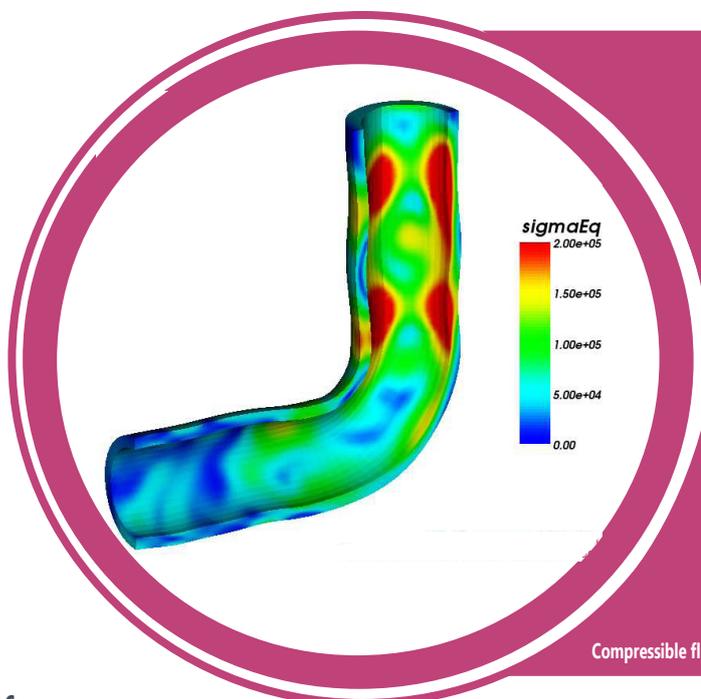
discussions, regular meetings with Dr. Schmidt and a friendly environment, which he maintains with his students, were immensely helpful o further progress in the project.

I must say that I have learnt a lot in last two months of introductory and looking forward to actually work on the specific problem statement in the next six months which will be '3D Turbulence modelling of the compressible fluid due to a sudden change in cross section of the pipe'. In the introductory session of the last two months, I have learnt how vast this subject is and how different challenges one can face coming from theory to the practical problems. I got to know the depth and scope of the subjects like Turbulence Modelling, Numerical methods, Computational Fluid Dynamics and a great opportunity it can offer me in the future.

I am very thankful to 'MSc. WASTE Office' and Dr. Schmidt who has provided me with this opportunity. I am looking forward to continue working in this area and explore the horizon in next few months

Mukul Biware

MSc. WASTE student, Generation 2017



Compressible fluid in OPEN FOAM - Docplayer Files

„We experienced an impressive and well-organized excursion with the friendly staff and their elaboration of the main parameters and systems of this technologically advanced plant. It was a great chance for the students to better comprehend how environmental engineering was applied to real life production.“

WASTE INTERCULTURAL MEETINGS (WIMs)

Indian WIM 2018



MSc. WASTE Indian WIM - Photo by I. Chourdakis Photography

We were very much delighted when we got the opportunity to organise the Indian WIM on the 20th of April 2018 and represent our culture in front of an international audience. The WIM was held as part of the Intercultural program organised by the MSc. WASTE Office and supported by the WASTE Club Stuttgart e.V. Three students including Aditya, Saikiran and myself, along with the help of WIM co-ordinators and the MSc. WASTE Office, successfully managed to make the event exciting and enjoyable. Needless to say, the event would not have been a success if it weren't for the people from different generations who participated so enthusiastically and helped us in making the event memorable.

The event began with a presentation about India from its origin in the Indus civilisation till the present day. We managed to show how India has gone through different phases in the past and how it is successfully heading towards its bright future. People were very much surprised to find out so many unknown and exciting facts about India. From its spiritual background to its cultural aspects and its scientific domain, people were amazed to know how vast, diverse and thriving India is. All the decorations and Indian ambience created in the room by Nelson and Gabriela were striking and added the perfect touch to the presentation.

The presentation was immediately followed by a variety of delicious Indian food. Some of the food, the sweets, in particular, were specially brought in from India. The food was cooked with the help of many friends, with Aditya and Saikiran being the main chefs. Cashew barfi, spicy delicious 'pakora' and 'lemon

rice' made by Saikiran were definitely worth the praise. After greatly enjoying the food's fragrant and spicy flavours, it was time for some Bollywood dancing! Irrespective of the fact that people couldn't understand the exact meaning of the songs, everyone enjoyed sharing the dance floor and grooving to the Bollywood beats. This continued for two hours, after which people were finally, unwillingly forced to stop as it was time to pack up.

The WIM proved to be an unforgettable day, and we learnt a lot throughout the process. Whether it was organising the event, the food preparation or the presentation, every aspect taught us something. I would really like to thank the MSc. WASTE Office and Mrs. Carolina for giving us this opportunity. Further thanks go to Gabriela, Yannis, Nelson and everyone else from our WASTE program who helped us in making this event successful. Last but not the least, a special mention goes to Aditya and Saikiran, without whom this event would not have been possible.

Mukul Biware
MSc. WASTE student, Generation 2017

WASTE INTERCULTURAL MEETINGS (WIMs)

∴ Alumni WIM 2018 ∴

On the 8th of June the 70th MSc. WASTE WIM - Alumni WIM took place. This year, 5 Alumni from the MSc. WASTE visited us to share their experiences and relive some moments in our beloved Room V23.01 of the IFK. It was an evening full of future planning, networking, and last but not least, delicious finger food made by the students of Generations 2016 and 2017.

Ms. Ximena Loaiza (Generation 2014) started the presentations with her experience working as a Water Management Specialist at Smurfit Kappa Zülpich, apparently living in a small little German town has its advantages too! Then, Ms. Golnoosh Mahami (Generation 2014) shared her journey of getting into the professional world, until she finally got a job at BASF.

The next Alumni, Ms. Piyathida Schmid (Generation 2006), told one of my favorite stories, with an unusual „Take home message“: Life could get in the middle of your professional plans.

Hence, be always ready to face it, and never be afraid to tell your children's teacher to wait until you are done with the grocery shopping. Afterward, was the turn for Mr. Alfonso Vidal to talk about his journey to find a Ph.D. position at the Fraunhofer Institute in the area of Waste Water Pond Systems. Finally, Mr. Denis Vega (Generation 2011) was in charge of closing the evening, by showing how he got his position as a Ph.D. in the field of Small Hydrocyclone design at the Imperial College London.

I could not be more grateful with Ms. Carolina Acuña for organizing this event and letting us know about our possible professional milestones!

Nelson Rincón
Class Speaker Gen. 2016, MSc. WASTE

„Life gets in your way, and there is nothing you can do but changing your plans“

- Ms. Piyathida Schmid



Ms. Piyathida Schmid at the Alumni WIM 2018

SMALL HYDROCYCLONES FOR MICRO PARTICLE SEPARATION

∴ Experimental and computational approach ∴

Hydrocyclones are static devices that use fluid pressure to create rotational motion as the driving force for particle separation. They are normally cono-cylindrical in shape, with a tangential feed inlet into the cylindrical section and an outlet at each axis. The outlet at the cylindrical section is called the vortex finder and extends into the cyclone to reduce short-circuit flows directly from the inlet. At the conical end is the second outlet; the spigot. Hydrocyclones are attractive for industrial use because they have no moving parts and are simple to operate, with relatively low capital and operating costs. The application of these devices includes dewatering, wastewater treatment and particle classification processes in chemical, mining and bioprocess industries. The handling of large volumetric flows is possible, and the equipment is simple and robust. However, hydrocyclones with a large diameter are restricted to large particles. The main

disadvantage of using these devices in industrial applications is that the separation of microparticles is rather inefficient. Nonetheless, since the diameter of the hydrocyclone is directly related to the particle cut size achieved, small hydrocyclones (e.g. 10mm in diameter) can overcome this limitation.

Small diameter hydrocyclones have been applied successfully for the separation of particle suspensions in the micron range. These small hydrocyclones are attractive because they show a bypass fraction larger than the water recovery, thus resulting in a high particle recovery in the underflow as well as low water recovery. However, this is a disadvantage when the purpose of the hydrocyclone is classification, due to the large number of fine particles that are misplaced in the underflow.

Continues >>

SMALL HYDROCYCLONES FOR MICRO PARTICLE SEPARATION

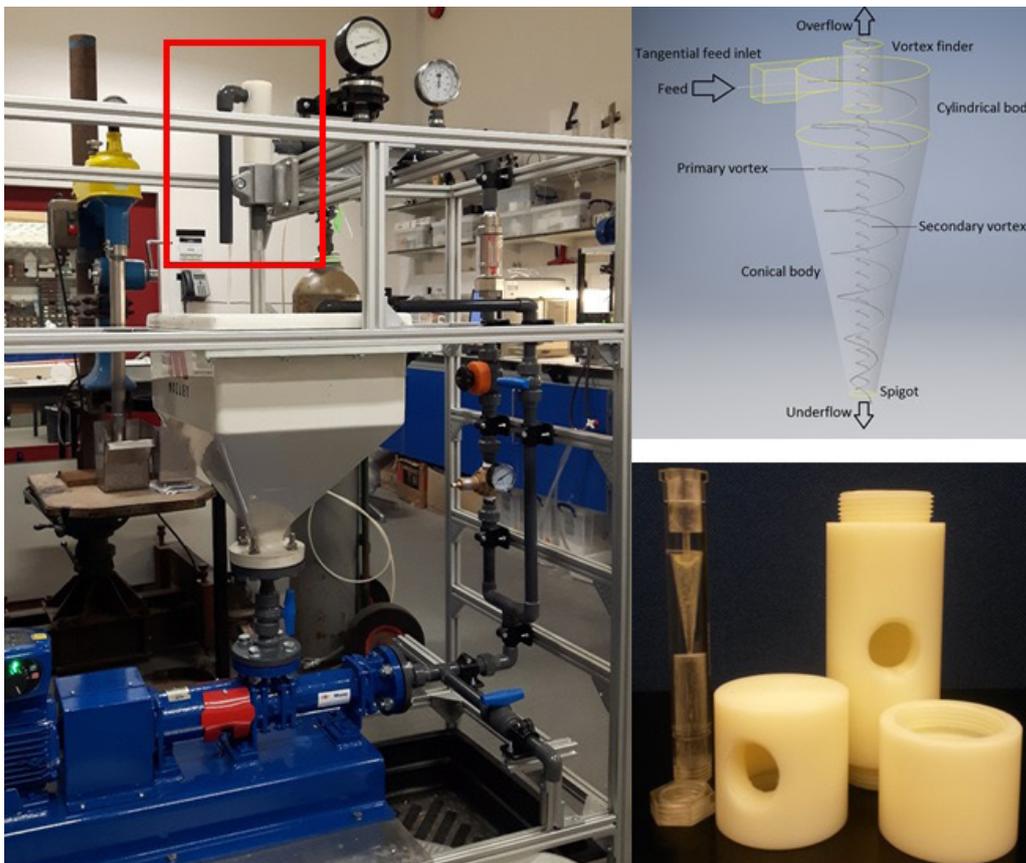
The use of small hydrocyclones for the separation of particles in the micron range is of growing interest. However, these hydrocyclones are typically limited to conventional shapes or restricted to specific outlet sizes, which can lead to sub-optimal performance.

The aim of my PhD research is to develop a method for the optimization of small hydrocyclone design applied to particle classification and dewatering processes. This method consists of four steps; designing, Computational Fluid Dynamics (CFD) simulations, 3D printing and experimental testing. A 3D printed 10 mm hydrocyclone was first shown to match the performance of the ceramic equivalent, followed by factorial experiments with a set of printed hydrocyclones of a different spigot and vortex finder diameters. A CFD model for small hydrocyclones was implemented and validated with the experimental data. For particle classification, a full factorial experimental design was defined to carry out comprehensive experimental tests using glass beads (below 20 microns) as the particulate system. It was shown that the dimensions of the spigot and vortex finder diameter can be effectively manipulated to change the separation performance of the system and the energy consumption. The CFD model was used to predict particle size distribution and the numerical results were in agreement with the experimental data. For the dewatering process, a full factorial experiment using yeast as particulate system was run. The

CFD model was used to simulate small hydrocyclone designs with parabolic walls. The model predicted improved separation performance compared to the conventional conic wall designs. In an innovative development, a 10 mm hydrocyclone with parabolic walls was 3D printed and the prediction was confirmed experimentally.

In this study, the use of 3D printing to manufacture small hydrocyclones of various designs has proven to be practical and it allows for rapid prototyping designs by CFD simulations. This is a significant improvement in the cost, time and versatility associated with hydrocyclone design, and can lead to enhanced separation performance for classification and dewatering processes.

Dennis Vega
Alumnus MSc. WASTE Generation 2011



Small hydrocyclones for micro particle separation - Photo compendium by Denis Vega

INTERVIEW WITH STUDENTS FROM GEN. 2018

::: Life before MSc. WASTE: Some Networking Experiences! :::

Since Generation 2016, creating a Facebook group to bring together the new students of the MSc. WASTE has been established as a new tradition. Within the group, students can interact and receive useful information about the Master Program and the life in Stuttgart. Kevin Nhan, class speaker from Generation 2015, was the founder of the idea and created the Facebook Group for my Generation (2016). I remember how excited I was when I started to use the Facebook Group to get in touch with my future colleagues, and when I realized the invaluable intercultural experience that was waiting for me in Stuttgart!

As it was an amazing and effective way to bring us all closer, together with the MSc. WASTE Office, we decided to continue the tradition and we created the Facebook Group for Generations 2017 and 2018. This year, I was particularly interested in the expectations of the new students from Generation 2018 regarding the MSc. WASTE. Hence, I interviewed a few of them through the Facebook Group: Mr. Igor Ramos, a Brazilian chemical engineer, along with Ms. Salua Moussawel, kindly addressed all my questions:



Mr. Igor Ramos, MSc. WASTE Gen. 2018



Ms. Salua Moussawel, MSc. WASTE Gen. 2018

MSc. WASTE
Generation 2018!

1. Why did you choose Germany for conducting your Master studies?

Igor: First, Germany is known worldwide as a high-tech country, the investments in R&D and education are astonishing, especially in the engineering field. Second, I got an opportunity once to study part of my Bachelor's degree in Germany and I fell in love with the country and the culture. Therefore, I am already familiarized with the daily routine in Germany and it would not be that difficult to take a whole master degree there.

Salua: I have two main reasons for having chosen Germany. Firstly, I was born and raised there. So, the fact that I know the language and that it feels like home there made me inclined to continue there. Secondly, the universities are free of charge in Germany which in comparison to Lebanon and other countries is a huge relief, as the quality of education is also very high.

are you expecting to acquire by attending the MSc. WASTE?

Igor: I am very excited about the MSc. WASTE. The waste management is a huge gap in any country and company that should be solved ASAP. Moreover, Germany is way ahead of Brazil when it comes to environmental integrity and sustainability, so I will be gaining knowledge and skills with the best.

Salua: Honestly I worked in the past year in the waste management field, so I have acquired some skills in the professional world. However, I feel that I do not have the academic knowledge to back it up. Hence, I am really looking forward to the knowledge I will be gaining. However, knowing that there is going to be so many internships in-between terms, I think I will learn some professional skills by working in reputable companies. In Lebanon, I did not really reach that kind of work level yet.

2. Speaking about the academic field, what skills

INTERVIEW WITH STUDENTS FROM GEN. 2018

3. Regarding the intercultural field, do you think that the MSc. WASTE will fulfill your expectations?

Igor: The intercultural chances offered by the MSc. WASTE are not less than awesome. Sharing, in my opinion, is one of the best ways to learn, and I will be studying with people from all over the world. So, students with extremely different backgrounds sharing different points of view and experiences

Salua: Actually I was not really having a lot of expectations concerning the classmates until you formed the Facebook Group. Then I found out that most of them are coming from so many different places. But seeing how equally excited and passionate they are about the environment, I think I will mostly look forward to sharing country experiences concerning waste management and how each culture and society deals with their environmental issues. I think it is definitely going to be a culturally rich program considering how international it is.

4. How do you imagine your life during the time that you will be studying MSc. WASTE?

Igor: I am pretty sure that my life during the MSc. WASTE will not be an easy task. Despite having quite good skills in the German language, the language still is a barrier to overcome. One of my goals is to get an internship during my studies and I know how important is to be fluent in German for that.

Salua: Firstly I expect it to be a lot of work considering. I want to be a high achieving student to get good job opportunities

when I am done. For me, Germany is not easy to live in since it gets so cold and gloomy in winter, so I am not expecting an easy time. The program already seems to foster a sort of family, so that coupled with daily sports activities will for me definitely help prevent the German blues.

5. Do you have any plans for your professional future once you are with your Master of Science?

Igor: I am still not sure if I will come back to Brazil right after finishing my Master (Or even if I will come back at some point). Even though, I will be focusing from the very beginning on matching both the knowledge gained in the Master and the waste management problems that I have been seeing in Brazil. So, undertake a Start-Up would be an option as well as move forward to a PhD.

Salua: Yes, I would definitely want to collect enough experience in Germany or international companies to learn „How it is really done“ in the professional world, and hope to eventually apply all I have learned in Lebanon to improve the waste situation. I see myself in job positions like consultancy or research and development, but I know my interests will be affected by what I learn throughout the program.

Nelson Rincón

Class Speaker Gen. 2016, MSc. WASTE

THE MEASUREMENT CAR AT MARIENPLATZ, STUTTGART

Stuttgart is a beautiful city comprising of extensive gardens, lakes and varied colorful seasons. Stuttgart lies in the fertile Neckar basin and is surrounded by terrains. The fresh air inflows into the city traverse in cold air paths of the Nesenbachtal due to its leeward side. The contaminated air accumulated in the basin is carried away by the main wind direction from South West to North East proceeding towards Neckar valley. On the other side, the development of Stuttgart on the valley slopes further reduces the air circulation into the city. But with the onset of winter, the pollutant concentration increases in comparison to the concentration during summer. This is due to the accumulation of pollutants in the inner city resulting from the stable atmosphere and less dispersion of air molecules due to temperature inversion. During this period, when the German Meteorological Service (DWD) forecasts high-pressure situation, Feinstaubalarm (particulate matter alarm) is established. This encourages the commuters to use public transportation and less number of cars in order to decrease the emissions.

Marienplatz located at the heart of Stuttgart is expected to be strongly influenced by the fresh air flows from the terrains and is a good location to implement the study of pollutant concentration. My student research project was aimed to study the ambient air quality measurements and its analysis at Marienplatz. It was performed under the supervision of MSc. Abdul Samad. It is a project under the programme Urban Climate Under Change [UC]2 funded by the German Federal Ministry of Education and Research (BMBF).

The ambient air quality at Marienplatz is measured using a measurement car as shown in the picture. The measurement car is surrounded by the main road and is placed approximately 40m away from the closest main road in the East. Continuous measurements are carried out since March 2017 and planned to be completed by December 2018. The devices in the measurement car measure air pollutants namely NO_x , NO , O_3 , Black Carbon, CO and PM (0.25 μm to 32 μm).

THE MEASUREMENT CAR AT MARIENPLATZ, STUTTGART

The meteorological sensors placed on the measurement car measure humidity, precipitation intensity, air temperature, solar radiation, air pressure, wind speed and wind direction. The data analyzed for the period from March 2017 to October 2017 depicted that Marienplatz had cold wind majorly coming from South West direction due to the surrounding leeward side of the elevated wooded ridges, flowing through clefts and over the slopes to reach to the city. North East and South East directions contributed to a higher concentration of NO, NO₂, and PM10 due to emissions of the traffic from the nearest main road in the East. Weekly comparisons proved an increased concentration of NO and NO₂ during weekdays as compared to weekends with prominent peaks during rush hours. It was observed that the concentration of NO, NO₂, and PM10 showed an increase in concentration during winter as compared

summer due to the stable atmosphere. The measurement data showed good accordance with the data obtained from LUBW stations (Baden-Württemberg state Institute for the environment, measurements, and nature conservation) located in proximity to the measurement car.

The data obtained from the measurement car during the entire measurement period will be used to understand the parameters influencing the increase in pollutant concentration. This can be implemented further to take necessary measures to regulate the emissions from various sources.

Rashmi Rao

MSc. WASTE student, Generation 2016



Location of the measurement Car in Marienplatz, Stuttgart - Google maps and photo by Rashmi Rao

AMERICAN FOOTBALL IN GERMANY: Stuttgart Scorpion Sisters

"Down, set, hut! Schön, aber tiefer okay, stay lower okay? Nochmal!" I never expected to find myself playing American football, let alone playing American football in Germany, auf Deutsch. Yet it happens that I keep finding myself at least twice a week in the middle of the football field in Waldau, surrounded by my German teammates of all skill levels, from rookies like me to national team players. We (the Stuttgart Scorpions Sisters) play in the women's second national league (2. Damenbundesliga). We practice twice a week, sometimes having weekend camps or extra practice and during the season, we have the long-awaited games. Although American football practices are physically and mentally demanding, it is something I have enjoyed immensely. But how did I end up spending hours studying playbooks, analyzing game videos, google translating what teammates are

joking about on Whatsapp, and traveling to different cities for camps and games? It's all thanks to Hochschulsport Stuttgart! In the beginning of our WASTE studies I heard about the Hochschulsport along with the notification "Uni sport here is very popular! All places are taken up immediately when the registration opens, so be fast!". I went online to see what Hochschulsport had to offer and I was amazed. They offer everything; Zumba, gym, tango, underwater rugby, ultimate frisbee, kayaking, parkour, capoeira, rowing, boxing, yoga, shooting sports, football, you name it. Back in Finland, I used to play basketball and go to the gym relatively frequently.

>> **Continues**

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I decided that I wanted to keep going to the gym but also try something new. After having browsed through all the options on the Hochschulsport website, I enrolled at the gym, and since American football seemed cool, I messaged the contact person who warmly welcomed me to join their next practice. This summer semester I also enrolled in another sports course offered by Hochschulsport called "Fit Fit Fit!". This course starts with 30 minutes of warm-up, after which we get to choose whether we want to spend the next 60 minutes doing fitness or playing some sports, such as basketball, volleyball, ultimate frisbee or uni-hockey. This is a great way of doing some exercise after long days at uni, as well as getting to interact with locals and learning the language, all whilst having fun. If you're interested in adding more sports to your week or trying something new, I highly recommend that you check out the Hochschulsport

Stuttgart website, scroll through the courses (there are many courses with free spots, "Mit freien Plätzen") and contact the coaches if you have any doubts. In the end, we only regret the chances we didn't take!

Janette Mäkipää
MSc. WASTE student, Generation 2017



Our team, Stuttgart Scorpions Sisters, celebrating our second win of the season, 0:52 against Saarland LadyCanes in Saarbrücken 03.06.2018. - Photo from Janette Mäkipää

STUTT GART CULTURAL ACTIVITIES

1. German Open Championships:

Standard and Latin American ballroom dancing at the German Open Championship. The tournament is the world's biggest dance festival: spread over 5 days, over 2000 couples from every continent display their championship dancing skills.

07 – 11 August 2018

More Information at: <http://www.goc-stuttgart.de>



Photo from goc-stuttgart.de

2. Music Festival Stuttgart

From concerts and master classes to a varied literary program, the International Bach Academy attracts internationally renowned artists, ensembles, lecturers and scientists from around the world.

25 August - 9 September 2018

More information at: <http://www.musikfest.de> (in German)



Photo from musikfest.de

Continues >>

STUTT GART CULTURAL ACTIVITIES

3. Stuttgart Summer Festival

Stroll around, sample delicious food, relax, dance – this elegant open-air festival is held annually at the beginning of August in the main Palace Square and in the Palace Gardens around the lake in front of the State Theatre. The white pavilions, countless fairy lights, and lanterns, the beautiful backdrop of the New Palace, a wide choice of culinary delights and a range of musical performances to suit every taste, give this chic summer festival its incomparable flair.

02 – 05 August 2018

Location: Schlossplatz Stuttgart (Palace Square),

<https://www.stuttgart-tourist.de/en/e-stuttgart-summer-festival-2018>



Photo from [stuttgart-tourist.de](http://www.stuttgart-tourist.de)

4. Stuttgarter Weindorf

Stuttgart's „Wine Village“ opens its doors for a 12-day extravaganza of quality wines and culinary specialties of the Swabian region. In the Market Square and Schillerplatz, and all along Kirchstraße, wine and food lovers can make themselves comfortable and indulge in local specialties, washed down by their favorite vintage.

29 August to 9 September

More information at: <http://www.stuttgarter-weindorf.de/english>



STUTT GARTER WEINDORF

Schillerplatz | Kirchstraße | Marktplatz

Photo compendium from stuttgarter-weindorf.de

Maria Paula Aparicio
MSc. WASTE student, Generation 2017

ACADEMIC ACTIVITIES



Photo from DWA.de

1. EnergieTag - Biogas

„Safe operation from Biogas - and sewage plants for the gas generation and storage.“

A whole day for sharing knowledge about Biogas, where national and international experts in the area (Especially from the industry) will hold conferences and workshops.

26.09.2018 Location: Würzburg, <https://de.dwa.de/de/EnergieTag.html>

2. KlimaTag

„Recognize consequences - plan dynamically - implement now.“

A whole day for sharing knowledge about climate change, where national and international experts in the area (Especially from the industry) will hold conferences and workshops.

24.09.2018 Location: Nürnberg, <https://de.dwa.de/de/klimatag.html>



Photo from DWA.de

ACADEMIC ACTIVITIES

4. 19th Kölner Kanal und Kläranlagen Kolloquium

Questions about sewage technology have been dealt with at the Cologne Canal Colloquium for over eighteen years.

Topics such as construction, operation, condition assessment, maintenance and rehabilitation of canals, the recording and assessment of potential environmental hazards or influences from extraneous water, as well as the assessment of the legal situation are taken up and deepened.

11 - 12.09.2018 Location: Köln, <https://kanalkolloquium.de/>



Photo from kanalkolloquium.de



Environmental process engineering and technologies
Stuttgart, November 23rd - 2018

SAVE THE DATE

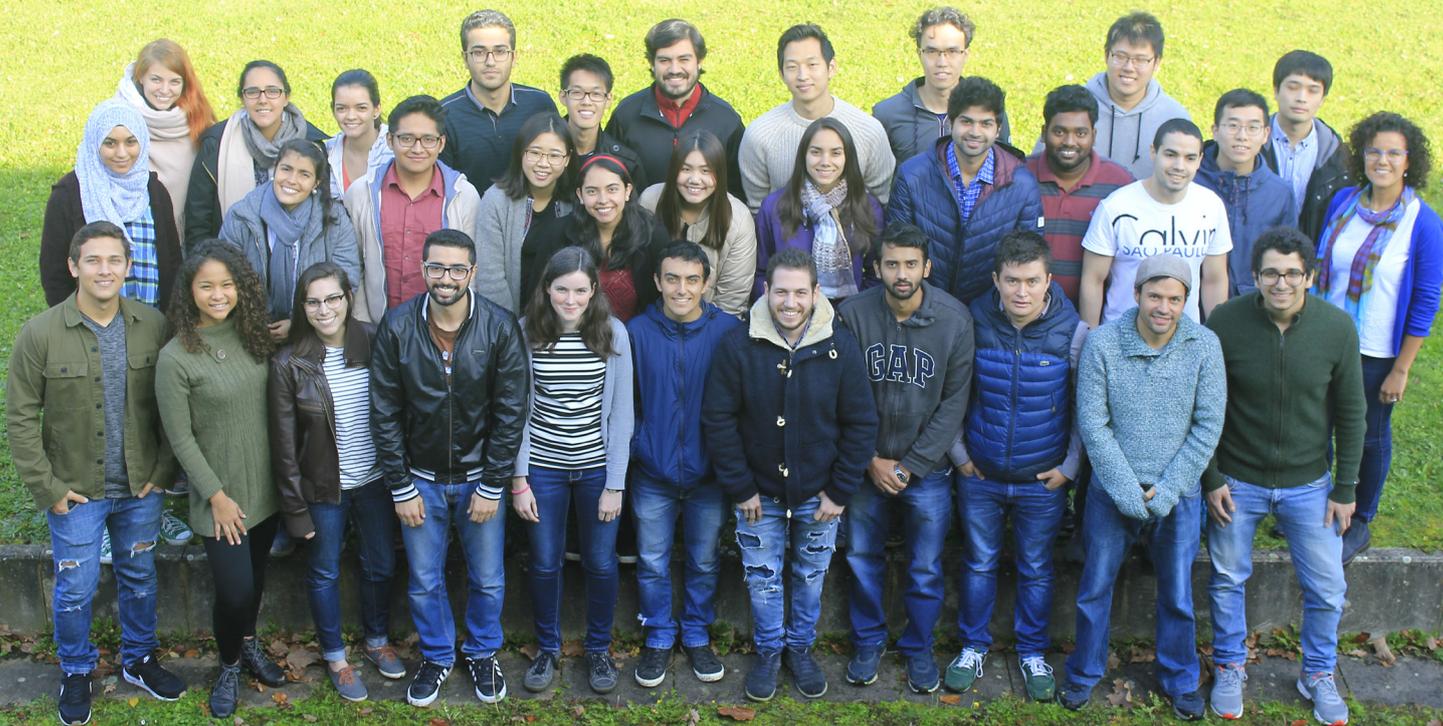
23.11.2018
8:45 - 18:00

VDI Haus Stuttgart
More Information:

www.wasteclub.net



MSc. WASTE Generation 2017 - Solid Waste Process Engineering, Excursion



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M.Sc. Air Quality Control,
Solid Waste and Waste Water
Process Engineering

WASTE