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KONNGSDAG

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Hyperloop – Interview with Sachin Yadav

Andrew Keys

The Hyperloop concept was first proposed by SpaceX and Tesla, who openedsourced their preliminary designs to encourage others to work on it. Hyperloop is essentially a sealed tube through which a pod may travel free of air resistance or friction at high speed whilst being very efficient. With a team of 37 highly motivated students from various disciplines of TU Delft, they are the leading university team proving the technical and commercial viability of the Hyperloop concept. I caught up with Sachin, a first year MSc Sustainable Energy Technology student who works part-time on Delft Hyperloop to get some further insight.

What made you want to get involved in Delft Hyperloop?

I first heard about Delft Hyperloop from the SpaceX competition in California in which Delft placed first overall last year. Being the world's best in anything is exciting, especially something so revolutionary, such as the Hyperloop. Since I knew I was coming to Delft, I thought this would be a great project to get involved with.



What was the application process?

On Facebook I saw an advertisement that Delft Hyperloop were recruiting for someone in the electronics department. This was perfect for me because I had worked in the electrical maintenance of a plant working with high voltage controllers for four years previous. I sent them my CV and they called me in for an interview and shortly after I got accepted into the team.

What is your role?

I primarily work on the powertrain, the propulsion system of the pod. This covers a range of components, from the batteries to the motor itself.

What sort of tasks does this involve?

I have spent a lot of time focussing on the inverter, converting DC to AC power. This must be factored into the design and constantly modified. It is a very high power piece of kit and hence my experience with high power components really came into use.

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An inside view of a dream team



How much time do you dedicate?

Initially, other team members assumed that I was full-time staff because I was in the office so much, but I am really parttime. I usually spend around 16 hours per week in the office but coming up to our design presentation in February this increased much more.

Are there any upcoming events that you are looking forward to?

The design presentation that just passed was a big event that I looked to and it exceeded forward expectations and was sold-out! Now, we need to submit the design for the SpaceX competition and then teams are eliminated at a preliminary and final stage and those remaining get a place at the competition in California. We are confident that we will get to the final competition and so I am looking forward to that most of all!



https://delfthyperloop.nl

Do you have any advice for other students thinking of joining a Dream Team?

You need to have relevant experience in what you are applying for. There are a range of positions available in every team, including lots of non-technical roles, and so make sure to apply to the one that suits your skills best. Also, you must be very motivated and willing to devote lots of time to the team and realise the additional benefits you are getting out of it to complement your studies. For international students like myself, there is no prejudice towards non-Dutch students so do not let this get in the way of applying. Finally, you must be able to handle some stress, but it all pays off in the end!

100% conversion of coal to biomass

Stella Chatzisakoula

The ever-increasing impacts of climate change has made the use of renewable energy sources in the energy sector all the more important. Besides solar energy and wind power, biomass is another important type of renewable energy source that may significantly contribute to a fully renewable future. The use of biomass is a controversial subject as it may cause significant CO_2 emissions, especially due to the land use when cultivating. However, during the last decades extensive research has focused on alternative bio based processes that have lower pollutant emissions.

A representative example is the world's first conversion from coal to biomass using advanced wood pellets. Ontario Power Generation (OPG) located in North America has ceased the use of coal and is currently completely fueled by biomass.



Overview of the power plant and the additional infrastructure for biomass implementation.

The implementation of this project included the construction of two silos and also certain modifications of the existing boiler, as from now on it will accommodate biomass instead of coal. For this change, a new receiving system is used to transport the wood pellets to the large storage silos, with a storage capacity of up to 5,000 metric tons of wood pellets per silo. The process of this bio-based power plant is clear; pellets are transported to the plant with the first-in, first-out operation from the silos through conveyor belts, the moment there is demand for production. The next steps are quite similar to that of the coal-based process, including the pulverized pellets that are fed into the boiler.

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World's first Coal-to-Biomass conversion

The advanced wood pellets go through a series of processes consisting of torrefaction, hydrothermal carbonization and steam explosion. One big advantage of this complete renewable transformation is that the advanced wood pellets appear to have a heat content similar to that of lignite coal, which makes it an attractive alternative and renewable fuel. Moreover, its properties enable outdoor storage and handling and only minor modifications of the existing infrastructure, leading to extremely low capital and investment costs of the project, compared to the traditional white wood pellets.



Overhead view of the loading of the advanced wood pellets. https://www.powereng.com

This breakthrough is considered the first unit constructed worldwide employs thermally upgraded wood pellets. This inspiring project confirms the ability to execute a significantly low capital cost conversion by taking advantage of the unique and ideal properties of the advanced second generation biomass fuels. Almost 100% of the electricity OPG produced are derived from non-polluting sources, providing a dispatchable renewable energy source that can effectively be used and replace the use of conventional polluting fuels.



The All Energy Day 2018

Meet the companies behind the energy transition!

Hilde Huismans & Leo Franco



In 2012 the first All Energy Day took place, organised by the Energy Club and GreenBlue (an employment agency with a focus on students and sustainability). One of the organisers was actually a student of SET, and is now CEO of SolarMonkey. The main goal of the All Energy Day is to bring together companies, politicians and scientists to let them collaborate on ideas for the energy transition. During the day challenging workshops, impressive speakers and many networking possibilities all contribute to achieving this goal. In the last few years companies such as; Tennet, Port of Rotterdam, Tesla and Nuon, participated in the event by giving workshops or meeting students on the exhibition floor. This year the All Energy Day will take place on <u>May 8th 2018</u>.

We also welcome international students!

This year there will be an in-depth track in the programme for both English speakers and Dutch speakers, specially designed for (international) master students. However, that doesn't mean that people with no prior knowledge of energy are not welcome at our event. On the contrary, we also have activities specifically aimed at increasing the awareness of the important subject of renewable energy.

Highlights

The keynote speaker of this year will be Jeremy Rifkin. Doesn't ring a bell? The name Angela Merkel might sound more familiar! He has served as an unpaid advisor for Angela Merkel and the European Union and wrote around 20 books about the energy transition. Furthermore Rifkin has been advising China in recent years. The Huffington Post reported from Beijing in October 2015 that "Chinese Premier Li Keqiang has not only read Jeremy Rifkin's book, '*The Third Industrial Revolution'*, but taken it to heart". He and his colleagues have incorporated ideas from this book into the core of the country's Five-Year Plan. When one of our committee members read this same book he knew immediately we had to invite him!

What do we do?

Our committee consists of 7 students, 3 of which are currently doing SET. What we do is organize **everything**. For the past few months we have been busy contacting all the companies to convince them to contribute to our day. Which is actually a lot of work, most companies are organized in a complicated way and have to discuss everything 'internally'. But hard work pays off and very soon the All Energy Day will actually take place! Want to stay informed of the process? Follow us on Facebook, Instagram, and check allenergyday.nl! And most importantly, keep 8 May open!!

King's Day in the Netherlands Casper Eijkens & Thomas Spruit

Hopefully, most of you have gained only good memories of one of the Netherlands' finest days of the year. As the obedient students that you are, you've been partying and celebrating. But do you even know what it is you've been honouring all this time? Possibly not. After all, we are engineers, not historians.

Once a year, the Dutch get royalistic and honour their king. Because women have been head of state from 1890 until 2013, the national day was called Queen's Day and has been celebrated mostly on the birthday of the then monarch. Tourists in possession of guide books older than 2013 still show up on the wrong day dressed in orange, comically confused!

King's Day is on the 27th of April, but the festivities start the night before, on King's Night, the 26th. Then, the celebration starts and at many locations there are concerts and parties.

Photo by Stella Chatzisakoula

The big day itself starts off with jumble sales (*vrijmarkten*) in the parks and squares of every city. King's Day is the only day on which people are allowed to freely sell off their possessions on the streets without having to pay taxes. It's only fitting that, on their national day, the Dutch showcase their business mentality from the times the Netherlands were a trading superpower.

Some of you may have been wondering about the color orange, the dress code on King's Day, because this color isn't even seen on the Dutch flag. Willem van Oranje, who died in 1584 in Delft, is the Father of the nation of the Netherlands. Our current King is the most direct descendant of the brother of Willem van Oranje. Only on King's Day can this color be worn without shame or fear of being ridiculed.

We hope you had a wonderful time this past Kingsday. Please share your pics with your fellow SET-students and remember the more orange the better!





Interview with Nishant Narayan

Karan Narayan

Nishant Narayan is 2013 graduate of SET. He hails from Mumbai, India and attended university at the prestigious National Institute of Technology, Calicut. These institutions accept students through a notoriously rigorous entrance examination with an acceptance rate of about 0.5% (about 20 times lower than the undergraduate acceptance rate at MIT or Harvard). He studied Electronics and Communication Engineering and subsequently worked at Texas Instruments for 3 years before choosing to switch career paths. He is now pursuing his PhD on the development of off-grid solutions in developing countries.

Let's start off with your background. How did you pick electronics engineering?

After the 10th grade, I realised I wanted to study Science, but I wasn't very fond of Biology. But, we had the option of picking a course on electronics instead, which I did and really enjoyed. I still have some equipment from that time back at home!

Texas Instruments is a great place to be for that field. Did you always want to end up working there?

I had a couple of choices towards the end of university. The first was Tejas Networks, which is an Indian company that deals in communication networks, and the second was TI in Digital Electronics. At the time, my love for the field made the latter seem like my life's mission!

What happened from that point on and led you to switch paths?

Over a period of time, I realized this wasn't what I wanted to do for the rest of my life. This semiconductor industry is mostly just about squeezing an ever-growing number of transistors on the chip while dealing with reducing chip sizes, which brings about a whole bunch of other challenges. At some point, I felt, what next? A number of my friends, as is often the case, began to move towards management and pursue an MBA. I was still very keen on technology but wanted to work on something more meaningful for myself.

How did you then decide on SET at TU Delft?

A couple of things. One, it seemed a great match for my desire to work on technology while contributing to a field facing more pressing problems. Two, at the time there had already begun a buzz of sorts about the possibilities in renewable energy and how it was the field of the future. I began first by exploring courses at universities in India, such as the Indian Institutes of Technology. Prominently, IIT-Bombay (Mumbai) has a great course in energy science, but further in my search, I found the SET course at TU Delft.

The experience of a SET student

Once you graduated, you worked as an onderzoeker for some time. Why did you make that decision?

It was less of a conscious decision and more of the next thing that came along really. I was very keen on research and wanted to explore some more fields. I also wasn't very keen on a job; at least, not the jobs available to me at the time. This is, I'd say, a negative for SET: there doesn't exist a ready-made job market for us. You are still largely judged on the strength of your traditional technical background, at which point graduates of more technical studies like Electrical Power Engineering or Mechanical Engineering have a clear advantage.

For my MSc thesis, I had wanted to work on solar-based charging of light EVs and approached Arno Smets with a project idea which he eventually accepted. After graduation, I ended up as a researcher under him.

What happened next?

I had already done quite a bit of PV systems modelling and simulations in my MSc thesis. I went on to work deeper on those on my own out of curiosity and began to understand details I had taken for granted before. In my last half year, I worked in Prof. Bauer's group when the opportunity came up for a project wireless charging with a consortium with universities from other parts of Europe. Later, another opportunity arrived through the Delft Global Initiative, which had opened the first call for fellowships in 2015. The aim was to work on projects in the developing world. In fact, Arno Smets and I had written a research proposal for a fellowship from them. As it turned out, Prof. Bauer's group received a grant from them on a PV related project as well. I found it interesting and by then had grown more drawn to the idea of a PhD*. Incidentally, Jelena Popovic, who I admire greatly, had written the other project proposal. I applied for the PhD position for the project, and after an interview process was selected for the position.

"There's probably only one piece of advice I'd give to all students: if you ever have an epiphany about discovering your life's passion, or even thinking you'd like to do one thing and not another bear mind that you're probably going to have another such epiphany a few years later."

Are you happy with the topic you narrowed down to?

I am extremely happy with the topic. I am working on Solar Home Systems for improving energy access in the developing world. It combines my technical proclivity towards PV systems while setting the backdrop of a highly pressing issue affecting a fifth of humankind. It's a complex topic with multi-faceted challenges and a direct link to UN's Sustainable Development Goal (SDG) #7. Remember what I said before being worried about a topic keeping me meaningfully occupied for 4 years? Well, I couldn't have found a more engaging topic to work on!

Spinvis by Spinvis

Casper Eijkens

Every morning, I ride my bike from Rotterdam to Delft along the *Delftse Schie*. It is a pleasant route, passing by a Dutch countryside microcosm: blue herons standing still along the trenches of the polders and students rowing silently on the waterway past me with a coach screaming them ahead. I like to listen to music on my way, and it's on these occasions that the lyrics of Spinvis strike me so *familiar*.

Spinvis (**Erik de Jong**) is a Dutch singer-songwriter born in Spijkenisse, not far from Delft. Before the fame, he was a postman, experimenting with music in his attic for years. Then, in 2002, *Exelsior Records* stumbles upon him and collects a handful of tracks de Jong had laying around. This selection becomes Spinvis' self-titled debut, an album that is critically praised and considered a Dutch classic.

Musically, there is a lot to unpack on this album. *Spinvis* is a beautiful collection of electronic, melodic pop music, all produced by de Jong himself. Spinvis even takes care of the vocals and although he is not a *great* singer, his voice fits the music neatly. At times he is almost whispering, giving room for the music to breathe. The production is colourful and at times slightly psychedelic, peppered with guitar licks and samples of lively drum loops.



Spinvis texts are enigmatic but beautiful. They might sound like nonsense or deeply profound, depending on the listener and his context. When once asked about his lyrics, de Jong admitted that he chooses great lines that are not necessarily connected. The vague texts leave room for interpretation and the listener usually finds a meaning of his own.

Still, I believe Spinvis' texts are not just foxy gibberish. My favourite cut on this record would be *Limonadeglazen Wodka*, a tribute to an alcoholic friend who died young. It is a wonderful pop tune dealing with the transiency of our lives, told through a series of bittersweet youth memories.

To conclude, Spinvis is a multi-coloured and rich record. The cryptic lyrics and lo-fi feeling of *Spinvis* create a personal experience with the music. Especially for our international friends, *Spinvis* is an ideal starting place for discovering some Dutch music, as it shows how poetic Dutch could be!



READY, S.E.T., GO! – SET Study Tour

Kritika Karthikeyan

A couple of months ago there was a survey passed around asking SET students if they would be interested in a study tour and their countries of interest. After months of challenging phone calls and a couple of rejection emails, the planning committee of Delft S.E.A. has at last managed to seal the deal. Get ready! **WE ARE OFF TO THE LAND OF DANISH PASTRIES AND WEISSBIER** (some yum Frankfurter Kranz for all the non-alcoholics out there too)!

Students participating in SET's first official study tour to Denmark and Germany leave on Sunday, July 8th for a five-day trip in which they will explore the technical and business aspects of their favourite profiles. It will give students an experience that not only goes beyond typical classroom but also gives them an opportunity to discover new cultures. A wonderful opportunity to uncover exemplary initiatives, meet players from the field and benefit from exchanges of practical experience.

Denmark was a clear choice! It won the popular vote in the survey and chosen by the committee due to its progressive attitude towards sustainability that contributes to a broad composition of sustainable energy companies. Most Danish people speak English being an added advantage. Germany, being quite the resourceful neighbour that it is, made it to the top 5 as well!



SET students will visit a handful of companies within 20km from Hobro, Denmark (the exact number is top secret as of now) and one company in Emden, Germany.

The companies were chosen in the most strategic way possible keeping all the clusters in mind. The names of some of the companies that were kind enough to host SET students, despite the lack of staff during the summer holiday period, are Aalborg CSP, LM Wind Power and Hybalance Project. Needless to say, this tour will give rise to some really interesting networking possibilities.

Coming to the most thought of aspect - **BUDGET**. The tour is expected to be around 400€ (food and stay included) but the numbers are still being working on. The committee is trying to get sponsorship from TU Delft to make it more economical for participating students. Students will stay in group hostels near Kolding, Aalburg and Hamburg. The tour will also have provision for sightseeing and social activities.

To know more about this study tour and to experience it first hand, interested students will get a chance to enrol themselves in the coming weeks. The date of the opening of the **32 available spots** will be announced soon. In case the demand is high, there will be some sort of selection criteria based on motivation letters.

This article is only just a teaser. It is definitely going to be a cracker of an event! So S.E.T. your dates!



No, government agents aren't stealing your organs

Thomas Spruit

Some tabloid headlines shrieking of danger have us worried about our rights being violated by the state. A reasonable warning or cheap fearmongering? For an answer, we have to look into a particular bill that passed both parliament and senate recently. The proposal concerns organ donation, since lists with people waiting for a new organ are getting longer every day, demanding urgent solutions.

In the current system, which we've had for some decades, you are not a donor unless you register to be one. This means that organs preselected by the donor can be transferred into a person in need of one after the donor deceases. This worked well until a shortage arose. The initial government response was to educate people through schools and ads, but the number of registrations still wasn't adequate, even though nationwide surveys showed most people would have no issue with being a donor. Nonetheless, the extra step of taking 5 minutes of their time to actually register seemed a bridge too far, giving their fellow Dutch in need of organs merely the finger.



Therefore, progressives in parliament decided to take action and proposed to turn things around. With the new law, adults are registered as donors unless they consciously choose otherwise, while awareness is still being raised comprehensively. As a result, quite a number of people decided to deregister in advance, which they are completely entitled to. However, some ideologues feel the need to create a new, somewhat dystopian narrative in which civilians have no say in the destination of their body parts and you have to donate your kidney when the state tells you to. Perhaps out of jealousy, because this law might actually save more lives than their dogmatic beliefs ever have, or will.