

ENVIRONMENTAL

TECHNOLOGY

ECONOMICAL

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EDITORIAL



Werte Kollegen,

Spannende Lektüre zur Weihnachtszeit: vom Leben in einen Camper, dem Abenteuer einer Doktorarbeit in einem fernen Land, bis hin zu dem Beitrag von Technologien für eine nachhaltige Entwicklung.

Viel Spass dabei, und „Merry Christmas“ vom ganzen DURABEL Team!

Harry Heinzelmann

vanlife



The idea of living a van already came up a long time ago. It probably started while travelling for half a year in a van in New Zealand and from books and videos telling stories about people living this way. With the desire to reduce my ecological impact and the wish to prove to myself and others that it is possible, I decided to make this dream come true in autumn 2017. I bought a Citroen Jumper 2006 with all my savings. Although most interior woodwork and isolation had been done by the previous owner, a carpenter, I dedicated last summer to rebuild the entire electrical system to be fully self-sustaining using 200W of solar panels on the roof of the car.

We live in a society of extreme comfort and consumption and (sadly) nature pays the price. We all live in a house or a flat that is heated to a comfortable T-shirt temperature 24/7, regardless of the temperature outside, even if we are not there during most of the day. How many of you ever looked at how much one of your electrical devices consumes? We simply have a plug in the wall giving us any power we want. Furthermore, Christmas season is arriving and shops try their best to make us buy as much as possible. However, sometimes personal time or experiences are a better gift than a materialistic present that will end up in the back of a closet.

Most of those questions and factors become very noticeable when living in a van. Having to fill/tap up manually every liter of water you consume reminds you what letting a tap fully flow actually means. Designing your own self-sustaining and renewable electrical system makes you realize that some trivial every-day, but unnecessary, items consume an incredible amount of energy. Being spatially limited to roughly 7 m² of surface makes you realize how many things we process, get and keep compared to how much we in the end really need. I realized for myself that living simpler and a bit closer to nature means appreciating more what we have, and being generally happier.

We usually associate sleeping in a van with travelling, being on the road, discovering countries like Australia and the USA. But why should this amazing feeling of freedom and excitement be only limited to the few weeks of holidays we have? And why only in exotic countries far away? Why can't we be on an adventure all the time, discover new places and new people near you every day, and never fall into the boring routine of work life? After having travelled to a few, admittedly very beautiful, countries with interesting cultures myself, I now wanted to discover more of my own country and what's around it. And I can say now that in the past

months I have explored my near surroundings very well.

You might be wondering how driving around a vehicle that weights about 2.8 tons all the time can be aligned with the wish to have a smaller impact on the environment. Sadly, this is a conflict that comes up often in my hobby of landscape photography. However, there are possibilities to still limit this effect. On the one hand, one can try to minimize the trips back and fourth and staying at one place for a couple of days. On the other hand, one can indirectly counterbalance the negative effect of the fuel consumption. A Swiss start-up called myclimate.org allows you to calculate your CO₂ emission of car rides, flights, etc. and tells you how much you can donate to support actions that perform equivalent CO₂ reductions.

My goal is to seek discomfort and adventures in everyday life in order to appreciate the well-being and privileges that we have, and to be more conscious about the environmental and social impacts our actions have. If you want to see progress, you cannot expect the industry to change without adapting your own lifestyle as well. Every small change you make yourself can be important.

Curdin Wüthrich

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The Interview: Safiye Jafari, PhD student at the Regional Center Landquart



Davide Migliorelli talked to Safiye Jafari about her adventure of moving from Iran to Switzerland, and her work on smartphone based biosensing.

Safiye, since when are you working at CSEM and how did you know about this opportunity?

I started working as a PhD student at the CSEM Center Landquart in September 2017. My PhD project is part of Marie Curie EU Horizon 2020 FoodSmartphone project (Grant Agreement N. 720325. foodsmartphone.eu), in which 11 PhD candidates will collaborate to tackle all the innovation challenges in implementing the smartphone-based food analyzer in real life application. After finishing my Master degree working on electrochemical DNA biosensors, I was looking for a multidisciplinary PhD position on biosensors in real life applications, then I found the project advertisement which was everything I ever wished for.

How was moving from your country to Switzerland?

At first, I couldn't be more excited, moving to another continent, a new world, a new culture for the first time in my life. I was able to keep up my bright-eyed optimism for a few months and then I was very overwhelmed by real life challenges of moving abroad. There were a lot of times when I felt like I am a weird alien from another planet dealing with the language barrier, cultural differences, making new friends and being a newbie PhD student and its first year challenges didn't help for sure. Now, I can say it was one of my hardest life experiences so far and one the most rewarding ones as well. I really like everything about Switzerland from its magnificent view of the lakes and mountains to its kind and polite people and its working culture. No matter how hard it was to be far outside of my comfort zone, it is totally worth it.

What is your work about?

My PhD project is part of the EU project FoodSmartphone, and I am working on the development of an aptamer-based electrochemical biosensor for detecting aflatoxins in food samples. The aim of the project is to develop a new generation of smartphone-based food analyzers, which provide simple, rapid, on-site food safety testing. The necessity for such a food analyzer comes from the many limitations of current food safety tests, such as long testing times, high cost, the need of specialized personnel, and the exposure to fraud. It is even more urgent in the case of aflatoxins, where chronic consumption even of a very low amount over a long period of time could lead to liver cancer.

I am using an aptamer probe as a novel biorecognition element which binds to the target analyte with high selectivity and specificity, similar to an antibody. The aptamer probe is immobilized on the electrode surface and the other end is labelled with a redox indicator (methylene blue) to generate a redox signal. A higher signal corresponds to a higher aflatoxin concentration.



In order to apply this system to the screening of aflatoxins in real samples, I am going to work on automated microfluidic sample preparation strategies and the miniaturization of the final prototype. Finally the aptasensor will be integrated into a smartphone either by a USB connector or by Bluetooth.

What contribution has your work to sustainability?

The main objective of FoodSmartphone is to provide an easy access to safe food and the link between food safety and market access, economic development and poverty alleviation. My work could contribute to all 3 pillars of sustainable development, environmental, economic



and social impact. Not to mention that the consumption of unsafe food negatively impacts public health which is another key factor for development. Simple, rapid and on-site food safety testing plays an important role in food and nutrition safety, sustainable agriculture, economic growth and enhanced livelihoods, and public health.

What have been up to now the biggest challenges with this work for you?

The biggest challenge for me has been keeping up with a hectic PhD life. There are a tons of things to learn and not enough time for doing so. I also realized that some transferable skills such as effective communication and time management are vital to survive my PhD and now I am more determined to improve those skills in order to be more productive at work.

What about your future?

I always wished to work as a researcher and continue learning throughout my life. I would like to stay in research in the future and continue working on the technologies that make a difference in real life applications and not just in laboratories.

*Interview by Davide Migliorelli
 Regional Center Landquart*

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Opportunité environnementale DES PRODUITS DU CSEM SA — Analyse avec la “boussole bernoise”



Cet outil peut être utilisé de manière simple, sans employer de grands moyens. L'évaluation se base sur des estimations qualitatives ; il n'est pas nécessaire d'entreprendre des mesures ou de procéder à des enquêtes. La «boussole bernoise du développement durable» est appropriée pour l'évaluation de projets et de concepts importants, au niveau régional et communal. L'échelle des résultats va de « -2 à +2 », la valeur « +2 » correspond à un projet qui répond parfaitement et en tout point aux 43 critères.

Bénéfice environnemental en francs ou en équivalent-CO2:

Cette année, il n'a pas été possible d'obtenir une valeur concrète et réelle des bénéfices environnementaux de nos projets.

Nous recherchons un projet qui permettrait de réaliser une estimation du bénéfice environnemental en francs ou en équivalent-CO2. Merci de vos propositions.

Charles Gilliéron

Qu'est-ce que le DEVELOPPEMENT DURABLE ?

Le développement durable c'est un développement qui répond aux besoins du présent sans compromettre la capacité des générations futures à répondre aux leurs.

Le développement durable s'appuie sur une vision à long terme qui prend en compte le caractère indissociable des dimensions environnementale, sociale et économique des activités de développement (Gro Brundland 1987 Loi sur le développement durable).

extrait du rapport ISO 14001 du CSEM (2018)

RESULTATS 2017

La méthode : La boussole bernoise du développement.

La «boussole bernoise du développement durable» est un outil destiné à évaluer les effets d'un projet donné sur le développement durable. L'évaluation se base sur des indicateurs préétablis dans les domaines de l'environnement, de l'économie et de la société. Le résultat en est un profil des forces et des faiblesses, qui donne des informations sur le potentiel d'optimisation du projet, ainsi qu'une évaluation globale du point de vue du développement durable. La boussole 2008 a été légèrement modifiée afin de mieux répondre aux besoins des utilisateurs.

Les projets

Les projets sont ceux présentés dans le rapport scientifique (Scientific and Technical Report, STR) de l'année 2017. Le STR est publié annuellement en juin (papier et web) et donc public.

Résultats

Les résultats sont présentés en « TOP 5 » selon les moyennes globales obtenues suite à la boussole Bernoise.

TOP 5 projets:

N° 1 PORGY BESS – Platform for the Optimal Regulation in Battery Energy Storage Systems (page 14)

N° 2 Silicon Photovoltaics for Hydrogen Production (page 86)

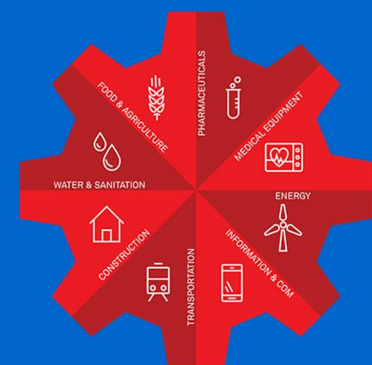
N°3 Machine Learning Using Satellite Imaging for Agriculture and Forestry (page 102)

N°4 WiseRock – Wireless Sensor Network for Monitoring Rock and Slopes (page 104)

N°5 ex aequo Classification of Early Stage zebrafish Fertilization (page 59)
Online Monitoring of Antibiotics in Treated Waste Water Matrix (page 64)

EssentialTech at EPFL

“The EssentialTech program aims to develop essential technologies that have the potential to reduce poverty and vulnerability. Its approach combines technology development with the elaboration of innovative business models for a sustainable and large-scale impact.”



Sustainable solutions have to go beyond technology. They need to consider the societal context and the training and experience of local users and operators, and adapt the technologies to environmental conditions and infrastructure.

Technology is one of the biggest hopes for a sustainable future for everyone. If done right and with well aligned business models, this may even become financially profitable for all involved parties.

We have started discussions about how CSEM's technologies could contribute.

Harry Heinzelmann

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Plastique dans les océans — un état des lieux non exhaustif des projets de nettoyage des océans du plastique qui les asphyxie

Ocean Cleanup : En septembre dernier, le jeune danois Boyan Slat a finalisé la phase de tests de son System 001 dans la baie de San Francisco. Il s'agit d'une structure tubulaire en forme de U de 600m de long, composée d'une barrière flottante et d'une bande de tissu de 3 mètres de haut qui retient les déchets, comme un PacMan géant. Elle a été conçue pour être portée par le vent et les vagues de la mer tout au long de son parcours autonome. Les projections des données de collecte des déchets sont étonnantes et donnent espoir aux professionnels et au monde entier. Plus d'infos sur www.theoceancleanup.com.

Plus contesté, surtout par quelque navigateur reconnu, le projet d'Yvan Bourgnon qui a lancé un projet de crowd funding pour construire le premier navire hauturier capable de collecter en grande quantité les macro-déchets plastiques qui flottent sur les océans. Plus d'infos sur www.theseacleaners.org.

De son côté, la fondation Race 4 Water qui a mené plusieurs campagnes de cartographie des « continents plastiques » a décidé de mener campagne « à terre » afin d'endiguer la pollution avant qu'elle n'arrive dans les océans et de mettre en place un programme en 3 actes, plus d'infos sur www.raceforwater.org :

- LEARN – avancer des connaissances scientifiques sur la pollution par plastique
- SHARE – alerter les décideurs, sensibiliser le grand public et éduquer les jeunes
- ACT – promouvoir et mettre en œuvre des solutions aux impacts économiques, environnementaux et sociaux durables.



Infographie de l'ONU

Chacune de ces initiatives est louable. Chaque geste compte. Car la question principale que nous devons nous poser : Quel monde voulons-nous laisser à nos enfants ?

Beatriz Tur

Le 31.12.2018 le site "neuchatel-covoiturage.ch" sera désactivé et supprimé.



Neuchâtel-covoiturage permettait à plusieurs entreprises actives sur ce site, de réaliser du covoiturage entre les employés de ces entreprises.

En effet lors de l'assemblée de la plateforme « Mobilité Durable » des entreprises neuchâtoises du 26 septembre 2018 au CSEM (!), les six des sept adhérents présents ont voté pour la dissolution de la plateforme en ligne neuchatel-covoiturage.ch.

Le CSEM continuera le principe du covoiturage, mais uniquement avec les personnes du CSEM. Les inscriptions sur le site seront remplacées par une inscription auprès de Mme Béatrice Petraz.

Charles Gilliéron

Science Slam 2018: 7 Dec !



CSEM MIP+PhD
Science Slam
07.12.2018 – 14:00

You won't regret it:

- cool projects
- entertainment
- and drinks!

Gratifieria plus visible: La culture de la gratuité

Une gratifieria est un néologisme espagnol qui signifie littéralement « foire gratuite » en général est un marché gratuit où il n'y a pas d'échange, pas de troc, pas de conditions et pas d'argent. Chacun est libre de prendre ce qui lui plaît, même s'il n'a rien à donner.



Vous pouvez apporter vos objets professionnels propres et en bon état dont vous n'avez plus besoin et qui se trouvent au fond de vos placards ou armoire, mais qui peuvent éventuellement servir à d'autres personnes afin de pouvoir leur donner une 2^e vie.

Une gratifieria est actuellement en place depuis un certain temps déjà dans le **bâtiment de Jaquet- Droz 1**,



dans laquelle vous pouvez apporter vos objets que vous n'utilisez plus et déposer dans l'armoire à étagères qui est prévu à cet effet, elle se trouve dans le **corridor au 2^e étage**

à proximité de la sortie nord.

Ne jetez plus vos objets qui pourront être utilisés par d'autres collaborateurs.

Antonio Mota & Dani Sigg