My Day as a DAN Volunteer Research Diver

How I ended up as a diving Guinea Pig: Living Citizen Science for the sake of research.

Today is a special day I have been looking forward to for weeks. I will be a volunteer research diver for DAN Europe for one day and take part in and contribute to a groundbreaking EU-funded scuba diving research project: CADDY – the Cognitive Autonomous Diving Buddy.

Volunteering in research projects is called Citizen Science and it has become quite popular and an integral part of many research projects over the recent years. It can be pretty meaningful work and make your life more interesting. I like this. Without volunteers researchers would sometimes not be able to conduct their work. They need our data or our help.

So, I take a day off from work and arrive in Y-40, the world's deepest pool near Padua, Italy, which opened only a year ago. There are others too who signed up for this. We are all very excited. Soon we all linger around the big windows in the pool's lobby which allow us a grand view in the blue pool. While standing there you can't help it, you just crave for a dive.

After a briefing about the underwater tasks yet to come, I must admit I'm starting to have mixed feelings about it. But, still, of course I sign up for this by signing the consent form.

Getting ready is quite a procedure. Three people work on me, and I have to stand the entire time with the heavy tank on my back. It takes Katharina Oremus (Kati) and Dom Reichl from the Human Behavior Group of the Department of Anthropology from the University of Vienna in Austria quite a long time until they have fixed all the sensors to my body. I also have a metal box mounted to my tank. The box houses the different cables that lead to my various body parts. Everything is connected by cables, finally leading to one bigger cable that combines them all and leads to Dom's laptop. On the screen he can watch the diver's movements. Now, I really feel like a guinea pig.

But this feeling will pass once I'm in the water and feel like a real – important – diver again.

While Kati and Dom are busy sticking the sensors onto head, arms and legs for measuring movements under water, and around the belly to measure the breathing rate, it reminds me a bit of how Hollywood made Gollum in T*he Lord of the Rings*. But Hollywood made the output look like Gollum, while mine is a clumsy-looking if colorful digital figure on the monitor.

Besides the inertial sensors fixed to the body, they also "decorate" the strap of the dive mask with a hearing device – and I find myself not in the soundless environment of the deep blue but yet surrounded by a kind of radio traffic while performing tasks like getting the regulator out and in, cleaning the mask, and answering millions of questions about my current mood and state of mind on a waterproof tablet (I wish I could take it home afterwards and use it during my next deco-stop).

It all gives me the impression of playing a role in a science fiction movie. If you think about it, it comes pretty close to it. One day the robot CADDY will be a useful tool for underwater archeologists or other research and commercial divers, and, eventually, the average recreational scuba diver.

So, what do they ask me to do?

As if there wasn't enough technology already around me, they put a standby diver in the water right next to me. He is wearing a full-face mask (an Ocean Reef integrated dive mask system) and is watching me. In

case of emergency (I hope there won't be any!), he will be there to assist me. Or he will read my pressure gauge before and after completing a task (luckily, he is not taking my blood pressure). If the full-face mask were entirely black, this again would remind me of Hollywood – although ages ago: Darth Vader! And, even more amazing – I can hear Darth Vader talking to me – underwater! Even more disturbing – Darth Vader is also talking to someone else outside the pool – especially after he has read my pressure gauge. Before and after I perform strenuous tasks like fin-kicking as fast as I can over a distance of 15 meters or carrying a weight over a distance of 6 meters or diving up and down on a rope, he sneaks up on me to get a glimpse of the gauge.

Actually, Darth Vader, alias the standby diver or, in real life, a research diver from DAN (Divers Alert Network) is telling the team on the ground, or, more precisely on the surface, how much air I used during the strenuous tasks, by reading my air pressure to them.

Sometimes someone else is talking to me over the ear device: it is Guy the guy on the ground, who also did the briefing at the poolside. Guy is also from DAN. From above he corrects my position on the platform because, of course, they are filming me while I'm giving my great performance like a hamster in a wheel. I told you. It's almost like Hollywood!

So, there is a camera behind the window in front of me. I cannot see it but I know Anna Schaman from the University of Vienna is "hiding" behind her laptop and controlling that all goes well with the recordings in order to produce valid movement data for analysis. Movements will later be correlated with the moods and feelings of the divers. Then they will feed this to CADDY, so CADDY can learn to interpret a diver's behavior.

What is it all for?

The idea is that CADDY will be a little robot that will hover around a diver, reading his or her facial expressions and gestures as well as body movements or body language, so to say. The hope is that the robot will eventually be able to identify a diver in trouble. The idea is that CADDY can help immediately or send the information to the surface and then assistance could be sent back down to the diver in need. Help could be anything: a tank with oxygen, other equipment, a rescue diver. It depends on the situation or the problem. It is assumed to be useful for research divers like underwater archeologists but also for others of course. The diver could be in trouble, entangled, or just in need of a tool. There is a wide field of application for this underwater robot once it is developed and ready for release. It will even go so far, that CADDY will be able to perform several tasks or be a guide.

Well, I'm kind of glad when it is finally over. It isn't so much the performing of the tasks, which are really easy for an experienced diver. It is more the time it takes to answer the questions on the tablet. It feels like answering a million of questions about my mood, feelings, and sensations after each exercise I perform. At some moments I would rather jumpe off the platform and dive through the pool, its cave system and down to the 40 meters to the bottom than answer all these questions over and over again… Finally, after 25 minutes I'm done and Guy the guy from the surface plays a song into my hearing device. When I hear it, I have to laugh my head off and my mask runs full with water… He says, "Well done! You can come up now!"

Climbing out of the pool is as difficult as climbing in it with this heavy equipment was. But on the surface three people are already waiting for me to free me quickly.

I cannot help but smile and signal "OK" to everyone. At the end of the day I contributed to a really interesting research project and I am happy I had this opportunity. All in all – it was great fun and really

interesting to see the researchers' state-of-the-art work and interact with them closely.

I know my contribution is one valuable part along with others – together we are all making a difference and taking research, innovation and development to the next level.

How did I hear about it?

I'm a diver and a DAN member and therefore receive DAN Europe's newsletter and other mails. DAN had actually sent email invitations to their members living around Padua – and this is how I got to know about it. I'm glad I checked my email that day.

Prerequisite for being a volunteer diver is of course being certified as a diver and having a valid medical certificate for diving.

As a reward for my volunteering, I not only get a bag with useful scuba presents – which otherwise I would have had to buy in the DAN shop – but also get the opportunity to do a real dive to 40 meters (or less) afterwards. I actually end up spending the whole day in Y-40. I really enjoyed it and I'm looking forward to DAN's next Citizen Science project.

I'm proud to be a volunteer diver practicing Citizen Science and wish CADDY the best of luck.