BIOINSPIRED FORUM

Report from the event:
Bioinspired Forum Augmented – Making Sense of the Sea
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By Phil Jandaly

The View Below

There's a teeming life-force under the planet's water systems. Species ranging from the beautiful to the utterly bizarre survive in and share complex ecosystems, some of which are untouched by man, some of which are being transformed all the time. It's a mystery that largely goes unexplored, partly because we have a tendency to take it for granted, partly because the underwater world seems so inaccessible.

But what if there were a way for people to get a fish eye view of what goes on under 70% of the Earth's surface? Could people be inspired to look a bit deeper, to understand what's down there?

That's the question **Mats Brodén** of the **Bioinspired Forum** wanted to start asking when he put out a call to bring together journalists, media artists, entrepreneurs, geologists and marine biologists at the Simrishamn Marine Center on the coast of the Baltic sea, to pool their knowledge and skills. The idea was to bring together data specialists and media storytellers who can turn the data into stories of the sea that go beyond the science and engage people on a human level.

Measuring roughly 377,000 km², subdivided into 14 zones across 10 countries, the Baltic Sea is amongst the largest bodies of brackish water in the world. Yet its reputation of being over-polluted, of having fish stocks with high levels of mercury and dangerous algal blooms every summer means that trust for the Baltic, as both a food source and a playground, has suffered immeasurably. Now fish stocks are leaving our coast and we're struggling to figure out what to do about it. It's not the only body of water to fall victim to public opinion, but its geographic location has made it especially public.

Thankfully, technology has given us a new door towards a better understanding of the complex systems that abound in our water systems. And you don't have to be a scientist to figure them out. In fact new initiates are being tailored to normal people who can't be bogged down by mountains of data.

ARGs, or Augmented Reality Games, are interactive activities that anyone with a smart phone or other mobile device can engage in. "It's a layer" explained **Mads Brix**, Social Media Manager at the **Mediacom** company in Denmark. To illustrate, he showed the audience clips of a campaign he ran for a car company in Denmark that satellite broadcast animated characters to select spots in Copenhagen.

Anyone who followed the trail to those spots could use a mobile device to see the animations, a little broadcast just for them. Without the app and the device you'd never know the characters were there.

It was an amazing display of technological conjuring, seemingly pulling product placement marketing out of thin air. But is the plan today to start marketing our products to the fish that swim the Baltic?

Not even close. As it turns out, an initiative has already been set in motion to explore the possibilities of not bringing us to other species, but the other species to us.

Jan Heuschele, an evolutionary biologist studying in Denmark and **Olof Werngren**, a Swedish Media Producer were there with their WIP ***How copepodes hit it off***, a prototype iPad app that tracks and animates the mating behavior of Copepodes in their native habitat. The prototype is a simple demonstration that places an iPad against an aquarium and displays heavily magnified images of male copepods as they respond to the pheromones of females ready to mate, animating their movements with blue and red outlines respectively.

The ***Icopepod*** is informative and lovely to look at, and an eye opening window into the "quality time" of a species so tiny we wouldn't even ordinarily see them. It's also a glimpse of one possible way to expand the relationship between science and art, in this case demystifying a small part of the sea, helping us to better understand it and its inhabitants.

And that's the whole point of this exercise after all; giving everyone a clearer role and stake in the mysteries of what covers most of the planet. It's an uphill struggle; after all there are as many layers of complexity within the underwater systems as there are fathoms to explore. The ultimate goal is to make the data accessible, to inspire people to treat the sea with more respect than we have.

Anders Liljestrand is a Geophysicist and CEO of **Marin Miljöanalys** AB in Gothenburg, Sweden, working tirelessly to map the sea bed of every major port in the country. The virtual images they archive give a detailed view of what goes on far from the surface, showing us everything from natural habitats for different species to geological blueprints for how the whole area fits together. His hope: "ideally this tech, these maps would be used in municipal archives the same way as land surveys are, to determine where sewage systems can be placed and maintain the integrity of the sea."

Having a clear visual reference of the sea, ultimately the most voluminous element on the planet, and covering most of it, holds the promise of engaging people's curiosity in the natural world. But there's an ocean full of data out there; where species live, what their environments are like, sea depths, pollution levels, natural habitats, predatory territories. How do you begin to put it together for anyone but a geophysicist to understand?

Isea is a first, hypothetical stab at creating a platform that would apply these topographical maps that anyone can use to discover more about what's under the water. "Anytime that you're on the beach, in the harbour or even on a boat - just hold up your smart phone in front of you, aiming the camera down toward the unseen depths and have the entire sea floor become visible to you." Suddenly the potential of that ARG campaign from Denmark as applied to the Baltic and its stories begins to surface. After all, who never wished for a pair of x-ray glasses?

Designed primarily as a tool to observe the endangered Baltic Sea harbour porpoise, Isea could be a template for a larger archival tool that could hypothetically identify any sea creature for the user and tell

them a bit about that species. Imagine a tool that could instantly tell you what you wanted to know about the school of fish under your boat, or the invisible microorganisms teeming all around. It's a simple snapshot that can isolate one of the infinite number of elements that make up the underwater ecosystem, when the whole picture is overwhelmingly abstract and complex. With a tool that nurtures curiosity and gives greater understanding of how the world works people might be more inclined to think a little more about the world around them.

A case in point is The *Leafsnap* project. **David W. Jacobs a** Computer Science Professor at the University of Maryland dropped in on the event via Skype, describing his project as an archival tool that folks can use and contribute to that catalogues leaf species. With an app users can scan and identify any archived species of leaf in a matter of moments, and the archive gets bigger all the time. Users are truly engaged in the project; that speaks volumes to a culture of instant gratification. It makes sense, if you don't have to wait for information chances are you'll spend a bit more time investigating the content.

It's another simple example of one possible application that could help break down an environment's complexities into manageable bites. In general, as a tool for unfolding natural science, augmented reality has an incredible potential to dynamize innovation infrastructure within the natural sciences.

The sea itself stands to benefit immensely from that kind of thing. Since so much of it is invisible to the naked eye, it's not as simple as seeing a leaf you think is interesting and sifting through a database. That's why user engagement is so very important. Like the people who are helping Leafsnap catalogue their species, people's specific interests and investments of time are invaluable in defining how an application works, what it does and what it says. In fact public engagement can be taken to a whole other level if we use crowd sourcing – individuals investing in a project – to fund and help define that project. In the end, cash is a great motivator for people's interest.

If that's what it takes to engage the public then so be it, as far as **Silke Kröger** is concerned**.** Senior Scientist at the **Cefas Lowestoft Laboratory**, England, Silke sees the mapping process as the beginning of a process for collecting data that can eventually be used comparatively. Initially skeptical of how tech can be used to raise meaningful awareness, by the end of the event she was a little more sold on the idea that the tools that exist can help to engaging people's interest in the mysteries beneath the surface of our water, and maybe help stem the tide of human behavior that degrades that world more and more. The good news is that those tools can make the process fun, interactive and creative as well as educational.

The day ended with an open conversation to generate new ideas of how to show the human importance of life in the sea. How do we make people listen? Ideas were many, ranging from an interactive mobile game to the *Baltic Whisper* – a new sensor development protocol that would be crowd sourced. There was a call to define protocols for under water communication, a suggested simple prototype measure station outside Marint Centrum and an idea for the Sea rack, which would send out spores when the environment is healthy.

Some of the proposals are simple to begin developing; some are clearly longer term projects that need healthy investment. But what was clear was that as the beginning of a greater conversation, everyone walked away *bioinspired* enough that the conversation will be continued next summer.