Contents

Introduction

We are proud to present you this booklet with a number of innovative ideas that have been submitted for the Amsterdam Science & Innovation Award 2015.

This year over 70 innovative ideas compete for the Amsterdam Science & Innovation Award.

The Amsterdam Science & Innovation Award is a yearly contest for the most innovative idea with a social and/or commercial value arising from research. The award is organised by Innovation Exchange Amsterdam (IXA) the valorisation centre of AMC, UvA-HvA and VU & VUmc.

If you want to learn more about the innovative ideas, please contact us at:

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Finalists Amsterdam Science & Innovation Award 2015

On Thursday, 30 April the jury, chaired by Alexander Rinnooy Kan, selected the 10 finalists for the Amsterdam Science & Innovation Award 2015. The organisation received over 70 innovative ideas from the Amsterdam universities, universities of applied sciences, academic hospitals and research institutes. The jury had the difficult task to select ten finalists. The quality of the ideas was very high and very diverse.

The ten finalists are:

Paul Govaerts | VU - Faculty of Arts - Dept. of Applied Linguistics
'Coding speech with a cochlear implant: a good reason for human intelligence to go artificial'
Katinka van der Kooij |VU – Faculty of Human Movement Sciences
'Fake it 'till they make It'
Karla de Bruin (Nick Laan) | UvA – Faculty of Sciences
'Crime scene reconstruction based on bloodstain patterns'
Daan Mes (Noortje Grijseels, Alje v. Dam) | UvA - Institute for Interdisciplinary Studies
'Circular economy and clean water: sustainable aquaculture in the port of Amsterdam'
Laila Blömer (Sophie Louise Koopmans, Laurens Samson, Mathijs Smeets) | UvA - Faculty of Sciences
'Brewers Spent Grain in Bread'
Giuseppe Procaccianti | VU - Faculty of Sciences - Dept. of Computer Science
'GREENSWEEP: Guided Recognition and EvaluatioN of SoftWare EnErgy hotsPots'
Pico van Heemstra (René Bohnsack, Hamdullah Handulle) | UvA & HvA
'Me2 the future of urban mobility and electricity'
Jochem de Boer | UvA – Ace Venture Lab
'CTcue: Patient-Trial Matching Platforms'
Jurre den Haan (Femke Bouwman)| VUmc - Alzheimer Center - Dept. of Neurology
'Visualizing Alzheimer in the eye with Curcumin'
Rik Olde Engberink (Bert-Jan van den Born, Liffert Vogt) | AMC - Dept. of Nephrology
'Improving blood pressure control by targeting the endothelial surface layer'

Heart is where the home is

Transcatheter Aortic Valve Implantation (TAVI) is a relative new therapy for severe aortic valve stenosis, an increasing problem in the aging society. Symptomatic cardiac conduction defects or arrhythmias may develop up to 7 days after the TAVI procedure, requiring close monitoring. Since postprocedural recovery is fast, observation may remain the only indication for prolongation of hospital stay.

To make health care after TAVI more efficient, it would be valuable to monitor patients in their home situation. For this purpose, vital parameters can be measured by wireless wearable sensors which are directly connected to the hospital to enable monitoring around the clock. With this, the patient is no longer confined to the hospital for observation which increases patient comfort and hospital capacity and reduces costs.

Overall, this new approach of health care could create future solutions for more efficient care while maintaining or increasing care quality and accessibility, for TAVI patient and many other patient groups beyond.

*This project is initiated by **Mathilde Hermans** and **Martijn van Mourik**, of the departement of Cardiology at AMC, who both have a background in technical medicine, and intervention cardiologist **Marije Vis**.*

'Fake it till they make it': investigating a gentle rehabilitation boost

When making a goal-directed movement, the brain uses a mental model of the body in its movement planning. This model is constantly updated to changes by a process called adaptation. Adaptation is optimal for everyday errors and is hence most persistent for the small errors that are caused by for instance bodily growth but more volatile for the larger errors that are often caused by changes in the environment. Following injury, there are large yet persistent errors and the brain takes time adapting to these errors because the corrections are rapidly forgotten. This contributes to the duration of rehabilitation.

In our lab, we found that adaptation is more persistent when errors haven been virtually downscaled. By using just a Kinect camera and projector we can let patients benefit from training with errors that have downscaled into a range the brain easily accepts, resulting in more persistent adaptation and shorter rehabilitation.

Coding speech in cochlear implants

When the human mind needs artificial intelligence

This innovation relates to programming cochlear implants to restore the hearing of deaf people. It consists in creating a new semi-automated method by using powerful methods from artificial intelligence. First, new hearing tests have been developed in order to set qualitative targets for fine-tuning. Then the implant behavior in response to speech sounds has been modeled mathematically, and finally, artificial intelligence algorithms and networks have been written and validated. Our new fine-tuning method is groundbreaking in that it introduces systematics, eradicates unjustifiable variation, reaches preset targets and requires only minimal intervention from an audiologist.

Being clinically validated, our new method is immediately applicable in cochlear implant centers worldwide. It is also a first and crucial step in the introduction of eHealth in the field of audiology. This innovation is the result of a strong academic-industrial research partnership.

Prof. dr. Paul J. Govaerts is Director of The Eargroup, a private Clinic specialized in Otology and Audiology in children and adults. He has recently been appointed as endowed professor of Speech Coding and Assistive Hearing Technologies at VU University Amsterdam. The research and development activities presented here are part of 'Hearing Minds', a collaborative research project funded by the European Commission under the 7th Framework.

Greensweep - Guided recognition and evaluation of software energy hotspots

The ICT energy consumption is growing beyond our control, due to the extreme diffusion of mobile devices and the increase in demand for digital services. While hardware is constantly improving its energy efficiency, such improvements are neglected by software technologies. Software is often developed without energy efficiency in mind, wasting computing resources and consequently energy. Increasing software energy efficiency will generate energy savings (thus less CO_2 emissions) and significant economic returns, especially for large cloud-based software companies and datacenter providers.

GREENSWEEP wants to optimize software energy efficiency on a large scale. The datacenter is seen as a "Big Data" source, from where software execution, hardware resources and energy consumption can be monitored and logged. Then, by applying modern analysis techniques, we will look for "energy hotspots", i.e. software elements that cause an excessive energy consumption. The analysis will be guided by experts, through interactive data visualization tools. We already developed a proof of concept in the Green Lab at the VU University Amsterdam, where we teach students how to improve software energy efficiency.

Giuseppe Procaccianti is a post-doctoral researcher of the VU University Amsterdam. He recently defended his PhD thesis entitled "Energy-Efficient Software".

Improving blood pressure control by targeting the endothelial surface layer

One billion people in the world suffer from high blood pressure (hypertension). Hypertension is the most important preventable risk factor for premature death worldwide, leading to 9.2 million deaths each year. Yet, 50% of patients treated for hypertension have an uncontrolled blood pressure. New treatments directed to better blood pressure control are therefore needed and will considerably improve life expectancy worldwide.

One of the most important reasons for persistent hypertension is high dietary salt intake. We have recently discovered that negative salt effects may be neutralized by a layer that is present on the inside of all blood vessels. This so-called 'endothelial surface layer' contains large amounts of complex sugars which are able to inactivate salt. With this new concept in mind, we re-examined all trials done so far with sulodexide, a drug containing the same complex sugars. Our analysis demonstrated that sulodexide was effective in lowering blood pressure to the same extent as present blood pressure lowering agents in patients with hypertension.

The endothelial surface layer is therefore a promising innovative target for the treatment of hypertension and seems pivotal in severe hypertension-related complications including heart attacks, stroke, heart failure and end-stage kidney disease.

R.H.G. Olde Engberink, B.J.H. van den Born and *L. Vogt* of the department of Nephrology, University of Amsterdam, Academic Medical Center, Amsterdam.

Circular economy and clean water: Sustainable aquaculture in the port of Amsterdam

We envision a fish farm in the Port of Amsterdam that converts food waste into farmed fish. Wild fish populations are depleted due to overfishing and while aquaculture may appear sustainable, farmed fish are often fed with wild fish. While we are emptying our oceans, we are also wasting huge amounts of food produced on land.

We will create a system in which green waste from local restaurants is used to grow insects or aquatic worms. These worms will serve as fish feed in our farm. The fully grown fish will then be sold back to the restaurant. We aim to develop a fish farm that produces zero waste by implementing a technique called Integrated Multi-Trophic Aquaculture. In this type of fish farming, species like mussels and algae are integrated in the farm.
These organisms feed on fish waste. In this way, we create a circular economy in which green waste is converted into valuable fish, and all fish waste is taken up by other organisms.

Our idea will bring sustainably produced fish right to your doorstep.

Noortje Grijseels, Daan Mes and *Alje van Dam* are master students from the Institute for Interdisciplinary Studies (University of Amsterdam), with a background in marine biology and mathematics.

From treasure chest to tool

It is not easy for language specialists (speech therapists, clinical linguists) to diagnose a bilingual child's language development (impaired or not). These children will often score below average because the child did not acquire enough Dutch yet. Testing in the mother tongue usually is not an option either because most tests are not available in these languages and the language specialists don't have enough knowledge of these languages to make analyses of spontaneous speech. What these language specialists need is information!

Much of the information they need, is available from the wikipage on multilingualism and language disorders (www.meertaligheidentaalstoornissenvu.wikispaces.com), where information can be found on normal and impaired language acquisition in 50 languages that are spoken as a minority language in the Netherlands. The page only needs to be transformed from a treasure chest of information, into a real tool, with more clearcut helping hands to the language specialists, such as comparisons between Dutch and these languages and suggestions for specific questions that the language specialist can ask the parents or translators. And that is what we intend to do before the end of 2015!!

*Made by: VU master students (Applied Linguistics), and their lecturer **dr. Petra Bos.***

Coffee Based

The Netherlands is a coffee country. Research shows that the average Dutch person drinks 2.4 cups of coffee a day. This is a huge amount and therefore we are number one in the world! Coffee grounds, the remaining product that is produced by each cup of coffee, is seen as a worthless residue and ends up directly in the bin.

Coffee Based sees coffee grounds as a useful material, therefore we make interior accessories of coffee grounds. We think it's important that the coffee stays recognizable in the products. In our 'yet to come' product line, the products differs from serving trays to lamps and from flowerpots to coasters. Our products are a unique addition to your interior, a love for the eye and have the subtle smell of coffee.

Coffee Based strives for a society which realizes that waste has more value. With the help of our products, we try to emphasize this vision. Our products do not only share a story with the user but also catches the eyes and the nose!

Check our website www.coffeebased.nl for more information.

*Coffee Based is an initiative of **Marjet de Jong**, a product design student at the University of Applied Sciences.*

Working, walking & wellbeing

Even for people with an otherwise healthy lifestyle regarding diet and physical activity, sedentary behavior is associated with various health risks. We propose a system that encourages people to collectively practice physical activity during their workday. The core of the system is an app which prompts the user to indicate their activity intentions, e.g. a lunch walk, and their preferred time and duration. Based on the proximity between users and the compatibility of their intentions, the app encourages the users to undertake their activities together. Besides the health gains through interrupted sedentary patterns, the system is expected to improve the ambiance in the workplace, which can spark creativity and productivity.

The system's innovativeness is based on three key ideas: simplicity, sustainability and privacy friendliness. Its simplicity is reflected in the fact that no intricate reasoning is necessary. Sustainability is achieved by focusing on small achievable goals instead of unrealistic intentions. Since the system is envisioned to work without sending data to a server or connecting with a social network, it is very privacy friendly.

This idea was submitted by the team behind Active2Gether, a joint research project of the EMGO+ institute and the Agent Systems Research group at the VU University Amsterdam.

Freethinking.org

The problem/opportunity that makes as a target for the idea is to find a way to go beyond the actual way of publishing scientific informations. This way the destiny of an article is in the hand of a few peer reviewers and a few editors and it's behind courtains, basically non-public. This could make for bad articles to be published and good articles to not be published, based on non-scientific criteria.

The suggested solution is to have a public review, where everyone can publish scientific data on a website and everyone can give a review. At the end of the review a grade will be given and weighted based on the scientific background of the reviewer. Higher grades will give higher visibility to the article. At the same time into another section scientific arguments could be treated (review like) in order to explain them in the easiest way possible for an all around public. This section will be functional to the other in order to make people closer to science and to spread knowledge and curiosity to the biggest possible public.

Davide Montesarchio, is a PhD candidate working on photosynthetic biofuels and strongly believes in sciende made for the good of the society.

The Corporate Bullshit-o-meter: Auditing in the 21st century

I find Organization Science both boring and fascinating, dogmatic and creative, peripheral and all-encompassing. How much time does one not spend in organizations? There are however also bookshelves of management-guru material that are, frankly, the source of a great deal of bullshit. We are all exposed to it on a daily basis: pointless protocols, ridiculous management blabla, and bonus-collecting office politicians soaking up fancy metaphors like sponges whilst shoving the latest budget cuts through employees' throats.

I therefore suggested an alternative to regular auditing processes, which merely create illusions of good behavior by corporations in terms of environmental friendliness, safety, corporate responsibility, etc. The Corporate Bullshit-o-meter inquires what bullshit is sold on everyday basis at people's workplaces. The tool then offers the respondent a tentative theory as to what shit really hit the fan, and stores all the data to be sold off on the big-data market to interested research institutes. Optionally, one may expose one's company for what it really is and forward the results of the questionnaire to some newspaper. This allows the operator of the Bullshit-o-meter to get rich, whilst forcing corporations to sell less bullshit.

David Passenier, is PhD/lecturer at the department of Organization Sciences of VU University Amsterdam.

Second Sight

What would a future fashion show look like? If we would actually incorporate new technologies and use exciting 3D fashion design software, like Clo3D, already available? "Second Sight" challenges fashion's aura of the future.

Fashion is very much connected to the idea of providing you with 'the latest', 'the newest', 'the hottest', 'the it'. It's avant-garde. Although todays' fashion indeed reflects a gaze into the future, the means of presenting it are still very much like they were at the time of the first runway show back in 1885.

Today's generation of fashion designers shows a desire to redefine the system of fashion. Second Sight is part of this generation by critically engaging with ideas that are so deeply embodied in fashion like laws, never to be broken...

Advanced 3D fashion design software allows designers to present their 3D fashion collection in a virtual environment and to produce garments on demand. Second Sight believes the potential benefits of virtual reality are promising; Imagine allowing the designer and consumers having a conversation about the design, getting instant feedback or even allowing consumers to customize their product to their needs. Creating a closer connection between them. Production on demand will favor sustainability and online shopping will be much more consumer friendly.

Second Sight is an example of what a fashion show could look like utilizing 3D design software. It is what happens if you use technology not only as inspiration, but by embodying the reality of it. It trespasses the dream. The title of the exhibition at Boijmans van Beuningen says it all; 'The Future of Fashion is Now' (October 2014, January 2015).

*3D Fashion Group: **Sophie Schaminée** (Fashion & Branding Alumni University of Applied Sciences Amsterdam), Yang Chen (Media Technology, University of Leiden), Kawe Khorramian (Polytechnic University of Turin), Amber Jae Slooten (Fashion & Design Amsterdam Fashion Insitute), Michael Alexander Lovett (Informatics, Game development & design)*

Invita: Real first person shooter

Instead of playing outside, which results in meeting new people and getting physical exercise. Gamers are spending a lot of time behind their computer, TV or smartphone screens playing games.

Invita wants to get these gamers to play outside again to promote physical exercise, social contact and maybe even learn new skills. Invita is going to accomplish this by developing a laserweapon to which the player can attach his or her smartphone. On the smartphone the player can see the user interface on which all game information will be shown. However, the player needs to run, aim, shoot and accomplish the goals himself! This way we will create an awesome, challenging and realistic first person shooter game that can be played outside in the open air.

Combining the thrill of playing a lasertag, paintball and airsoft game with the computational power of the smartphones to set and maintain the game rules and objectives and see statistics. Our team consists mostly of students from the HvA (Amsterdam University of Applied Sciences) and an application development student from Zwolle. We are planning to launch beta test events this summer, if you are interested follow us on Facebook at Invita (www.facebook.com/invita.entertainment).

Martin Balk is a student at the Amsterdam University of Applied Sciences.

Visualizing Alzheimer's disease in the eye with Curcumin

Alzheimer's disease (AD) is the best known and the most common form of dementia, responsible for more than 55% of all dementias. The prevalence is increasing rapidly with a present worldwide number of 35 million, with an estimated increase to 65 million in 2030.

AD is caused by accumulation of the Alzheimer protein, starting 15-20 years before symptom onset, ultimately leading to shrinkage of the brain. Current therapy fails, because it is started too late in the disease course: the brain is already irreversibly destructed. Therefore, an early diagnosis is needed to treat AD in time and effectively.

The currently used methods for diagnosis are expensive, invasive and time consuming. And they detect AD relatively late in the disease course. We therefore present a method of examining the eye, dealing with these disadvantages.

The eye contains brain cells reflecting brain disease. Curcumin, a herb used in Indian curries, has been known for decades to specifically bind the Alzheimer protein. With Curcumin and a specially designed eye scanner we make the Alzheimer protein visible in the eye. This enables early AD diagnosis, as a first step to make AD a treatable disease.

Me 2: the future of urban mobility and electricity

Intrigued by the increasing popularity of electric vehicles (EVs) and the effects this would have on our energy system in the future, the team developed a particular interest in vehicle-to-grid (V2G) technology: using EVs as mobile power plants and storage devices to improve demand and supply management of electricity. In this way, EVs can be used when parked to increase the efficient use of renewable energies and to make the electric grid more flexible and reliable – a much needed service for grid operators which struggle to accommodate increasing electricity demand in the future.

We developed a novel business model - 'me2' - which offers V2G to urban communities. me2 combines the services of an energy provider and a car-sharing operator into one solution. The grand idea is that shared EVs create value at all times: while they are used by customers (per minute rate) and while they are connected to the grid (V2G services). For customers, all it takes is contracting with me2 as their new energy supplier; in addition to electricity, they also receive free, monthly car-sharing minutes. Go me2: green, economical, easy.

*The dedicated team behind 'me2' consists of **Dr. René Bohnsack, Pico van Heemstra** and **Hamdullah Handulle** of the Amsterdam University of Applied Sciences and University of Amsterdam .*

Food safety test for Chinese market

The Chinese economy has grown rapidly during the last 30 years and caused major industrialization and urbanization. Due to these changes the pressure on the production of food has increased. This results in enormous food safety problems due to both deliberate or unintentional contamination in all steps of the production chain. As huge scandals appeared in the media, public concern is rising and causes an increase in the demand for a means to test food safety.
This project aims to develop a reliable and accessible end-user food test that indicates whether a certain product is safe to consume.

***Ana Vojvodic** of the University of Amsterdam.*

A bottom-up approach to social innovation

Radical innovations in research, business and society are rarely achieved within a niche. Instead, insight and collaboration across fields pushes boundaries for institutions, academia and society forward.

However, more often than not, knowledge, skills and creativity are compartmentalized.
We want to create an interactive knowledge and communication platform that brings together current and young leaders from the arts to break the barriers that separate them. We aim to strengthen the precious network of bright and open-minded people and connect academia, business, institutions, civil movements and governments to foster interdisciplinary change in society.

This is part of a movement that we recently successfully started up in Belgium, see otletsalons.wordpress.com. To boost a new web of connected individuals and organizations, we want to organize regular events where people can learn, meet and i nteract; build a website; and facilitate and follow up on new contacts.

Vigjilenca Abazi (PhD researcher, Amsterdam Centre for European Law and Governance) and Bert Vercnocke (postdoc, Institute of Physics) are two international UvA employees with different backgrounds, looking for new ways to take up the university's responsibility to reach out to society and speak up in the public debate.

CTcue: Patient-Trial Matching Platform

Cancer is one of the leading causes of death. We need better ways to treat cancer patients. The most reliable and the only accepted scientific method to take discoveries from the lab to the bedside is by testing through clinical trials. Unfortunately, more than 20% of these trials are never completed. The most common reason: the poor process of recruiting patients. On average, less than 3% of all cancer patients participate in clinical trials!

Since the most valuable patient information is archived as text (clinical notes, discharge letters, etc.) into the hospital information system, physicians are unable to actively search for eligible patients. Our idea neither requires a complex query design nor a need to involve data experts; clinicians can now find eligible patients using standard medical terminology in just a few mouse clicks. It can alert the hospital medical team in advance and during a consult, thus increasing trial inclusion awareness. The team can invite patients, physicians won't miss a patient-trial match and should patients request to participate in trials, an overview will be available instantly. And all this for free!

We want to bring disruptive technology and business models to Healthcare.

Jochem de Boer of the University of Amsterdam - ACE Venture Lab.

Brewers Spent Grain in Bread

A few months ago four students at the University of Amsterdam did a consultancy case for Brouwerij 't IJ, about possible solutions for their waste flow. The main waste product in the beer brewing process is called brewers spent grain, which consists mostly of crushed barley. Luckily there has been conducted a lot of research in the past few years about brewers spent grain and its applications. In the brewing process most of the sugars dissolve in the beer mixture, and in a later stage these will be converted into alcohol. This means brewers spent grain is low in sugars and fat, and relatively high in proteins.

In the business we started after the consultancy case we make bread with additional brewers spent grain from local breweries in Amsterdam, which gives the bread a unique, delicious taste. Using brewers spent grain decreases the use of other resources, like plain flour, in these breads. By re-using barley in spent grains we create value for a waste flow. This way we can connect two completely different markets, namely the baking industry and the brewing industry in Amsterdam. We produce a local, healthy and above all sustainable bread, with which we hope to make the small economy of Amsterdam a bit more circular.

Laila Blömer, Sophie Louise Koopmans, Laurens Samson and *Mathijs Smeets* are *students at the University of Amsterdam.*

Hide Your Story with Augmenting Masterpieces - or:
Social Augmentation using iBeacons in Rijksmuseum

As the research project Augmenting Masterpieces has shown, museum visitors feel awkward and intimidated easily by the setting of the Rijksmuseum. Therefore the chance that they engage with art is lower.
Through providing three additional app features integrated into the existing multi-media app, they are more relaxed, their contribution gives them a feeling of appreciation and they are ultimately more likely to engage with artworks. It allows them to hide their own stories, to submit trivia questions and to support the service design team.

Thus, art historic information provided by museums and museum experts is complemented by alternative storytelling on various levels by the visitors themselves. By that museum visitors are not only addressed on multiple levels, but also learn that their own impressions are valuable input with which they can contribute to the museum.

Johanna Barnbeck is an artistic researcher and creative consultant. After graduating from the research master's in Cultural Analysis and Artistic Research at the University of Amsterdam, she specialized in audio-visual research communication. For Augmenting Masterpieces she designs the research process and carries out the different phases of creation and experimentation.

CheerItUp

Depression is a pervasive mental disorder and a primary source of disability, contributing to many physical and mental health disorders. Life events and everyday activities have a role both in triggering (e.g. death of a relative, illness etc.) and in offering relief from depression. Self-help is reputed an important approach for taking care of people with depression.

CheerItUp aims at deploying a tool for monitoring on a daily basis the incidence of a relevant list of everyday activities grounded on the MacPhillamy and Lewinsohn (1982) dataset on the user mood. The app has societal benefits because it can promote healthy lifestyles and it will reinforce local networks, because users in difficult situations will feel supported by the community. CheerItUp will also be useful for academic purposes: it will help in collecting new data about events and associated emotions that will improve Sentiment Analysis models. The data thus collected will be freely distributed to the NLP community facilitating the development of new systems and reducing the costs of corpora collection.

The app idea departs from a joint collaboration with Irene Russo from ILC-CNR in Pisa, Italy, on the identification of implicit sentiments and emotions associated to events and their participants.

Tommaso Caselli - Computational Lexicology & Terminology Lab (CLTL), Faculty of Humanities, VU University Amsterdam.