

HEALTHY LONGEVITY GLOBAL COMPETITION

2021 Catalyst Awardees

Sponsor: EIT Health of the European Union

.lumen – Glasses for the Blind

Principal Investigator	Cornel Amariei
PI Primary Affiliation	DOTLUMEN S.R.L
Co-Investigator(s)	Gabriel Chindris, Mihai Ivascu Chairman & Co-Founder

PROJECT DESCRIPTION

There are 40 million blind people today, increasing to over 100 million by 2050, and despite all technological advancements, when it comes to solutions for their mobility, there are only two options and are thousands of years old: The guide dog and the white cane. The guide dog's features are unanimously seen as useful, but it has a few drawbacks. For example, to train a guide dog can cost up to \$60,000 and it's incredibly difficult for a blind person to take care of one. Because of these, there are 40 million blind individuals, and only 28 thousand guide dogs.

.lumen builds a pair of glasses that mimic the same features as a guide dog, without the drawbacks. A solution for the other 39,972,000 blind individuals. .lumen is one year old and already has reached a team of 40 engineers, scientists, psychologists, business developers and industrial designers. The technology has been tested with over 200 blind individuals and it's preparing for production.

A wearable sensor for pediatric asthma monitoring

Principal Investigator	Heleen Willemsen
PI Primary Affiliation	Asthmaware BV
Co-Investigator(s)	Jurrit Vellinga, Beatrijs van Hoof

PROJECT DESCRIPTION

Asthmaware develops a wearable sensor, integrated in a smart t-shirt, that measures respiratory muscle activity. This sensor will help children with asthma and their parents to monitor the disease's symptoms and react timely when asthma worsens.

1 in 10 children worldwide suffer from asthma, and more than a third of these children have poor controlled asthma. This means that they may suffer from frightening and harmful asthma attacks and are impaired in their daily activities, like playing and doing sports. Asthma is also the biggest cause of hospitalizations in children.

Asthma is a disease with highly fluctuating symptoms, and doctors have little knowledge on how the child is doing in between regular doctor's visits. They have to base their treatment on memory of the parents. For parents, it is difficult to notice a deterioration in their child's asthma, and asthma worsening is often noticed too late.

Our sensor monitors respiratory effort using so called electromyography technology, capturing the small electrical signals that the brain sends to the respiratory muscles. When respiratory muscle activity is higher, this

is a very direct indication of shortness of breath and asthma worsening. The smart shirt measures continuously during nighttime, to timely identify asthma worsening, enabling the child and its parents to increase medication, avoid triggers or consult the doctor timely. This way we aim to avoid asthma attacks, ER visits and hospitalizations, and improve quality of life, long term lung health outcomes and to decrease society's costs on pediatric asthma.

antisense RNA treatment against myotonic dystrophy

Principal Investigator	Beatriz Llamusi
PI Primary Affiliation	Arthex Biotech S.L.
Co-Investigator(s)	Prof. Ruben Artero MsC and PhD in Biochemistry Co-founder and full professor of University of Valencia (Department of Genetics) Ms. Sheila Soriano MsC in Chemistry Product Manager Mr. Marc Carrscosa Biotechnologist Lab Manager

PROJECT DESCRIPTION

ARTHEX is developing an advanced RNA therapy for myotonic dystrophy type 1 (DM1) based on a portfolio of patent-protected antimiRs. These antimiRs act as long-acting disease modifiers, targeting key pathways leading to disease through a clearly defined, first-in-class mechanism of action which is unique and novel.

These molecules have shown a promising long-term therapeutic effect after one single administration (proof of concept published in <https://doi.org/10.1038/s41467-018-04892-4> and <https://doi.org/10.1016/j.omtn.2020.07.021>).

After the optimization and selection of the lead, our project entered into the IND-enabling toxicology studies in the last quarter of 2021. We plan to move forward into the clinical phase by the beginning of 2023.

Biel Digital Glasses

Principal Investigator	Jaume Puig
PI Primary Affiliation	Biel Glasses SL
Co-Investigator(s)	Constanza Lucero Master in Clinical Research, Medicine PhD CMO (Chief Medical Officer) Eulalia Sanchez Bachelor in Optics and Optometry, Master in Optometry and Vision Sciences CSO (Chief Scientific Officer) Jordi Puig Bachelor in Computer Engineering, Licentiate Degree in Computer Engineering CTO (Chief Technology Officer) Alex Cabañeros Lopez Bachelor in Electronics Engineering, Master in Automatic Control and Robotics

Software Development Manager

Arthur Díaz Juan

Bachelor in Engineering of Telecommunication Technologies, Master in Advanced Telecommunication Technologies
Software Developer

Saskia Mülheim

Bachelor in Biomedical Science, Master in Innovation & Entrepreneurship
Investor Relations & Marketing Executive

Ishan Talathi

Bachelor in Computer Science, MBA
Operations Manager**PROJECT DESCRIPTION**

The name of the company came from Biel, the son of the founders, who was born with low vision (LV), a visual disability 7 times more common than blindness, that cannot be corrected with regular glasses, medicine, or surgery. People with LV suffer mobility problems such as falls, collisions and disorientation, especially when they suffer peripheral vision loss, like in Glaucoma or Retinitis Pigmentosa. These mobility issues have direct health effects: 63% of falls require medical attention, and 36% have long-term consequences. There are also indirect effects: Mobility reduction causes dependence, inability to work and social isolation. The consequent sedentary lifestyle causes cardiovascular and psychological problems.

We are a team of experts in technology, optometry and medicine that has joined to create digital glasses that use 3D Vision, AI and Mixed Reality, to improve the mobility and personal autonomy of people like Biel. Our Smart Glasses recognize obstacles, traffic lights, and ground changes, like steps, and indicate them to the patient using mixed reality. Furthermore, they include zoom and other image enhancement functions to improve the overall vision.

We have a functional MVP, certified with a CE Mark for a Class 1 medical device, that we are testing on patients with remarkable preliminary results. In the future, we will include advanced functions like LV adapted navigation.

Bringing augmented reality to the operating room

Principal Investigator	Nicolas Bourdel
PI Primary Affiliation	SurgAR
Co-Investigator(s)	Professor Adrien Bartoli PhD Director of Endoscopy and Computer Vision (EnCoV) research group, Université Clermont Auvergne

PROJECT DESCRIPTION

Numerous surgeries are performed through very small incisions with the help of a camera (minimally invasive surgery). These mini-invasive surgeries are highly beneficial to the patient but greatly complicate the surgeon's task. If the surgeon needs to precisely locate a tumor in an organ on the surgical screen, they have nothing but one solution: to use augmented reality! SurgAR has developed an augmented reality (AR) software dedicated to laparoscopic surgery. Our software is the culmination of a long and fruitful collaboration between surgeons and scientists. The software revolutionizes the generic laparoscopic paradigm by displaying the invisible inner anatomical structures (eg tumours, arteries) on the laparoscopic screen leading to significant impact in terms of patient benefits and healthcare costs. The technology offers the surgeon the possibility to see inside the organs by merging preoperative images with the surgical view in real-time. This guides and assists the surgeon for safer, more efficient and faster surgical procedures. The surgeon is guided to respect a free margin around the tumours (with a potential significant impact on the survival), to perform the minimally invasive surgery accurately and to respect anatomical landmarks (with a potential significant impact on postoperative morbidity and

mortality). SurgAR combines computer vision and artificial intelligence techniques to deliver the first functional real time augmented reality system on a mobile organ which has already been successfully used on 45 patients. AR may be the next revolution in surgery. It has the potential to bring huge benefits to the surgeon's practice and to patient outcome.

Deviskan: democratizing melanoma early detection

Principal Investigator	Narcis Ricart Geli
PI Primary Affiliation	Dermavision Solutions S.L
Co-Investigator(s)	Enric Campmòl Ametller, CTO Technical Engineer Maria Sunyer i Rigau, Developer Computer Scientist

PROJECT DESCRIPTION

Deviskan is a non-invasive medical device powered by Deep Learning and Artificial Intelligence able to take clinical and dermoscopic images to detect melanoma in early stages. In this context, Deviskan is able to gather all these images in just 5 minutes without human intervention, reducing the cost and time of detection by 84%. This allows democratizing the access to melanoma early detection.

EVOGEX

Principal Investigator	Hadrien LANVIN
PI Primary Affiliation	Evora Biosciences SAS
Co-Investigator(s)	Anna Kostrzak, PhD, R&D Director Amanda Brun, PhD, PharmD, CSO (CNRS / Paris University)

PROJECT DESCRIPTION

EVORA develops EVOGEX, a breakthrough treatment of complex digestive fistulas (GI). EVORA uses stem cells to secrete biological nanoparticles called exosomes, which are the "active principle" at the core of EVOGEX. Exosomes are a much more industry-friendly alternative to conventional cell therapy, where stem cells are directly administered to patients. Indeed, exosomes can be produced at scale, have significant logistics advantages, and retain and can sometimes supersede the therapeutic properties of stem cells. We believe exosomes are where cell therapy is headed and will become a major therapeutic platform in the coming years, for regenerative medicine and beyond.

Explainable Artificial Intelligence for Early Diagnosis of Gynecological Cancer during Sonography

Principal Investigator	Daniele Conti
PI Primary Affiliation	SYNDIAG S.R.L.
Co-Investigator(s)	Dr. Rosilari Bellacosa Marotti, PhD PhD in Experimental Psychology SynDiag s.r.l., Founder and R&D Director

Dr. Federica Gerace, PhD
PhD in Physics
SynDiag s.r.l., Founder and AI Specialist

PROJECT DESCRIPTION

SynDiag brings a new mindset to diagnose ovarian cancers early, putting Artificial Intelligence at the service of gynecology. Sonography is the primary level of medical investigation for most of women's oncologic diseases, particularly for ovarian cancer, the most lethal tumor pathology for women, whose incidence increases dramatically with aging and leads each year to about 300.000 new cases worldwide and more than 170.000 deaths. Nevertheless, since sonography is intrinsically user dependent and requires a subjective evaluation of variables, the correctness and quality of the diagnosis mainly relies on the physician's experience.

Today there is no instrument that supports gynecologists in sonography interpretation. SynDiag's GynAi cloud platform provides a software, OvAi, for clinical decision support based on AI, and the Academy for Digital Gynecology, a new learning platform based on digital peer learning.

Thousands of high-quality clinical cases have been collected by world-class hospitals to train GynAi as an expert system based on state of the art algorithms and according to international guidelines for clinical evaluation. OvAi highlights relevant features to be considered for definitive diagnosis, proposes a malignancy risk of ovarian cancer and makes it evident to the physician the sonographic features considered that led to such a second opinion, without changing clinical practice and leaving the gynecologists the final decision.

GynAi is a solution designed to provide decision support systems based on AI and advanced peer learning for physicians training for all conditions in gynecology, starting from Ovarian Cancer and then expanding to Uterine and Pelvis conditions.

Growing coverage of Medical Assistance by Nursebeam bots

Principal Investigator	Timo Uustal
PI Primary Affiliation	Nursebeam OÜ
Co-Investigator(s)	Dr Hussen Tareq, Chief Medical Officer Vea Gaygon, Chief Caring Officer Andre Sõstar, Chief Data Officer

PROJECT DESCRIPTION

Worse than being sick, is being sick abroad. Nursebeam chatbots help you out. Find out what drug to use, where to find it and how to use it. Instantly and anywhere. Being part of travel insurance, we reduce claim payouts up to 200x for insurers while providing policyholders convenient access to care. It's much needed in everyday travel and scale well in surge periods as well, such as current COVID19 outbreak for example.

Before COVID19 there were 1.6B international tourist arrivals per year annually. We believe that in post-COVID19 world this is going to grow further, as more people are adapting digital-first work and joining the ranks of digital nomads. Nursebeam led borderless healthcare network can help both current travelers as well as the new generation of digital nomads to have instant access to healthcare across the globe for healthy long life.

Hephaï

Principal Investigator	Serge Kinkingnehun
PI Primary Affiliation	Hephaï

Co-Investigator(s)	Dr Valery Trosini-Desert MD CMO Hephaï, Pneumologist at Pitié-Salpêtrière hospital, Paris
	Pr Thomas Similowski MD, PdD President of the scientific board of Hephaï, Pneumologist at Pitié-Salpêtrière hospital, head of the pulmonology Department, Paris
	Dr Ludovic Minvielle PdD Data Analyst Hephaï
	Yasser Hariri MSc Computer Vision Engineer Hephaï
	Sylia Boumedjane MSc Data Analyst Engineer Hephaï

PROJECT DESCRIPTION

It is now clearly demonstrated that the use of inhalation devices for asthma and COPD symptoms (chronic obstructive pulmonary disease) results in 30% to 40% critical error due to misuse.

Proper use of inhalation devices is crucial to the relief of asthma and COPD symptoms and to the prevention of exacerbations of these diseases. The misuse of these devices is currently considered a major problem.

Inhaled treatments are difficult to take because of the need for more or less complex successive manipulations, which are not always very intuitive. The inhaler misuse leads to significant medical and economic consequences: a negative impact on the clinical efficiency of treatment and unnecessary expenditure for the paying agencies with direct and indirect costs related to misuse estimated between \$6 and 12 billions in the US.

HEPHAÏ is a multi-device application (IOS, Android Windows) and kiosk (terminal) based on artificial intelligence, allowing to recognize the proper use of prescribed inhalers in asthmatic and COPD patients.

The application:

- 1) Allows the patient to film himself directly in front of his application [from his smartphone, computer, tablet, terminal...] when he takes his inhaler.
- 2) Interviews an AI based on patient behavior analysis (movements and sound). The algorithm is able to recognize the right/bad actions/gestures (that is to say the right use) for the inhalers.
- 3) Gives the patient an immediate feedback that will inform the patient of whether or not the inhaler is taken correctly and why.

Natural sperm selection for improved outcomes in IVF

Principal Investigator	Declan Keane
PI Primary Affiliation	neoMimix
Co-Investigator(s)	Professor Sean Fair PhD (Reproductive Biology) neoMimix CSO
	Dr Eoin White PhD (Medical Device Design) neoMimix regulatory lead

Dr David Newport
PhD (Microfluidics Engineering)
neoMimix engineering lead

Professor Leonard O'Sullivan
PhD (Product Design)
neoMimix product design and human factors lead

Barry Russell
BEng
Commercial advisor with med-tech start-up expertise

PROJECT DESCRIPTION

One in six couples require fertility treatment and this is increasing due to increasing maternal age and a decrease in sperm counts by 52% over the last 40 years. During in vitro fertilization (IVF), the method of choice of fertilizing a woman's eggs is using intra cytoplasmic sperm injection, a procedure which involves the embryologist selecting a suitable sperm and injecting it directly into the egg. While the embryologist can select motile and morphologically normal sperm they have no information on the DNA integrity of the sperm, as the only test available destroys the sperm. Eggs fertilized using sperm of poor DNA integrity have a reduced chance of developing and women whose partners have high levels of DNA fragmentation are twice as likely to have a miscarriage.

Our multidisciplinary team at neoMimix have developed a simple to use biomimicry technology that is the best-in-class sperm selection technology in terms of its ability to select human sperm with intact DNA (as assessed across three test sites). In a mouse-model, our technology improved fertilization rates by 8% points and pregnancy rates by 12% points. neoMimix's microfluidics based technology stimulates sperm to swim against a fluid flow within microchannels simulating how sperm are naturally selected as they swim towards the fallopian tubes against an outward flow of mucus. We are currently working towards regulatory approval of this class II device and are starting to develop an embryo culture and diagnostics system based on our microfluidics platform, which will revolutionize the entire IVF lab into a desk-top sized instrument.

New generation of contrast agents for MRI

Principal Investigator	Donatella Vecchione
PI Primary Affiliation	Kyme NanoImaging srl
Co-Investigator(s)	Maria Russo, PhD ESPCI Paris - PSL Alfonso Maria Ponsiglione, PhD University of Naples Federico II Prof. Enza Torino, PhD University of Naples Federico II Prof. Paolo Antonio Netti, PhD University of Naples Federico II

PROJECT DESCRIPTION

Magnetic Resonance Imaging (MRI) is the most used diagnostic modality and more than 40% of MRI scans (> 30M/year) are performed with Contrast Agents (CAs). Despite the use of CAs, medical images still have poor quality and clinicians are forced to inject high dosage, causing CAs deposition in the body and acute side effects.

Kyme NanoImaging Srl has the solution: we patented a nanotechnology platform to combine biomaterials with clinically used CAs. Our formulation enhances the contrast capability of CAs up to 12 times, potentially improving the safety of patients.

Our products make visible anatomical details otherwise not appreciable, ensuring better diagnoses, potentially reducing side effects and widening the range of treatable patients.

Personalized bio-electronic medicine for chronic inflammatory endocrine conditions

Principal Investigator	Siobhán Kelleher
PI Primary Affiliation	Sision Medical
Co-Investigator(s)	N/A

PROJECT DESCRIPTION

At Sision Medical, we make invisible chronic endocrine conditions, such as endometriosis, which impact the most productive years of patient's lives, visible. We apply digital biomarker insights to deliver optimal bioelectronic treatment at the best time to each patient, thereby better identifying and managing high-risk and high-cost patients.

Endometriosis affects one in ten women of reproductive age, that's 176 million women worldwide, and is characterised by debilitating chronic pelvic pain and infertility. The annual societal burden in the USA is estimated to be \$69 billion. She Sync is a wearable, smartphone-controlled bio-electronic device which has the potential to reduce endometriosis-associated pain without the hormonal side-effects associated with current medications and the risks associated with surgery, which is currently how endometriosis is treated. We are reforming the entire care pathway, from diagnosis to treatment and subsequent monitoring of disease progression. Our unique digital biomarker offers many benefits; (i) earlier diagnosis of women with endometriosis (ii) selection of women for whom She Sync will provide best treatment outcomes, (iii) monitoring of progression or recurrence of the disease without the requirement for surgery and (iv) value to over-stretched healthcare budgets. With growing awareness of endometriosis and pressure on healthcare budgets for treatment of chronic disease, this approach brings value not only to patients and their physicians but to healthcare systems and society at large.

This platform technology has the potential to offer better understanding, detection, and treatment of not only endometriosis but also other chronic inflammatory endocrine conditions such as polycystic ovary syndrome and infertility.

Portable MRI

Principal Investigator	Clemens Tepel
PI Primary Affiliation	DeepSpin GmbH
Co-Investigator(s)	Pedro Freire Silva, M.Sc. DeepSpin GmbH

PROJECT DESCRIPTION

Today access to lifesaving medical imaging through MRI is limited to certain population groups and clinical use cases due to its high cost, complexity, and infrastructure constraints. Where MRI is available, waiting times are often weeks. DeepSpin's mission is to change this status-quo and make MRI universally accessible.

We are developing a 20x cheaper, portable, and open MRI system that enables point-of-care MRI scans. For the first time, this will allow medical professionals to conduct high-quality MR-imaging at a hospital bed, in non-radiology outpatient settings or in the long run even at a GP's office.

By making machine learning an integral part of the system design, DeepSpin is able to perform MR imaging in inhomogeneous magnetic fields for the first time ever, taking imaging quality far beyond the limits of the conventional, low-cost permanent magnet designs used by competitors. Simultaneously, it enables not only an

operation in non-shielded rooms and without cryogenics or high-power outlets, but also an automated operation of the system. Moreover, DeepSpin's system uses a projected field of view rather than a fully enclosed one, inside a magnet's bore. This not only significantly increases patient convenience, but also allows the patient to be in any situation, from a load-bearing position to an incapacitated state, unlocking completely novel use cases, e.g., in interventional MRI.

Through this technology, DeepSpin will make MRI universally accessible, allowing deadly diseases to be detected early, diagnosis times to be shortened and consequently thousands of lives saved.

Resitu NoSurgery

Principal Investigator	Stefan Sowa
PI Primary Affiliation	Resitu AB
Co-Investigator(s)	Henrik Thunqvist, MSc Development Engineer Therese Sundell, MSc Chief Marketing Manager

PROJECT DESCRIPTION

The aim is to develop a device that removes breast cancer tumors without open surgery. To determine if a lesion visible on X-ray is cancer a biopsy is necessary. 60% of all breast cancers are detected via mammography and 80% of the tumors are less than 2 cm. Today's products can take a 3 mm sample of the lesion and if cancer the tumor must be removed by open surgery. The Resitu patented biopsy-technology enables the whole lesion with margins can be removed and no open surgery is required.

Salvus Health: Preventive Point-of-Care Platform

Principal Investigator	Philip Van den Bergh
PI Primary Affiliation	Salvus Health BV
Co-Investigator(s)	Salvador Severich BSc International Trade, MSc Product Management Co-founder, Operations Axel Vulsteke BSc Computer Science Technical Lead

PROJECT DESCRIPTION

Salvus Care 1.0 is a Point-of-Care solution that enables consumers/users take measurements at their community pharmacies, for the early detection of symptoms that can be associated with common chronic conditions, such as a heart disease.

The value proposition of our MVP is focused on enabling consumers to take control of their health by helping them to understand the importance of regular monitoring of certain vital health parameters, instruct them in the correct use of the medical devices involved and, once the measurements have taken place, give the right context to the results obtained. Medical devices are available in the pharmacy at zero (or very little) cost to the user, lowering the barrier to perform regular checks.

The MVP consists of the following:

- a native application (on an tablet) that integrates three medical devices, placed in a private, but well-accessible corner in the pharmacy. The setup allows the measurement of:
 - o Medical parameters (7): blood pressure, heart rhythm (with atrial fibrillation detection), heart rate, oxygen saturation, weight, BMI, belly circumference.
 - o Body parameters (4): body fat percentage, muscle mass, lean body mass and bone mass.
- a mobile-first web application that allows registered users to save their results and track them over time. Also, it allows for convenient sharing of the obtained results with their care team.
- a back-end infrastructure that securely and efficiently stores the data capture at the POC with the native application and allows to display it remotely in the web application.

SepTec - Enabling lifesaving sepsis care by diagnosing infection within 15 minutes

Principal Investigator	Keith O'Neill
PI Primary Affiliation	Novus Diagnostics LTD
Co-Investigator(s)	Elaine Spain, PhD COO Kellie Adamson, PhD CSO Hazel McArdle, PhD

PROJECT DESCRIPTION

Sepsis is a global healthcare challenge with more than 49M diagnosed cases every year, leading to more than 11M deaths and total costs to healthcare systems of over \$60 billion. Tragically, while 80% of sepsis deaths could be prevented with rapid diagnosis and treatment, conventional diagnostic tests take several hours to several days to deliver results. This means physicians are forced to administer a non-specific treatment option for patients until the results of the tests come back. Unfortunately, for many patients (>30%), this treatment will be ineffective.

SepTec is a groundbreaking in-vitro diagnostic technology that can provide a solution by rapidly diagnosing blood stream infections at the patient's bedside. SepTec can detecting and classify pathogens within 15 minutes at very low concentrations (<10 CFU/ml) without the need for slow, complicated lab tests.

Unlike current approaches, SepTec is near-patient rather than lab-based. So it is more cost-effective, portable, easier-to-use (no specialist training required) and can extend testing to a wider range of care settings. Early pathogen identification also offers the potential to reduce the inappropriate use of antibiotics; supporting efforts to prevent the proliferation of antibiotic resistant pathogens.

Preliminary health economics research shows that our rapid Sepsis infection diagnosis will result in patients receiving the correct treatment between 2 and 4.5 days earlier than in current protocols; resulting in a consequent 50% reduction in mortality rate, 25 times fewer patients receiving unnecessary antibiotics and a healthcare saving between €17-40m per 5m population.

Serenno Sentinel

Principal Investigator	Tomer Lark
PI Primary Affiliation	Serenno Medical

Co-Investigator(s)	Mr. Noam Hadas M. A. Industrial design, medical devices. Technion, Tel-Aviv M.Sc. EE. Electro-optic/fiber-optic sensors. Electronics Engineering. Tel-Aviv University.
	Mr. Sagie Meshulam Bsc. in Biomedical Engineering

PROJECT DESCRIPTION

The Serenno Sentinel is a novel medical device used to monitor, predict, identify and avoid common, life threatening complications in Intensive Care hospitalizations such as Acute Kidney Injury - a deadly ICU risk with a yearly estimated death-toll of 300,000 lives in the US alone (tripling mortality), and no cure after onset.

Serenno is using a robust, hands-free, low cost and non-invasive device, measuring accurate, ongoing Urine Output (currently collected and calculated manually in hospitals around the world). Allowing contact free monitoring for hospitalized patients as well as quarantined and home ICU patients. Using the system medical personnel would reduce their exposure and only be alerted to conditions requiring immediate attention, and will be able to predict and avoid AKI with no need for massive interventions, and so significantly improving patient health by reducing risk, decreasing hospital

Strengthening of Osteoporotic Hips to Prevent Devastating Fractures

Principal Investigator	Ulrike Kettenberger
PI Primary Affiliation	Flowbone SA
Co-Investigator(s)	Dr. Valérie Malfroy Camine Co-founder & COO flowbone SA
	Dr. Régis Gauderon Co-founder & Chairman of the Board flowbone SA
	Prof. Dominique Pioletti Co-founder flowbone SA Head Laboratory of Biomechanical Orthopedics at EPFL

PROJECT DESCRIPTION

Flowbone is a spin-off of the Swiss Federal Institute Lausanne (EPFL), founded in July 2020 after 6+ years of research and development. We aim to transform the care of elderly patients with fragile bones with the goal of preserving their mobility and independence.

Hip fractures are a huge burden: 20% of affected patients die within the first year, 50% never walk unassisted again, and the related treatment costs are very high. Anti-osteoporotic drugs, the standard of care, have a limited efficiency for the hips. Therefore, new hip-targeted, local approaches are required for hip fracture prevention, a \$2.6 billion addressable opportunity in the US, growing at 8% per year.

At flowbone, we develop the most physiological minimal-invasive treatment for local bone strengthening. Under local anesthesia and fluoroscopy, our new generation of patented biomaterial, provided in a pre-filled, ready-to-use syringe, is injected into the fragile hips. The hydrogel-based material flows smoothly into zones of low bone density, while preserving bone vascularization and biomechanics. Once in place, it triggers the body to recruit its own minerals to form a scaffold that allows fragilized bone to augment and repair itself. Pilot animal studies in rats and sheep have shown a turnover of the material into viable, new bone within only a few weeks. So far, we raised close to \$1 million non-dilutive money to finance our operations and initiate preclinical studies. We still need about \$2 million to complete the pre-clinical phase and get FDA approval for a first-in-human study in 2024.

The Sensa System by Advosense

Principal Investigator	Martina Viduka
PI Primary Affiliation	Advosense GmbH
Co-Investigator(s)	Erin Webb, MSc., PhD Candidate Bachelor of Science in Commerce (B.S.), Bachelor of Arts in Environmental Thought and Practice (B.A.) Master of Science in Health Policy, Innovation and Management COO Florian Gmeiner B.Eng. Bachelor of Engineering (B.Eng) Specialization in Mechatronics CTO

PROJECT DESCRIPTION

Advosense is on a mission to transform geriatric care. We are empowering clinicians to know when, where and how to best respond to their patient's needs by using intelligent sensors to do so. Starting with incontinence, The Sensa System by Advosense, a bedside incontinence management system including, disposable sensors and a web application detects patients and resident's incontinence episodes, providing real-time notifications to their caregivers so they can be cared for and managed effectively in hospitals and nursing homes. 70% of nursing home residents in Germany are suffering from incontinence, which only affects quality of life, but can cause serious complications such as pressure ulcers, falls and urinary tract infections. In Germany, the treatment of pressure ulcers costs up to €2.3 billion per year. There is no current best practice for managing incontinence contributing to these indirect costs. The Sensa System by Advosense not only provides empathic, quality care but helps our clinicians in a resource constrained, episodic environment; reducing costs, increasing the quality of life for our patients, families and caregivers, and ultimately advocating for an age friendly, healthy society.

Transcutaneous energy links for active medical implants, first application: mechanical circulatory support like Ventricular Assist Devices (VADs) and Total Artificial Hearts (TAHs)

Principal Investigator	Bengt Bern
PI Primary Affiliation	Invivopower AB
Co-Investigator(s)	Göran Dellgren, MD PhD, Associate professor Section manager Thorax transplant, Sahlgrenska University Hospital Kristján Jónsson, MD, Thoracic surgeon, Sahlgrenska University Hospital Giovanni Maltese, MD PhD, Plastic Surgeon Sahlgrenska University Hospital Per Klockar, M.Sc. Information technology Stefan Winström, M. Sc. Chemistry

PROJECT DESCRIPTION

Patients die waiting in line for a heart transplant. Donor hearts are limited and there are only 6000 heart transplants made every year in the world today. The need is 50 times higher and growing. Artificial hearts or mechanically circulatory supports are becoming the solution to this problem, but the treatment has an Achilles heel: the driveline/a power cable percutaneously (percutaneously=penetrating through the skin) powering the artificial heart. This driveline is severely prone to infections. Invivopower has solved this infection problem that has haunted and challenged the industry for more than 25 years. Invivopower's has developed a transcutaneous

energy implant link that transfers energy, up to 40 Watts, wirelessly through the skin. The technology opens a new era for high power, class three, active medical implants. First in line for this solution are artificial hearts and ventricular assist devices but the list of active implants to follow can be made long like retina implants, high power prosthesis, internal pumps etc. Our team has vast experience in developing, producing, and selling energy links for active medical implants. Our energy link is based on earlier clinical experience, scientific data regarding skin heating to avoid necrosis, and scientific bench models performing as in real humans.