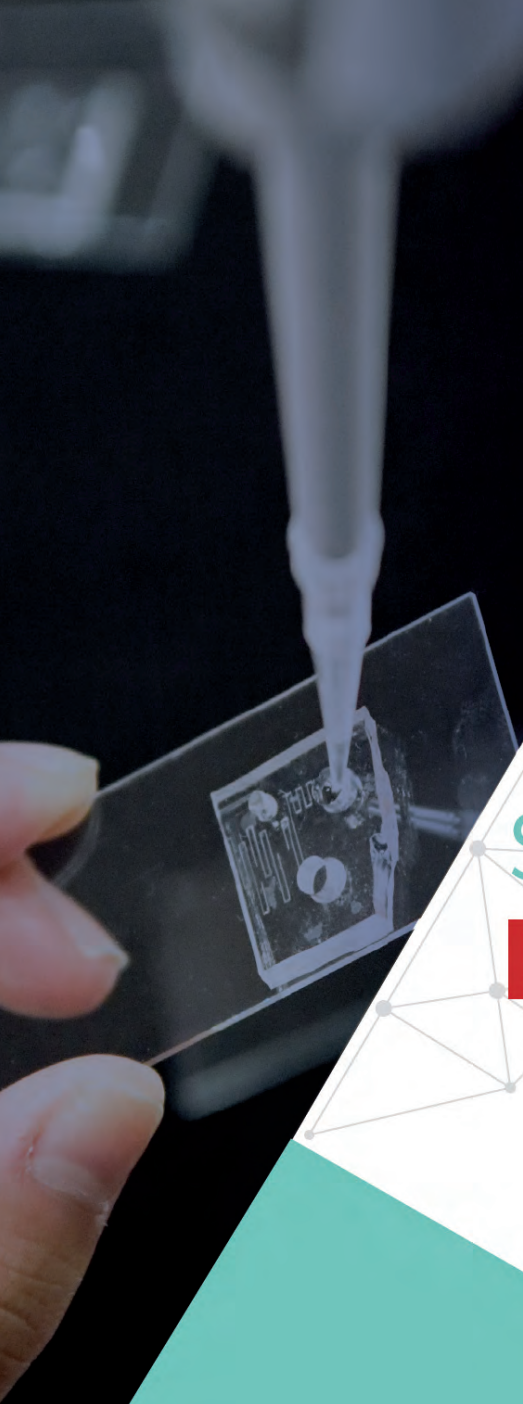

SensUs

SensUs 2019
PROGRAM

CONTENT

FLOOR PLAN

All locations are in the Atlas building.

SensUs

	General		Market		Pitches	
			Hall		*Stage 1: -1.820* *Stage 2: -1.825*	
10.00	Opening *0.820 / 0.825*	10.30	Market			
10.45						
11.00	Testing event *Hall*			11.15	Translational Pitches (Stage 1) & Technical Pitches (Stage 2)	11.30 12.15
13.30				13.00		
				13.45	Translational Pitches (Stage 1) & Technical Pitches (Stage 2)	13.45 14.30 15.00
				15.30		15:45
16.15	Closing *0.820 / 0.825*	16.15				
17.30	Network Drink *Hall*					
19.00						

PROGRAM

Workshops	Symposium	High Schools Project
-1.715	*0.820 / 0.825*	

Workshops		Symposium		High Schools Project
Workshop 1 ReumaZorg Nederland	12.30 12.45	Opening Meet the SensUs teams		
			13.00	1-minute Pitches *Stage 1: -1.820*
	13.30	Nanoparticles: new immunological medicines	13.30	Poster Presentations *Hall*
Workshop 2 Slimmer Leven				
	14.45	Sensor technology for continuous immuno-monitoring		
Workshop 3 Peter Joosten				
	15.30	Biomarkers & big data for clinical immunology	15.30	
	16.15	Immunodiagnostics, past, present, future	16.15	Closing SensUs with award ceremony High Schools Project *0.820 / 0.825*
	17.30	Discussion: Translations to clinic, how and when *0.710*	17.30	
	18:00	Closure		

"0" means ground floor
"-1" means basement

SensUs

WELCOME

Prof. dr. Menno Prins
Founder of SensUs

Welcome visitors and participants of SensUs 2019! We are going to admire 14 student teams from universities in North America, Asia, Africa, and Europe, that have developed sensors for the measurement of a very important drug to treat rheumatic disease. In SensUs the students learn how to be courageous, work together, make real prototypes, and analyze applications in healthcare. University professors, companies, healthcare professionals, and patients play their parts. SensUs brings us all together in order to learn about innovation. Thank you for being here and I wish you a lively and inspiring SensUs Innovation Day!

Kirsten Peeters
Chair of SensUs

Welcome to SensUs 2019! After a year of hard work from both the teams and the organization, the finals of the fourth edition of the SensUs student competition are finally here! The SensUs organization is a group of students aiming to bring people and knowledge together, in order to innovate the field of biosensors. It makes me very proud to see what these students did to make SensUs 2019 possible and I am confident it will be a great success. I am looking forward to the upcoming days, to this unforgettable experience in which we all strive to improve healthcare and the quality of life of patients. On behalf of the whole organization, I wish you an amazing and inspiring time at the SensUs Innovation Days. Together, let's bring a boost to the innovation in sensors for health!

THE ORGANIZATION

Chairs & Co
Yannick Leurs
Kirsten Peeters
Maria Pop
Aaron Saam

Public Relations
Isabel van der Steenhoven
Job van Helvoirt
Julia Geschiere
Suzanne Ansems
Jorrit Baartman

External Relations
Cecile van Riele
Vincent Eurlings
Roderick Haarselhorst
Teun van Acker

Technology
Hanna Merényi
Marloes Coolen
Myrthe Kater
Jojanne van Leeuwen

Events
Rutger van Doorslaer
Judith Hoekstra
Julia van der Vleuten
Maaike Konig

Strategy & Innovation
Tamar van Asch
Eliene Rutten
Bart Engelen
Abel Goedegebuure
Luuk Kemna

SensUs

WHAT IS SENSUS?

The future of healthcare

An important aim in healthcare is to keep people healthy as long as possible and to enable people in need of care to live a high-quality life in their own environments. Healthcare is developing toward a world wherein care is delivered in a highly personalized manner, attuned to the status of the patient, based on actual, precise and reliable data. This is where biosensors play a big role.

Our mission

The mission of SensUs is to stimulate the development of biosensors in a friendly competitive manner whereby students design and make innovative biosensors. Each year a different healthcare theme is selected. The focus of SensUs 2019 is on rheumatic disease.

The teams

The participating teams consist of students from multiple scientific disciplines. Biosensing technologies are inherently multidisciplinary. To be successful, the teams need to creatively combine molecular technologies and device technologies. The style of the competition is ‘friendly competitive’. Teams of students compete for different prizes. However, it is equally important that teams learn from each other, share information, and sow seeds for international collaboration.

A platform for collaboration

SensUs stimulates information sharing and community development for continuous innovation in biosensors. It forms a platform for open innovation and welcomes stakeholders such as healthcare organizations, patient organizations, R&D funding organizations, and companies to partner with the competition.

THEME & BIOMARKER

Managing rheumatic disease by measuring with ease

SensUs 2019 challenges student teams to develop innovative biosensing systems for the treatment of rheumatoid arthritis. Rheumatoid arthritis is an inflammatory disorder with a worldwide prevalence of about 1%. The biosensors are specifically developed for the measurement of adalimumab. Adalimumab is the largest selling pharmaceutical drug worldwise and relieves symptoms in many patients suffering from rheumatoid arthritis.

Our mission

Rheumatoid arthritis is characterized by inflammation of small joints, like hands and feet, which leads to the destruction of cartilage and bone. The cause of the disorder is not well understood, but the overexpression of pro-inflammatory molecules plays an important role. One pro-inflammatory molecule that plays a key role is TNF-alpha.

The teams

The fourteen participating teams will demonstrate biosensors for the detection of adalimumab. Adalimumab is a protein-based drug that binds to TNF-alpha. The drug suppresses inflammation and thereby relieves the symptoms of rheumatic disease. Adalimumab is a very expensive biological drug. However, it is not an adequate treatment for every patient. Patients may not have benefits or may even lose treatment benefits over time. A biosensor that can precisely measure the level of adalimumab in a patient's blood is expected to be of great value for optimally managing the rheumatic disease.

SensUs

SPEAKERS

Master of Ceremonies
Annabel Romijn

Annabel Romijn (1994) obtained her M.Sc. degree in Applied Physics in 2018 from Eindhoven University of Technology (TU/e). In 2019, she obtained her second M.Sc. degree in Science Education & Communication. During her time at TU/e, she worked as a student advisor to advertise the TU/e. Examples include presentations during the lustrum dies in 2016, at the Graduate School event and at the information days together with members of the executive board and the rector magnificus. Additionally, she has led multiple scientific events as moderator such as TEDxEindhoven, Famelab and Pint of Science. Recently, she also got chosen as one of the participants in Expedition Spinvis and as Young European Talent. Since August, she works as a physics teacher 4 days a week and 1 day a week as freelance moderator & photographer.

Keynote Speaker
Marien de Jonge

The immunological system is involved in many different diseases ranging from infection and inflammation to cancer and cardiovascular disorders, ranging from acute to chronic illness. In the past diagnosis relied on single biomarkers and complex time-consuming diagnostic assays. Currently, multidisciplinary teams are conducting studies to investigate immune regulation and develop new methods and technologies to measure dynamic profiles of immune parameters. This will enable us, in the near future, to better predict the course of disease to facilitate treatment stratification and to provide improved personalized health care.
Dr. Marien de Jonge is Associate Professor at Radboud University Medical Center, head of section Pediatric Infectious Diseases, and has a background in both academic research and industrial R&D.

WORKSHOPS

Workshop 1 | Rheumatiod arthritis patients

ReumaZorg Nederland

What does it feel like to have rheumatoid arthritis (RA)? What symptoms are you confronted with? What does a treatment look like, but most of all … what does it do with your life?

About 30 years ago rheumatism was symbolized by joint swelling and a wheelchair. This is not the case anymore thanks to medication. However, rheumatism still cannot be cured. Almost 23 million people are fighting against inflammation, pain and fatigue.

In this workshop, given by ReumaZorg Nederland, two patients with RA share their personal story. They show their lives before and after the diagnosis of RA. How do they manage to enjoy life despite their condition?

Workshop 2 | Design thinking & co-creation

Slimmer Leven

Design Thinking is the corner stone of many innovation projects. This workshop will provide you with three methods that can be found in the designer's tool kit! One method is about creating ideas, the other two with the aim to test those ideas. See you there!

Workshop 3 | Biohacking

Peter Joosten

What are major developments in biohacking and human enhancement? Biohacking covers a lot of technologies: from gadgets and wearables, to implants, brain-computer interfacing, artificial intelligence and genetic modification.

How can we judge the impact and effects of human augmentation? During this workshop we discuss the pro's and con's of biohacking, and we seek for a common ethical framework.

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EIT Health

EIT Health is supported by the EIT, a body of the European Union

Together for healthy lives in Europe

www.eithealth.eu

Eindhoven Startup Alliance

"CREATING THE HIGH TECH CAPITAL OF THE WORLD"

EINDHOVEN STARTUP ALLIANCE (ESA)

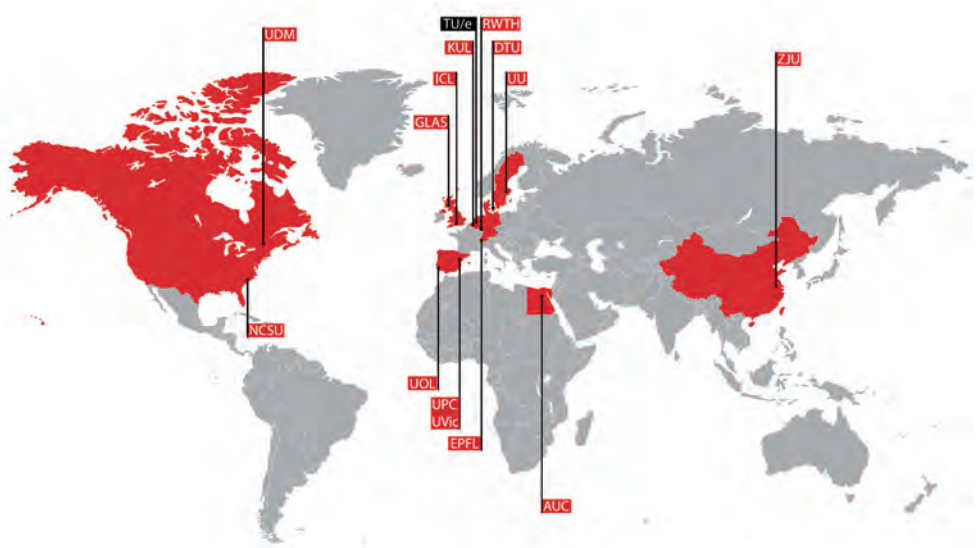
ESA is a collaboration between several large Dutch companies to stimulate startups in the region of Eindhoven. The alliance's goals is to support the startup-accelerator HighTechXL.

"We know how to turn deep-tech into global business. With our skills in the region, we can make the difference to startups active in our target industry applications." - Rob van der Werf, Co-founder

Eindhoven Startup Alliance

www.eindhovenstartupalliance.com

SENSUS TEAMS



England	Imperial College London
Spain	Univ. Politecnica de Catalunya + Univ. of Vic
Sweden	Uppsala University
China	Zhejiang University
Belgium	KU Leuven
Denmark	Technical University Denmark
United States of America	North Carolina State University
Scotland	University of Glasgow
Netherlands	Eindhoven University of Technology
Germany	RWTH Aachen
Switzerland	École Polytechnique Fédérale de Lausanne
Canada	Université de Montréal
Egypt	The American University in Cairo
Portugal	University of Lisbon

Joint Venture

Imperial College London

SensingBarcelona

UPC + UVic

SensUs

SENSUS TEAMS

AdUpSense

Uppsala University

TruSense

Zhejiang University

SynoSense

KU Leuven

DeTectUs

Technological University Denmark

SensUs

SENSUS TEAMS

SenseNC

North Carolina State University

Glasensor

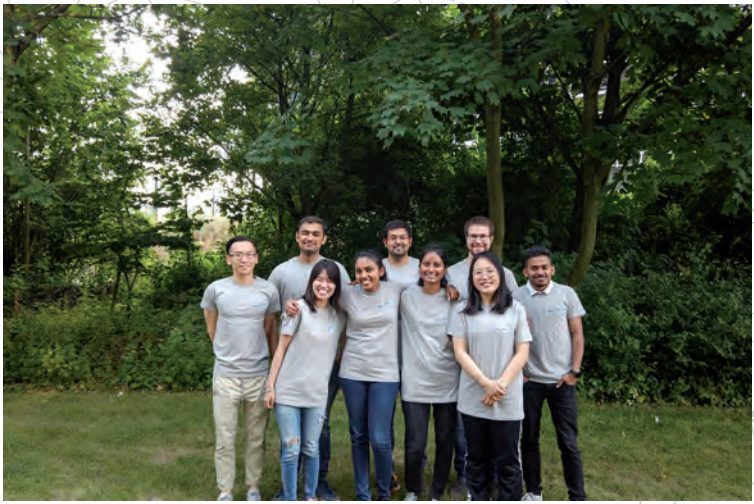
University of Glasgow

T.E.S.T

Eindhoven University of Technology

AixSense

RWTH Aachen



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SENSUS TEAMS

EPFSens

Ecole Polytechnique Fédérale de Lausanne

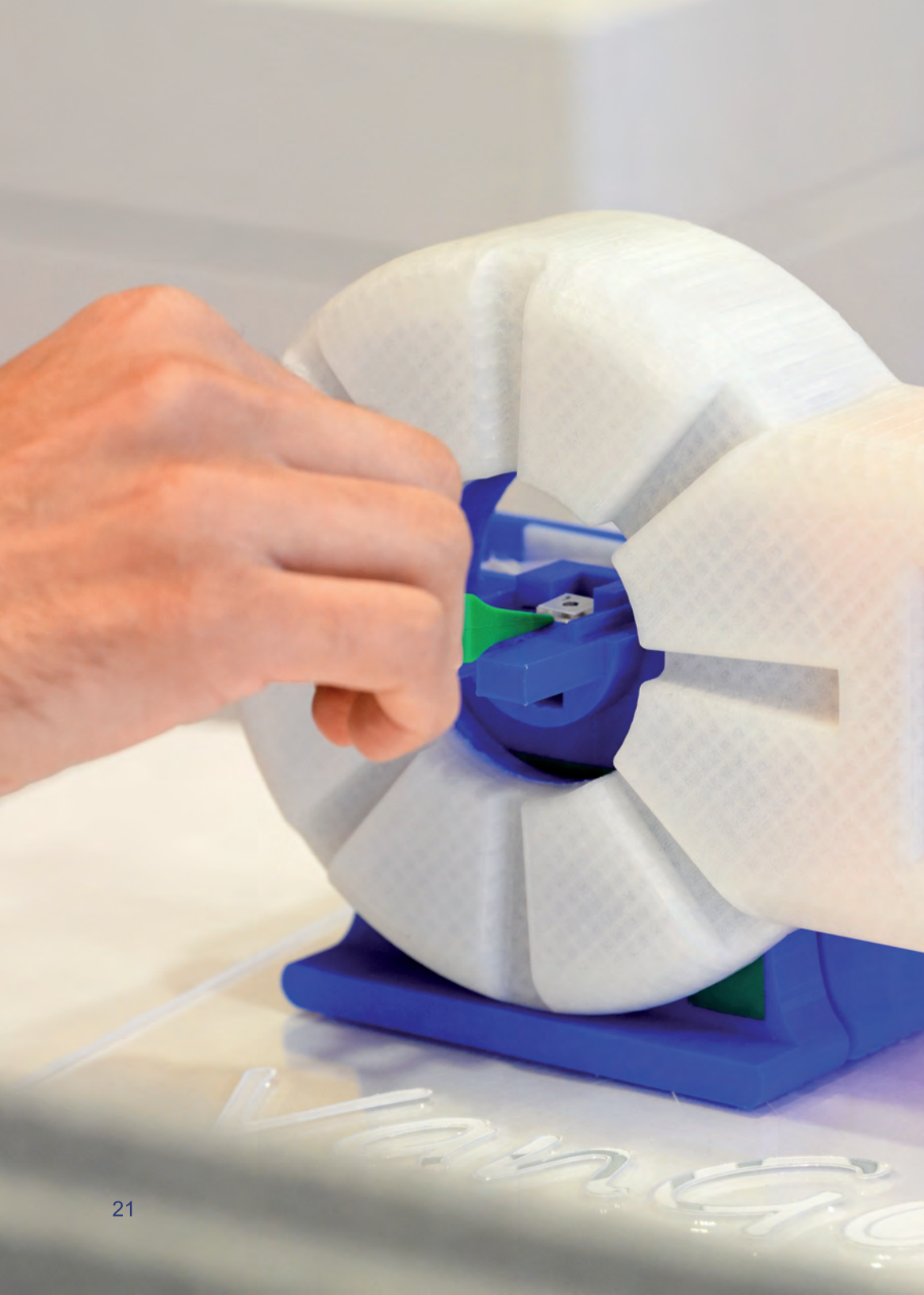
BiosensUM

Université de Montréal

AUSense
American University in Cairo

LxUs
University of Lisbon

SensUs



UNIVERSITIES

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

UVIC UNIVERSITAT DE VIC UNIVERSITAT CENTRAL DE CATALUNYA

UPPSALA UNIVERSITET

Université de Montréal

DTU Technical University of Denmark

University of Glasgow

THE AMERICAN UNIVERSITY IN CAIRO الجامعة الأمريكية بالقاهرة

RWTH AACHEN UNIVERSITY

NC STATE UNIVERSITY

U LISBOA | UNIVERSIDADE DE LISBOA

KU LEUVEN

Imperial College London

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

ZHEJIANG UNIVERSITY 1897

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AWARDS

The Analytical Performance award goes to the team with the biosensor that functions best, in terms of measurement accuracy, speed, and required sample volume.

The Creativity award relates to the technological novelty of the biosensors and to the way how the teams have worked during their development process.

The Translation Potential award is about the plans of the teams to bring their biosensor from a prototype to a product that can be used in society. Will the product meet the needs of doctors and patients, and will it be suited for industrial production?

The Public Inspiration award gives recognition to the teams that best inspire the public. The award is based on the votes from the worldwide public, who see on SensUs Digital the presentations, pitches and demonstrations of the teams.

JURY

Jury Process

The Analytical Performance award and Public Inspiration award are based on numerical data. The Creativity award and Translation Potential award are based on judgments by members of the jury. The jury consists of people from universities, companies, healthcare, and innovation organizations.

Jury Composition

Creativity Awards

Steven Staal, Medimate
Maarten Broeren, clinical chemist
Jean-François Masson, university representative Canada
Stefano Menegatti, university representative USA
Hugo Ferreira, university representative Portugal
Sven Ingebrandt, university representative Germany
Leo van IJzendoorn, university representative the Netherlands
Jasmina Casals, university representative Spain
Hassan Azzazy, university representative Egypt

Translation Potential - Stakeholder Desirability

Luc Derijks, clinical pharmacologist
Carolien Oppeneer, CbusineZ
Frank van den Heuvel, CLB
Renee Meijer & Annemieke Fransz, PatientPartners

Translation Potential - Business Feasibility

Marko Blom, Micronit
Mercedes Tuin, BOM
Menno Kok, EIT Health
Julien Reboud, university representative Scotland

Translation Potential - Financial Viability

Annelies Bobelyn, assistant professor TU/e
Guus Frericks, HighTechXL
Jorte Nijboer, MedValue
Leo Smit, ReumaNederland

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EIT Health

EIT Health is supported by the EIT, a body of the European Union

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Eindhoven Startup Alliance

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Medtronic

Further, Together

DEMCON

PARTNERS

Bronkhorst® Flow Technology

TMC PEOPLE DRIVE TECHNOLOGY

CbusineZ Partner in zorginnovatie

future diagnostics

micronit microtechnologies

AXXICON

scienion ENABLING LIFE SCIENCE

PalmSens

The Technology Partnership

HIGH TECH CAMPUS EINDHOVEN

saltro

ACS SENSORS

CLB

BRAINPORT EINDHOVEN

ReumaNederland voorheen Reumafonds

SensUs

SENSUS ARTICLE

Potential use of Biosensing in the Treatment of Rheumatic Disease

By involving students, industry, patients and healthcare professionals, SensUs strives to accelerate the development of sensors for health and to stimulate education and innovation in the field of biosensing. The theme of SensUs 2019 is *Managing rheumatic disease by measuring with ease*. SensUs 2019 challenges teams of students worldwide to develop innovative biosensors for the detection of the anti-inflammatory drug adalimumab. Over the year, we spoke with several stakeholders to deepen our knowledge on rheumatoid arthritis and the usage of adalimumab. Here are brief summaries of the articles:

Both Gerda and Wendy were diagnosed with rheumatoid arthritis when they were very young. Initially, they were not diagnosed with RA, as this is not common among children. Gerda, now 59 years of age, owes a lot to the biologicals she has taken, otherwise she would not have been so mobile right now. This is also one of the reasons why she has never seen her disease as a burden. Wendy is currently a PhD student at Eindhoven University of Technology. She thinks that a biosensor in the field of RA would be of great value, as it is an indication of whether the inflammation is controlled or not.

Keita Ito strongly agrees with this. He is a full professor in Orthopaedic Biomechanics and he says that a downside of rheumatoïd arthritis is that it is not possible for patients to monitor their joints. In the past, only the pain was treated, however, the cartilage is worn away slowly, without yourself even noticing. Point of care testing could be of great value to inform patients whether the drug is actually modifying the disease. He mentions that the biosensors have to be patient-proof, only when a patient is happy to use the system, it will work.

Keita Ito: *“ Movement is life, life is movement.”*

A similar opinion on biosensors for rheumatoid arthritis patients is expressed by Judith Kreuk, a rheumatoid arthritis nurse. She guides patients to regain

balance in their daily lives and is socially and emotionally involved with patients. A biosensor, in her opinion, will provide a lot of insights in the patient's treatment.

Judith Kreuk: *"An important challenge in the treatment of RA is to create a situation where the progress of the disease can be predicted."*

Eric-Jan Kroot is a rheumatologist who says that the trickiest about rheumatoïd arthritis is that it is an invisible disease. He has seen a lot of progression within the field of rheumatoïd arthritis. Nowadays, rheumatoïd arthritis patients do not end up in a wheelchair anymore, in contrast to a few decades ago. In his opinion, a strong part of the SensUs competition is that the teams aim to build the best sensor, without being influenced by other parties.

Luc Derijks is a hospital pharmacist and specializes in autoimmune diseases. He works on personalized medicine in inflammatory bowel disease and rheumatoid arthritis. Both are autoimmune diseases in which the immune system works too hard and attacks cells of the human body. The treatments of these two diseases are very alike. Picking the right drug and the right dose can be very challenging. Tools like therapeutic drug monitoring (TDM) are of help, e.g. for rheumatoid arthritis patients who use the drug adalimumab. Biologicals, such as adalimumab, are very expensive compared to other drugs. The goal is to give each patient the most cost-effective treatment. The drug has to be effective, but it is simply not possible to give everyone a biological, and it is not necessary either.

Luc Derijks: *"The challenge is to give the right dose to the right patients and to avoid unnecessary costs."*

For their full interviews and personal stories, visit www.sensus.org.

SensUs


Carlota Mestre

CLOSING

The SensUs organization would like to thank you for visiting this event. We hope you had an inspiring and innovative time and enjoyed the creations of our teams. The university teams participating in SensUs 2020 are:


Germany
RWTH Aachen


Scotland
University of Glasgow


United States
NC State University


Egypt
The American University in Cairo


England
Imperial College London


China
Zhejiang University


Switzerland
École polytechnique fédérale de Lausanne


Belgium
KU Leuven


Portugal
University of Lisbon


The Netherlands
University of Twente


The Netherlands
Eindhoven University of Technology


Denmark
Technical University of Denmark


Canada
Université de Montréal


Sweden
Uppsala University


Spain
BarcelonaTech, University of Vic and University of Barcelona

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The international competition on biosensors for health
www.sensus.org