

MSCA Staff Exchanges: Opportunities for Researchers from the Western Balkans

Goran Stojanović, University of Novi Sad, Serbia

06/11/2023

Innovative bio-inspired sensors and microfluidic devices for saliva-based theranostics of oral and systemic diseases

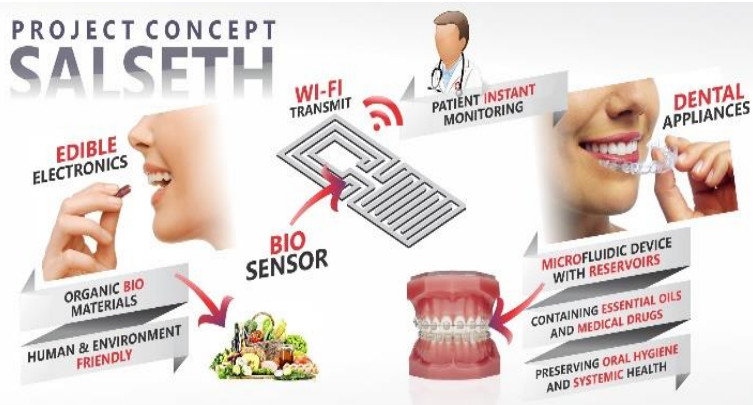
Acronym: SALSETH
Grant No: 872370
Type of action: Marie Skłodowska-Curie Research
and Innovation Staff Exchange
(RISE) - Horizon 2020
Starting Date: 01/12/2019
Ending Date: 30/11/2024



Basic information

Title:	Innovative bio-inspired sensors and microfluidic devices for saliva-based theranostics of oral and systemic diseases
Acronym:	SALSETH
Grant No.:	872370
Type of action:	Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE)
Starting Date:	01/12/2019
End Date:	30/11/2024
Max. grant amount:	828.000,00 EUR

Project concept and objectives



Specific research objective 1:

To develop sensors from edible materials for monitoring of important biomarkers from saliva

Specific research objective 2:

To manufacture and test microfluidic chips and intraoral/orthodontic appliances for theranostics

Specific research objective 3:

To make new essential oils and to apply them in oral cavity using microfluidic-based intraoral appliances

Knowledge-sharing objective 1:

To facilitate the exchange, flow and co-creation of knowledge within the consortium

Knowledge-sharing objective 2:

To develop transferable skills and to stimulate entrepreneurship, boosting career prospects of involved staff members

Knowledge-sharing objective 3:

To increase excellence of R&I activities contributing to higher Europe's competitiveness and growth

The SALSETH consortium should develop:

- biosensors for detection of important biomarkers from saliva, on a non-invasive way;
- microfluidic device as a fixed or removable intraoral appliances using biocompatible materials;
- new combinations of essential oils for oral hygiene maintenance and improving systemic health.

Project partners

No.	Institution	Short name	City, Country	Type	Sector	Scientist-in-charge
1.	University of Novi Sad	UNS	Novi Sad, Serbia	AC	Academic	Goran Stojanović
2.	Wroclaw University of Science and Technology	WUST	Wroclaw, Poland	MS	Academic	Wojciech Kubicki
3.	Materials Research Centre Ltd.	MRC	Kiev, Ukraine	AC	Industrial	Oleksiy Gogotsi
4.	WEST Aquila S.r.l.	WEST	L'Aquila, Italy	MS	Industrial	Stefano Tennina
5.	Naturality Research and Development SLU	NAT	Terrassa, Spain	MS	Industrial	Raphaël G. Duval
6.	AYUS GmbH	AYUS	Bühl, Germany	MS	Industrial	Julian Frank
7.	University of Malaya	UOM	Kuala Lumpur, Malaysia	TC	Academic	Fatimah Ibrahim
8.	Curtin University	CUU	Perth, Australia	TC	Academic	Hani-Al Salami

Secondments

We have to implement 185 person-months of secondments during 4 years of the project life

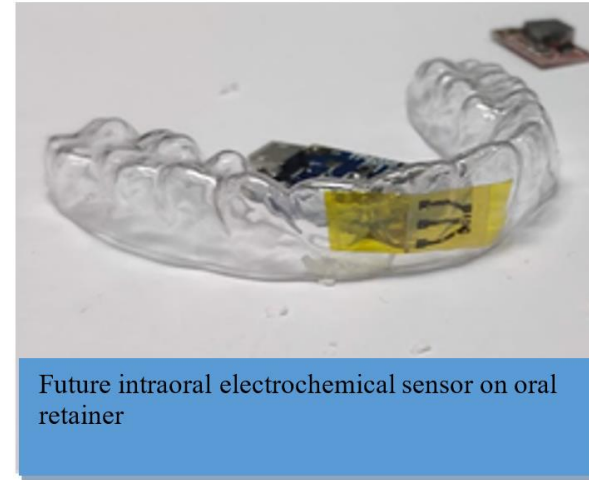
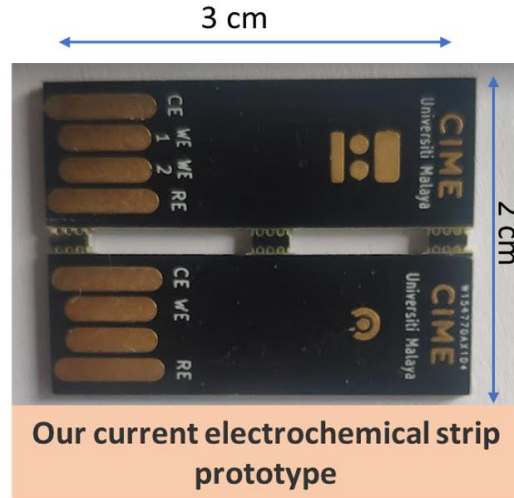
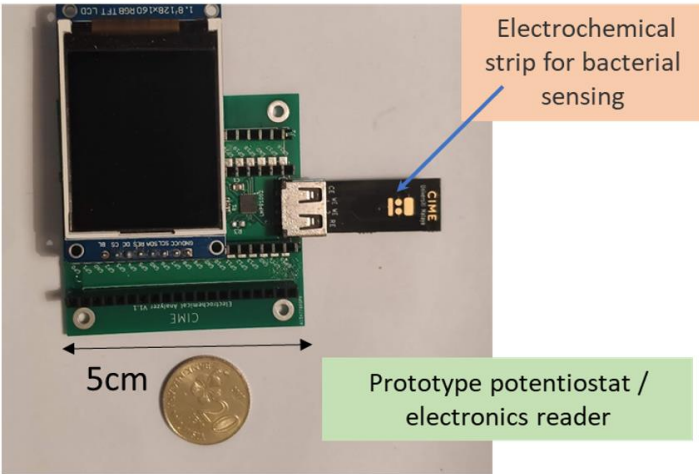


43 staff members will be involved, in average 4.3 PM is duration of secondment per researcher

ESRs will have 135 PM of secondments, ERs - 41 PM and TECHs - 9 PM

Some research results (1)

We have developed a portable potentiostat and sensor strips for electrochemical biomarker detection



Electrochemical sensor and readout prototypes: (a) readout circuit (b) fabricated electrochemical sensor strip (c) future intraoral electrochemical sensor mounted on oral retainer

MEASUREMENT

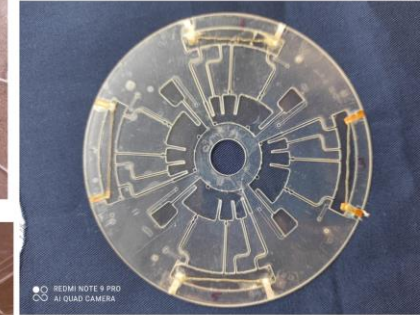
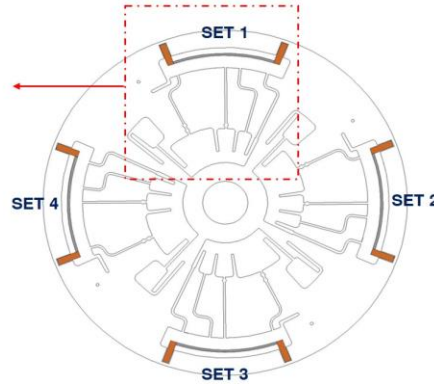
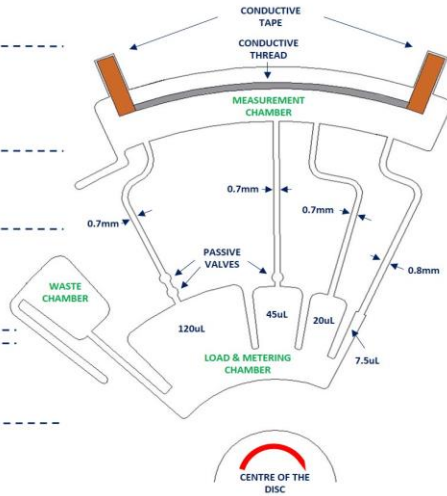
VIA THE CONDUCTIVE TAPE USING IMPEDANCE ANALYSER

FLOW CONTROL

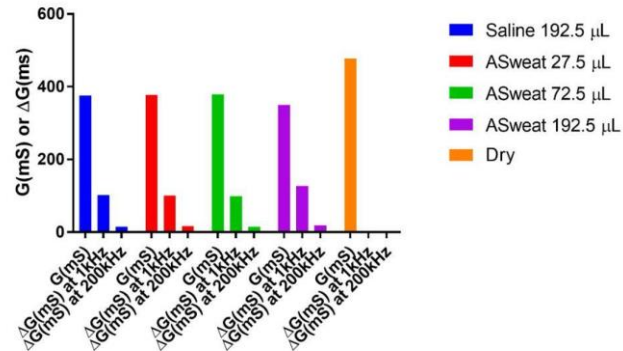
WITH USE OF PASSIVE VALVES AND CHANNEL WIDTH

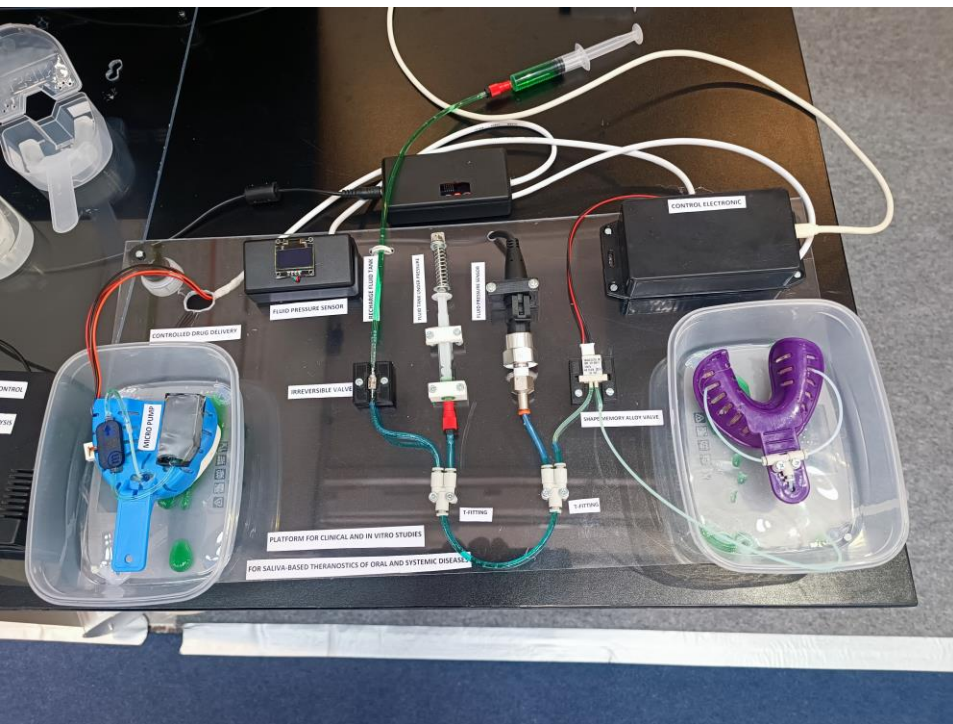
METERING

USING SECTIONED CHAMBER WITH DESIGNATED VOLUME



Cu







<https://ec.europa.eu/research-and-innovation/en/horizon-magazine/how-flossing-and-brushing-may-be-good-your-lungs>
Will saliva tests replace blood tests?

Don't take your saliva for granted. It says a lot about your health. As indicated, bacteria present in saliva might one day inform researchers about the future lung health, but also other diseases too. And although it is routine to take blood samples from patients, doctors in future may learn about their patient's health simply by taking a mouth swab. The idea is for the saliva to be tested there and then, without the need for sophisticated and expensive lab tests.

'There is an urgent need for very sensitive and simple sensors that could be used in the dentist or a doctor's office or even a patient's home,' said Professor Bojan Petrovic, dental scientist at the University of Novi Sad in Serbia. This would allow more people to be tested and diagnosed, easier and faster, and thereby receive any appropriate treatment earlier. Petrovic is involved in a research project (SALSETH) that seeks to use tiny amounts of saliva, with just a few reagents, to run fast and inexpensive tests using advances in microfluidics – the precise control of minuscule amounts of fluids in microchannels.

There is an urgent need for very sensitive and simple sensors that could be used in the dentist or a doctor's office or even a patient's home

Professor Bojan Petrovic, dental scientist at the University of Novi Sad, Serbia

There are many diseases and infections where tiny drops of saliva could tell doctors about the health of their patients more rapidly and less invasively than taking a blood test and sending it for analysis. Numerous viral infections such as hepatitis A, B, C; Epstein-Barr virus; and herpes virus have their detectable biomarkers in salivary samples,' explained Prof. Petrovic. 'Saliva serves as a



Acknowledgement



This project has received funding from European Union's Horizon 2020 research and innovation programme under grant agreement No. 872370



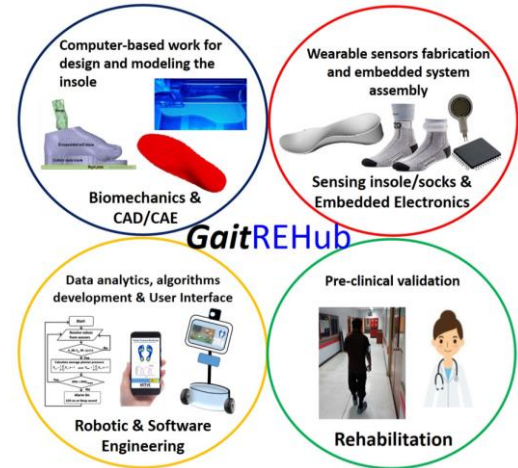
GaitREHub MSCA SE project

Prof. dr Goran Stojanović, UNS

Basic information about the project

Full title:	Intelligent Wearable System for Enhanced Personalized Gait Rehabilitation
Acronym and no.	GaitREHub, 101086348
Type of action:	HORIZON-MSCA-2021-SE-01, MSCA Staff Exchanges 2021
Starting date:	01/01/2023
Project duration:	48 months
Max. grant amount:	915.400,00 EUR
Web site:	www.gaitrehubproject.com
Cordis site:	https://cordis.europa.eu/project/id/101086348

Project concept



- The GaitREHub project wants to provide an Interactive Smart Wearable System with Artificial Intelligence for Personalized Gait Rehabilitation, by developing an interactive tool for rehabilitation at home with real-time tele-monitoring from the clinic.
- GaitREHub aims to develop an effective, comprehensive approach to providing targeted home-based gait rehabilitation, by integrating cutting-edge technologies, from the areas of:
 - (1) computer-based design and modelling of customized smart insole/socks,
 - (2) wearable sensors and flexible embedded electronics realization,
 - (3) home assistive robots, data analytics and artificial intelligence algorithms development as well as user-friendly software tool for gait rehabilitation, and
 - (4) pre-clinical validation of the developed holistic, integrated and interactive system (our “REHub”).
- The project will allow patients to practice walking, have their performance and improvement monitored in real-time by professionals, and reduce the costs associated with traditional clinical treatment.



Members of the consortium

No.	Institution	Short name	City, Country	Type	Sector	Scientists-in charge
1.	University of Novi Sad 	UNS	Novi Sad, Serbia	AC	Academic	Goran Stojanović
2.	KU Leuven 	KUL	Leuven, Belgium	MS	Academic	Ilse Jonkers
3.	BioAssist 	BIO	Athens, Greece	MS	Industrial	Christos Panagopoulos
4.	CoAIMed 	CAM	Firenze, Italy	MS	Industrial	Filippo Cavallo
5.	Euleria srl 	EUL	Rovereto, Italy	MS	Industrial	David Tacconi
6.	Prince of Songkla University 	PSU	HatYai, Thailand	TC	Academic	Surapong Chatpun
7.	Austral University of Chile 	UAC	Valdivia, Chile	TC	Academic	Gudrun Kausel

Budget categories



The financial support is composed of two categories: Category A and B.

Category A or staff member unit costs amount to 2.300 EUR per month

Category B or institutional unit cost also amount to 2.300 EUR per month

Contributions for recruited researchers Per person-month	
Top-up Allowance	Category A
EUR 2 300	Requested unit x (1/number of months)

Category B

Institutional unit contributions Per person-month	
B1	B2
Research, training and networking contribution	Management and indirect contribution
EUR 1300	EUR 1000

Planned (joint) networking events

No.	Networking event	Provisional date	Duration/Location	Local host	Expected no. of attendees
1.	Workshop: <i>“Technology for 3D fabrication of smart insole and biomechanical testing”</i>	Sept. 2023	3 days, HatYai, Thailand	PSU	~ 40
2.	Webinar: <i>“Writing competitive project proposal”</i>	Feb. 2024	online	All	~ 80
3.	Summer School: <i>“Sensors and Embedded electronics in smart insole”</i>	Sept. 2024	4 days, Los Ríos, Chile	UAC	~ 20
4.	Seminar: <i>“Developing entrepreneurial spirit and establishing spin-off”</i>	Apr. 2025	1 day, Trento, Italy	EUL	~ 30
5.	Final project conference: <i>“Summarizing project results”</i>	Oct. 2026	2 days, Novi Sad, Serbia	UNS	~ 50



GaitREHub Workshop#1 Already DONE!

October 5, 2023

During 20-22 September 2023, PSU organized a workshop on „Technology for 3D fabrication of smart insole” at the Faculty of Medicine, Prince of Songkla University, Thailand. We gave the lecture and hand-on experience on ...



PhD student from UNS performed secondment at Euleria Health company

October 2, 2023

Ph.D. student Sanja Mandić, from the University of Novi Sad, Serbia, recently completed a one-month secondment within the GaitREHub project, with Euleria Health company, based in Rovereto, Italy. During her secondment, Sanja had a ...



Workshop Technology for 3D fabrication of smart insole”

Date: 20-22 September 2023

QR code for registration

For participation a link
<https://forms.office.com/r/ZnavSF3VT>

SONGKHA, THAILAND

QR code for Songkhla

QR code for Accommodation near PSU

Date: 20-22 September 2023

Tentative schedule:

20 SEP 23 (Onsite): Afternoon: Workshop Design thinking

21 SEP 23 (Onsite): Morning: Workshop 3D printing 101
Afternoon: Hand on experience for 3D print

22 SEP 23 (Hybrid):

Morning:

- Invited lectures on technology for 3D fabrication of
- Panel discussion on 3D printing technology for smart healthcare

Afternoon:

- Invited lectures on technology for 3D fabrication of
- Lab tour (insole fabrication at PO unit) Onsite

Organized by **PSU** PRINCE OF SONGKHA UNIVERSITY



Funded by the European Union

Workshop “Technology for 3D fabrication of smart insole” in Songkhla, Thailand

July 15, 2023

We are happy to announce that we are organizing a workshop “Technology for 3D fabrication of smart insole” on September 20-22, 2023 in Songkhla, Thailand. More information below. Feel free to join us! ...

Contact info and acknowledgment:

Prof. dr Goran Stojanović

Address:

University of Novi Sad

Dr Zorana Djindjica street, no. 1

21000 Novi Sad

Serbia

Email: sgoran@uns.ac.rs

Phone: +381 21 4854520



This project has received funding from Horizon Europe Framework Programme under grant agreement No. 101086348



gaitREHub

Thank you for your attention!