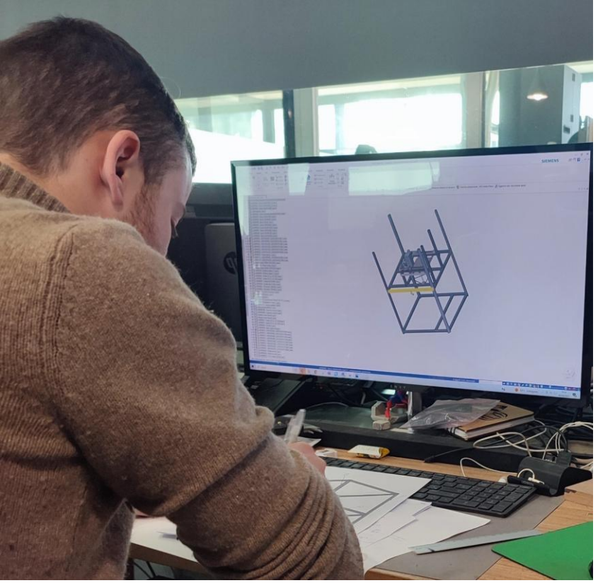
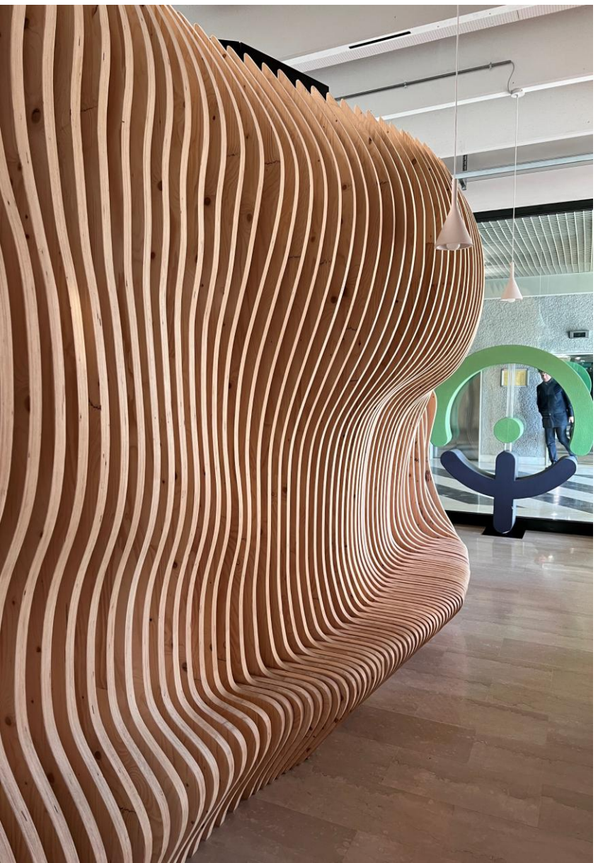
ISINNOVA

NEW IDEA COME TRUE

Andrea Brianza
Biomedical Engineer- DIANA project





Who is Isinnova

Active in Research and Development since 2014

ISINNOVA is a Research and Technological Developments Center composed by more than 20 people focused on the innovation and manufactoring process. The main goals are to come up with new idea on the market, and to support the companies in the making of new ideas.

The team is specialized in multiple fields including engineering, product design, electronics, prototyping, grant and calls, patents and training.

Isinnova provides its laboratory, know how and ecosystem to the companies to make innovation together.

Their projects embrace the concept of circular economy focusing on both ecological and social issues.

Isinnova highlights

+500

Idea

+60

Ongoing projects

+100

Ongoing projects

+60

Registered patent

+35

External collaborators

+25

Winning calls

MAIN AWARDS AND RECOGNITIONS

The **Charlotte Valve** permanent installation at the **Victorian & Albert Museum of London** (2022)

Title of **Cavaliere al Merito della Repubblica Italiana**, provided by Italian president Mattarella for the effort in MEDICAL area

Award "**Mother Teresa Memorial Award for Social Justice 2020**", considered as the **Nobel for the social impact** (2020)

OTHER RECOGNITIONS

Premio forum PA Sanità 2022
Easy-Covid 19

Premio Compasso D'oro

Premio Anima
Ethic entrepreneur of the year

Premio Grifone d'Acciaio
Città di Brescia

2 prizes **Paul Harris Fellow**

Lifebility Award

Targa al Merito
Corte Franca

Targa al Merito
Bassano Bresciano

Klimahouse Prize, the **European prize** for the **most innovative start up in the field of** wood constructions

Development Area

Medical

Medical innovation
The team works to search innovative solutions for the health of the people, with a focus on social issues. Operative area: Aritificial Intelligence, Hospitals and Protesic

Industrial

Company research and development
The team opertes to find new solutions allowing to optimize company internal processes or to develop new products in the industrial processing.
Operative area: Pharmaceutical, Plastic and Steel industry

Chemical

Recycling of waste materials
The team operates to search green solutions for the recovery of industrial materials like sawage, ink and secondary waste production.
Operative area: Energetic, Steel industry, papers.

Design

Design devoted to sustainability
The team embrace the concept of industrial design recognizing the importance of functionality, sustainability and aesthetics related to modern design.
Operative area: Product Design, Interior Design and Public Installation

Building

The birth of ISIBrix
From the project of Brix system, a creation of the CEO Cristian Fracassi, the start-up ISIBrix srl was born.
Operativa area: Constructions, Glamping, Interior
Design and showroom arrangements.

Charlotte valve

Easy covid-19

The Charlotte valve allow to realize an emergency mask C-PAP.

During the the Covid-19 emergency our company received large visibility due to the establishment of Charlotte valve.

Thanks to the idea to supply the sketch worldwide for free we helped thousand of people in different countries.

We used the 3D print to realize additional Venturi valve for the hospital during the Covid-19 emergency.

The Easy covid-19 project went round the world!

The Charlotte valve is currently exibited in different important museum all over the world (**MoMA** of New York and **Victoria and Albert Museum of** London). It was included in the ADI Design Index 2020 catalogue (**Compasso d'Oro award**), it was exposed at **G20** of Roma, it won the **Mother Teresa Award for Social Justice**.

Two documentaries on Rai e Amazon webcast were realized.

Thanks to the acquired fame, Isinnova is collaborating with **Fondazione Bill & Melinda Gates**. It collaborated with **Google**, **Coca Cola**, **NASA** e **Nato**.

Cristian Fracassi, founder and CEO of Isinnova, received the **Cavaliere dell'Ordine al Merito della Repubblica Italiana award** and joined more than 200 events all over the world during the last 18 months.

Tutto d'un fiato

The book - testimony

L'ingegnere, la valvola e la maschera.

«The innovation also help during the emergency»
The New York Times

DIANA

Starting point of the project: RNA and Genetherapy National Research Center

RNA &GENETHERAPY NATIONAL RESEARCH CENTER

Objective: to develop innovative pharmaceutical products based on RNA and gene therapy

Equipped with capabilities to design and manufacture next-generation medicines, the National Center aims to make healthcare delivery more effective, efficient and sustainable.

Outcomes: reduced waste in drug manufacturing, lower costs for the Italian National Health Service (SSN), and broader personalized care.

The center promotes training and invests in state-of-the-art infrastructure, fostering dialogue between the research community and pharmaceutical manufacturing.

€320M to develop Key Enabling Technologies (KET) - PNRR

The concept: DIANA Cabinet

DIANA *(Diagnostic Intelligence for Advanced Non-Invasive Analysis)* is an **advanced diagnostic platform** equipped with medical devices to **deliver comprehensive health assessment**.

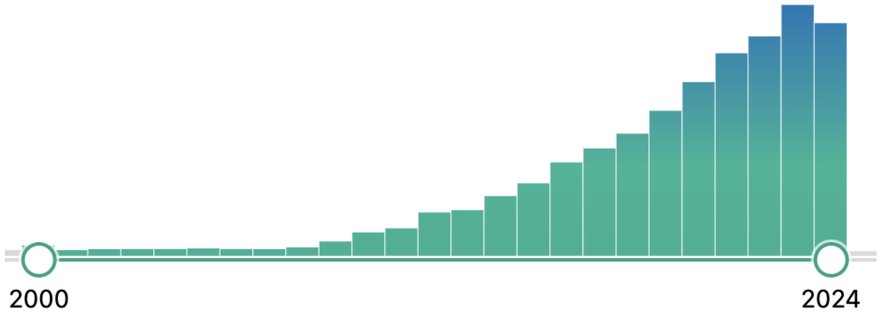
Enable the simultaneous detection of a series of clinical parameters with **non-invasive tests in just 15 minutes**.

Provide an **automated tool** for clinical patient evaluation, usable across different healthcare settings.

Optimize clinical practice by **reducing costs** and timeframes, while improving the service provided to the patient.

Precision Medicine

> 16,000 scientific publications in the last 20 years have demonstrated the importance of **health monitoring as a tool for precision medicine**.



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Progress in Cardiovascular Diseases
journal homepage: www.onlinepcd.com

Advances in Health Technology Use and Implementation in the Era of Healthy Living: Implications for Precision Medicine

Shane A. Phillips [a,b,*], Mohamed Ali [a], Charles Modrich [a], Shariwa Oke [c], Ahmed Elokda [d], Deepika Laddu [a,b], Samantha Bond [a,c]

[a] Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago, Chicago, IL, USA
[b] Integrative Physiology Laboratory, College of Applied Health Sciences, University of Illinois at Chicago, Chicago, IL, USA
[c] Department of Biomedical and Health Information Sciences, College of Applied Science, University of Illinois, Chicago, IL, USA
[d] Department of Rehabilitation Sciences, Florida Gulf Coast University, Fort Myers, FL, USA

Citation: Clin Transl Sci (2021) 14, 86–93; doi:10.1111/cts.12884

REVIEW

Precision Medicine, AI, and the Future of Personalized Health Care

Kevin B. Johnson[1,2,*], Wei-Qi Wei[1], Dilhan Weeraratne[3], Mark E. Frisse[1], Karl Misulis[1,4], Kyu Rhee[3], Juan Zhao[1] and Jane L. Snowdon[3]

Cell
Leading Edge

Commentary

Precision medicine in 2030—seven ways to transform healthcare

Joshua C. Denny[1,3,*] and Francis S. Collins[2]
[1]*All of Us* Research Program, National Institutes of Health, Bethesda, MD, USA
[2]National Institutes of Health, Bethesda, MD, USA
[3]Present address: Bldg. 1 Room 228, 1 Center Drive, Bethesda, MD 20814, USA
*Correspondence: joshua.denny@nih.gov
https://doi.org/10.1016/j.cell.2021.01.015

OXFORD

Human Molecular Genetics, 2018, Vol. 27, No. R1 R56–R62
doi: 10.1093/hmg/ddy114
Advance Access Publication Date: 12 April 2018
Invited Review

INVITED REVIEW

The next generation of precision medicine: observational studies, electronic health records, biobanks and continuous monitoring

Benjamin S. Glicksberg[1,2,†], Kipp W. Johnson[1,†] and Joel T. Dudley[1,*]

DIANA

Keypoints of DIANA

- **Predictive AI Models and Proprietary Solutions**

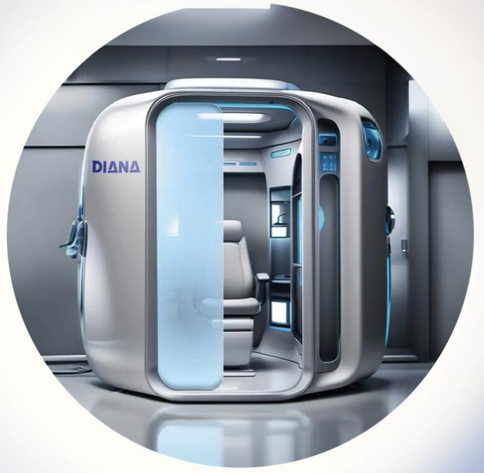
  Machine-learning algorithms capable of anticipating risk and critical conditions

- **Secure Data Archiving and compliance**

  Encrypted data storage compliance with regulatory requirements *(GDPR)*

- **Medical-Grade Technology**

  Certified devices *(CE/ISO)* that guarantee accuracy, reliability, and consistency



- **Comprehensive Monitoring of 6 Key Body Systems**

  Holistic overview through wide range of physiological parameters

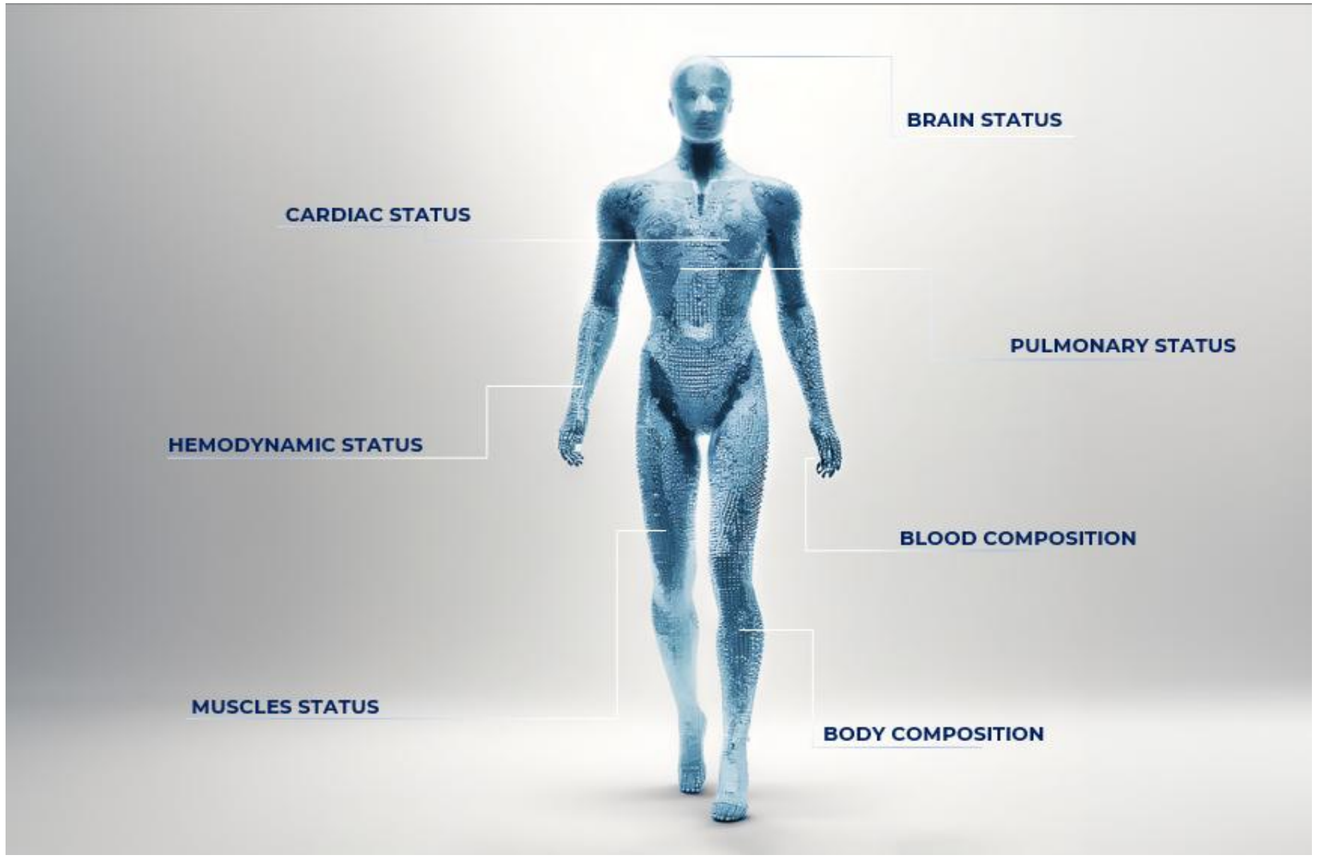
- **Rapid, Non-Invasive Diagnostic Testing**

  Short procedures *(15 minutes)* that streamline the diagnostic process and reduce multiple clinical visits

- **Personalized Care Continuous Tracking**

  Regular data collection enables precision medicine approach

The parameters



The 7 body area checked by medical devices:

- Eelctrocardiograph + Digital stethoscope *(Cardiac status)*
- Electromyograph *(Muscle status)*
- Electroencephalograph *(Brain status)*
- Pulse Oximeter + Blood pressure monitor *(Hemodynamic status)*
- Capillary blood analyzer *(Blood composition)*
- 3D body scanner + Bioelectrical impedance analyzer *(Body composition)*
- Spirometer *(Pulmunary status)*

> 100 physiological parameters organized in hybrid architecture:

- Raw data (e.g. ECG, EMG, EEG trace; 3D mesh)
- Structured data *(matrix)*

The design supports downstream analysis, clinical interpretation and AI-driven processing.

DIANA

Roadmap

2020
Global **redefinition** of **diagnostic needs**

2022
Scientific collaboration with **IRCCS National Cancer Institute of Milan**

2024
1st MPV

2025
1st **installation** in diagnostic centers (June and October), **company establishment** and 1st **seed round**

OSAKA, KANSAI, JAPAN EXPO 2025

2026
Certifications
CE (in accordance to **ISO13485, MDR**) and **FDA** + **market launch**

in collaboration with

ANTARES VISION GROUP

RNA &GENETHERAPY

DIANA

The concept: DIANA Wall

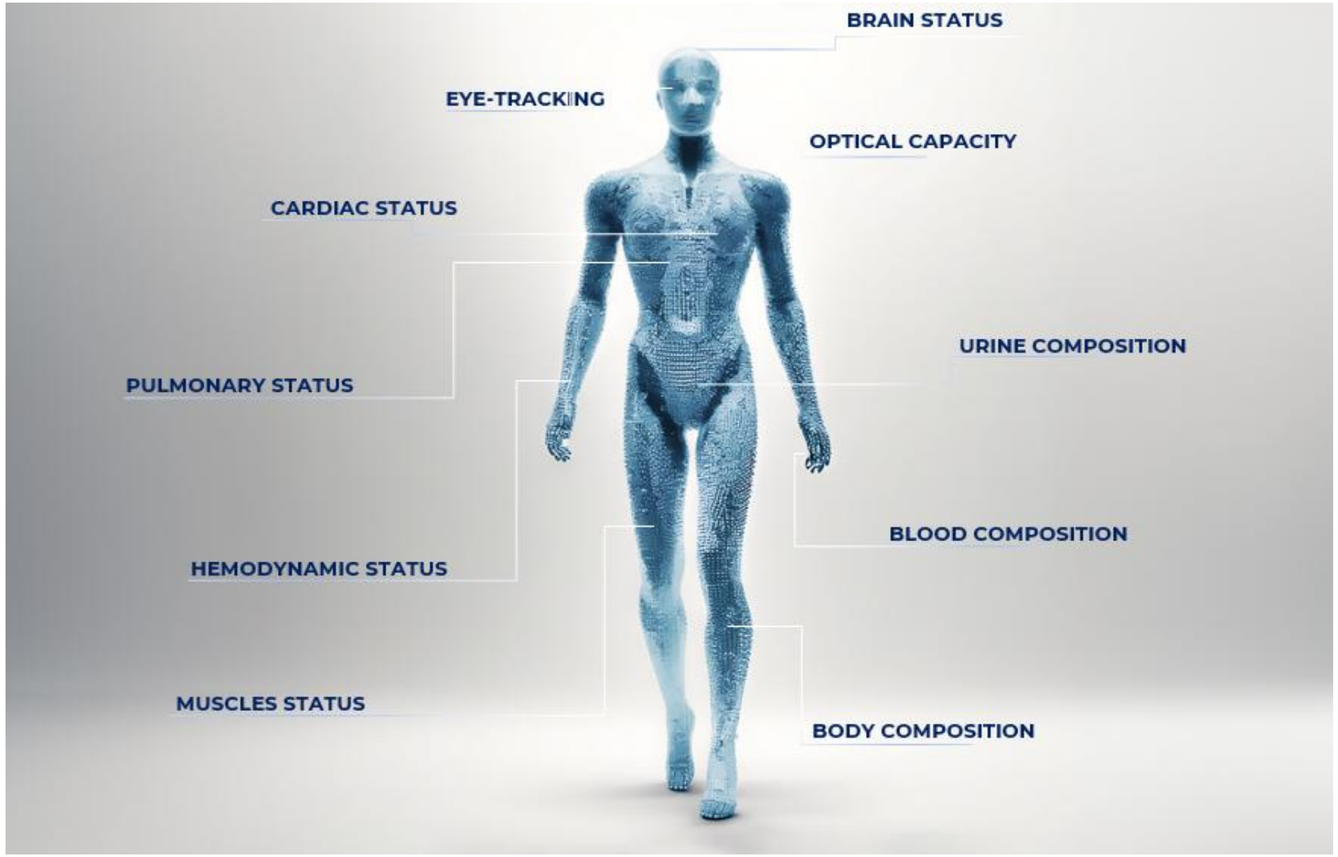
DIANA Wall *(Diagnostic Intelligence for Advanced Non-Invasive Analysis)* is a **modular diagnostic platform** equipped with medical devices to **deliver comprehensive health assessment**.

A platform composed of **9 independent modules, managed through a single software platform**, that performs non-invasive examinations **with the assistance of healthcare professionals**.

Enable the simultaneous detection of a series of clinical parameters with **non-invasive tests in just 30-45 minutes**.

Optimize clinical practice by **reducing costs** and timeframes, while improving the service provided to the patient.

The parameters



The 10 body area checked by medical devices:

- Eelctrocardiograph + Digital stethoscope *(Cardiac status)*
- Electromyograph *(Muscle status)*
- Electroencephalograph *(Brain status)*
- Pulse Oximeter + Blood pressure monitor *(Hemodynamic status)*
- Capillary blood analyzer *(Blood composition)*
- 3D body scanner + Bioelectrical impedance analyzer *(Body composition)*
- Spirometer *(Pulmunary status)*
- *Urine test strip analysis (Urine composition)*
- *Neuro-oftalmological analysis (Eye-tracking)*
- *Binocular refractometer (Optical analysis)*

> 200 physiological parameters organized in hybrid architecture:

- Raw data (e.g. ECG, EMG, EEG trace; 3D mesh)
- Structured data *(matrix)*

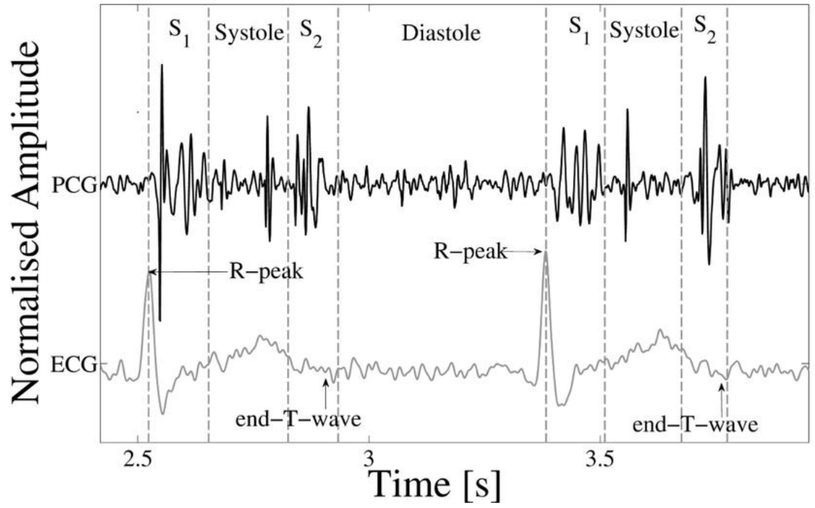
The design supports downstream analysis, clinical interpretation and AI-driven processing.

Preliminary results

Bimodal ECG-PCG Cardiovascular Disease Detection: a Close Look at Transfer Learning and Data Collection Issues

Alessia Calzoni[1,2,*], Mattia Savardi[3] and Alberto Signoroni[3,*]

[1]*Department of Information Engineering, University of Brescia, Via Branze 38, 25123 Brescia, Italy*
[2]*Isinnova SRL, Via Berlinguer, 2, 25124, Brescia, Italy*
[3]*Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, University of Brescia, Viale Europa 11, 25121, Brescia, Italy*



Calzoni. A. et. Al. Physiol. Meas. 2016

- Comparison between unimodal *(ECG or PCG)* and bimodal approach to detect cardiovascular disease *(CVD)*.
- 4 databases *(ECG+PCG)* splitted in discovery and test set. 2827 patients and 9291 recordings.
- Methods: Convolutional neural network *(CNN)*, transfer learning.

Unimodal approaches

Configuration	Accuracy	AUROC	Precision	Recall	Specificity	F1
1D-CNNs ECG-only; 5 layers, both pooling types	**86.1%**	92.6%	85.9%	86.3%	85.9%	86.1%
1D-CNNs ECG-only; 6 layers, all avg pooling type	85.6%	**93.1%**	88.9%	81.2%	89.9%	84.9%
1D-CNNs PCG-only; 8 layers, both pooling types, dropout	**77%**	**83%**	74.1%	82.7%	71.2%	78.2%
Transfer learning PCG	**77.2%**	**85.7%**	80.6%	71.6%	82.8%	75.8%

Bimodal approaches

ECG model	PCG model	Accuracy	AUROC	Precision	Recall	Specificity	F1
1D-CNNs 6 layers, all avg pooling type; frozen	1D-CNNs 8 layers, both pooling types, dropout; frozen	**90.6 %**	**96.4%**	88.1%	93.9%	87.4%	90.9%
1D-CNNs 6 layers, all avg pooling type; frozen	Transfer learning unimodal PCG model; fronzen	**90.4%**	**95.8%**	90%	91.4%	89.4%	90.5%

DIANA

DIANA application: healtcare context

Emergency

A network of pre-hospital and hospital emergency services ambulance/EMS units, emergency departments, and critical care transport providing rapid response, triage, stabilization, and safe transfer for time-critical conditions such as trauma, cardiac events, stroke, severe infections, and respiratory failure.

(Organization: 116-118).

Screening

Population-based testing performed across broader or narrower cohorts to identify and analyze a disease or its precursors (the abnormalities from which a disease develops) before symptoms appear.

(Organization: hospital; clinic; rural area, Case della comunità)

Sport medicine and wellness

Healthcare and sports-medicine services providing prevention, rehabilitation, and performance and non-performance evaluations for athletes engaged in different sporting activities.

(Organization: sport centers)

Insurance medicine

The study of how social needs are met in protecting against occupational risks and safeguarding health, with a focus on preventive and curative medicine through examinations and assessments, as well as specific medico-fiscal issues.

(Organization: Insurance)

The team

1 CEO

2 Tech Leaders

2 Mechanical Engineers

3 Biomedical Engineers

1 Software Engineer

1 Designer

1 Economist

1 Amministrative

Collaborations

RNA &GENETHERAPY
NATIONAL RESEARCH CENTER

Ministero della Salute

Sistema Socio Sanitario
Fondazione IRCCS
Istituto Nazionale dei Tumori
Regione Lombardia

AREU
Sistema Socio Sanitario
Regione Lombardia

IOTINGA

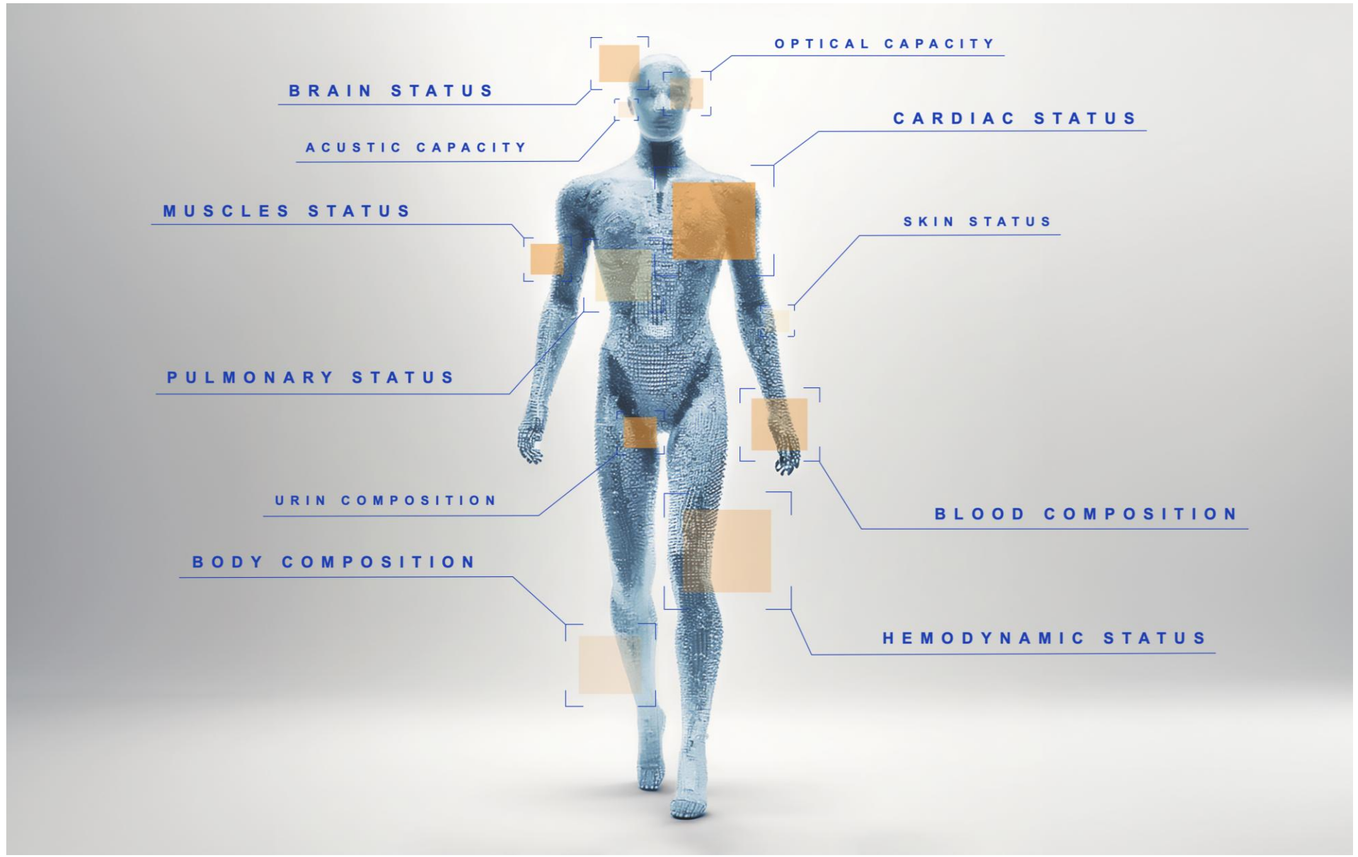
Cluster lombardo
scienze della vita

UNIVERSITÀ
DEGLI STUDI
DI BRESCIA

LIGHT
INNOVATION IN LIFE SCIENCE

UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

The next step to the future



Additional body areas analyzed, like as optical, acustic, skin and urin.

Additional physiological parameters derived from cross-correlation analysis.

Upgrade of database structure, cloud and datalake based to favour flexibility and scalability.

- Raw data *(e.g. ECG, EMG, EEG trace; 3D mesh)*
- Structured data *(matrix).*

Development of AI algorithm to predict health status condition and monitor patients follow-up.

DIANA

CREO Challenge

If DIANA were to launch TODAY in just one market:

Which one would be the right choice?

And why?

DIANA