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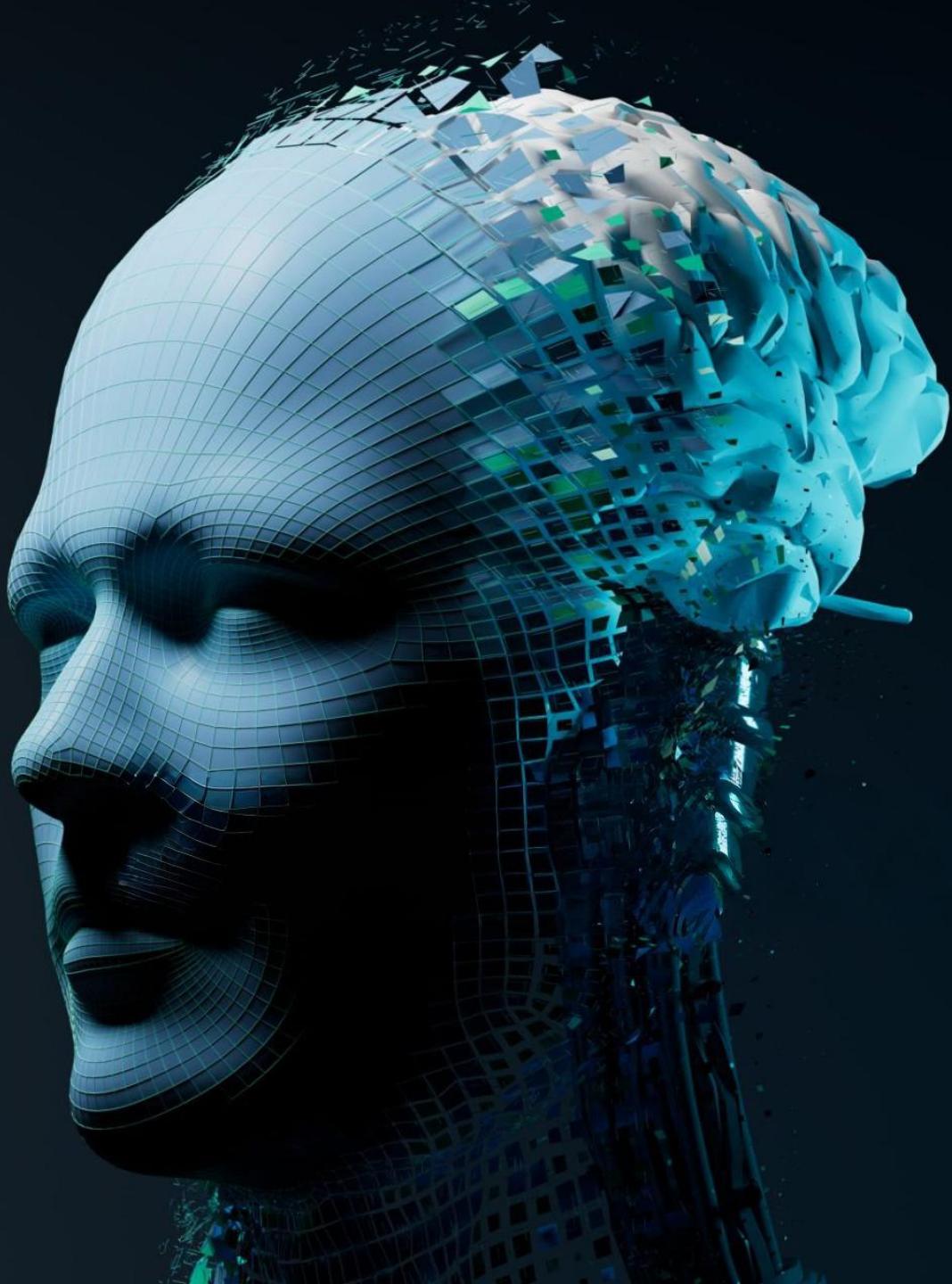
EUROPE'S VISION FOR HEALTH IN THE AGE OF AI: CYPRUS & THE JOURNEY TOWARD THE VIRTUAL HUMAN TWIN.

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Chief Scientist of the Republic of Cyprus

Chairman, National AI Task Force

21 October, Brussels



EU-FUNDED PROGRAMMES WITH CYPRUS PARTICIPATION



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- **CY@EHDS-2nd**: Integration into European Health Data Space
- **AIDH-AI**: AI for Digital Health governance frameworks
- **AI4HealthSec**: AI-based cybersecurity for Health Data Spaces
- **PanCareSurPass**: Data integration for childhood cancer survivors
- **BY-COVID**: Open data infrastructure for pandemic preparedness
- **iToBoS**: Digital twins and AI for early melanoma detection
- **TEF-Health**: AI validation and experimentation facility
- **REBECCA**: Real-world evidence for breast cancer care
- **AI4Life**: AI for microscopy and bioimaging
- **HealthyCloud**: Roadmap for cross-border health-data sharing
- **EDIC for EHDS**: Cyprus exploring participation in new EU governance framework

NATIONAL PROJECTS AND INSTITUTIONAL ECOSYSTEM (CYPRUS)



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These are **Cyprus-based initiatives and institutional pillars contributing to the national health and AI ecosystem:**

- Ministry of Health (MoH): Digital health and data governance
- National eHealth Authority (NEHA): Electronic Health Records interoperability
- Cyprus Institute of Neurology & Genetics (CING): Bioinformatics, neurodegenerative research, organs-on-chip experiments
- Cyprus Cancer Research Institute (CYPCRI): Precision oncology and personalised treatment pathways
- Cyprus Institute (Cyl): High-Performance Computing (HPC), digital twins, computational modelling
- University of Cyprus – KIOS Research Centre: AI-enabled healthcare systems and data analytics
- Cyprus University of Technology (CUT): Medical imaging and AI diagnostics
- Research & Innovation Foundation (RIF): National coordination, funding, and innovation policy implementation

EU-FUNDED PROGRAMMES WITH CYPRUS PARTICIPATION



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- CY@EHDS-2nd – Integration into the European Health Data Space; promoting secure secondary use of health data
- AIDH-AI – Artificial Intelligence for Digital Health; developing governance frameworks for personalised medicine
- AI4HealthSec – AI-based cybersecurity framework for Health Data Spaces
- PanCareSurPass – Long-term data integration for childhood cancer survivors
- BY-COVID – Building open data infrastructures for pandemic preparedness and response
- iToBoS – AI-based digital twins and imaging biomarkers for early melanoma detection
- TEF-Health (Testing & Experimentation Facility) – European infrastructure for AI validation in medical devices
- REBECCA – Real-world evidence and data analytics for breast-cancer patients
- AI4Life – AI for microscopy and bioimaging in life sciences
- HealthyCloud – Strategic roadmap for health-data sharing and FAIR data principles in Europe
- EDIC for the European Health Data Space – New European governance structure that Cyprus is exploring joining



EUROPEAN PERSPECTIVE AND ROADMAP

- VHT is not the final destination — it is the vehicle enabling evidence-based policymaking and R&D.
- By 2030, Cyprus aims to implement national Virtual Human Twin use cases for diagnostics and preventive care.
- Europe can lead the world by operationalising the values of trust, ethics, and inclusivity in AI-driven healthcare.





- Cyprus's participation reflects national commitment to AI-driven innovation and health transformation.
- **National AI Task Force**, revising Cyprus's National AI Strategy.
- Healthcare is a national priority area, with dedicated use cases already under design.





THE NATIONAL AI TASK FORCE AND HEALTH FOCUS

- Cyprus' AI Strategy integrates Virtual Human Twin concepts into diagnostics and personalised medicine.

Ongoing collaboration:

- Cyprus Medical Association.
- Hospitals, research institutions, and private partners.

Objective: build readiness, governance, and trust for AI-enabled healthcare.





OUR ECOSYSTEM: FOUR PILLARS OF MEDICAL DATA EXCELLENCE



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NEUROLOGY & GENETICS



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German
Medical
Institute



NATIONAL
eHEALTH
AUTHORITY

Bioinformatics,
neurodegenerative
research, organs-on-chip
experiments.

Haematology and
oncology data for
personalised
diagnostics.

Pioneering AI
oncology and bridging
data collaboration with
India.

eHealth infrastructure,
data governance, and
interoperability with the
European Health Data
Space.

Together, they form the foundation for a **national Virtual Health Data Ecosystem**.

FROM DIGITAL TWINS TO THE VIRTUAL HUMAN TWIN

- Cyprus hosts multiple digital-twin projects already contributing to the European VHT vision.
- The national ambition: to unite these into a **Super Medical Language Learning Model** — an AI architecture integrating cardiology, oncology, neurology, and genomics.
- This would serve as a pan-European enabler for predictive, ethical, and explainable medicine.



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HOW (NATIONAL STRATEGY)

- AI in Diagnostics at National Strategy level to be an enabler.
- Sovereign AI infrastructure to support federated learning.
- Virtual Assisted Medical orchestrator (Real-time scheduling and re-routing of emergency incidents to ER).
- Accelerate the implementation of EU Healthcare Data spaces.
- Build Data infrastructure Bridges with Other Nations already pioneering VHT and Medical data.

FROM DIGITAL TWINS TO THE VIRTUAL HUMAN TWIN

Research & Ecosystem

- Inclusive Ecosystem Leadership and Participation (Government, Academia, Industry).
- Launch of the VHT Manifesto and Alignment of the EDITH CSA Project.
- Building the Roadmap for Integrating Organ-level Twins into full-body Digital Representations.
- Focus on Silico Research and Simulation.
- Supporting Ethical and Legal Framework Development through Ecosystem.

Digital

- Multiscale Modelling of Human Anatomy.
- Integration of Digital and Medical Technologies.
- Data Infrastructure and Federated Repositories.
- Simulation Platforms.



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Goal

Safe, Ethical, Personalized Patient Treatment at Scale

- Testing Clinical Hypothesis.
- Healthcare Impacts & Network Effects.
- Disease Correlation and Impact
- Supporting Evidence Based Policy.
- Medical Learning Models Supporting Every Doctor.
- Next Generation Medical Assisted Learning.
- Ecosystem and Marketplace Compliance to Standards.



GLOBAL COLLABORATION AND DATA PARTNERSHIPS

- Private Industry Collaboration with **India**: joint work on cancer diagnostics and data-driven healthcare. *German Oncology Center with Tata Memorial Hospital.*
- Dialogue **with Australia (Monash University)** on the “artificial heart” research ecosystem.
- Explorative discussions with **UAE** on AI ethics, healthcare standards usage, and real-time medical data.

*Aim: create a **bridge between Europe and global data ecosystems** to enrich research and innovation.*



CYPRUS PROJECTS CONTRIBUTING TO THE VHT VISION



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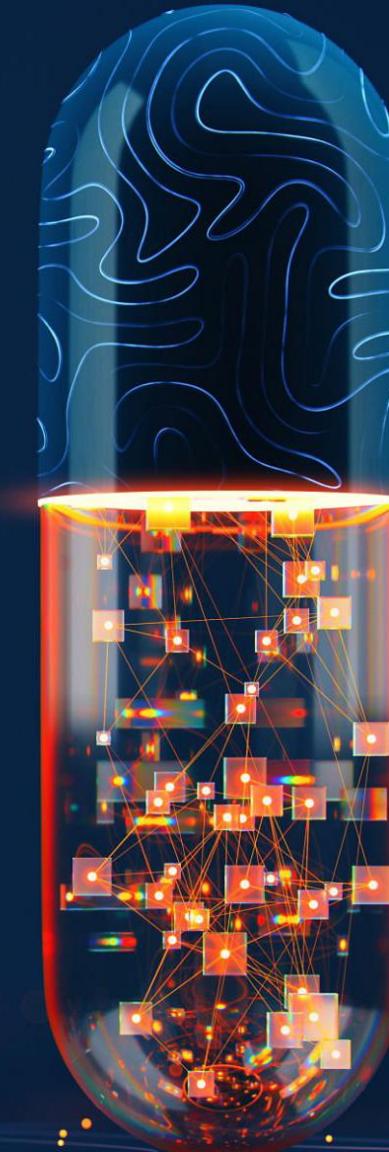


*All contribute to **multi-scale modelling, interoperability, and clinical translation***



ENABLING THE ECOSYSTEM

- Building R&D clusters for **MedTech and PharmaTech** is key to scaling.
- Ambition to launch **Virtual Human Twin Accelerator** will link research institutions, clinicians, and startups.
- Supportive policy actions:
 - Adoption of EHDS and FAIR data standards.
 - Secure data-sharing frameworks (GDPR-compliant).
 - Incentives for cross-border collaboration.





CALL TO ACTION

- Europe must accelerate collaboration between researchers, regulators, and clinicians.
- Enable real use of **European Health Data Spaces** — currently underused.
- Create testbeds and policy sandboxes for healthcare AI.

The Virtual Human Twin will be Europe's competitive advantage — grounded in our values, powered by our science.





- Implementation of Cyprus' MyHealth@EU for cross-border health services and operation as the National Contact Point for digital health (NCPeH) and cross-border services. Cyprus is the 16th Member State that has been connected to the network.
- Implementation of Cyprus' HealthData@EU for secure cross-border access to health data for research, innovation and policy-making, supported by the EU-funded programme CY@EHDS-2nd
- Neha presenting during EU presidency title "Building a Robust and Secure Connected Health Data Space for a Stronger European Health Union".

HOW THE NEHA IS SUPPORTING THE VHT FROM A CYPRRUS PERSPECTIVE



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Research Actions Neha is taking include:

- Collection and management of high-quality health data.
- Interoperability between systems.
- Legal and regulatory framework (GDPR, security, privacy).
- Collaboration and partnerships among European stakeholders.

VHT contribution

- Enrichment with multiple types of health data
- Networking of hospitals, clinics, research center and integrating of data
- Development of computing resources (e.g., cloud, HPC)
- Creation of secure storage repositories (Access rules)
- Promote secondary use of health data for research and innovation
- Develop policies and guidelines for ethical secondary data use
- Regulation of Legal and Ethical Frameworks
- Funding for Startups in healthtech area



DIGITAL TWIN CYPRUS PROJECT PARTICIPATION OVERVIEW

- Establishment of an Intelligent Transport System using Digital Twin technologies
- IDEATION (University of Cyprus)
- TwinEU (KIOS Center of Excellence)
- iNicosia Digital Twin (CYENS)
- Sustainable Mobility
- Electra (FOSS Research Centre)
- Cultural Heritage
- OCEANOS
- ZENON



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Cyprus stands ready to contribute, collaborate, and co-create
the future of personalised medicine in Europe.

Innovation is not just about data — it's about
dignity, humanity, and trust.”

**LET'S BUILD THE
VIRTUAL HUMAN TWIN,
TOGETHER.**

