Digital Health – The Academic Perspective

Shaping the Future of Healthcare Through Education and Innovation

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המחלקה לטכנולוגיות דיגיטליות ברפואה
Department of Digital Medical Technologies

Digital Health is More than AI and Data

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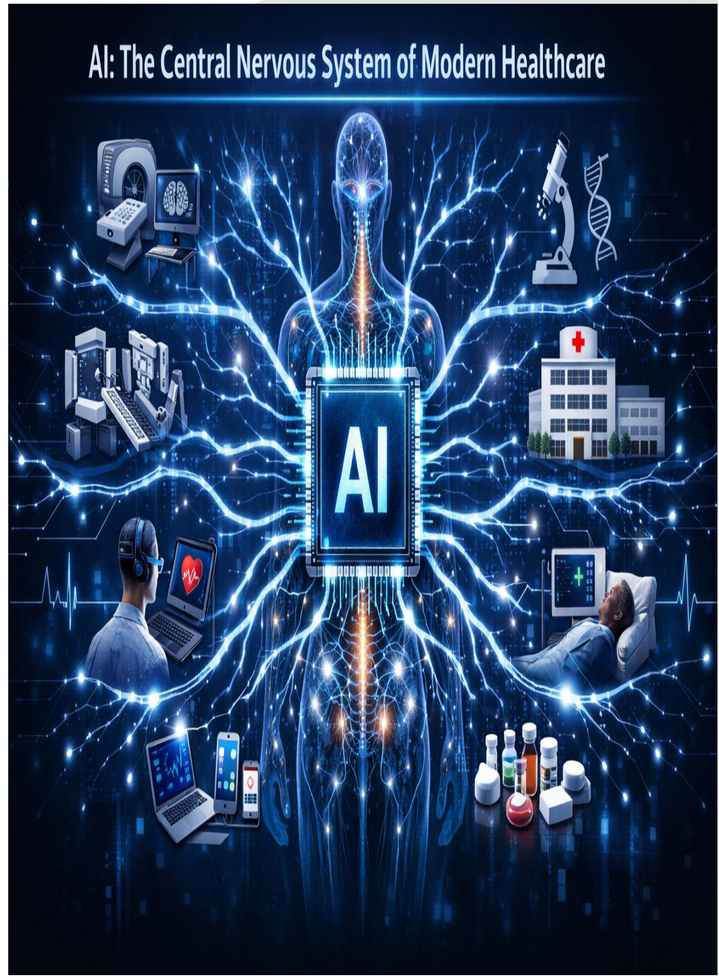
- **It is a systemic transformation of healthcare.**
- **The convergence of the digital and genomic revolutions with healthcare, living and society.**
- Digital Health empowers us to better track, manage, and improve our own and our family's health, live better, more productive lives and improve society.
- Digital Health helps to reduce inefficiencies in healthcare delivery, improve access, reduce costs, increase quality and make medicine more personalized and precise.



Academia's Four Pillars in Digital Health

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Education

- Redefining education & professional roles
- New academic programs and curricula

Training

- Ongoing professional development

(Applied) Research

- From clinical need to PoC

Industry Partnership

- Translation to market

Redefining Education & Professional Roles

Emerging Multidisciplinary Roles

Healthcare Data Analyst

- Bridging bio-medicine and analytics to translate clinical data into actionable insights for personalized care.

Physician-Engineer

- Clinicians with the technical capacity to design and validate medical devices and AI software in clinical loops.

Responsible AI Officer

- Ensuring algorithmic fairness, privacy and responsible use of predictive technologies in healthcare systems.

New Academic Programs and Curricula

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Case Studies (Med)

Computational Medicine (M.D. B.Sc.), HUJI

- 7-year program
- CS + Medicine (3-1-3)
- Competitive and limited to outstanding candidates

Digital Medical Technologies (B.Sc.), HIT

- 3-year, unique, technological pre-med program
- DS + Medical Science
- MedTech industry oriented

Integrating AI into the Core Curriculum

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AI is the CNS of Modern Healthcare:

- **Automation of Diagnostics:** AI-driven radiology and pathology
- **Precision Medicine:** Tailoring treatments via omics data
- **Operational Efficiency:** Predictive patient flow analytics

Integrating AI into the Core Curriculum

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- ✓**Foundational AI Literacy:** Teaching med students the "why" and "how" of machine learning (ML) outputs
- ✓**Responsible Implementation:** Deep dives into data privacy, bias detection and clinical validation
- ✓**Human–AI Interaction:** Developing soft/power skills for shared decision-making when assisted by AI – it is not EBM anymore but AI-based EBM.
- ✓**Transdisciplinary Projects:** Collaborative capstones between Medical, Engineering (HW+SW) and Design faculties

The Physician’s New Skill Set

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AI & Data Literacy

- Foundational competency
- Physicians must understand AI — not necessarily build it, but critically interpret it.
- From “using tools” to **critically supervising intelligent systems**

Human–AI Clinical Decision Integration

- AI becomes part of the care team.
- The physician becomes the **final integrator of intelligence**.

Ethical & Responsible AI Competence

- Physicians must safeguard patient trust.
- From clinician to **guardian of responsible innovation**

The Physician’s New Skill Set

Systems & Workflow Thinking

- AI changes workflows, not just decisions.
- Physicians as **implementation leaders**, not passive adopters

Multidisciplinary Collaboration

- Modern healthcare is team-based across domains.
- From isolated expert to **clinical innovation partner**

Continuous Learning & Adaptability

- AI evolves rapidly.
- Clinical expertise + digital agility

The Physician’s New Skill Set

Communication & Patient-Centered AI Mediation

- Explainability, empathy and trust
- The physician remains the **human anchor of medicine**.

The physician of the AI era is a clinically expert, digitally literate, ethically responsible and system-aware integrator of human and artificial intelligence.

New Academic Programs and Curricula

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Case Studies (Health)

- AI-based Medical Imaging (B.Sc.)
- Clinical Technology (B.Sc.)
- Medical/Healthcare Environment Design (M.Des.)
- Bio-Convergence (M.Sc.)
- Nursing Informatics (M.A.)

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February 15 at 4:16 PM ·

גאים לשתף על פתיחתה של פקולטה שישית ב-HIT מכון טכנולוגי חולון - הפקולטה לטכנולוגיות רפואיות.

הפקולטה החדשה מהווה צעד נוסף בתנופת ההתפתחות האקדמית והפיזית של HIT, ותשמש מסגרת גג לכלל תוכניות הלימוד והמחקר בממשק שבין רפואה, טכנולוגיה ועיצוב. היא פועלת מתוך תפיסה רב-תחומית, המשלבת מקצועות בתחומי ה- STEM והעיצוב יחד עם מדעי החיים והרפואה.

בראש הפקולטה יעמוד פרופ' אדו פרלמן, לשעבר דקן הפקולטה לרפואה בטכניון וסגן יושב ראש מל"ג, המביא עמו ניסיון אקדמי רחב היקף.

בפקולטה החדשה ישתלבו, לצד תוכנית הלימודים הייחודית לתואר ראשון, B.Sc., בטכנולוגיות דיגיטליות ברפואה, המוכרת גם כקדם-רפואה, תוכניות נוספות הנמצאות בשלבי פיתוח, כולן בשיתוף פעולה עם מרכזים וארגונים רפואיים ובהתאם לתוכנית הרב-שנתית שאושרה על ידי המל"ג.

הפקולטה תפעל במשכן חדש ומתקדם, הכולל מעבדות חדשניות, הנבנה בימים אלה בתמיכת קרן הלמסלי, וצפוי להיחנך בתוך כשנה.

גאים להמשיך ולחזק את החיבור בין מדע, טכנולוגיה, עיצוב ורפואה - לטובת מחקר, הכשרה והשפעה אמיתית על עולם הבריאות.

Continuous Learning & Workforce Training

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Lifelong Digital Upskilling

Healthcare Data Analyst

- Bridging bio-medicine and analytics to translate clinical data into actionable insights for personalized care.

Nursing Informatics

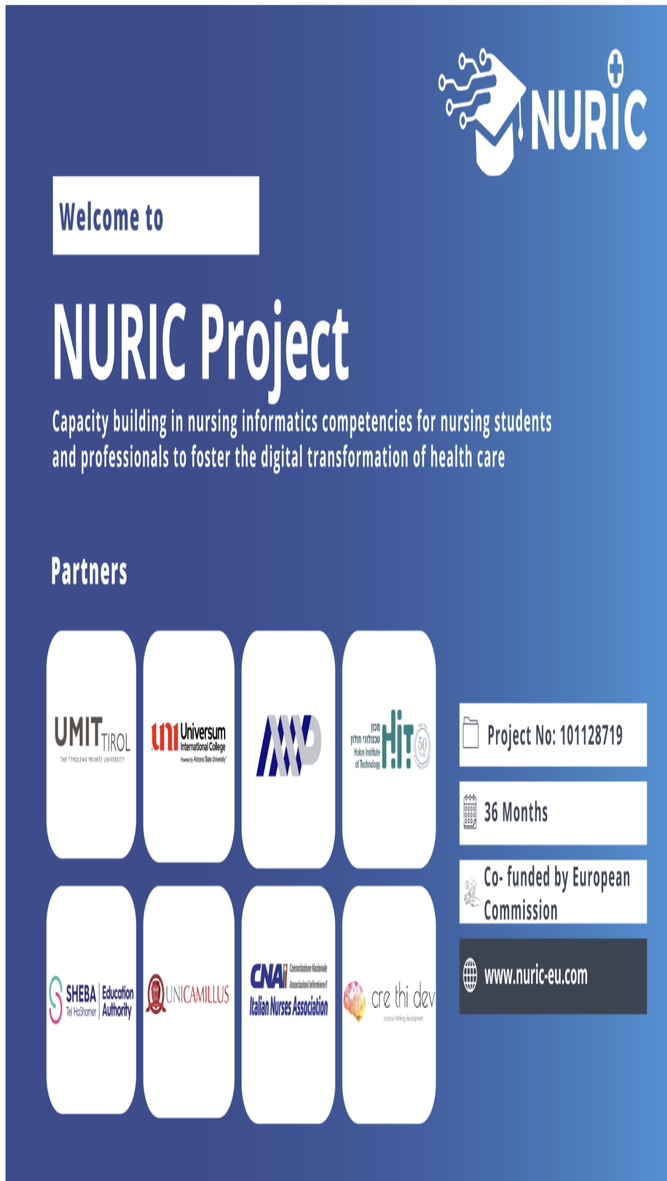
- Nurses play a crucial role in using and promoting digitalization, yet they often lack the needed skills to efficiently use digital tools.
- Including nursing informatics skills in Vocational Education and Training

3D-Medical Planning and Bio-printing

- Originated in Orthopedics within Ors (Sheba, TLVMC)
- Extends to other clinical domains
- Multi-disciplinary

Basic Science by IMA

- Focus on Medical Informatics and AI
- 6-month training
- Project-Based Learning (PBL)



(Applied) Research - From Clinical Need to PoC

Co-creation Process

Milestone	Clinical need	Defining the challenge	Teaming	Work plan & resources	POC - Prototype	Clinical trial
Example	כללית מרכז רפואי רבין בילינסון · השרון	A non-intrusive technological solution is required for diagnosis, monitoring and treatment	Multidisciplinary team: • Designers • Engineers • Data scientists	• MADE Lab • Schedule • Resources	A practical and user-friendly solution A combination of hardware and software product	

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≥900
TIMES A DAY

An average person swallows once per minute (while awake).

Dysphagia

20%
of general population above 50

30%
of general population above 65

50%
of geriatric patients

above
50%
of nursing home residents

Up to
64%
of post stroke patients

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7180111/

Rudney JD, Ji Z, Larson CJ. The prediction of saliva swallowing frequency in humans from estimates of salivary flow rate and the volume of saliva swallowed. Arch Oral Biol. 1995;40(6):507–512. [PubMed]

* https://www.asha.org/practice-portal/clinical-topics/adult-dysphagia/#collapse_1

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The Challenge

Diagnose

An invasive test

Monitor

Subjective assessment

Treatment

Swallowing therapy, dietary changes, medications or surgery

Currently, **no solution exists** for effective diagnosis and follow-up.

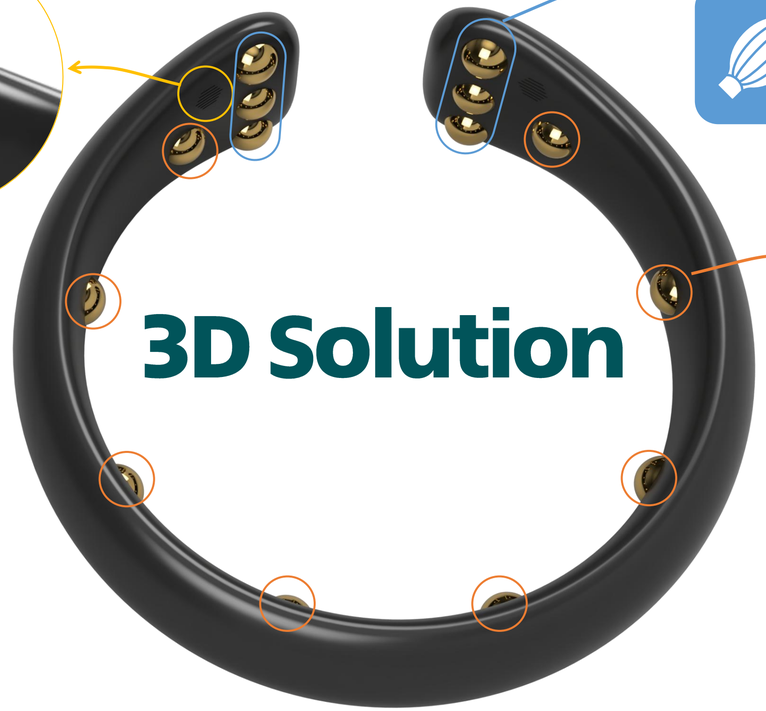
The Solution: MODAM

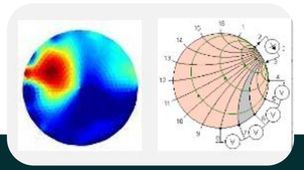
Muscles

- 6 surface electromyography (sEMG) sensors
- Measure muscle dynamics

Audio

- 2 microphones
- Measure swallowing and breathing sounds





Electrical Impedance Tomography (EIT)

- 8–32 electrodes around the neck
- Measure bio-impedance

Industry Partnership

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Why Industry Needs Academia?

Scientific Rigor

- Academia provides independent, peer-reviewed validation that commercial products often lack.

Impartiality and Long Term Perspective

- Focus on foundational research and complex, high-risk projects

Neutral Ground for collaboration & Longitudinal Data

- Access to diverse, high-quality clinical data environments through healthcare organizations

Talent Pipeline

- Producing the next generation of professionals who are fluent in both clinical and tech languages

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Thank you

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