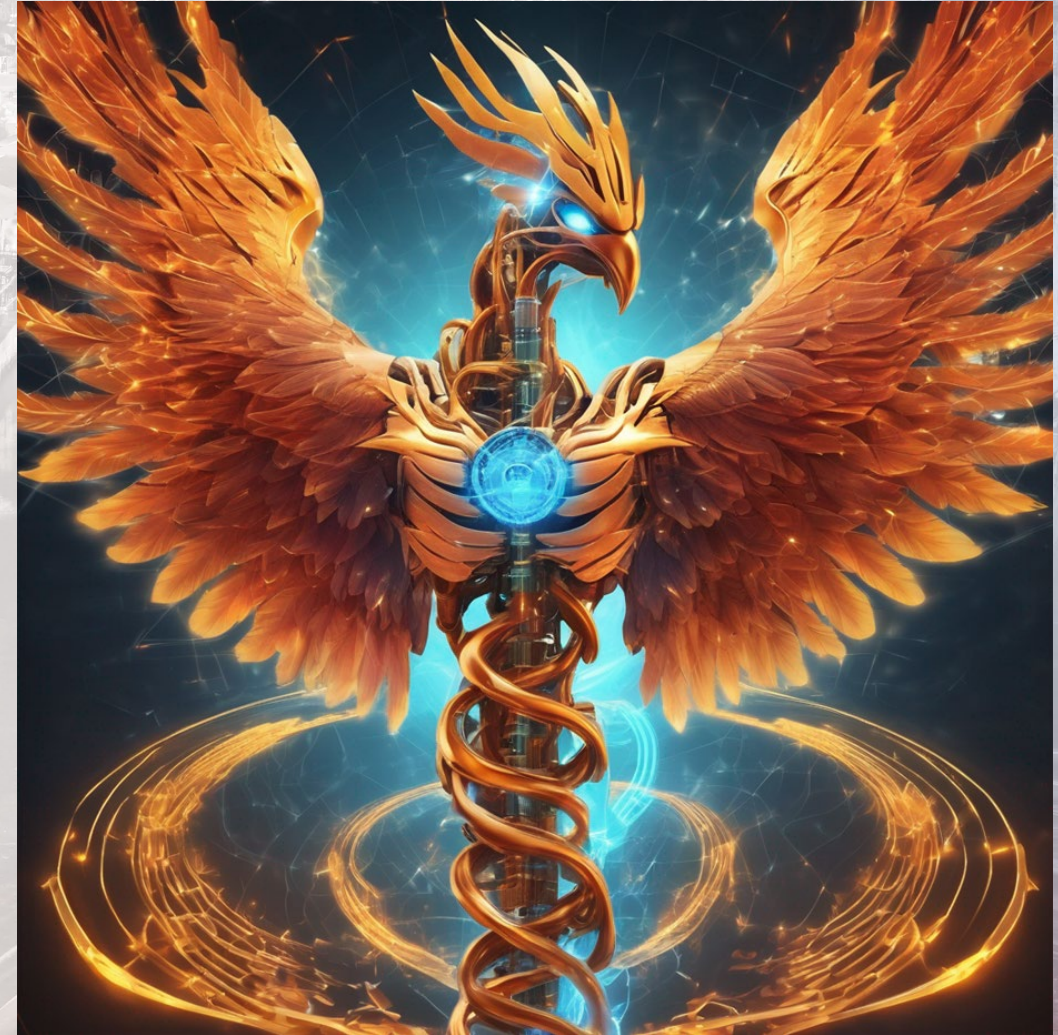


# A World with AI: The Rebirth of Osteopathy

Ravi David Yarid, DO



# Disclosures

1. I am stubborn
2. I have opinions to share about most everything
3. I created this presentation with the assistance of ChatGPT 4o
4. I have no relevant **relationships** to disclose

... and sometimes I swear



# Why are We Here?

- 1. Review** and classify the 4 types of Artificial Intelligence (AI)
- 2. Describe** risks and biases within healthcare data as it relates to AI and current solutions to these issues
- 3. Envision** the blueprint of AI in osteopathy and how we can use AI with our data to revolutionize research and healthcare delivery.



# Who am I and Why am I Here?

- Osteopathic Physician, Professor, Creative thinker, innovator, father, problem solver, nagging thorn in the side, husband, visionary, AI enthusiast
- OG gamer – been playing videogames since the late 1970's (In my youngest videogame memory, I was 3)
- FP/OMT residency with OMM+1 fellowship
- FP and OMM practice for years
- Correctional Healthcare for years (lots of swearing there)
- Assistant Professor at PCOM for years
- Currently researching AI-enhanced study for OMM students
- AI working groups for PCOM and ECOP
- Member of the AOIA Digital Health Innovation Steering Committee





# Artificial Intelligence



**Artificial Intelligence (AI)** refers to the field of computer science and engineering that focuses on creating systems capable of **performing tasks** that typically require **human intelligence**.

These tasks include problem-solving, learning from experience, understanding natural language, and visual recognition.

# Types of AI



- **Machine Learning (ML):** focuses on developing **algorithms** that allow computers to **learn** from data. ML is used to identify patterns, make predictions, and improve over time without being explicitly programmed for specific tasks.
- **Natural Language Processing (NLP):** enables computers to understand, interpret, and **generate human language**. Large language models, such as ChatGPT, are based on this type of AI.
- **Robotic Process Automation (RPA):** uses software bots to **automate repetitive tasks**, traditionally performed by humans. These tasks often involve interactions with digital systems and data management.
- **Computer Vision:** enables computers to **interpret and process visual information** from the world, much like human vision. It involves tasks such as image recognition, object detection, and video analysis.



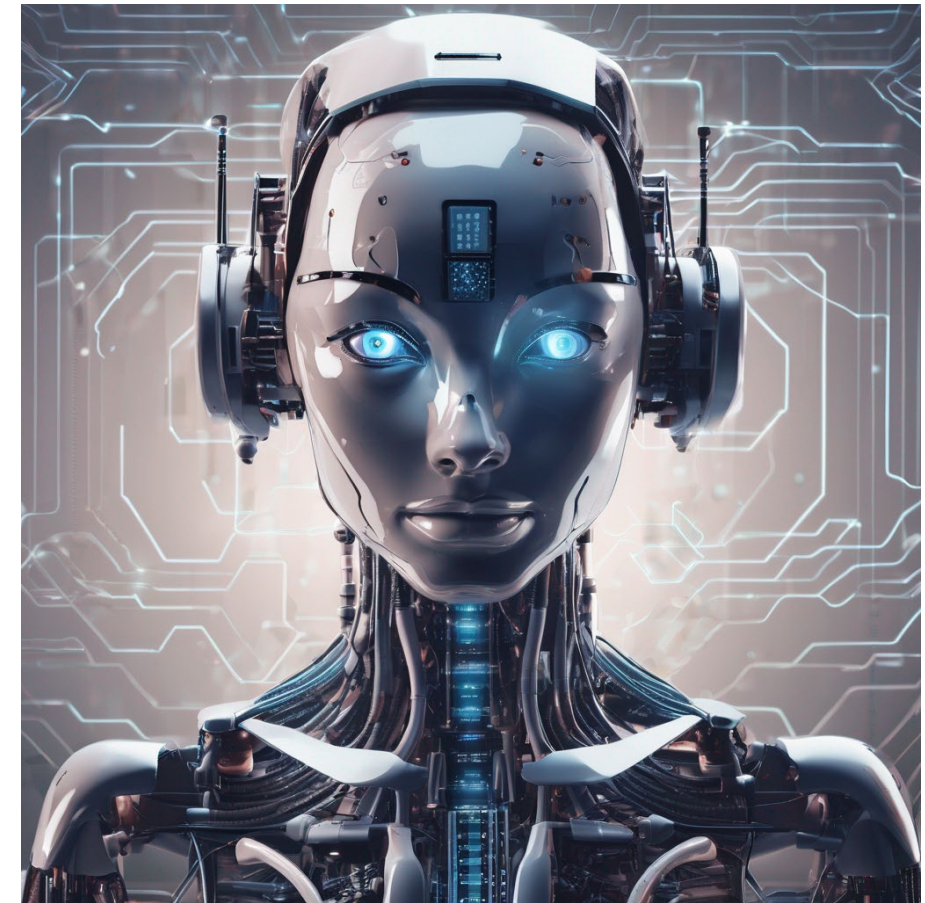
# Machine Learning

- **predictive outcomes** and **disease progress** for patients.
- assists providers with diagnosis, give **recommendations** for testing, **analyze** radiologic images, labs, patient histories, and give providers **evidence based recommendations** in treatment.
- gives **real-time guidance** during a patient visit sorting vast amounts of medical data gathered from the entire patient history and all available and up-to-date medical knowledge.



# Natural Language Processing

- **enhances overall AI interactions**
- assists patient with virtual assistants which may answer questions, schedule appointments, and can administer health advice.
- analyze EHRs
- helps providers with transcription and provide efficient documentation
- used in research to analyze limitless amounts of medical literature and knowledge



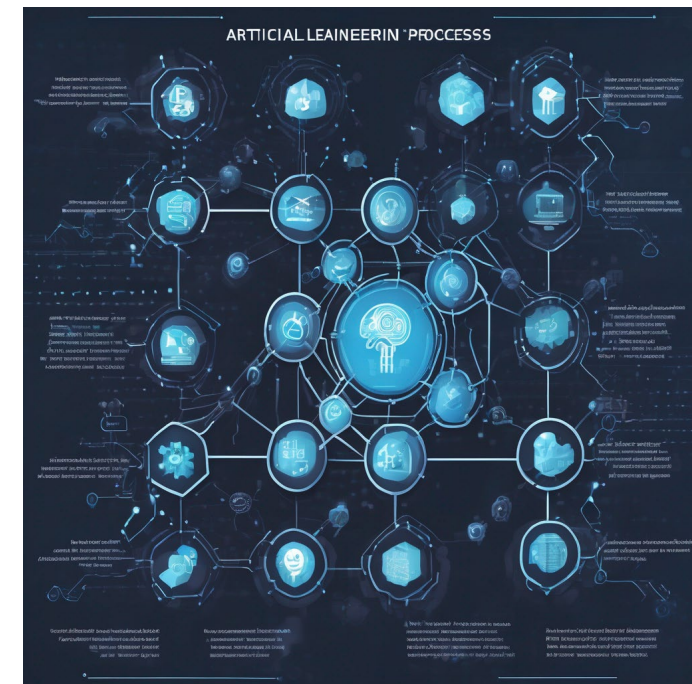


# Robotic Process Automation

- **creates efficiency** throughout the entire patient care process
- automates scheduling with efficiency reducing wait times and maximizing patient volume
- streamlines patient intake, billing, claims processing, record updates, data entry, data extraction, and data filtering giving providers up-to-the-minute accurate patient information.



# Computer Vision



- Analyzes radiological images, pathology, and may be employed to monitor patients remotely.
- Robotic surgery guidance systems
- Improved diagnostic accuracy
  - Initial AI engagement has already discovered breast cancer 5 years earlier using current mammogram guidelines
  - Retinal changes associated with Parkinson's disease identified 7+ years before symptoms



# Risk in AI

## AI Algorithm/Design

- Transparency
- Bias
- Ethical concerns
- Explainability
- Oversight
- Validation



## Operational

- Adversarial attack
- Input data shifts
- Proper controls

## Data

- Quality adequacy
- Privacy
- Bias

## Risk Mitigation

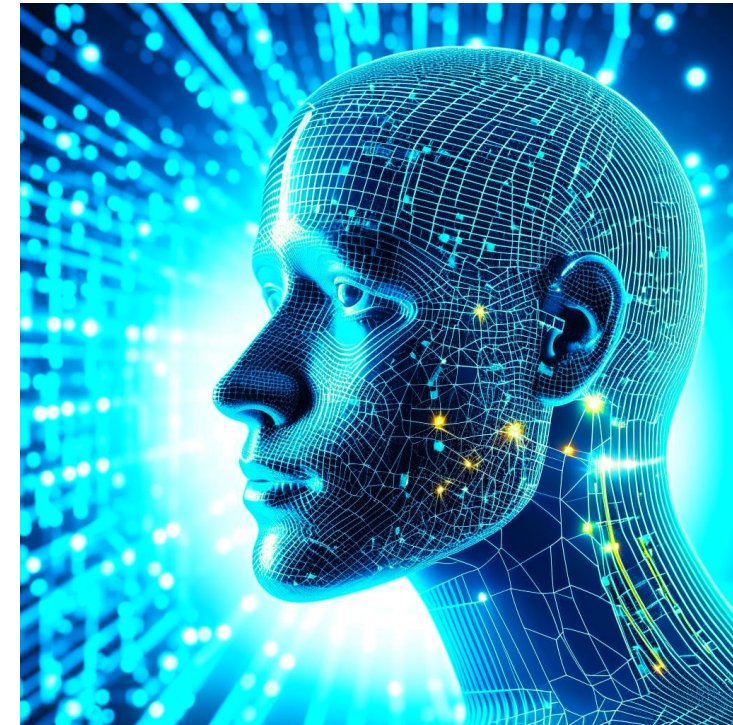
- Awareness
- Data quality control
- Transparency
- Governance
- Attack prevention measures
- Bias detection/correction
- Continuous monitoring
- Ongoing validation

# Machine Bias

**Bias** in AI refers to unequal treatment of individuals based on irrelevant decision features

**Sources of bias** include training data, algorithm design, and model application

**Bias Mitigation** involves diversity of groups in testing and development, utilization of fairness and bias detection tools, and compliance with laws regarding accessibility and inclusivity.



# AI in Osteopathy

## Where to start?

### Research

- Realtime data
- Realtime analysis
- Ongoing data evaluation for correlations and associations

### Education

- Student
- Faculty
- Curriculum
- Administration

### Practice

- EHR
- Oversight
- Efficiency
- CME

### Challenges

- Cost
- Data collection
- Adaptation





# Data

- In the world of AI, data is not just a resource, it's the **lifeblood**.
- The **quality, quantity, and comprehensiveness** of data directly **determine the effectiveness, accuracy, and innovation potential** of AI systems.
- **Healthcare data**, especially within osteopathy, is among the **most valuable and sensitive** types of data. It holds the key to **groundbreaking insights**, yet its complexity and sensitivity make it one of the riskiest assets to manage.



# The Blueprint

## Step 1: Start Gathering and Protecting Our Data

To unlock the full potential of AI in osteopathy, we must prioritize the systematic gathering of our healthcare data.

This is not just an opportunity — **it's a necessity**

Our collective data is the foundation upon which future innovations in patient care, personalized medicine, and healthcare efficiencies will be built.



# The Race is On!

## Why We Must Act Now:

Delaying this effort puts us at a disadvantage. Other healthcare sectors are already capitalizing on their data assets. For osteopathy to lead in AI-driven advancements, we must treat data gathering as our top priority and act decisively.





# Osteopathic Data Value

## Size and Uniqueness:

- Approximately **150,000 DOs** in practice in the USA (approx. 11% of practicing physicians)
- Over 1 billion visits annually
- Over **1 petabyte** of data generated **annually** (1 petabyte = 1 million gigabytes)
- **Osteopathic Manipulative Medicine (OMM)** uniqueness
- Holistic osteopathic focus



# Osteopathic Data Value

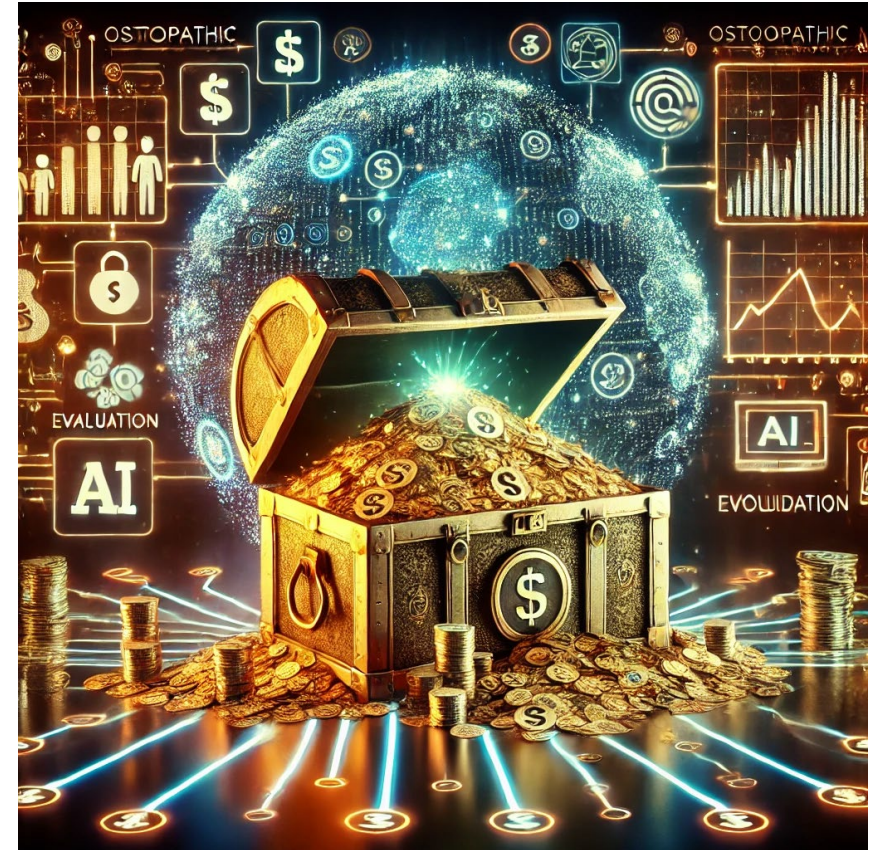
## Direct Data Monetization

- Pharmaceutical Companies
- Research Institutions
- Tech Firms
- AI Developers
- Partnerships

## Value of Collected Data Monetization?

Over **\$100 million annually\***

(estimates range to well over \$300 million)



\*Source: McKinsey & Company, *Unlocking the Value of Healthcare Data* (2024).

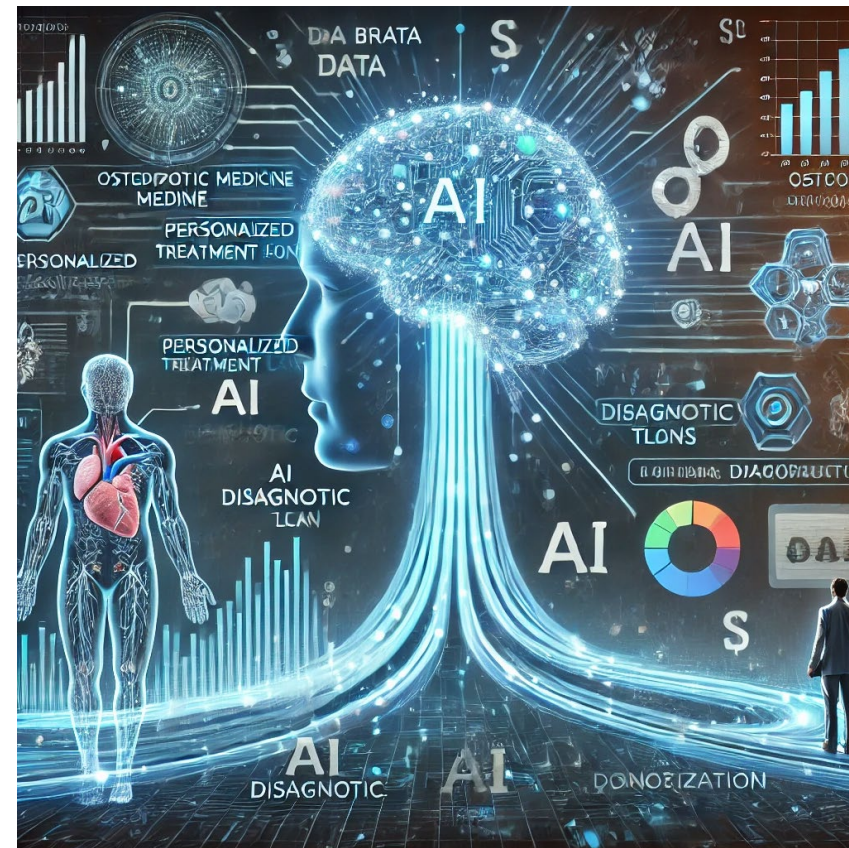


# Osteopathic Data Utilization

**What can our data do? It is the foundation for:**

- AI-Driven Product Development
- Personalized Healthcare Plans
- OMM research and expansion
- Education Enhancement
- Research Enhancement

(value potential limitless)





# The Blueprint

## Step 2: Develop AI Tools and Products

- AI product development from data can be developed along side data collection
- Non-data driven AI product development can begin **immediately**
  - What are we waiting for?

We Can Fund, Build, Test, and Deploy **Now**



# AI Development in Osteopathy

## “Fit to Purpose”

- AI product development can:
  - solve identifiable problems
  - address inefficiencies
  - uncover hidden opportunities

... so the only question for us is:

## What is our purpose?





# What is Our Purpose within Osteopathy?

to **SERVE**

**Who?**

**Our Community**

**Patients**

**Students**

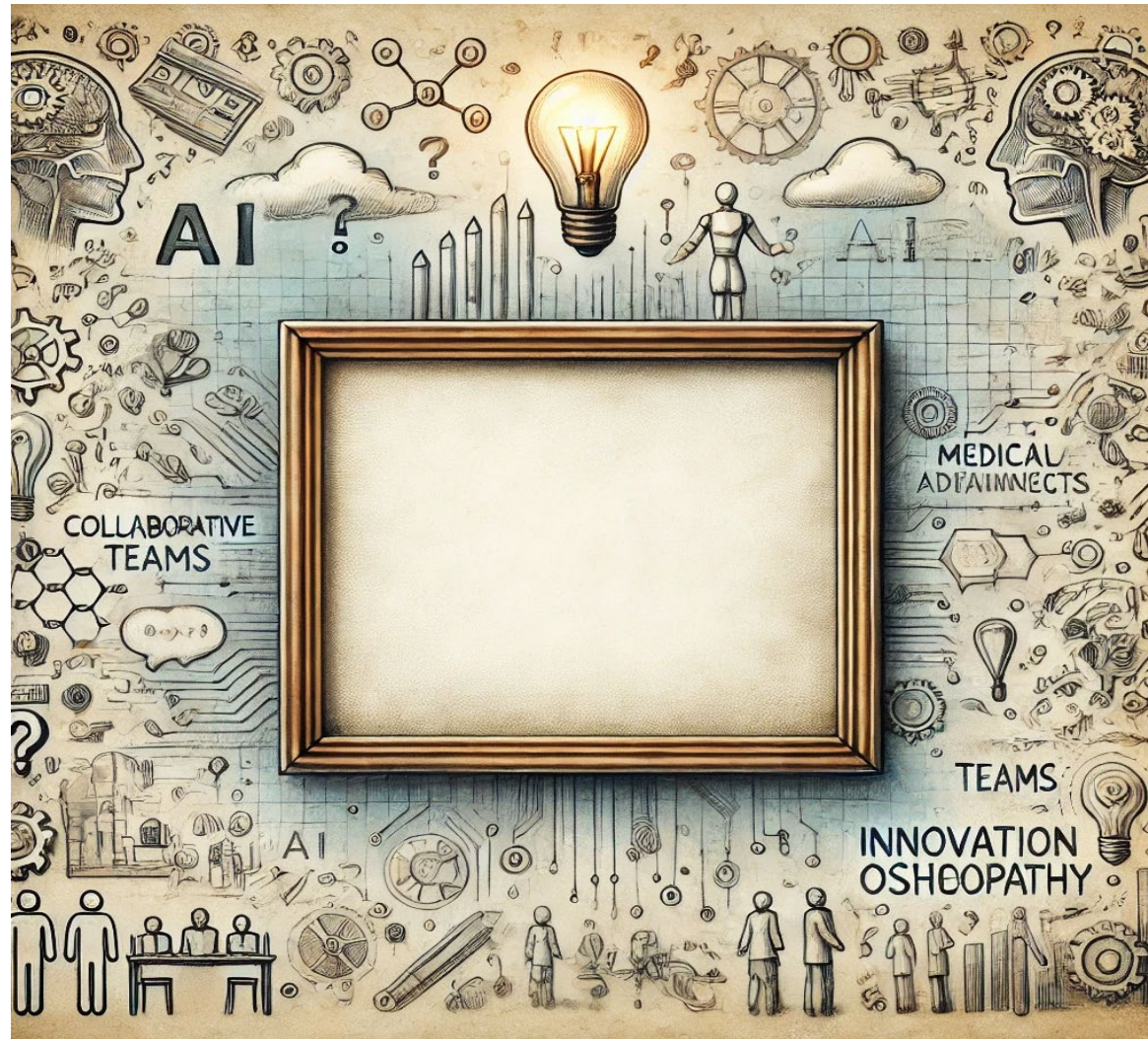
**Each Other**

**the World**



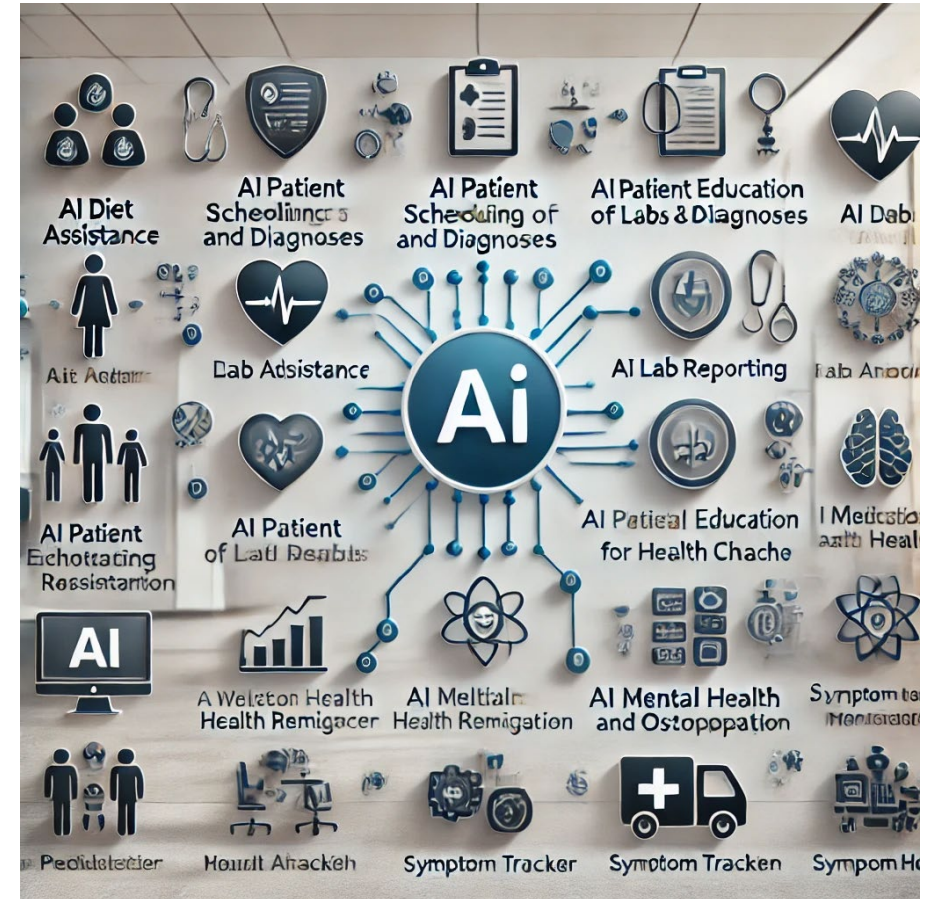


# What Do You Want to Create?



# Patient Focused Development

- AI Diet Assistance
- AI Patient Scheduling Assistant
- AI Lab Reporting
- AI Patient Education of Labs and Diagnoses
- AI Patient Advocate
- AI Patient Insurance Navigation
- AI-Enhanced Patient-Provider Communication
- AI-Driven Lifestyle Modifications
- AI Wellness Tracker and Health Coach
- AI Medication and Treatment Reminder
- AI Symptom Tracker
- AI Virtual Health Assistant
- AI Mental Health and Stress Management





# AI Diet Assistance Example

What does a diet of a 55-year-old with DM type II, CHF, and CKD stage III look like?

**Diet Goal:** Manage blood sugar, reduce Na to control CHF, and limit potassium and phosphorus to protect kidney function while ensuring adequate nutrition.

## Recommendations:

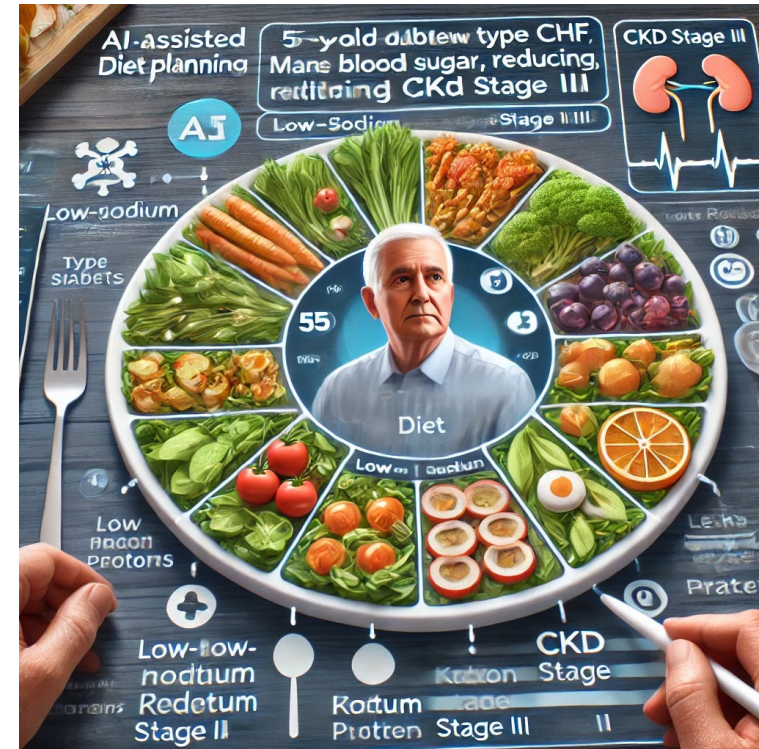
### Grilled Salmon with Steamed Asparagus and Quinoa

#### Ingredients:

- Grilled salmon (rich in Omega-3, low in sodium)
- Steamed asparagus (low potassium, fiber-rich)
- Quinoa (low glycemic index, complex carbs)

#### Health Benefits:

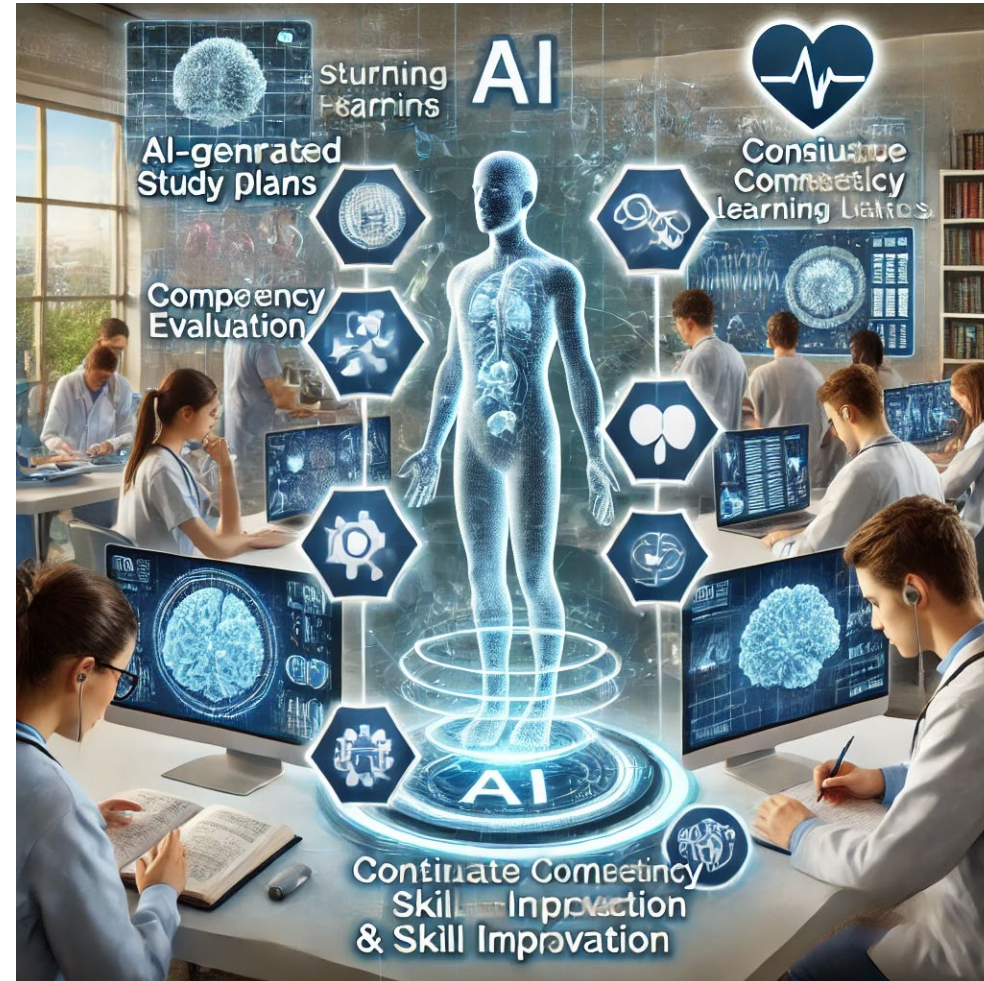
- Omega-3s improve heart health and reduce inflammation.
- Balanced carbohydrates and fiber help manage blood sugar levels.
- Low potassium and phosphorus protect kidney function.





# Osteopathic Student Focused AI Development

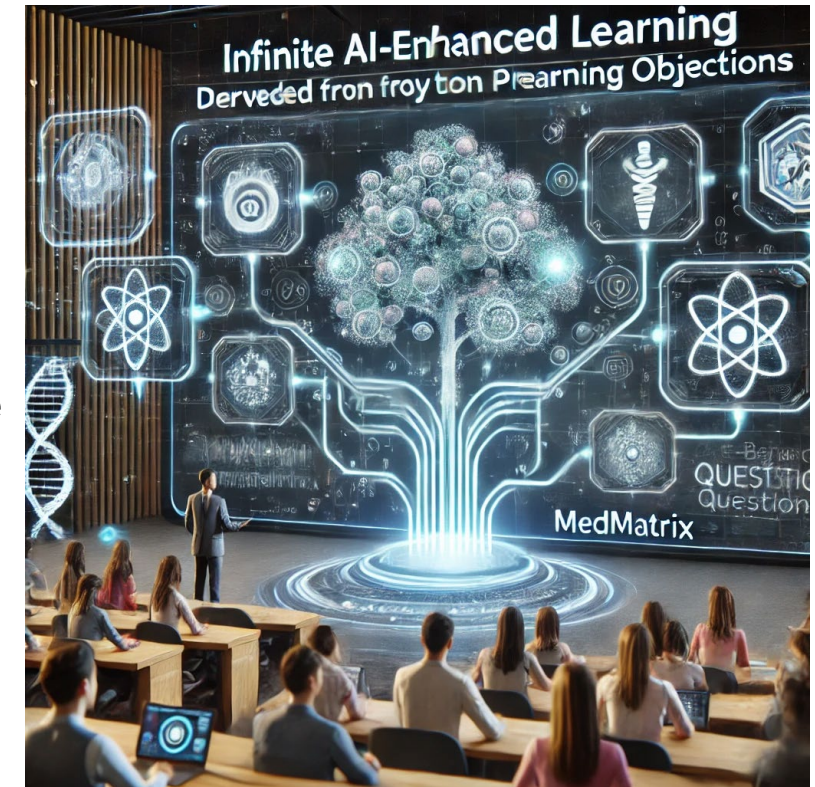
- AI-Driven Personalized Learning Pathways
- Real-Time Objective Feedback
- Continuous Competency Evaluation
- Enhanced Simulation Learning
- AI-Powered Quizzes and Assessments
- Interactive Case Studies
- AI-Mediated Peer Learning and Competition
- Curriculum Integration Assistance
- AI-Generated Study Plans
- AI-Guided Practical Skill Improvement
- AI-Enhanced Sim Lab



# Current Student AI Product Evaluation at PCOM

- MedMatrix (themedmatrix.com)
  - Infinite AI generated case questions
    - based on the learning objectives of uploaded presentations
  - Designed by osteopathic students for COMLEX preparation
  - Realtime objective feedback on curriculum material knowledge

**Less time memorizing, more time engaging**









# AI for Osteopathic Physicians

- **AI-Assisted Practice Analysis with Detailed Provider Profiles**
- **AI-Directed CME (Custom-tailored Continuing Medical Education)**
- **AI-Assisted Partner Finder**
- **AI-Assisted Treatment Suggestions**
  - **OMM Treatment and Reimbursement Guidance**
  - **AI assistance in rediscovering and developing OMM skills**
- **AI-Assisted Community Building and Referral Networks**
- **AI-Enhanced Scheduling for Optimal Patient Management**
- **AI Private Practice Assistance (Management, Billing, and Compliance)**
- **AI-Assisted Job Availability and Career Pathway Suggestions**
- **AI-Driven Patient Care Optimization (Predictive and Preventive Care)**
- **AI for Outcome Tracking and Evidence-Based Practice Improvements**



# The Blueprint

## Step 3: Engage with and Promote What We Create

Once we fully engage this path, we will bring health and betterment to all of our patients, students, our osteopathic community, and all of humanity

Through AI enhancement, osteopathy can be reborn into the world, renewed, and as we always have, we will lead. But now, we will lead from the front.





# This is Our Moment

## The Rebirth of Osteopathy in the AI era

- Osteopathy is at the crossroads of history
  - We stand at the precipice of a new era—one where AI empowers osteopathic physicians to elevate patient care, innovate education, and reshape healthcare for generations to come
  - This is our opportunity to lead and redefine what healthcare can be, staying true to the holistic and human-centered principles upon which osteopathy was built

## Our Vision for Global Healthcare Leadership

- Guided by osteopathic principles, we embark on a path that is both ethical and moral
  - With AI as our tool, we create solutions that not only solve complex problems but also foster better health outcomes for humanity
  - We offer the world a vision of healthcare where personalized, compassionate care meets the power of cutting-edge technology





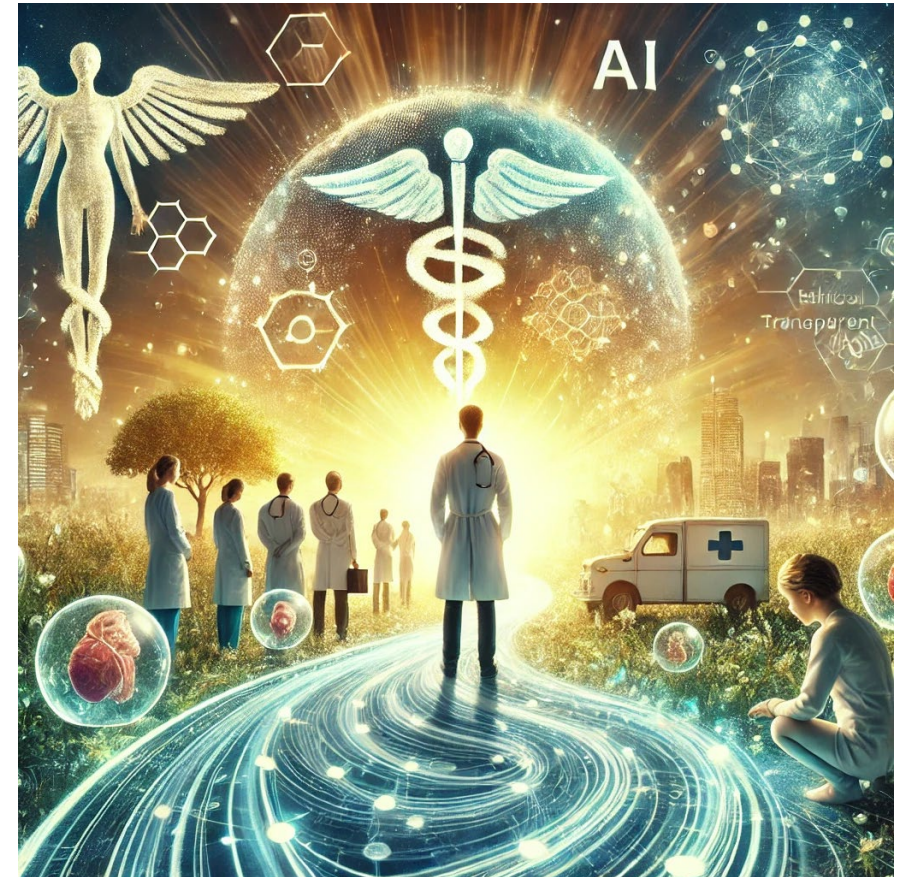
# Leading Healthcare into the Next Generation

## What We Can Share with the World

- **Through AI, we transform osteopathy and healthcare globally**
  - **AI-driven learning pathways** that raise the standard of education, empowering the next generation of osteopathic physicians.
  - **AI-guided patient care** that provides personalized treatments, always rooted in osteopathic principles, for better health and well-being.
  - **AI-powered healthcare systems** that place humanity at the forefront, ensuring ethical, transparent, and sustainable advancements.

## The Time Is Now

- **This is our rebirth—our chance to lead healthcare into a new age**
  - We choose **innovation** over stagnation, **ethical progress** over profit-driven care.
  - Together, we ensure that osteopathy is not only relevant but leads the **global transformation** of healthcare.
  - **The world is watching**—and we have the power, the knowledge, and the **vision to inspire** and guide this next chapter.



# In Review:

- There are 4 main types of AI
  - Machine Learning
  - Natural Language Processing
  - Robotic Process Automation
  - Computer Vision
- Risk and Bias
  - Risk in data both in and out, but that is also why it is so valuable
  - Bias exists and mitigation is a priority
- The Blueprint of AI in Osteopathy
  - **A Once-In-Humanity Moment**





# Our Once-In-Humanity Moment

- Gather and Protect Our Data
  - This is not just an opportunity, it is a necessity
  - The discovery of health is our service to the world and we are at the next step of health expression
- With this **goldmine of data**, we can:
  - Revolutionize patient care
  - Elevate osteopathic research
  - Build sustainable financial models that **fund osteopathy** for generations to come.





# The Path Forward

## Our Time is Now: Leading the Next Generation of Healthcare

- We are at the **forefront of healthcare transformation**, driven by AI and guided by osteopathic principles.
- **Osteopathic data is unique** and holds the key to a future where **personalized care, predictive analytics, and holistic treatment** dominate healthcare.
- By seizing this moment, we can ensure that **osteopathy leads the charge** in AI-driven medical advancements.

## Let's Build Together

- By **gathering and using our data**, we open limitless possibilities for AI in:
  - **Patient care:** Personalized treatments, real-time diagnostics
  - **Education:** Tailored learning, real-time feedback for students and practitioners
  - **Research:** Unlocking new correlations, expanding OMM studies



# This is Our Rebirth: Let's Lead

- **Osteopathy** is poised to **lead healthcare into the AI era**—not from the back, but from the front.
- **A beacon of light**, using **the tools** and **the knowledge** to create ethical, human-centered AI systems that will benefit all of humanity.
- **The time to act is now.** This is our once-in-humanity moment to build and innovate.

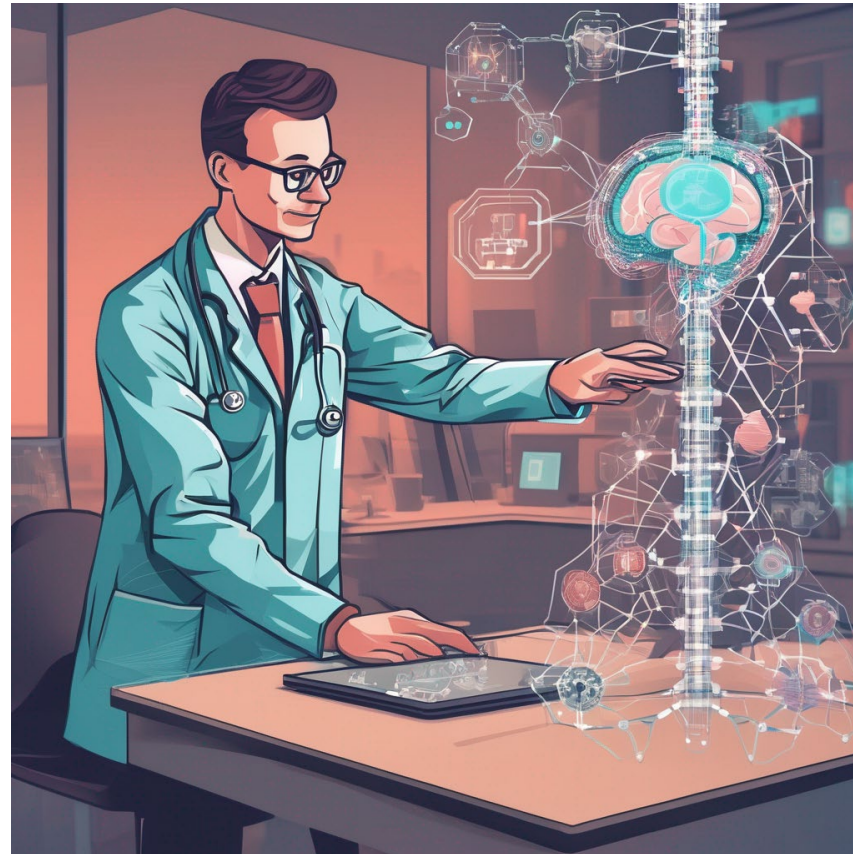
**Join us in building our future, together. NOW.**





## Images using:

- ChatGPT 4o
- SDXL
- Stable-Diffusion
- Kandinsky
- DALL-E



# Questions and Discussion

... this is only the beginning



Ravi David Yarid, DO  
raviya@pcom.edu

