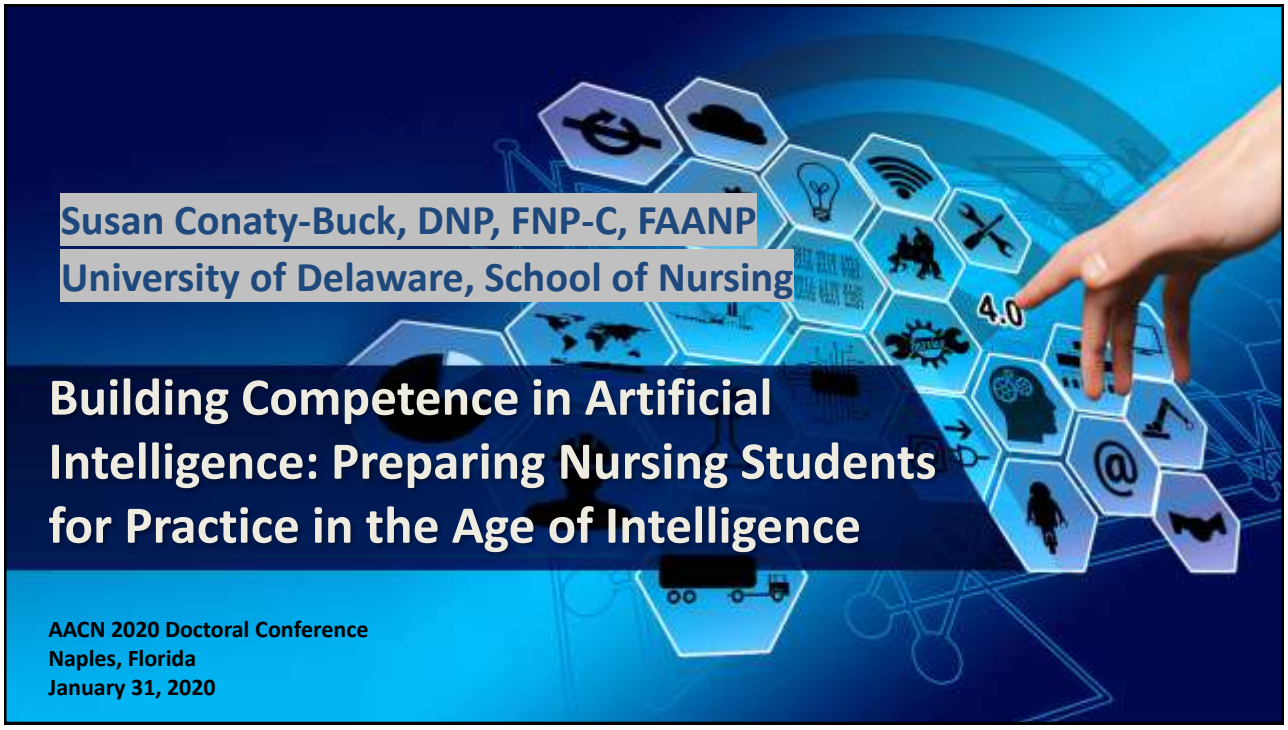


Susan Conaty-Buck, DNP, FNP-C, FAANP
University of Delaware, School of Nursing

Building Competence in Artificial Intelligence: Preparing Nursing Students for Practice in the Age of Intelligence

AACN 2020 Doctoral Conference
Naples, Florida
January 31, 2020

1

Informatics Trends

- Precision Medicine
- Digital Technology
- Healthcare Cybersecurity
- Robotics
- Artificial Intelligence

2

Artificial Intelligence (AI)

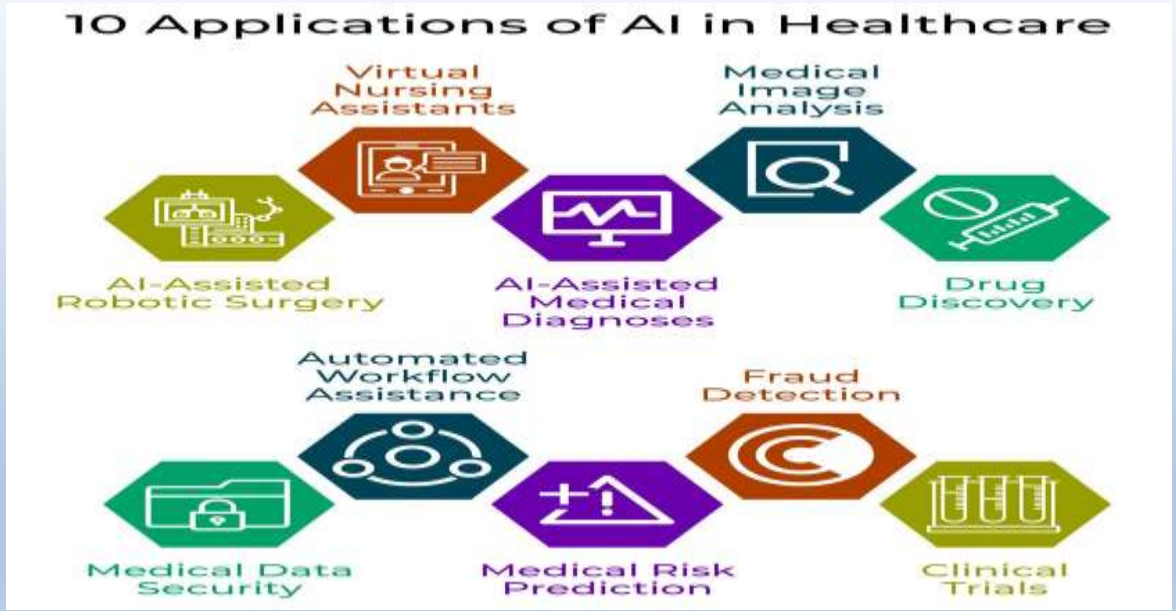
- computer systems
- capable of performing tasks that require human intelligence
  - decision making
  - object detection
  - solving complex problems

3

Categories of AI

Stages Of Artificial Intelligence	Types Of Artificial Intelligence	Branches Of Artificial Intelligence
• Artificial Narrow Intelligence • Artificial General Intelligence • Artificial Super Intelligence	• Reactive Machines • Limited Memory • Theory Of Mind • Self-aware	• Machine Learning • Deep Learning • Natural Language Processing • Robotics • Expert Systems • Fuzzy Logic

4



https://igniteoutsourcing.com/healthcare/artificial-intelligence-in-healthcare/

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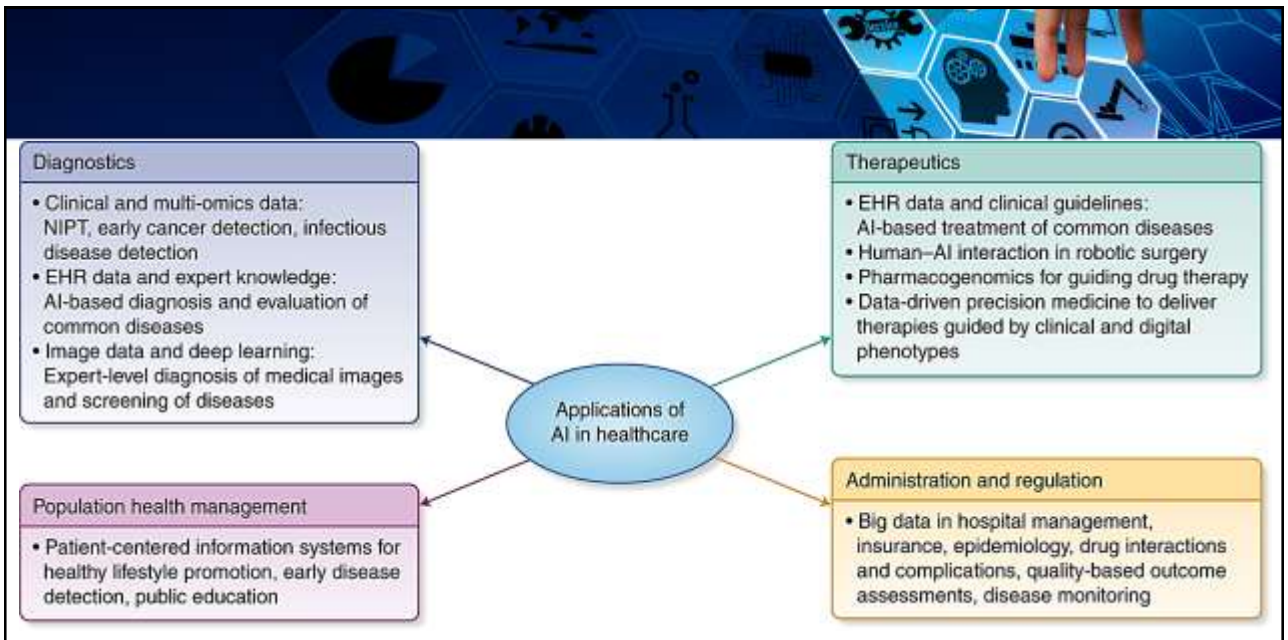

He, J., Baxter, S.L., Xu, J. *et al.* The practical implementation of artificial intelligence technologies in medicine. *Nat Med* **25,** 30–36 (2019). https://doi.org/10.1038/s41591-018-0307-0

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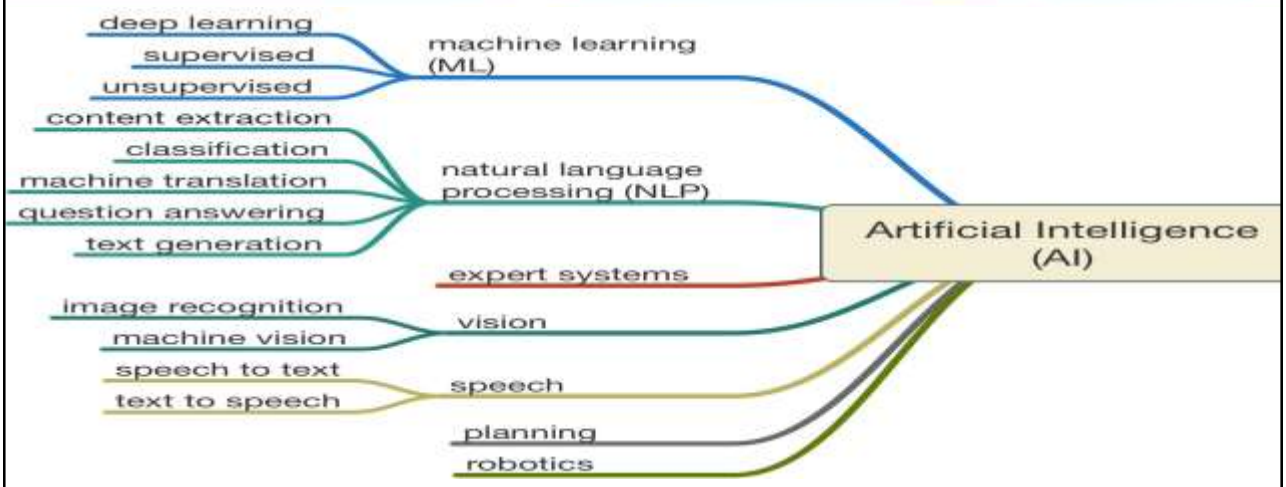
Focus on AI Branches



https://www.legalexecutiveinstitute.com/

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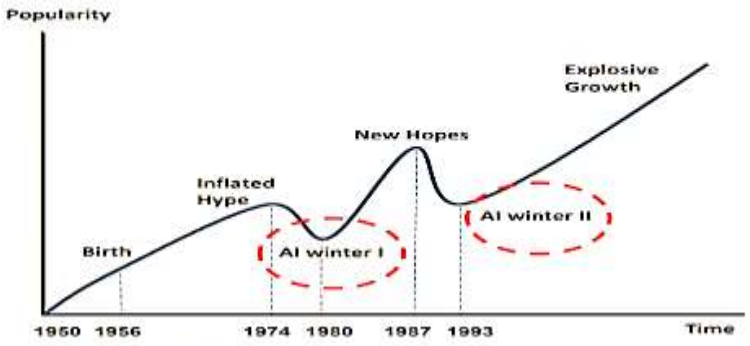
Artificial Intelligence

AI HAS A LONG HISTORY OF BEING "THE NEXT BIG THING"...



Timeline of AI Development

- **1950s-1960s**: First AI boom - the age of reasoning, prototype AI developed
- **1970s**: AI winter I
- **1980s-1990s**: Second AI boom: the age of Knowledge representation (appearance of expert systems capable of reproducing human decision-making)
- **1990s**: AI winter II
- **1997**: Deep Blue beats Gary Kasparov
- **2006**: University of Toronto develops Deep Learning
- **2011**: IBM's Watson won Jeopardy
- **2016**: Go software based on Deep Learning beats world's champions

Source: Literature review; Gao Feng analysis

7 Team Finland Future Watch Report, August 2017

TEAM FINLAND

https://www.actuaries.digital/2018/09/05/history-of-ai-winters/

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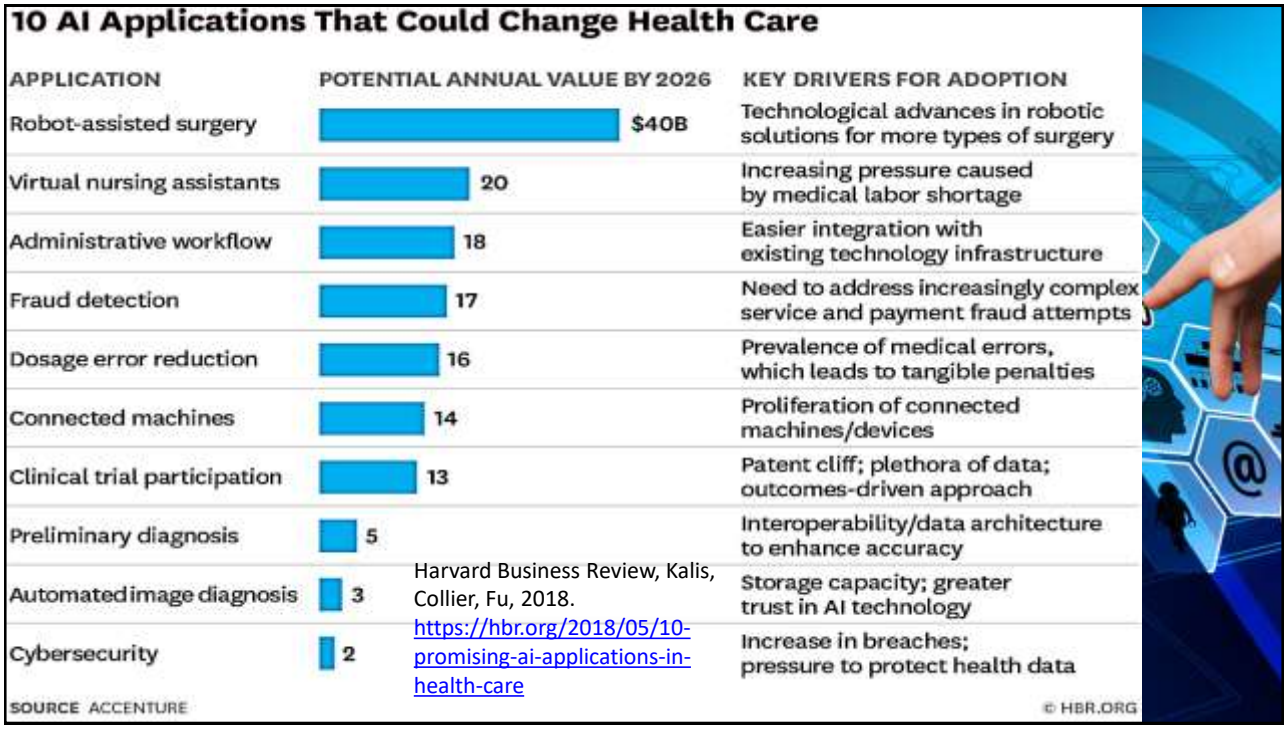


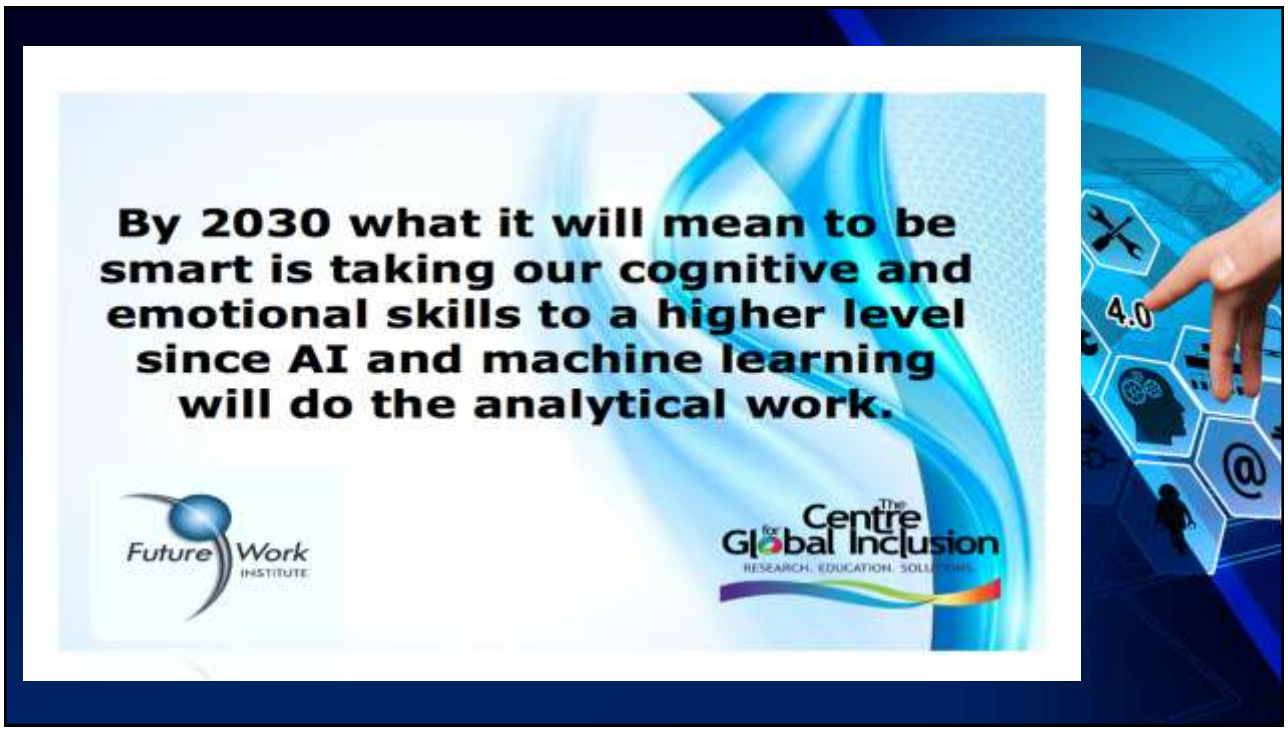
Harvard Business Review, Kalis, Collier, Fu, 2018. https://hbr.org/2018/05/10-promising-ai-applications-in-health-care

9

10

Pros and Cons of AI in Healthcare	
Pros	Cons
Improved specificity of diagnosis	Staff resistance
More rapid diagnosis	Increased equipment cost
Decreased treatment time	Need specialized staff
Integration of large amounts of data	Continued lack of interoperability
Decrease admissions	Privacy and security concerns
Decrease LOS	Loss of non-specialized staff
Improve time use with decreased unnecessary tasks	Lack of patient trust

11



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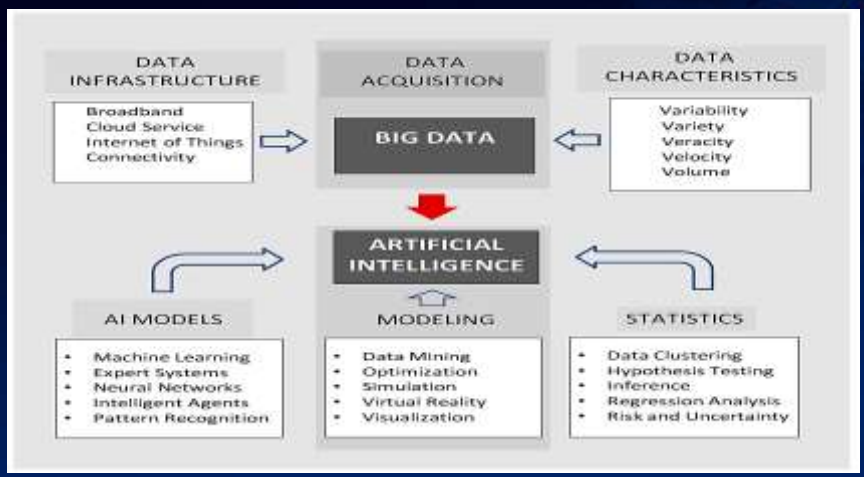
Cognitive Skills

- Informatics Concepts
  - Data Science
  - Information retrieval and synthesis
  - Statistics and evidence-based medicine appraisal
  - Interpretation of predictive models
  - Evaluation of diagnostic performance measures
  - Avoidance of Data Bias
- Innovation/Entrepreneurship

13

Data Drives Artificial Intelligence



Benke, K.; Benke, G. Artificial Intelligence and Big Data in Public Health. *Int. J. Environ. Res. Public Health* **2018**, *15*, 2796.

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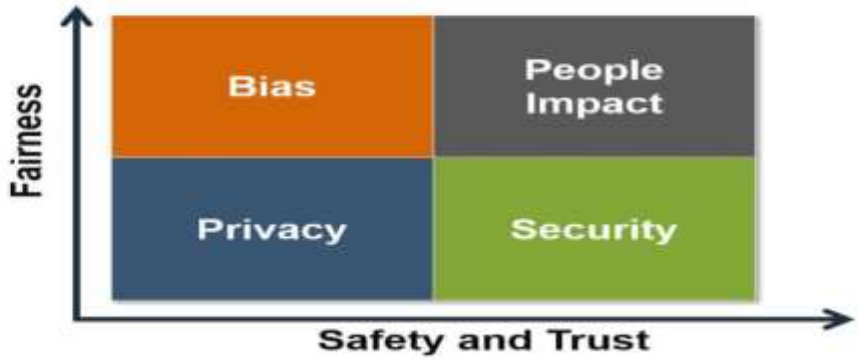
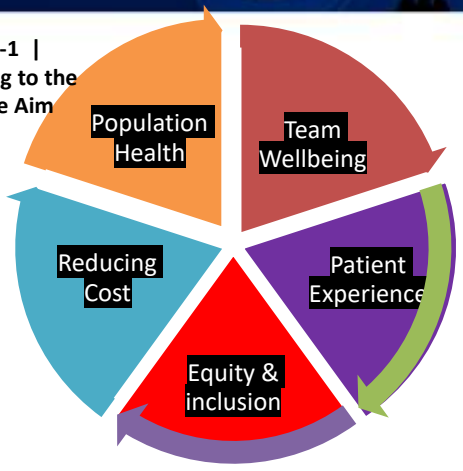
A Framework For Ethics of Data and AI



https://joshbersin.com/2019/05/the-ethics-of-ai-and-people-analytics-four-dimensions-of-trust/

15

FIGURE S-1 | Advancing to the Quintuple Aim



Matheny, M., S. Thadaney Israni, M. Ahmed, and D. Whicher, Editors. 2019. Artificial Intelligence in Health Care: The Hope, the Hype, the Promise, the Peril.

16

Human Skills

- Trust
- Counseling
- Physical Examination with Touch
- Respectful Communication
- Patient Centered
- Empathy

17

Enhancing Empathy

- Improve Healthcare Outcomes
- Improve Patient and Family Wellbeing
- Increase Patient Satisfaction
- Improves Medication Adherence

- Reduce Medico-Legal Risk
- Reduce Clinician Burnout
- Decreases Readmissions

18

19

AI Near You

- University
  - Math
  - Engineering
    - Materials Design
    - Cybersecurity
  - Art
    - Fashion Design
  - Business
    - Entrepreneurship
  - Law
  - Policy
- Hospital
  - Chief Informatics Officer
  - Office of Healthcare Innovation

20

AI Resources

- **Regional/National**
  - **Office of the National Coordinator for Health Information Technology (ONC)**
  - **National Library of Medicine**
  - **CMS**
  - **AHRQ**
  - **American Nurses Informatics Association**
  - **American Medical Informatics Association**
    - **Educators Forum**
  - **Healthcare Information and Management Systems Society**
  - **SONSIEL- Society of Nurse Scientists, Innovators, Entrepreneurs & Leaders**

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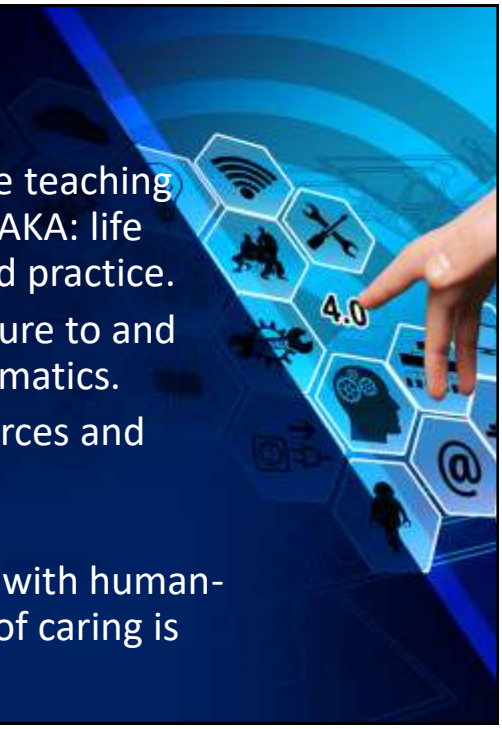
Take Home Messages

- Many nursing faculty are not comfortable teaching advanced healthcare informatics topics (AKA: life beyond the EHR) and need education and practice.
- Nursing students at all levels need exposure to and practice using advanced healthcare informatics.
- Nursing students need curriculum, resources and opportunities to innovate and become entrepreneurs.
- Nursing faculty must balance innovation with human-centered care delivery to ensure the art of caring is not overshadowed by technology.



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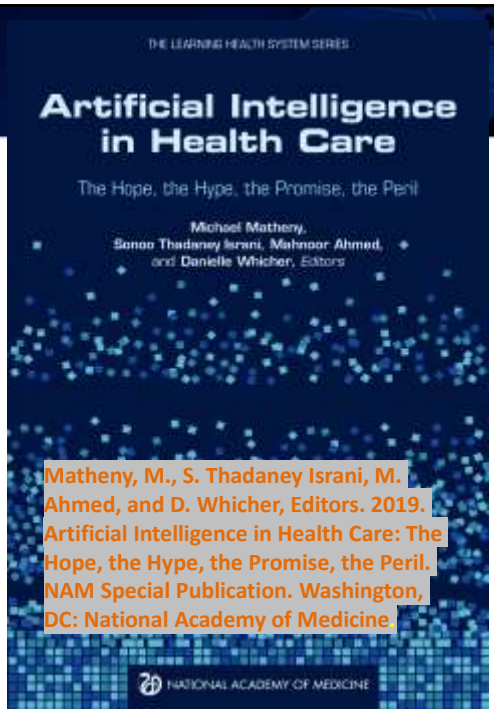

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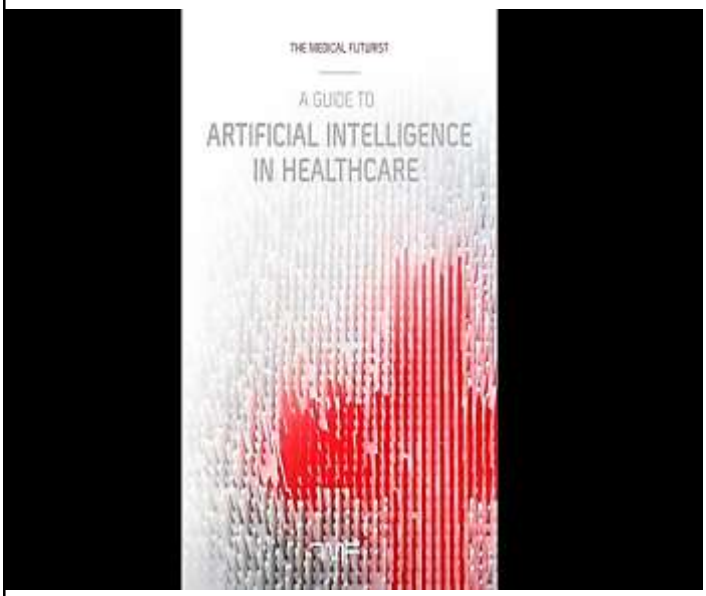

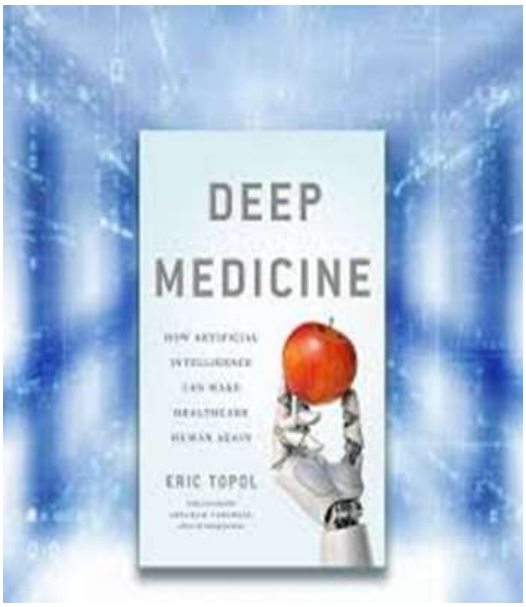

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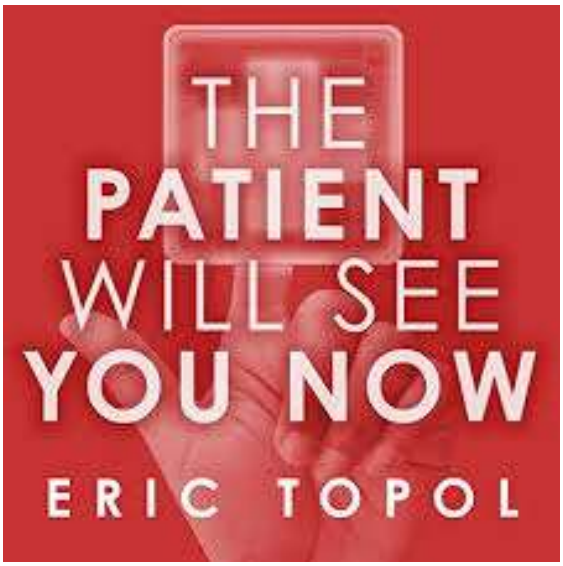
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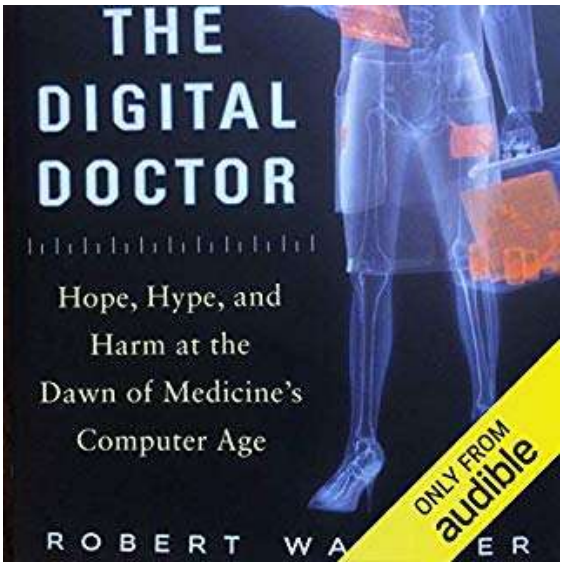
WILL SEE
YOU NOW
ERIC TOPOL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Hope, Hype, and
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Dawn of Medicine's
Computer Age
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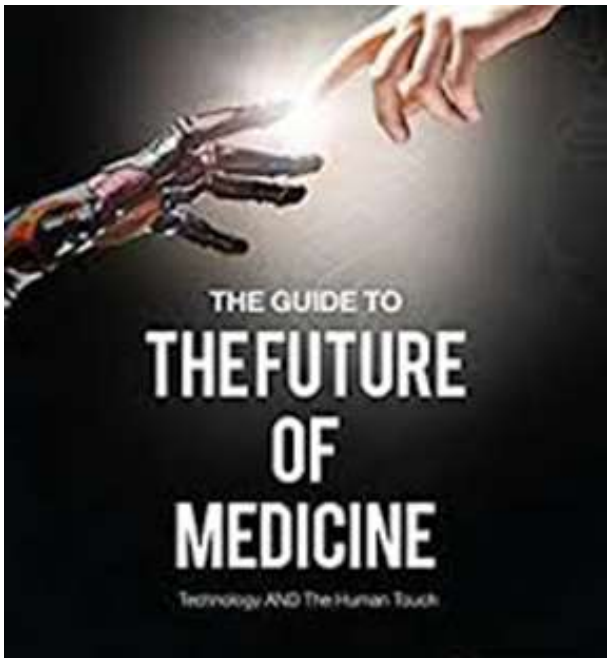
THE GUIDE TO
THE FUTURE
OF
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Technology AND The Human Touch

AI
IN
HEALTHCARE
DEFINING
THE ROADMAP
PURESTORAGE

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Contact Information

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School of Nursing

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