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International Academic Collaborations: Impact on the globalization of care, education, and clinical research

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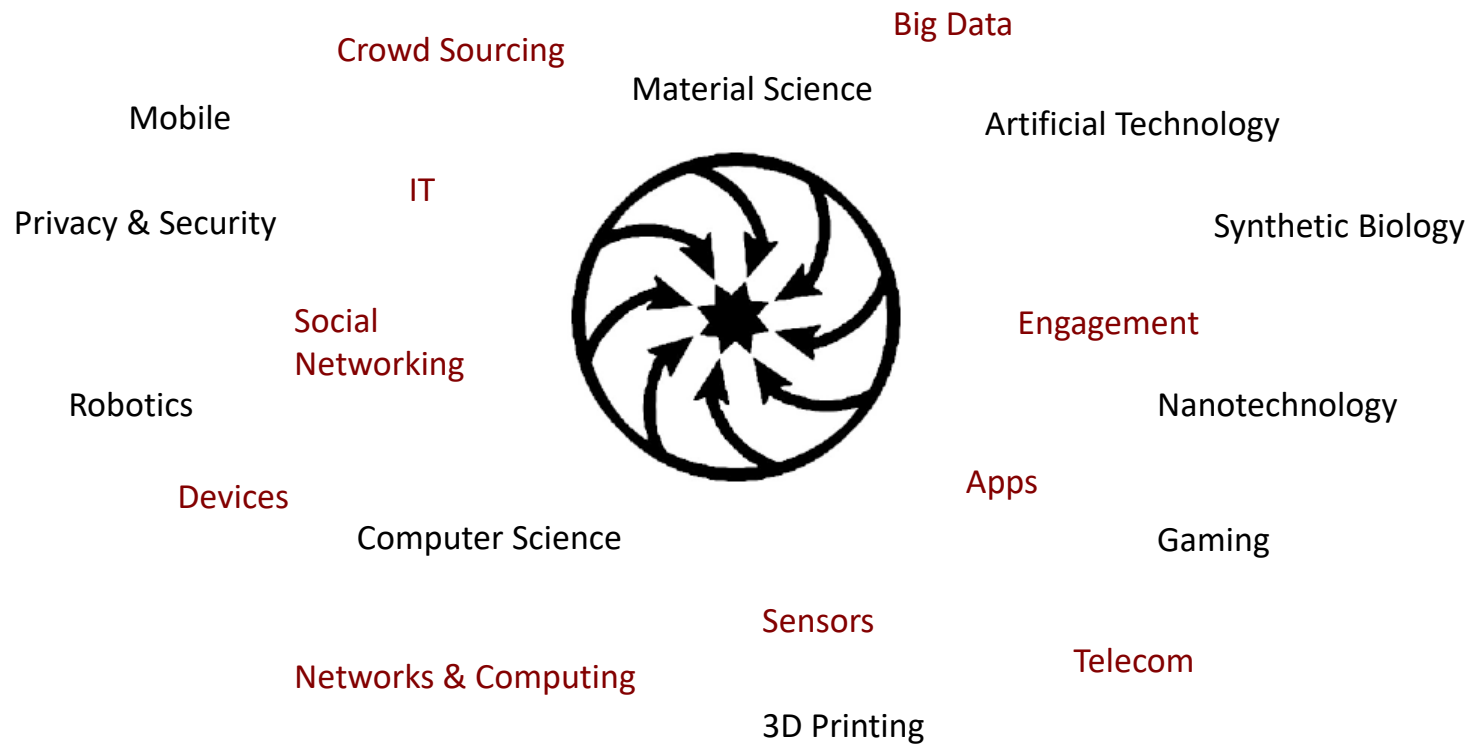
Setting the Stage: The “Fourth Industrial Revolution”

1. Steam power
2. Electricity
3. Digital
4. And now: the “technologic convergence”

Moving from a print-based industrial society
to a technology-based Internet society¹

1. Susskind R and Susskind D. *The Future of the Professions*. 2015: Oxford University Press.

THE TECHNOLOGIC CONVERGENCE



- Slide attributed to Daniel Kraft, Singularity University -

A few game-changing technologies²

- Portable Diagnostics
- AI in decision-making
- The end of human experiments
- Augmented reality
- Social media
- DIY biotechnology
- Direct-to-consumer genomics
- Surgical and other robots
- Augmenting human features
- Nanorobots in our bloodstream

2. The Medical Futurist, 4/12/16.

Fundamental changes in medicine and science are on the way

- 21st century trends are transforming some of the most basic and timeless qualities of medicine and research:
 - A medical and research marketplace driven by technology, AI, and consumer empowerment
 - The nature of the “guild” and the locus of knowledge
 - The sacrosanct doctor-patient relationship
 - The lone (“heroic”) investigator
 - Focus on precision medicine - ?future of clinical trials?

The role of academic health centers

- The mission of academic health centers is to *educate* the next generation of health professionals, conduct basic and clinical *research*, and provide comprehensive *patient care* and *population health*
- They are increasingly working globally in all these mission areas

Critical observation

- Despite differences in health system, culture, language, and economy, academic health centers are united in their goal to align education, research, and patient care with each other, so as to ultimately create a *real-time learning healthcare system*
- To do so requires knowledge of best practices in a highly technologically connected world

Some key 21st century challenges for academic health centers

1. Adapt to the “care anywhere” model

- Technology is moving with and inside the patient’s body, wherever the patient may be
- Large, social networks will form dense, dynamic data clouds
- Consumers and funders want answers and actions quickly and where possible in real time

Some key 21st century challenges for academic health centers

2. *Work with global teams*

- Need to overcome the lead author and principle investigator bias in academe
- Figure out how to gain the most value from team research
- Fund research models that are more flexible, supportive, adaptable, and recurrent

Some key 21st century challenges for academic health centers

3. Enhance expertise in using large, multi-ethnic data sets

- Collections of huge meta-data sets are becoming standard for patients, eventually leading to continuous monitoring
- A new interpretive and functional infrastructure is required to manage this data
- Locus of decision-making is shifting to the cloud

Do the math...

“The new tools for tailoring treatment will demand a greater tolerance of uncertainty and greater facility for calculating and interpreting probabilities than we have been used to as [researchers], physicians and patients ...Assessing and acting on these probabilities will require approaches to data presentation, risk quantification, and communication of uncertainty for which we are largely ill equipped and that we already struggle with.”³

3. Hunter DJ. *Uncertainty in the era of Precision Medicine. NEJM 2016;375:711-713.*

Some key 21st century challenges for academic health centers

4. *Work closely with the tech sector*

- Collaboration and partnerships are critical
- New rules for transnational intellectual property, funds flows, and patents
- Risks increase but so do the rewards

Some key 21st century challenges for academic health centers

5. Effectively manage artificial intelligence platforms

- Develop and manage an interface that is meaningful and directive
- Separate “real” from “fake”
- Take the lead on rational, human-based decisionmaking

International collaborations in health professions education

- Are common and growing rapidly
 - Faculty and students are seeking international partners at a high rate
- The field is moving slowly but gradually towards international standards in education, research, and patient care

International collaborations in clinical research

- Creation of large, ethnically diverse research databases and biobanks are well underway
- A new interpretive and functional infrastructure is required to manage, understand and use this data

International collaborations in patient care and population health

- Moving from disease-specific epidemics to broader therapeutic and preventive measures
- Many, if not most, patients will be continuously monitored wherever they happen to be at the time
 - As a result, the locus of care shifts from the office to the cloud and, when necessary, to local resources and expertise

Impact of international collaborations on the business model

- Health insurance will need to adapt to a more global model of payment
- Faculty salaries and student tuition will need some kind of community-based standard
- Research costs and intellectual property issues are in need of some kind of standardization

Concluding comments

- International collaborations among academic health centers will significantly increase for the foreseeable future
- New models are needed to address standards for education, research, authorship, patents, and insurance and other payments
- Ultimately, academic health centers will be viewed in a dominantly global context

Thank you!



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