From the Longwood Medical Area to Oregon: An Informatics Career Journey

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Goals for talk

- My journey from computer science to medicine and back
- Recent career transition
- Reflections on personal and departmental accomplishments in informatics research and education at OHSU
- Leave time for discussion and advice

Jay Cummings @LongFormMath · 6h
When you were a carefree tenured professor living your best life, and then are suddenly forced to chair your department
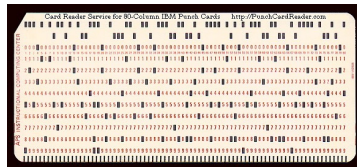
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From computer science to medicine

- High school
  - First exposure in 1973 to HP 9830A with one-line LED display, thermal printer, and cassette "mass storage"; programmed in BASIC
- Off to college in 1976 to University of Illinois starting as computer science major
  - Two reasons to attend: tuition $293/semester and world-renowned computer science department
  - Most exciting part was bit-mapped graphics on PLATO
  - But punch cards and programming in PL/1 less so
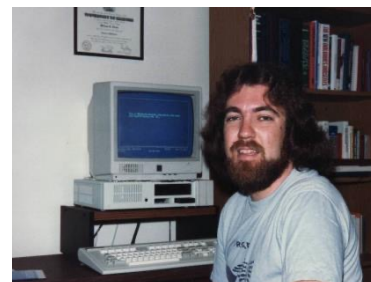 - Changed major to Biology in 1978 and pursued medical school

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From medicine back to computing

- **While in medical school, restarted with a Commodore 64 – 1983**
  - 64K RAM, 5¼" floppy drive, and 300 baud modem
- **Joined the PC world – 1984**
  - IBM PCJr souped up to 640K RAM, 20 MB hard disk, and 2400 baud modem
  - Much early programming in Turbo Pascal
- **Started going online – mostly Compuserve MEDSig**

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Internal medicine residency, 1984-1987

- Continued devoting spare time to computing "hobby"
- When on wards, maintained database of patients, with fresh printout for my clipboard each day
  - Don't tell the HIPAA police!
- Contemplating pursuing General Internal Medicine Fellowship but someone suggested to look into "informatics"
  - No Google – had to call or write letters to NLM program directors

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NLM informatics fellowship, 1987-1990

- Joined lab of Robert Greenes, MD, PhD at Brigham & Women's Hospital for postdoc fellowship
  - Moved to Mac
- First use of Internet – main apps were email, FTP, and telnet
  - Read about World Wide Web in 1989 but thought Internet was too slow for it
- Discovered information retrieval (IR, aka search)
  - Most in informatics still working on first-generation AI systems
  - Most biomedical IR activity at NLM, e.g., ELHILL and Grateful Med
  - Participated in development of UMLS Metathesaurus applied to develop and evaluate IR systems
  - Developed IR capability for a Hypercard-based system of nephrologist Burton Rose, MD of Brigham that would later become Up To Date

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Reminisces about fellowship

- Take advantage of last opportunity for learning time and serendipity
- Establish mentors
- Many of your colleagues now will be colleagues for life
- Get to know wide range of people in field, especially those with diverse activities and viewpoints

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First faculty position, 1990

- As fellowship ending, looking for a job
  - Came to know J. Robert (Bob) Beck, MD, who left Dartmouth for OHSU in 1989
- New program forming at OHSU with funding from NLM IAIMS grant
  - Earmark from Sen. Mark Hatfield (R-OR)
- Most physician informatics positions at time were academic
  - No academic informatics unit so first appointment in Internal Medicine
- First grant in 1991 – NLM R29

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Computing and informatics in the 1990s

- Saw first live Web browser at NLM in 1992 (NCSA Mosaic)
  - No doubt would be a game changer
  - Set up first Web server at OHSU – ran www.ohsu.edu on a NeXT machine in my office
- IR becoming mainstream via Web search engines in late 1990s
  - Why didn't I think of ranking search output by how many Web pages point to a page?
- Connectivity
  - First @Home broadband around 1998

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Start of informatics at OHSU

- In 1989, OHSU recruited Dr. Beck to head IAIMS program, who came with Kent Spackman, MD, PhD
- In 1990, Dr. Beck recruited Assistant Professors William Hersh, MD and Mark Helfand, MD, MS, both with academic appointments in Department of Medicine
- Also recruited first fellow, Paul Gorman, MD
- In 1992, OHSU and Dr. Beck awarded initial NLM T15 (initially postdocs only)
- Around that time, Joan Ash was working OHSU Library while completing PhD at Portland State University

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Some setbacks but more successes

- In 1990, Oregon voters approved Measure 5 property tax limitation, which led to OHSU budget cuts and reductions in commitments to BICC
  - Dr. Beck left OHSU in 1992
  - Leadership of academic informatics assumed by Dr. Spackman
- But many other early successes
  - Dr. Gorman awarded NLM R29 in 1995
  - Dr. Hersh awarded NLM U01 for applied EHR research in 1995
  - AHRQ Evidence-Based Practice Center (EPC) awarded in 1997 under leadership of Dr. Helfand
  - Dr. Ash funded to study "physician order entry" by philanthropist Paul Mongerson in 1997, leading to her first NLM R01 in 2000

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Toward DMICE

- SOM Dean Joseph Bloom, MD noted informatics group was coalescing and needed to form a recognized unit
- In 1997, free-standing Division of Medical Informatics & Outcomes Research (DMIOR) established with Dr. Hersh as Head
  - At OHSU, free-standing divisions act as departments in everything but name
- In 2003, SOM Dean Joseph Robertson, MD, MBA established Department of Medical Informatics & Clinical Epidemiology (DMICE), with Dr. Hersh as first Chair

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A passion I never knew I had: education

- Started teaching introductory informatics course as PH 549 elective in OHSU Master of Public Health Program in 1993
- Began planning for first graduate program, Master of Science in Medical Informatics in 1994
- After state approval, matriculated 7 students in 1996
- Courses numbered with MINF prefix
  – Introductory course became MINF 510
- First graduates of program in 1998

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Syllabus for first offering of introductory course

Public Health 549 -- Introduction to Medical Informatics

William Hersh, M.D., Course Director
Fall Quarter, 1993
3 credit hours
Time -- Wednesday 9/22-12/1, 4:00-6:30 PM
Location -- 531 BICC Building

Objectives:
This course is designed to introduce the fundamental principles of medical informatics. The course will be taught so that individuals with various backgrounds, including those with medical, nursing, library science, or computer science backgrounds, can become familiar with information management in medicine, computer applications in medicine, and the fundamentals of medical decision making, artificial intelligence, and information retrieval.

Textbook:
Medical Informatics: Computer Applications in Health Care, Edward H. Shortliffe, Leslie E. Perreault, editors. Addison-Wesley, 1990. (Available in OHSU Bookstore.)

Instructors:
BH -- William Hersh, MD
KS -- Kent Spackman, MD, PhD
JE -- Jim Elert
HJ -- Holly Jimison, PhD
MH -- Mark Helfand, MD, MPH

Topic outline (Corresponding textbook chapters and lecturers):
9/22 -- Introduction to Computers and Their Medical Applications (1, 4), (BH)
9/29 -- Medical Data, Information, and Knowledge (2), (BH, HJ)
10/6 -- Medical Decision Making (3), (HJ)
10/13 -- Information Retrieval (14), (BH)
10/20 -- Clinical Information Systems I - Overview, Hospital (6, 7), (KS)
10/27 -- Clinical Information Systems II - Lab, Nursing, Ambulatory, Systems Perspective (8, 9, 13), (KS, JE)
11/3 -- Clinical Research Systems and Outcomes Research (16), (MH)
11/10 -- Expert Systems and Decision Support Tools (15), (BH)
11/17 -- User-System Interaction: User Interface, Needs Assessment (HJ)
11/24 -- Health Care Policy and Technology Assessment (19), (KS, HJ)
12/1 -- Student Paper Presentations, Wrap-Up

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Subsequent educational program milestones

- 1999 – first online course – MINF 510 converted to online format
- 2000 – Graduate Certificate approved and launched
- 2002 – MS approved for online delivery, non-thesis Master of Medical Informatics (MMI) established
- 2003 – PhD program approved and launched, with program name changed to Biomedical Informatics
- 2007 – first PhD graduate, Adam Wright

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More educational accomplishments

- 2005 – establishment of 10x10 ("ten by ten") program
  - Standalone version of BMI 510 offered in partnership with AMIA
- 2010 – awarded $5.8M for health IT workforce development in HITECH Act
  - One of five Curriculum Development Centers (CDCs)
  - Designation as National Training and Dissemination Center to support CDCs
  - One of nine University-Based Training (UBT) Programs, which funded students in Graduate Certificate and MBI programs
- 2013 – grant from AMA for Accelerating Change in Medical Education
  - Competencies for clinical informatics in medical education (Hersh, AMEP, 2013)
  - Opened door to clinical informatics curriculum in MD program
- 2015 – launched ACGME-accredited Clinical Informatics Fellowship
  - First of four programs (now ~55) – half-dozen of which use OHSU online courses

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Where we are today

Degree	Total	BCB	HCIN
Grad Cert	483	0	483
Master's	422	71	351
PhD	38	15	23
Total	943	86	857

International students from: Argentina, Singapore, Egypt, Israel, Saudi Arabia, Zimbabwe, Thailand, China, South Africa, and others

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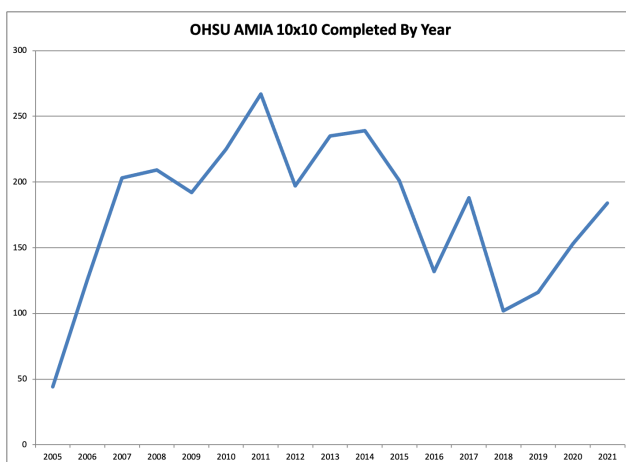# 10x10 – passed milestone of 3000 by 2022

OHSU AMIA 10x10 Completed By Year

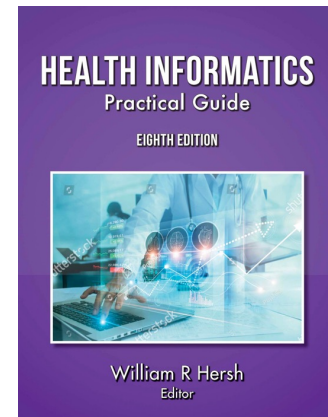| Organization	Course Offerings	People Completing
AMIA	48	1953
American College of Emergency Physicians	14	221
American College of Physicians	1	25
Academy of Nutrition and Dietetics	7	126
Centers for Disease Control	1	18
California Health Care Foundation	1	16
Gateway Consulting (Singapore)	26	377
Ministry of Health (Israel)	1	11
King Saud University (Saudi Arabia)	4	83
Mayo Clinic	2	87
New York State Academy of Family Practice	3	22
Abu Dhabi Health Services (United Arab Emirates)	1	54
Scottsdale Institute	1	15
Society for Technology in Anesthesiology	1	5
Total	111	3013

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Other numbers and accomplishments for introductory course

- BMI 510 and predecessors – 1598 from 1996 through 2022
- Other customized offerings – Mayo Clinic, Kaiser Permanente, Bangkok Hospital, H3ABionet
- Course for medical students early in pandemic – 222 students from 17 medical schools in early-mid 2020
  - Still available to OHSU medical students as MINF 705B/709A elective
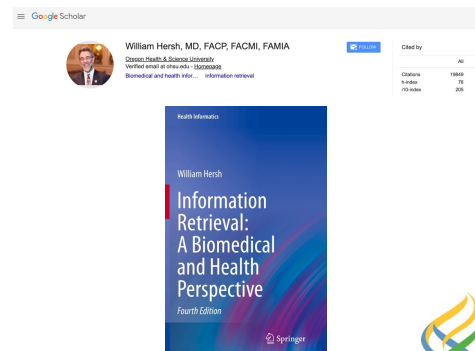
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Also active in research

- Main effort in IR (aka search)
- Early focus on access to knowledge-based resources by clinical users (JAMA, 1998)
- Have played central role in biomedical tracks of Text Retrieval Conference (TREC; https://trec.nist.gov) annual IR challenge evaluations
- Current focus on EHR data for use cases of
  - Cohort retrieval (2017, 2020)
  - Detection of rare diseases (2020, 2022)
- Other areas of research
  - Systematic reviews – telemedicine (2001, 2002, 2006), health information exchange (2015)
  - Characterizing workforce (2006, 2008, 2018)

How Well Do Physicians Use Electronic Information Retrieval Systems?

A Framework for Investigation and Systematic Review

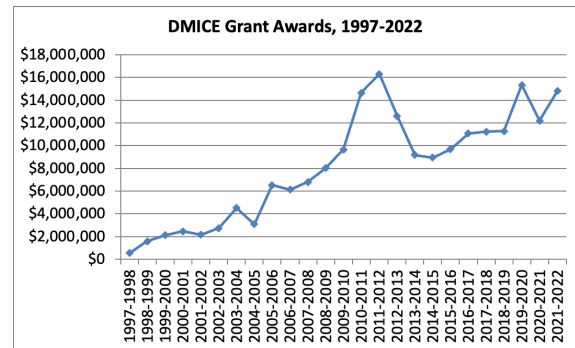William R. Hersh, MD; David H. Hickam, MD, MPH

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Current status of DMICE

- Recognized national and international leader in biomedical informatics and clinical epidemiology
  - NLM T15 largest and second-longest training grant at OHSU (131 trainees, $22M)
- Stepped down as Chair in January 2023
  - Karen Eden, PhD appointed Interim Chair
  - Recruitment for permanent Chair likely to be launched later in 2023

DMICE Grant Awards, 1997-2022

Over $200M since 1997

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What will I do when I am no longer Chair?

- BMI 510, 10x10, and MINF 705B/709A
- NLM R01 – *Semi-structured Information Retrieval in Clinical Text for Cohort Identification,* 2021-2026
- NIH Data Science Initiative for Africa, *Computational Omics and Biomedical Informatics Program (COBIP),* 2021-2026
- NLM R25, *Attracting Talented and Diverse Students to Biomedical Informatics and Data Science Careers Through Short-Term Study at OHSU,* 2022-2027
- DMICE collaborations
  - Cohen, *Identification of Patients with Previously Undiagnosed AADC Deficiency,* PTC Therapeutics, 2021-2023
  - Dorr, *Voice as a Biomarker of Health,* NIH Bridge2AI, 2022-2027

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Thank you!

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