BIOGRAPHICAL SKETCH

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NAME: William Hersh, MD, FACP, FACMI, FAMIA, FIAHSI

eRA COMMONS USER NAME (credential, e.g., agency login): hershw

POSITION TITLE: Professor, Department of Medical Informatics & Clinical Epidemiology, School of Medicine, Oregon Health & Science University, Portland, OR

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
University of Illinois, Champaign-Urbana, IL	BS	08/1976	12/1979	Biology
University of Illinois, Chicago, IL	MD	08/1980	06/1984	Medicine
University of Illinois Hospital, Chicago, IL	Residency	07/1984	06/1987	Internal Medicine
Harvard University, Boston, MA	Postdoc Fellowship	08/1987	06/1990	Medical Informatics
Harvard University Extension School, Cambridge, MA	Certificate	08/1987	06/1990	Computer Science

A. Personal Statement

I am a Professor in the Department of Medical Informatics & Clinical Epidemiology (DMICE) in the School of Medicine at Oregon Health & Science University (OHSU) in Portland, Oregon, USA. I served as the Inaugural Chair of DMICE from 2003-2022.

I am a leader and innovator in biomedical informatics both in education and research. In education, I developed and continue to serve as Director of all of OHSU's graduate biomedical informatics education programs, including the Master of Science, the Master of Biomedical Informatics, the Graduate Certificate, and the Doctor of Philosophy. I am also the Director of OHSU's National Library of Medicine (NLM) Biomedical Informatics Training Grant (T15), which was recently competitively renewal for a 7th five-year cycle. I spearheaded OHSU's efforts in distance learning for biomedical informatics, which are available up to the master's degree level. In addition, I conceptualized and implemented the first offering of the American Medical Informatics Association (AMIA) 10x10 ("ten by ten") program, which has been completed by over 3000 individuals. I also serve as Director of the AMIA Clinical Informatics Board Review Course, and am active in implementation of the new medical subspecialty of clinical informatics. I also am Editor of the textbook, *Health Informatics: Practical Guide, Eighth Edition* (Lulu.com, 2022).

I have also made many contributions in research. My research originally focused in the area of information retrieval (IR, also known as search), where I have authored over 200 scientific papers and abstracts as well as the book, *Information Retrieval: A Health and Biomedical Perspective* (Springer, 2020), recently updated in its fourth edition. I have been interested in developing and evaluating IR systems and users in the biomedical domain. More recently, I have focused on the application of IR techniques to patient cohort discovery and rare disease surveillance from the electronic health record. Other areas have included producing systematic reviews of informatics-related topics and assessing the size and characteristics of the informatics workforce. I have been elected to honorific societies both in biomedical informatics (American College of Medical

Informatics and International Academy of Health Sciences Informatics) and computer science (SIGIR Academy).

Ongoing and completed research projects pertinent to this project include:

1. *Semi-structured Information Retrieval in Clinical Text for Cohort Identification*

R01LM011934 Liu/Hersh (MPI) 8/2021-4/2026
Develop information retrieval techniques for cohort identification based on clinical text.

2. *Biomedical Informatics Research Training at Oregon Health & Science University*

T15LM007088 Hersh (PI) 7/2007-6/2027
Predoctoral and postdoctoral training grant in biomedical informatics.

3. *Implementing USPSTF Recommendations for Breast Cancer Screening and Prevention by Integrating Clinical Decision Support Tools with the Electronic Health Record*

R01HS027796 Eden (PI) 9/2020-9/2025
To demonstrate the ability of the EHR to securely exchange information with MammoScreen using interoperable, standards-based approaches; provide appropriate clinical and patient decision support for users; and to evaluate its use among patients and clinicians using mixed methods based on the RE-AIM framework.

4. *Computational Omics and Biomedical Informatics Program (COBIP)*

U2RTW012131 Mutsvanga/Hersh (MPI) 9/2021-7/2026
Develop an interdisciplinary computational omics and biomedical informatics program to train African biomedical data scientists.

5. *Voice as a Biomarker of Health*

1OT2OD032720 Bensoussan (PI) 9/2022-8/2026
The build workforce and skills expertise for the Bridge2AI program in a project devoted to building an ethically sourced, bioaccoustic database to understand disease.

6. *Attracting Talented and Diverse Students to Biomedical Informatics and Data Science Careers Through Short-Term Study at OHSU*
NLM R25LM014207 Hersh (PI) 9/2022-6/2027

7. *A Turn-Key EHR Simulation Program to Reduce Diagnostic Error in Ambulatory Care*

R18HS027119 Gold (PI) 9/2019-6/2024
Develop and validate a library of EHR based simulation exercises designed to reduce the likelihood of diagnostic error across 5 major ambulatory care specialties, and create, using Fast Healthcare Interoperability Resources (FHIR), a novel simulation tool which will allow for importation of these simulated charts into the major EHR vendors in the U.S.

Four publications (choose) pertinent to this project include:

1. Mohan V, Abbott P, Acteson S, Berner ES, Devlin C, Hammond WE, Kukafka R, **Hersh W**, Design and evaluation of the ONC health information technology curriculum, *Journal of the American Medical Informatics Association*, 2014, 21: 509-516. PMC3994849.
2. **Hersh W**, Boone KW, Totten AM, Characteristics of the healthcare information technology workforce in the HITECH era: underestimated in size, still growing, and adapting to advanced uses, *JAMIA Open*, 2018, 1: 188-194. PMC6952018.

3. Chamberlin SR, Bedrick SD, Cohen AM, Wang Y, Wen A, Liu S, Liu H, **Hersh WR**, Evaluation of patient-level retrieval from electronic health record data for a cohort discovery task, 2020, *JAMIA Open*, 3: 395-404. PMC7660955.
4. **Hersh W**, Cohen A, Nguyen M, Bensching K, Deloughery T, Clinical study applying machine learning to detect a rare disease: results and lessons learned, *JAMIA Open*, 2022, 5(2):ooac053, PMC9243401.
5. **Hersh WR**, Competencies and curricula across the spectrum of learners for biomedical and health informatics, *Achievements, Milestones and Challenges in Biomedical and Health Informatics*, 2022, 93-107.
6. Bichel-Findlay J, Koch S, Mantas J, Abdul SS, Al-Shorbaji N, Ammenwerth E, Baum A, Borycki EM, Demiris G, Hasman A, **Hersh W**, Hovenga E, Huebner UH, Huesing ES, Kushniruk A, Lee KH, Lehmann CU, Lillehaug SI, Marin HF, Marschollek M, Martin-Sanchez F, Merolli M, Nishimwe A, Saranto K, Sent D, Shachak A, Udayasankaran JG, Were MC, Wright G, Recommendations of the International Medical Informatics Association (IMIA) on education in biomedical and health informatics: second revision, *International Journal of Medical Informatics*, 2023, 170: 104908.

B. Positions, Scientific Appointments and Honors

Positions

2003-2022	Chair, Department of Medical Informatics & Clinical Epidemiology, OHSU
2001-present	Professor, Department of Medical Informatics & Clinical Epidemiology, OHSU
1997-2007	Associate Director, Evidence-Based Practice Center, OHSU
1997-2003	Head, Division of Medical Informatics & Outcomes Research, OHSU
1996-present	Director, Graduate Program in Biomedical Informatics, OHSU
1995-2001	Associate Professor, OHSU
1990-1995	Assistant Professor, OHSU
1989-1990	Instructor in Medicine, Harvard Medical School

Scientific Appointments

2020-2022	President, International Academy of Health Sciences Informatics
2018-present	Scientific Advisory Board, Health and Human Heredity in Africa Bioinformatics Network (H3ABionet), University of Cape Town, South Africa
2013-present	Director, Clinical Informatics Subspecialty Board Review Course, American Medical Informatics Association
2009-present	Gateway to Health Informatics Online Course, Singapore
2008-2011	Member, Board of Scientific Counselors, National Center for Public Health Informatics, Centers for Disease Control and Prevention
2006-2008	Chair, National Informatics Steering Committee, Clinical & Translational Science Award Program, National Institutes of Health
2006-2012	Chair, Education Working Group, International Medical Informatics Association
2006-2014	Director, Biomedical Informatics Program, Oregon Clinical & Translational Research Institute, OHSU
2005-present	Director, AMIA-OHSU 10x10 Program
2005-2010	Co-Editor, *Information Retrieval Journal*
2003-2009	Chair, Medical Informatics Subcommittee, American College of Physicians
1997-2003	Editorial Board, *Journal of the American Medical Informatics Association*
1999-2003	Secretary, American Medical Informatics Association

Honors

2022	AMIA William W. Stead Award for Thought Leadership in Informatics
2022	Member, ACM Special Interest Group in Information Retrieval (SIGIR) Academy
2019	Founding Fellow, American Medical Informatics Association (FAMIA)
2017	Inaugural Fellow, International Academy of Health Sciences Informatics (FIAHSI)
2015	HIMSS Physician IT Leadership Award

2008 AMIA Donald A.B. Lindberg Award for Innovation in Informatics
2007 Distinguished Faculty Award – Outstanding Teaching, OHSU Faculty Senate
1996 Fellow, American College of Medical Informatics (FACMI)
1994 Fellow, American College of Physicians (FACP)
1980 Bachelor of Science with Distinction, University of Illinois

C. Contributions to Science

1. My initial research focused on the development and implementation of information retrieval (IR, also called search) systems in biomedicine and health. I experimented with concept-based approaches to indexing and retrieval of knowledge-based information. Subsequently, I found that methods for evaluation systems were inadequate, and developed an interest in new approaches to evaluation. My interests in search have also evolved with the emergence of new content for retrieval, such as medical images and electronic health record data. My recent work focuses on IR needs in the setting of pandemics with rapidly emerging publications and evolving information needs. I am also the author of a textbook in the field.
    a. Hersh WR, Greenes RA, SAPHIRE: an information retrieval system featuring concept matching, automatic indexing, probabilistic retrieval, and hierarchical relationships, *Computers and Biomedical Research*, 1990, 23: 410-425.
    b. Hersh WR, Crabtree MK, Hickam DH, Sacherek L, Friedman CP, Tidmarsh P, Moesbaek C, Kraemer D, Factors associated with success for searching MEDLINE and applying evidence to answer clinical questions, *Journal of the American Medical Informatics Association*, 2002, 9: 283-293. PMC344588.
    c. Hersh W, *Information Retrieval: A Biomedical and Health Perspective, 4th Edition*, New York: Springer, 2020.
    d. Roberts K, Alam T, Bedrick S, Demner-Fushman S, Lo S, Soboroff I, Voorhees E, Wang LL, Hersh WR, Searching for answers in a pandemic: an overview of TREC-COVID, *Journal of Biomedical Informatics*, 2021, 121:103865, PMC8264272.

2. My work in IR has converged with additional interest in the re-use (or secondary use) of clinical (especially electronic health record) data. The focus of this work has been on the use cases of cohort retrieval and identification of patients with possible rare disease diagnoses.
    a. Voorhees E, Hersh W, Overview of the TREC 2012 Medical Records Track, *The 21st Text Retrieval Conference - TREC 2012*. http://trec.nist.gov/pubs/trec21/papers/MED12OVERVIEW.pdf.
    b. Chamberlin SR, Bedrick SD, Cohen AM, Wang Y, Wen A, Liu S, Liu H, Hersh WR, Evaluation of patient-level retrieval from electronic health record data for a cohort discovery task, *JAMIA Open*, 2020, 3: 395-404, PMC7660955.
    c. Cohen A, Chamberlin S, Deloughery T, Nguyen M, Bedrick S, Ko JJ, Amin J, Wei A, Hersh W, Detecting rare diseases in electronic health records using machine learning and knowledge engineering: case study of acute hepatic porphyria, *PLoS ONE*, 2020, 15: e0235574, PMC7331997.
    d. Hersh W, Cohen A, Nguyen M, Bensching K, Deloughery T, Clinical study applying machine learning to detect a rare disease: results and lessons learned, *JAMIA Open*, 2022, 5(2):ooac053, PMC9243401.

3. I have also made contributions in conducting systematic reviews of evaluative research of informatics technologies. These reviews can be challenging because many evaluations use weak evaluation methodologies, in part because these technologies are tools rather than typical medical tests or treatments.
    a. Hersh WR, Hickam DH, How well do physicians use electronic information retrieval systems? A framework for investigation and systematic review, *Journal of the American Medical Association*, 1998, 280: 1347-1352.
    b. Hersh WR, Hickam DH, Severance SM, Dana TL, Krages KP, Helfand M, Diagnosis, access, and outcomes: update of a systematic review on telemedicine services, *Journal of Telemedicine and Telecare*, 2006, 12(Supp 2): 3-31.
    c. Stanfill MH, Williams M, Fenton SH, Jenders R, Hersh W, A systematic review of automated clinical coding and classification systems, *Journal of the American Medical Informatics Association*, 2010, 17: 646-651, PMC3000748.

d. Hersh W, Totten A, Eden K, Devine B, Gorman P, Kassakian S, Woods SS, Daeges M, Pappas M, McDonagh MS, Outcomes from health information exchange: systematic review and future research needs, *JMIR Medical Informatics*, 2015, 3(4): e39, PMC4704923.

4. I have also carried out research characterizing the informatics professional workforce. My study on the need for health IT professionals played a role in workforce development being a component of the Health Information Technology for Clinical and Economic Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA).
    a. Hersh W, Who are the informaticians? What we know and should know, *Journal of the American Medical Informatics Association*, 2006, 13: 166-170. PMC1447543.
    b. Hersh W, Wright A, What workforce is needed to implement the health information technology agenda? Analysis from the HIMSS Analytics™ Database, *Proceedings of the AMIA 2008 Annual Symposium*, 2008, 303-307. PMC2656033.
    c. Hersh WR, Margolis A, Quirós F, Otero P, Building a health informatics workforce in developing countries, *Health Affairs*, 2010, 29: 274-277.
    d. Hersh W, Boone KW, Totten AM, Characteristics of the healthcare information technology workforce in the HITECH era: underestimated in size, still growing, and adapting to advanced uses, *JAMIA Open*, 2018, 1: 188-194, PMC6952018.

5. Also, as a result of being an educational leader, I have carried out evaluation of educational programs in informatics, including those using distance learning technologies.
    a. Hersh W, Williamson J, Educating 10,000 informaticians by 2010: the AMIA 10x10 program, *International Journal of Medical Informatics*, 2007, 76: 377-382.
    b. Hersh WR, A stimulus to define informatics and health information technology, *BMC Medical Informatics and Decision Making*, 2009, 9: 24, PMC2695439.
    c. Hersh WR, Competencies and curricula across the spectrum of learners for biomedical and health informatics, *Achievements, Milestones and Challenges in Biomedical and Health Informatics*, 2022, 93-107.
    d. Bichel-Findlay J, Koch S, Mantas J, Abdul SS, Al-Shorbaji N, Ammenwerth E, Baum A, Borycki EM, Demiris G, Hasman A, Hersh W, Hovenga E, Huebner UH, Huesing ES, Kushniruk A, Lee KH, Lehmann CU, Lillehaug SI, Marin HF, Marschollek M, Martin-Sanchez F, Merolli M, Nishimwe A, Saranto K, Sent D, Shachak A, Udayasankaran JG, Were MC, Wright G, Recommendations of the International Medical Informatics Association (IMIA) on education in biomedical and health informatics: second revision, *International Journal of Medical Informatics*, 2023, 170: 104908.

Complete List of Published Work in MyBibliography:

https://www.ncbi.nlm.nih.gov/sites/myncbi/william%20r.hersh.1/bibliography/40676623/public/?sort=date&direction=descending