

# Keeping the Curriculum Up To Date: Data Science/Analytics in the OHSU Biomedical and Health Informatics Program

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## Outline

- Overview of OHSU Biomedical Informatics Graduate Program
- Growing opportunities in data science/ analytics
- Adapting informatics curricula to data science/ analytics

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## Overview of OHSU biomedical informatics graduate program

- One of largest and well-established (Hersh, 2007)
  - <http://www.ohsu.edu/informatics-education>
- Graduate level programs at Certificate, Master's, and PhD levels
- “Building block” approach allows courses to be carried forward to higher levels



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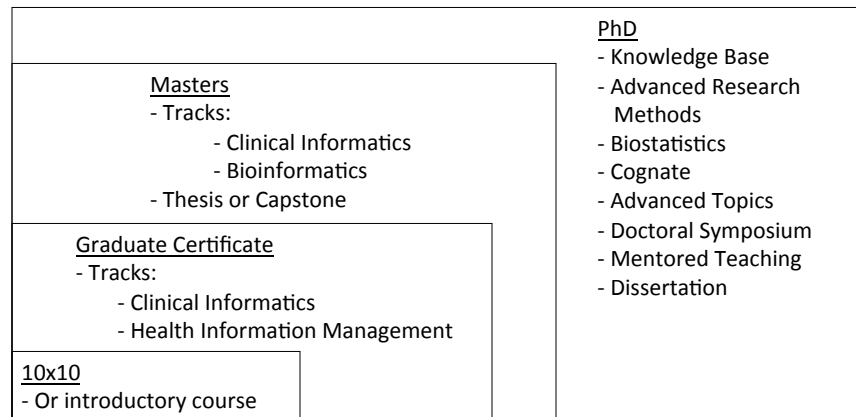
## OHSU tracks, degrees and certificates, and availability

Degree/Certificate Track	PhD	MS	MBI	Grad Cert
Clinical Informatics	On-campus	On-campus	On-campus	On-campus
		On-line	On-line	On-line
Bioinformatics and Computational Biology	On-campus	On-campus		
Health Information Management		On-campus	On-campus	On-campus
		On-line	On-line	On-line



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## Building block approach



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## The next big thing?

- Recent investments in EHR adoption and meaningful use through the HITECH Act provides a “data dividend” (Perlin in Walsh, 2015)
- Data analytics/data science? Playing out in
  - Learning health system (Smith, 2012)
  - Predictive analytics in clinical practice (Sniderman, 2015)
  - Precision medicine (Collins, 2015)
  - Future of National Library of Medicine (NIH, 2015)

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## A critical aspect of data science is people

- Data scientist is the “sexist job of the 21<sup>st</sup> century” (Davenport, 2012)
- Estimates of need – Data analytics jobs (not limited to healthcare) estimated to have 150-180K jobs in core data science and 5-10 fold more jobs managing and using data (Manyika, 2011; IDC, 2014)

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## Data science use cases

- Clinical mission
  - Clinical decision support – data-driven, including precision medicine
  - Quality measurement and improvement – value-based care
  - Business intelligence – improve business and financial operations
  - Patient engagement – upload and interact
  - Public health surveillance
- Research mission
  - Prospective studies
  - Retrospective studies
  - Basic science research – including omics and imaging
  - Data science and informatics research
- Educational mission
  - Training for data users and managers, clinicians, and others
  - Education for data science and informatics professionals
  - Advanced education for data science and informatics researchers

**INFORMATICS PROFESSOR**


THIS BLOG MAINTAINS THE THOUGHTS ON VARIOUS TOPICS RELATED TO BIOMEDICAL AND HEALTH INFORMATICS BY DR. WILLIAM HERSH, PROFESSOR AND CHAIR, DEPARTMENT OF MEDICAL INFORMATICS & CLINICAL EPIDEMIOLOGY, OREGON HEALTH & SCIENCE UNIVERSITY.

FRIDAY, OCTOBER 30, 2015

**Use Cases for Data Science at Academic Health Science Centers**

Like many academic health science centers, my institution is undergoing a planning process to determine our strategy for data science. I have expressed my concerns about the (lack of?) differences between data science and biomedical and health informatics, but the former term seems to be carrying the day. I consider it a personal mission to ensure that the long learned history of biomedical and health informatics is not lost in our rush to embrace this seemingly new data science.

<http://www.billherh.info/>



WILLIAM HERSH

<http://informaticsprofessor.blogspot.com/2015/10/use-cases-for-data-science-at-academic.html>

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# Data science skills needed

- Deep quantitative
  - Deep analysis - machine learning, NLP, predictive modeling, visualization
  - Data wrangling / integration
  - High performance computing
  - Domain-specific applications - medicine, biology, etc.
  - Tools
- Data users and managers
  - Statistics
  - Programming – data-oriented
  - Basic analytics - machine learning, NLP, predictive modeling, visualization
  - Communications - writing, presentations
  - Project management
- End users – clinicians, administrators
  - Understanding applications of data science

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FRIDAY, JULY 10, 2015

**What is the Difference (If Any) Between Informatics and Data Science?**

I am increasingly asked to describe the difference between data science and biomedical informatics. Distinguishing these disciplines takes on added importance with the recent publication of the NIH Advisory Committee to the Director, National Library of Medicine (NLM) Working Group, report on the future of the NLM, which calls for NLM to become a leader in data science at NIH. NLM has of course historically been a leader in research and training in biomedical informatics.

WILLIAM HERSH



<http://www.billhersh.info/>

<http://informaticsprofessor.blogspot.com/2015/07/what-is-difference-if-any-between.html>



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# Current environment

- Doctoral/postdoctoral – Deep quantitative
- Master's – Data users and managers
- Initial and continuing education – clinicians, administrators
- Other activities
  - 10x10 – introductory course in partnership with AMIA
    - <http://www.billhersh.info/10x10>
  - Big Data to Knowledge (BD2K) – NIH funding in education and training for biomedical big data science
    - <http://skynet.ohsu.edu/bd2k>
  - ONC – update of Health IT Curriculum



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## Moving forward in data science

- Data analytics course launched in clinical informatics track
- Bioinformatics and Computational Biology track morph to Big Data Science track?
  - Keep quantitative focus, expand beyond genomics data
- Clinical Informatics track add concentration in data science
  - Focus on applications in different use cases
- Aiming to implement for 2016-2017 academic year

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## For more information

- Bill Hersh
  - <http://www.billhersh.info>
- Informatics Professor blog
  - <http://informaticsprofessor.blogspot.com>
- OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE)
  - <http://www.ohsu.edu/informatics>
  - <http://www.youtube.com/watch?v=T-74duDDvwU>
  - <http://bit.ly/1KMwaaM>
- What is Biomedical and Health Informatics?
  - <http://www.billhersh.info/whatis>

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