The Full Spectrum Biomedical and Health Informatics Education at Oregon Health & Science University

William Hersh, MD
Professor and Chair
Department of Medical Informatics & Clinical Epidemiology
School of Medicine
Oregon Health & Science University
Portland, OR, USA
The full spectrum

• Informaticians
  – Academic ↔ Professional
• Informatics domains
  – Bio ↔ Clinical
• Educational experience
  – Primary ↔ Continuing
• Beyond informaticians
Education of informaticians

- OHSU Biomedical Informatics Graduate Program
  - Aims to train future professionals, researchers, and leaders
- Two Majors
  - Health & Clinical Informatics (HCIN)
  - Bioinformatics & Computational Biomedicine (BCB)

<table>
<thead>
<tr>
<th>Degree/Certificate Major</th>
<th>PhD</th>
<th>MS thesis</th>
<th>MS non-thesis</th>
<th>Graduate Certificate</th>
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<tbody>
<tr>
<td>HCIN</td>
<td>On-campus</td>
<td>On-campus</td>
<td>On-campus</td>
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<td>BCB</td>
<td>On-campus</td>
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## Curriculum building block approach

<table>
<thead>
<tr>
<th>Masters</th>
<th>PhD</th>
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<tr>
<td>- Courses in domains:</td>
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<tr>
<td>- HCIN</td>
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<td>- BCB</td>
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<tr>
<td>- Thesis or Capstone/Internship</td>
<td>- Knowledge Base</td>
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<td></td>
<td>- Advanced Research Methods</td>
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<td>- Biostatistics</td>
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<td>- Cognate</td>
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<td>- Doctoral Symposium</td>
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<td>- Mentored Teaching</td>
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<td>- Dissertation</td>
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<th>Graduate Certificate</th>
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<td>- HCIN</td>
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<th>10x10</th>
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<tr>
<td>- Or introductory course</td>
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OHSU Biomedical Informatics Graduate Program

• Most students tuition-paying but with two key fellowship programs
  – NLM T15 Training Grant
    • Since 1992
    • Renewed in 2017 for another 5 years (with additional funding from NIEHS)
  – ACGME-accredited Clinical Informatics Fellowship
    • 4th program (of 34 now) to receive accreditation, launched in 2015
    • Funded by OHSU, Portland VA Medical Center, and OCHIN

• Master’s program accredited by CAHIIM

• http://www.ohsu.edu/informatics-education
HCIN Major

• Focused on informatics applied to health, healthcare, and public health
• Available online at Graduate Certificate and Master’s levels
• Physician subspecialty fellowship
  – Master’s program accepted for board eligibility – now extended to 2022
  – Six fellowships, including OHSU’s, use courses in their programs

International students from: Argentina, Singapore, Thailand, Egypt, Israel, Saudi Arabia, Zimbabwe, China, and other countries
Alumni numbers, accomplishments, and employers

### Accomplishments of our alumni
- Faculty leaders at many institutions
  - Regenstrief Institute
  - Harvard Medical School
  - Children’s Hospital of Philadelphia
- 11% (15 of 130) of newly anointed Fellows of AMIA (FAMIA)

### Employers
- OHSU
- OHSU Knight Cancer Institute
- Providence Health System
- Kaiser-Permanente
- OCHIN
- Intelligent Medical Objects
- Impact Advisors
- Deloitte
- Epic
- Cerner
- Jefferson Health Information Exchange
- National Library of Medicine
- WebMD
- Institute for Systems Biology

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### Table

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<thead>
<tr>
<th>Certificate/Degree</th>
<th>Health &amp; Clinical Informatics**</th>
<th>Bioinformatics &amp; Computational Biomedicine***</th>
<th>Total</th>
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<td>Graduate Certificate</td>
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<tr>
<td>MS with Thesis****</td>
<td>74</td>
<td>21</td>
<td>95</td>
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<tr>
<td>MS without Thesis******</td>
<td>196</td>
<td>17</td>
<td>213</td>
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<tr>
<td>PhD</td>
<td>18</td>
<td>9</td>
<td>27</td>
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<tr>
<td>Total</td>
<td>710</td>
<td>47</td>
<td>757</td>
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* Formerly Track
** Includes formerly Clinical Informatics and Health Information Management Tracks
*** Includes formerly Bioinformatics & Computational Biomedicine Track
**** Includes formerly Master of Science
****** Includes formerly Master of Biomedical Informatics and Master of Medical Informatics

Number of students receiving degrees and certificates: 891
How have OHSU students and graduates done?

• Over 20 years of experience...

• General observation: What people do when they graduate is partially dependent on what they did when they entered, e.g.,
  – Physicians, nurses, public health, etc. draw on their clinical/professional background
  – Information technology professionals draw on their unique background and experience

• Graduates have obtained jobs in a variety of settings, e.g., clinical, academic, and industry

• Growing number of opportunities in data science/analytics
Continuing education

- 10x10 ("ten by ten")
  - In partnership with AMIA, original and still largest 10x10 offering
    - Currently 2517 by 2018
  - Standalone version of introductory course
  - Allows entry into OHSU Graduate Program
  - [https://dmice.ohsu.edu/hersh//10x10.html](https://dmice.ohsu.edu/hersh//10x10.html)

- Update in Health IT: Healthcare Data Analytics
  - Based on materials developed by grant from Office of the National Coordinator for Health IT (ONC)
  - Offered CME, CNE, and MOC-II credit for clinical informatics subspecialists

- More CE, CME, MOC-II to follow
Other happenings at OHSU

• Dr. Frank Naeymi-Rad and Dr. Theresa Kepic Scholarship for Biomedical Informatics

• Teaching of informatics in other programs
  – MD curriculum
  – Basic science graduate programs
  – Undergraduate health informatics course at Portland State University

• National Center for Data to Health (CD2H) part of NIH CTSA program
What about data science?

- First data analytics course launched three years ago
- Funding from NIH BD2K, ONC, and NLM aiding in development of curricular content
  - [https://dmice.ohsu.edu/bd2k/](https://dmice.ohsu.edu/bd2k/)
  - Data science for basic science PhD students and postdocs
  - Internship for college undergraduates
For more information

• Bill Hersh
  – http://www.billhersh.info
  – @williamhersh

• Informatics Professor blog
  – http://informaticsprofessor.blogspot.com

• OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE)
  – http://www.ohsu.edu/informatics
  – http://www.ohsu.edu/blogs/health-data/
  – http://www.youtube.com/watch?v=T-74duDDvwU
  – https://www.youtube.com/channel/UCChPERb6i3xXE DQxwIcEIA
  – @OHSUInformatics