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

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The full spectrum

• Informaticians
  – Academic ↔ Professional
• Informatics domains
  – Bio ↔ Clinical
• Educational experience
  – Primary ↔ Continuing
• Beyond informaticians
  – Informaticians ↔ Clinicians, researchers, etc.
Full spectrum of OHSU informatics education programs

- **Graduate**
  - PhD, MS – with/without thesis
  - Online – MS, Graduate Certificate
- **Fellowships**
  - NLM – T15 training grant
  - Clinical – ACGME-accredited
- **Continuing education**
  - Clinical informaticians of all stripes
  - CME and MOC-II for clinical informatics physicians
- **10x10** – partnership with AMIA
- **Health and other professionals**
  - Medical students, nursing graduate students
OHSU Biomedical Informatics Graduate Program

• Aims to train future professionals, researchers, and leaders
  – [http://www.ohsu.edu/informatics-education](http://www.ohsu.edu/informatics-education)

• Two Majors
  – Health & Clinical Informatics (HCIN)
  – Bioinformatics & Computational Biomedicine (BCB)

<table>
<thead>
<tr>
<th>Degree/Certificate Major</th>
<th>PhD Location</th>
<th>MS thesis Location</th>
<th>MS non-thesis Location</th>
<th>Graduate Certificate Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCIN</td>
<td>On-campus</td>
<td>On-campus</td>
<td>On-campus</td>
<td>On-campus</td>
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<tr>
<td>BCB</td>
<td>On-campus</td>
<td>On-campus</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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<tbody>
<tr>
<td>- Courses in domains:</td>
<td>- Courses in domains:</td>
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<tr>
<td>- HCIN</td>
<td>- HCIN</td>
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<tr>
<td>- BCB</td>
<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></td>
<td>- Dissertation</td>
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<thead>
<tr>
<th>Graduate Certificate</th>
<th>10x10</th>
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<tbody>
<tr>
<td>- Courses in domains:</td>
<td>- Or introductory course</td>
</tr>
<tr>
<td>- HCIN</td>
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**Students and alumni**

International students from (among others): Singapore, Thailand, Argentina, Egypt, Israel, Saudi Arabia, Zimbabwe, China, and more

<table>
<thead>
<tr>
<th>Degree</th>
<th>Total</th>
<th>BCB</th>
<th>HCIN</th>
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</thead>
<tbody>
<tr>
<td>Graduate Certificate</td>
<td>455</td>
<td>0</td>
<td>455</td>
</tr>
<tr>
<td>Master’s (any)</td>
<td>348</td>
<td>46</td>
<td>302</td>
</tr>
<tr>
<td>PHD</td>
<td>28</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>831</strong></td>
<td><strong>55</strong></td>
<td><strong>776</strong></td>
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Fellowships

• Primary source of financial aid for students
• NLM T15 Training Grant
  – Since 1992
  – Renewed in 2017 for another 5 years (with additional funding from NIEHS)
  – https://www.ohsu.edu/school-of-medicine/medical-informatics-and-clinical-epidemiology/fellowships
• ACGME-accredited Clinical Informatics Fellowship
  – 4th program (of ~40 now) to receive accreditation
    • Launched in 2015
    • Three cohorts graduated
    • 6th cohort will start in 2020
  – Funded by OHSU, Portland VA Medical Center, and OCHIN
  – Six other programs use OHSU online courses
  – https://www.ohsu.edu/school-of-medicine/medical-informatics-and-clinical-epidemiology/clinical-informatics-subspecialty
Alumni accomplishments

- Faculty leaders at many universities
  - OHSU
  - Regenstrief Institute
  - Vanderbilt University
  - Harvard Medical School
  - Children’s Hospital of Philadelphia
  - University of Virginia
  - University of Utah
  - University of Washington
- 11% (15 of 130) of first class of Fellows of AMIA (FAMIA)

- Some employers of our graduates
  - OHSU
  - OHSU Knight Cancer Institute
  - Providence Health System
  - Kaiser-Permanente
  - OCHIN
  - Intelligent Medical Objects
  - Intersystems
  - Deloitte
  - Epic
  - Cerner
  - National Library of Medicine
  - WebMD
  - Institute for Systems Biology
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 2600 by 2019
  – Standalone version of introductory course
  – Allows entry into OHSU Graduate Program
  – https://dmice.ohsu.edu/hersh//10x10.html

• Update in Clinical Informatics
  – Update on key topics
  – CME and MOC-II credit for clinical informatics subspecialists
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
Data science at OHSU

- First data analytics course launched in 2015
- 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

- OHSU Department of Medical Informatics & Clinical Epidemiology (DMICE)
  - Department Web site – [http://www.ohsu.edu/informatics](http://www.ohsu.edu/informatics)
  - Department blog – [http://www.ohsu.edu/blogs/health-data/](http://www.ohsu.edu/blogs/health-data/)
  - Research conference videos archive – [https://www.youtube.com/channel/UCCekPERb6i3xXEDQxwlCeIA](https://www.youtube.com/channel/UCCekPERb6i3xXEDQxwlCeIA)
  - Twitter – [@OHSUInformatics](https://twitter.com/OHSUInformatics)

- Bill Hersh
  - Twitter – [@williamhersh](https://twitter.com/williamhersh)
  - Informatics Professor blog – [http://informaticsprofessor.blogspot.com](http://informaticsprofessor.blogspot.com)