

IUB Qualifying Doctoral qualifying Exam

Bioinformatics Track of IUB School of Informatics

December 1, 2008

IUB Bioinformatics qualifying exam consists three parts: computer science, biology, and one breadth area. For each of the three parts, a student should pass an oral exam after a written. A student needs to pass the qualifying exam within three years after starting his/her doctoral study at IUB. The *ad hoc* qualifying exam committee will decide on pass/conditional pass/fail for each of the three parts. If decision is “fail”, the student will have one more chance for the part of the qualifying exam. The second exam for the part can be designed specially for the student if the committee agrees and this special exam will require the approval by Director of Bioinformatics Program at IUB.

Each student will be expected to master *one of the two following computational areas*:

1. Algorithms
2. Machine learning

And *one of the three following biological areas*:

1. Structural biology
2. Evolution
3. Molecular Biology/Genetics

In addition, *a breadth exam* of the student’s choice on one of the Informatics areas is required.

The students will indicate to the faculty, at some point prior to the qualifying exam, which of the subjects he/she has chosen. The guidelines for what students should know in an area are loosely tied to the classes they have taken and the material in the following textbooks:

- Algorithms: *Introduction to Algorithms*, Second Edition by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein; 2001 MIT Press
- Machine learning: *Machine Learning* by Tom Mitchell, McGraw Hill, 1997.
- Structural biology: *Introduction to Protein Structure*: Second Edition by Carl Branden, John Tooze; Garland Science; 2 edition, 1999

- Evolution: *Molecular Evolution* by Wen-Hsiung Li; Sinauer Associates Inc, 2006
- Molecular Biology/Genetics: *Molecular Biology of the Cell* by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter; Garland Science; 6th edition

In addition, the general consensus is that the exam should be offered once a year as a written, in-class exam followed by an oral qualifying exam, and the structure of the breadth portion of the exam will be determined by the outside member of the qualifying committee.