Bioinformatics 552A/652A
Research in Bioinformatics & Computational Biology

Two Credit Hours
Winter 2017, Fridays 10:30 AM – 12:50 PM*
BICC 123 & 124

Course Description: The Research in Bioinformatics course is designed to give students a foundation in general research approaches with specific application to bioinformatics, computational biology, and clinical informatics. This is the first in a two-part course, with the second part of the course being taken in the Spring. This course will focus on developing the critical thinking and evaluation skills necessary to be successful in the field. Special emphasis will be placed on critical evaluation of the literature, and preparing to do a project in the Spring term course.

*Course Meeting Time: There are two Fridays where the course only meets for 1 hour (2/17/17 & 3/17/17). See syllabus for full details.

Prerequisites: Acceptance into the DMICE bioinformatics track or instructor permission. There are no specific course prerequisites for the class.

Instructors:
Eilis Boudreau, M.D., Ph.D., boudreau@ohsu.edu
Deborah Woodcock, woodcocd@ohsu.edu
Office Hours: by appointment


Reading Material: Relevant literature from the fields of biomedical research, bioinformatics, and computer science.

COURSE GRADING POLICY:
This course is given for a letter grade. The final grade will be based on 100 points. The number of points assigned to each activity is as follows: 35 points for your written bibliography, 25 points for your in class bibliography presentation, 10 points for your NIH biosketch and Individual Development Plan, and 30 points for your project plan for Spring term. All written assignments should be submitted through Sakai and grades for written assignments will be posted in Sakai no later than two weeks after the assignment due date (for assignments submitted late, grades will be posted no later than two weeks after the assignment is submitted).

<table>
<thead>
<tr>
<th>Task</th>
<th># Points</th>
<th>Due Date</th>
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</thead>
<tbody>
<tr>
<td>Written bibliography.</td>
<td>30</td>
<td>2/24/17 (10 AM)</td>
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<tr>
<td>Bibliography presentation.</td>
<td>20</td>
<td>In-class.</td>
</tr>
<tr>
<td>NIH Biosketch</td>
<td>20</td>
<td>3/3/17 (10 AM)</td>
</tr>
</tbody>
</table>
Individual Development Plan | Check mark when email sent to instructor that it is completed, no formal grade | 3/3/17 (10 AM)
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Rewrite Sample Specific Aims Page | 15 | 3/10/17 (10 AM)
Project Management Exercise | 15 | 3/24/17 (10 AM)
Final Class Grade | 100 | ---

### Late Submissions

The assignments will be marked down by 1 point per day if you have not obtained prior permission to delay submission from the instructor. An assignment is considered late if submitted anytime after the Sakai deadline. For example, if a written assignment is due at 10 AM and you submit it at 10:05 AM you will lose 1 point. If the assignment still has not been submitted by the following day by 10 AM, you will lose another point. A one-point loss will continue to occur for each day late until the assignment has been submitted.

### Class Participation

While you will have some lectures during the term, a significant amount of class time is devoted to interactive in-class exercises. Therefore, it is very important that you come to all class sessions on time. If for some reason you must miss a class, please let the instructor know in advance (or in the case of an emergency as soon as possible after the class is missed). In these cases, you may be given a make-up exercise if appropriate to do on your own. Repeated tardiness to class may also result in the loss of 1 point on your final grade for each class session for which you are late.

Grades are assigned based on the following criteria:

- **A** 93-100
- **A-** 90-92.99
- **B+** 87-89.99
- **B** 83-86.99
- **B-** 80-82.99
- **C+** 77-79.99
- **C** 73-76.99
- **C-** 70-72.99
- **F** <70

Graduate Studies in the OHSU School of Medicine is committed to providing grades to students in a timely manner. Course instructors will provide students with information in writing at the beginning of each course that describes the grading policies and procedures including but not limited to evaluation criteria, expected time needed to grade individual student examinations and type of feedback they will provide.

Class grades are due to the Registrar by the Friday following the week of finals. However, on those occasions when a grade has not been submitted by the deadline, the following procedure shall be followed:

1. The Department¹ /Program Coordinator² will immediately contact the Instructor requesting the missing grade, with a copy to the Program Director and Registrar.
2) If the grade is still overdue by the end of next week, the Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} will email the Department Chair directly, with a copy to the Instructor and Program Director requesting resolution of the missing grade.

3) If, after an additional week the grade is still outstanding, the student or Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} may petition the Office of Graduate students for final resolution.

\textsuperscript{1} For courses that are run by a specific department.

\textsuperscript{2} For the conjoined courses (course number is preceded by CON_ that are run by Graduate Studies.

COPYRIGHT INFORMATION:

Every reasonable effort has been made to protect the copyright requirements of materials used in this course. Class participants are warned not to copy, audio, or videotape in violation of copyright laws. Journal articles will be kept on reserve at the library or online for student access. Copyright law does allow for making one personal copy of each article from the original article. This limit also applies to electronic sources.

To comply with the fair use doctrine of the US copyright law, Sakai course sites close three weeks after grades are posted with the Registrar. Please be sure to download all course material you wish to keep before this time as you will have no further access to your courses.

DMICE COMMUNICATION POLICY

1. If the syllabus directs the student to contact the TA before contacting the instructor, the student should do so. Otherwise, the student should contact the instructor and allow 2 business days (not including weekends) for a response.

2. If the student does not receive a response from the instructor within 2 business days, s/he should contact the TA (if there is one). When contacting the TA s/he should cc the instructor and Diane Doctor at doctord@ohsu.edu.

3. If a student does not receive a response from the TA within 1 business day (not including weekends), s/he should contact Diane Doctor at doctord@ohsu.edu and cc the instructor and the TA.

4. If Diane does not reply within 1 business day (not including weekends), the student should contact Andrea Ilg at ilgan@ohsu.edu.

5. Students having difficulties with Sakai should contact the Sakai Help Desk at sakai@ohsu.edu or at (877) 972-5249. Sakai help is available M-F from 8am to 10-pm and weekends from Noon to 5pm. Do not contact the instructor.

Please use professional etiquette when communicating with peers and the instructor. This means avoiding aggressive or offensive language, showing respect for others’ opinions and positions, and conducting yourself as if you were face to face with them. Please pay special attention to etiquette in class forums and when using email. If you notice someone violating this policy, please make the instructor and TA aware of the problem.
STUDENT ACCESS: 
OHSU is committed to providing equal access to qualified students with disabilities. Student Access determines and facilitates reasonable accommodations, including academic adjustments and auxiliary aids, for students with documented disabilities. A qualified student with a disability is a person who meets the academic and technical standards requisite to admission or participation in a particular program of study. As defined by the Americans with Disability Act (ADA), a person with a disability has a physical or mental impairment that substantially limits one or more major life activities of the individual. This may include, but is not limited to, physical conditions, chronic health issues, sensory impairments, mental health conditions, learning disabilities and ADHD. Student Access works with students with disabilities from all of OHSU’s educational programs and at each campus.

Each school has an assigned Program Accommodation Liaison (PAL), who acts as an “in-house” resource for students and faculty concerning access issues for students with disabilities. The PAL works in collaboration with Student Access to implement recommended accommodations for students with disabilities.

It is recommended that you contact Student Access to consult about possible accommodations if you a) received disability accommodations in the past, b) begin experiencing academic difficulties, and/or c) are given a new diagnosis from your healthcare provider.

Learn more about Student Access:
Phone: 503 494-0082
Email: studentaccess@ohsu.edu
Website: www.ohsu.edu/student-access

ACADEMIC HONESTY:
Course participants are expected to maintain academic honesty in their course work. Participants should refrain from seeking past published solutions to any assignments. Literature and resources (including Internet resources) employed in fulfilling assignments must be cited. See http://www.ohsu.edu/xd/education/library/research-assistance/plagiarism.cfm?WT_rank=1# for information on code of conduct for OHSU and http://www.ohsu.edu/xd/education/teaching-and-learning-center/for-students/index.cfm for more information on citing sources and recognizing plagiarism.

In an effort to uphold the principles and practice of academic honesty, faculty members at OHSU may use originality checking systems such as Turnitin to compare a student’s submitted work against multiple sources.

To protect student privacy in this process, it will be necessary to remove all personal information, i.e. student name, email address, student u-number, or any other personal information, from documents BEFORE submission.

NOTE:
This syllabus and class schedule is subject to changes by the instructors. Changes will be made with as much advance notice as possible.
COURSE COORDINATION:
The course Website will be the central location for the distribution of course materials and assignment listing. For any technical questions or if you need help logging in, please contact the Sakai Help Desk.

Hours: Sakai Help Desk is available Mon – Fri, 8 am – 9 pm and weekends 12 pm – 5 pm, Pacific Time.
Contact Information:
(Toll-free) 877-972-5249
(Web) http://atech.ohsu.edu/help
(Email) sakai@ohsu.edu

COURSE OBJECTIVES:
- If presented with a research idea, be able to identify informatics issues relevant to the problem and be able to develop and articulate appropriate approaches to finding solutions to these problems.
- Critically develop a research idea (hypothesis), including complete a thorough background evaluation of the literature relevant to this idea.
- Understand basic principles of project management and be able to develop a simple project plan.

COURSE OUTLINE:

SUMMARY OF CLASSES SESSIONS

<table>
<thead>
<tr>
<th>CLASS #</th>
<th>CLASS DATE</th>
<th>ACTIVITY</th>
<th>SPECIAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/13/17</td>
<td>Course Introduction; Developing a Novel Scientific Idea</td>
<td></td>
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<tr>
<td>2</td>
<td>1/20/17</td>
<td>Reference Management Best Practices; NIH Biosketch</td>
<td>Guest Speaker from Library</td>
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<tr>
<td>3</td>
<td>1/27/17</td>
<td>Using a Bibliography to Trace Lineage of an Idea</td>
<td>Meet in Old Library Building in Historical Archives</td>
</tr>
<tr>
<td>4</td>
<td>2/3/17</td>
<td>Specific Aims Page &amp; Grant Writing</td>
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<tr>
<td>5</td>
<td>2/10/17</td>
<td>Best Practices for Bioinformatics Collaborations</td>
<td></td>
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<tr>
<td>6</td>
<td>2/17/17</td>
<td>Career Development Resources</td>
<td>Guest Speaker Virginia Lankes; Instructor Gone, class about 1 hr,</td>
</tr>
<tr>
<td>7</td>
<td>2/24/17</td>
<td>In-class Bibliography Presentations</td>
<td></td>
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<tr>
<td>8</td>
<td>3/3/17</td>
<td>In-class Bibliography Presentations</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3/10/17</td>
<td>Complete Bibliography Presentations; Review Bibliography Rewrites</td>
<td>Deb Woodcock, class about 1 hr; Instructor Gone</td>
</tr>
<tr>
<td>10</td>
<td>3/17/17</td>
<td>Introduction to Project Management</td>
<td>Deb Woodcock &amp; Eilis Boudreau</td>
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<tr>
<td>11</td>
<td>3/24/17</td>
<td>Project Management; Discussion of Design Challenges</td>
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Week 1 (1/13/17; room 124)
- Course Introduction
- The bibliography as a tool for idea development.
- Introduction to REPORTER for researching a project idea.
- Accurate documentation of your scientific work.

Week 1 Assignments:
(1) Reading: UW-Madison Writing Center document on acknowledging sources (see supplemental material on Sakai)
(2) Reading: Assigned Reading from The Grant Application Writer’s Workbook.
(3) Begin preparation of a bibliography based on the topic of your choice. This is a project requiring iterative work and you should plan to spend some time on it every week it is due to be submitted to Sakai on **Friday 2/24/17 at 10 AM**. This bibliography will be the tool by which you trace the lineage of a key idea(s) in your chosen area. This literature review should go back **AT A MINIMUM to 1900**. As part of this exercise, you will choose a reference manager and prepare the bibliography using a common reference format of your choosing. Please list on the bibliography which reference manager that you used to prepare the document. For each reference cited, you must have reviewed a copy of the actual reference. It is insufficient to cite a reference for which you have not been able to obtain a copy of the actual article or for older literature, the book which you are citing. To accomplish this exercise, you will need to cite between 10 – 15 references. However, during the course of the exercise you will need to review significantly more papers or resources in order to identify the most significant ones. In general, these references should cover the whole time period equally (eg. do not cite 8 references from the past 10 years and then only a few covering the previous 100 years). If there is a large time gap, about 20 years or greater, during which no major developments occurred in the field, then you must note this in your bibliography and briefly state why you think progress in the area was stagnant. Each reference should be followed by a few sentences that describe what the paper contributes to the field. Lastly, at least one of the references you cite must be considered archival material. This material may predate 1900. We will be spending the entire third class in the OHSU library archives, where you will be given an introduction to these resources and provided with an opportunity to review some archival materials. Feel free to be creative with this assignment (eg. you may insert 1-2 pictures or diagrams but only use them if they really support and enhance the bibliography).

The grading of your bibliography will focus on the following features:
(a) Documentation of the reference manager used and demonstration that this reference manager was used to generate the bibliography.
(b) Coverage of the literature on the topic back to at least 1900 with no gaps longer than 20 years. If there are truly no major developments in the area for over 20 years, then insert a line or two in the bibliography hypothesizing why this gap in development occurred.
(c) Citation of at least one archival reference that you have personally reviewed.
(d) A succinct description after each reference as to what that reference contributed to the body of literature on the subject and/or how the reference represented a paradigm shift in the field.

During one of our class sessions, each of you will give a brief, 15 minutes plus time for questions, in-class presentation of your bibliography with a focus on how your bibliography delineates the lineage of the core idea(s) you have chosen to focus on. You may bring a copy of your bibliography with you for your class presentation for reference but you will not need to prepare handouts or slides. During your presentation, you should not just read your bibliography to the class. You should come to class prepared to tell an engaging story to your classmates about the development of the idea(s) you researched. Some of the ideas you present, may have also been cited by others in the class during their bibliography presentations, so you may be interrupted during your presentation to comment on the overlap.

The course of science is often impacted by external forces such as the politics of the era (eg. bans on certain experiments, war, etc.) and the personalities of the individuals engaged in research (eg. individuals working in isolation or those with such difficult personalities that they were ostracized by colleagues). If you feel that a particular discovery was substantially influenced by one of these factors, then you should be prepared to weave this into the story you create around your bibliography. You may also want to note these factors on your written bibliography, as they may be relevant to the development of a particular paper or may be the reason why there was a prolonged gap in the development of a key idea.

**Week 2 (1/20/17; room 124)**
- Introduction to the NIH Biosketch & the Individual Development Plan (IDP).

**Week 2 Assignment:**
1. Assigned Reading from The Grant Application Writer’s Workbook.
2. Continue work on bibliographies.
3. Begin work on NIH Biosketch & IDP. **NIH biosketch and IDPs due by 10 AM 3/3/17.** Note that you do not need to turn in the IDPs but need to send the instructor an email (boudreau@ohsu.edu) attesting that you have completed this exercise. You are strongly encouraged to review this IDP with Virginia Lankes at some time during the term. Submit your NIH biosketch to Sakai. Include the web link to your biosketch on this document.

**Week 3 (1/27/17; Archives Room, meet in Old Library Historic Archives Room)**
- Bibliography development, tracing the lineage of an idea, come prepared to do research in on your topic in the OHSU historic archives.

Week 3 Assignment:
(1) Assigned Reading from The Grant Application Writer’s Workbook.
(2) Continue work on bibliographies due 2/24/17.
(3) Continue work on NIH Biosketch & IDP due 3/3/17.

Week 4 (2/3/17; room 123/124):
- Introduction to the Specific Aims page and writing grants.

Week 4 Assignment:
(1) Continue work on bibliographies due 2/24/17.
(2) Continue work on NIH Biosketch & IDP due 3/3/17.
(3) Begin work on rewrite of assigned Specific Aims page due Friday 3/10/17 at 10 AM (submit to Sakai). You be assigned a sample Specifics Aim Page and will rewrite it for improved clarity using the guidelines outline in The Grant Application Writer’s Workbook.
(4) Assigned Reading from The Grant Application Writer’s Workbook.

Week 5 (2/10/17; room 124):
- Best practices for Collaborations in Bioinformatics & Computational Biology

Week 5 Assignment:
(1) Continue work on bibliographies due 2/24/17.
(2) Continue work on NIH Biosketch & IDP due 3/3/17.
(3) Continue work on rewrite of assigned Specific Aims page due 3/10/17.
(4) Assigned Reading from The Grant Application Writer’s Workbook.

Week 6 (2/17/17; room 124):
- Introduction to available career development resources with Virginia Lankes. Note: this class will only be about 1 hr. long.

Week 6 Assignment:
(1) Continue work on bibliographies due 2/24/17.
(2) Continue work on NIH Biosketch and IDP due 3/3/17.
(3) Continue work on rewrite of assigned Specific Aims page due 3/10/17.
(4) Assigned Reading from The Grant Application Writer’s Workbook.

Week 7 (2/24/17; room 123/124):
- In-class presentation of bibliographies.
Week 7 Assignment:
(1) Continue work on NIH Biosketch & IDP due 3/3/17.
(2) Continue work on rewrite of assigned Specific Aims page due 3/10/17.
(3) Assigned Reading from The Grant Application Writer’s Workbook.

Week 8 (3/3/17; room 123/124):
- In-class bibliography presentations continued.

Week 8 Assignment:
(1) Continue work on rewrite of assigned Specific Aims page due 3/10/17.
(2) Begin thinking about potential projects for Spring term. Investigate AMIA Design Challenge and if desired, other design challenges.

Week 9 (3/10/17; room 124):
- Complete in-class bibliography presentations.
- In-class review of corrected Specific Aims pages.

Week 9 Assignment:
(1) Assigned project management reading.

Week 10 (3/17/17; room 123)*:
- Introduction to Project Management, Deb Woodcock (1 hr.)
  *Today’s class is only 1 hr.

Week 10 Assignments:
(1) Project management assignment due by Friday 10 AM 3/24/17 (Submit to Sakai)

Week 11 (3/24/17; room 123):
- Project Management Lecture with Deb Woodcock (1 hr.)
- Class Wrap-up, discussion of design challenges (1 hr.)