Course title: Special topic course STAT 892-004 - Integrative Data Science for Plant Phenomics

Dates/Times: Spring 2018 Semester; Tue / Thu 11:00am - 12:15pm

Credits: 3 Credits. 2 x 75-minute lectures per week

Prerequisite: STAT 801

Textbook
No specific textbook required for this course. Relevant research papers and documents will be used.

Instructor Team: Gota Morota (GM), Toshihiro Obata (TO), Harkamal Walia (HW), Hongfeng Yu (HY), Chi Zhang (CZ), and Qi Zhang (QZ)

Course logistics: Hands-on plant data science course. Combine theory and data analysis using R. Students will analyze publicly available data as well as data generated through the WRCHR project. <http://wrchr.org/>.

Course Description: This is a plant phenomics data science course. The main data types include image-based phenomic, genomic, metabolomic, and transcriptomic data. Students will become proficient in the principles, statistical models, and practice of data-driven genome-to-phenome analysis via multi-type data integration; and hands-on experience in data analysis using R and/or Matlab. Successful completion of this course will enable students to process and integrate these diverse data types and build genomic linkages.

Schedule

- 1/9 (Tue): Overview plant phenomics (HW)
- 1/11 (Thu): The NIC Greenhouse Innovation Center tour (HW)
- 1/16 (Tue): Introduction to data science and reproducible research using R (GM)
- 1/18 (Thu): Introduction to data science and reproducible research using Matlab(GM)
- 1/23 (Tue): Classical phenotyping to high-throughput phenotyping (HW)
- 1/25 (Thu): Classical phenotyping to high-throughput phenotyping (HW)
- 1/30 (Tue): Pixelomics (HY)
- 2/1 (Thu): Pixelomics (HY)
- 2/6 (Tue): Pixelomics (HY)
- 2/8 (Thu): Pixelomics (HY)
- 2/13 (Tue): Genomics (GM)
- 2/15 (Thu): Genomics (GM)
- 2/20 (Tue): Genomics (GM)
- 2/22 (Thu): Genomics (GM)
- 2/27 (Tue): Transcriptomics and network biology (CZ, QZ)

- 3/1 (Thu): Transcriptomics and network biology (CZ, QZ)
- 3/6 (Tue): Transcriptomics and network biology (CZ, QZ)
- 3/8 (Thu): Transcriptomics and network biology (CZ, QZ)
- 3/13 (Tue): Epigenomics (QZ)
- 3/15 (Thu): Epigenomics (QZ)
- 3/20 (Tue): Spring break
- 3/22 (Thu): Spring break
- 3/27 (Tue): Metabolomics (TO)
- 3/29 (Thu): Metabolomics (TO)
- 4/3 (Tue): Metabolomics (TO)
- 4/5 (Thu): Metabolomics (TO)
- 4/10 (Tue): Integrated genome to phenome approach (ALL)
- 4/12 (Thu): Integrated genome to phenome approach (ALL)
- 4/17 (Tue): Student project presentations and discussions (ALL)
- 4/19 (Thu): Student project presentations and discussions (ALL)
- 4/24 (Tue): Student project presentations and discussions (ALL)
- 4/26 (Thu): Student project presentations and discussions (ALL)

Student Learning Activities and Assessments

Assessments	Percentage	Point
Homework assignment (7)	35%	350
Class discussion sessions	20%	200
Project ● presentation ● report ● peer-review	45% ● 15% ● 15% ● 15%	450
Total	100%	1000

Student projects: TBA
20 minutes presentation (15 minutes presentation and 5 minutes discussion)

Grading

Point	Grade
900	>= A-
800	>= B-
700	>= C-
600	>= D-

Emergency Response Information

- Fire Alarm (or other evacuation): In the event of a fire alarm: Gather belongings (Purse, keys, cellphone, N-Card, etc.) and use the nearest exit to leave the building. Do not use the elevators. After exiting notify emergency personnel of the location of persons unable to exit the building. Do not return to building unless told to do so by emergency personnel.
- Tornado Warning: When sirens sound, move to the lowest interior area of building or designated shelter. Stay away from windows and stay near an inside wall when possible.
- Active Shooter
    - Evacuate: if there is a safe escape path, leave belongings behind, keep hands visible and follow police officer instructions.
    - Hide out: If evacuation is impossible secure yourself in your space by turning out lights, closing blinds and barricading doors if possible.
    - Take action: As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter.
- UNL Alert: Notifications about serious incidents on campus are sent via text message, email, unl.edu website, and social media. For more information go to: http://unlalert.unl.edu.
- Additional Emergency Procedures can be found here: http://emergency.unl.edu/doc/Emergency Procedures Quicklist.pdf

Students with Disabilities

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3737 voice or TTY.

Student Code of Conduct

Students are expected to adhere to guidelines concerning academic dishonesty outlined in Section 4.2 of the Universitys Student Code of Conduct (http://stuafs.unl.edu/ja/code/). Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns