HOS 6932 Concepts of artificial intelligence for plant scientists  
Graduate Level – 1 credit hours
Fall 2023

Instructor:  Dr. Charlie Messina  
Fifield Hall Office 2215  
Horticultural Sciences Department  
cmessina@ufl.edu

Location and time:  TBD Friday ~ 3.00-3.50 PM

Office hours:  TBD Friday ~ 4.00-5.00 PM

Prerequisite:  Familiarity with AI and basic knowledge of plant breeding, quantitative genetics, mathematics, and statistics

Course Description
This course creates an intellectual container for students to experience the excitement, tensions, complexities, and contradictions we encounter today in artificial intelligence (AI), and to discover the need for transdisciplinary science if we are to realize the potential of AI to transform agricultural systems and thus create societal value. The modality of the course is structured around the discussions of current papers and books published on artificial intelligence and applications in science, engineering, and medicine.

Intended Audience
The course is designed for graduate students and advanced undergraduate students working in plant sciences (e.g., agronomy, horticulture, environmental horticulture, biology, and forestry) with emphasis on plant breeding. Students working in other disciplines are welcome to expand their awareness of methods and the integration of symbolic and sub-symbolic AI.

Course Objectives
The course goal is to create awareness of the opportunities and limitations of contemporary AI that stems from natural systems complexity, and thus motivate the students to seek transdisciplinary approaches to advance AI in science and engineering. By the end of the semester students should be able to critically think about AI, explain the advantages and disadvantages of the different methods, and discuss these in context of system complexity.

Evaluation

<table>
<thead>
<tr>
<th>Points</th>
<th>Type</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>50</td>
<td>Presentation</td>
<td>Quality of the presentation that introduces the paper to be discussed in class</td>
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<tr>
<td>50</td>
<td>Engagement</td>
<td>Quality of contributions to advance the collective understanding of the paper being discussed</td>
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<tr>
<td>100</td>
<td>TOTAL</td>
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Letter Grade
A >90  B+ 85 to 90  B 80 to 84  C+ 75 to 79  C 70 to 74  D+ 65 to 69  D 60 to 64  E < 60

UF grading policies:  https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Evaluation Description

Presentations: the student is expected to report the main points of one or more papers and/or book chapters in 15 minutes.
Graduate level Course

Engagement: instructors will grade the students based on the quality of their questions, comments and answers to questions raised by instructors and peer students. The student is expected to post questions and contribute to discussions in Canvas.

Recommended Literature


Vasudevan RK, Ziatdinov M, Vlcek L, Kalinin SV. 2021. Off-the-shelf deep learning is not enough, and requires parsimony, Bayesianity, and causality. npj Computational Materials 7, 16.


### Course Schedule and Topics

<table>
<thead>
<tr>
<th>Week of semester Month/day</th>
<th>General Topic Description &amp; Publication</th>
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<tbody>
<tr>
<td>Wk 1 8/25</td>
<td>Introduction</td>
</tr>
<tr>
<td>Wk 2 9/1</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 3 9/8</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 4 9/15</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 5 9/22</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 6 9/29</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 7 10/6</td>
<td>Homecoming</td>
</tr>
<tr>
<td>Wk 8 10/13</td>
<td>Student presentation</td>
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<tr>
<td>Wk 9 10/20</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 10 10/27</td>
<td>Student presentation</td>
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<tr>
<td>Wk 11 11/3</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 12 11/10</td>
<td>Holiday (no class)</td>
</tr>
<tr>
<td>Wk 12 11/18</td>
<td>Student presentation</td>
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<tr>
<td>Wk 14 11/24</td>
<td>Holiday (no class)</td>
</tr>
<tr>
<td>Wk 15 12/1</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Wk 16 12/8</td>
<td>Reading days</td>
</tr>
</tbody>
</table>

### Attendance and Make-Up Work

"Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)"

### Online Course Evaluation Process

"Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at [https://evaluations.ufl.edu](https://evaluations.ufl.edu). Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at [https://evaluations.ufl.edu/results/](https://evaluations.ufl.edu/results/)

### Academic Honesty

"UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code ([http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/](http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/)) specifies a
number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.”

Software Use:
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

Services for Students with Disabilities
“Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.”

Campus Helping Resources
Health and Wellness:

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS) Student Health Care Center, 392-1161. University Police Department, 392-1111 (or 9-1-1 for emergencies). http://www.police.ufl.edu/