PCB7922: Journal Colloquium: Single-Cell Genomics, Beyond Transcriptomics - Spring 2026.

Number of credits: 1 Credit.

Course Registration: Departmentally controlled (PMCB).

Meeting Time and Place

Thursday, 1:00-1:50 pm

Location: UFGI (Cancer and Genetics Research Complex), **Room 451**.

In-person attendance is required for students in Gainesville, while participation via Zoom is available for those located outside the main campus.

Course Description

Critical discussion and presentation of recent journal articles in the area of plant molecular and cellular biology.

Course Introduction

High-throughput, single-cell technologies are rapidly revolutionizing scientific research of biological organisms by providing an unprecedented understanding of their cellular heterogeneity. Single-cell RNA sequencing is becoming the preferred method for transcriptomics studies, with hundreds of studies published to date, including in plants. Less understood are the single-cell technologies beyond transcriptomics, such as single-cell epigenomics, single-cell proteomics, and single-cell metabolomics, among others.

This course examines recent publications highlighting innovative single-cell methodologies (the focus is not scRNA sequencing!) or the biological breakthroughs they enable. Students will engage in weekly presentations, evaluating the strengths and limitations of each technology and assessing their potential applications in various biological contexts. In addition, students will discuss the opportunities and challenges associated with analyzing and interpreting single-cell data.

The primary goal of the course is to equip participants with a critical understanding of the newly developed methodologies in single-cell research and their applications.

Learning Objectives

- Describe the advantages of single-cell technologies compared to more traditional bulk technologies.
- List the main challenges of applying single-cell technologies in plant research and how the scientific community is addressing them.
- Articulate a workflow describing the main steps for analyzing data produced by single-cell methods, including suggesting software that can be used to address each step of the workflow.
- Describe the fundamentals of a new single-cell technology or its application, and expose the advantages and disadvantages of such technologies to plant research.
- Describe how one or more of the different single-cell technologies could be used to address questions investigated as part of their Master's or Ph.D.

Course Instructor

Dr. Wendell Pereira

Research Associate Professor, School of Forest, Fisheries, & Geomatics Sciences,

309 Cancer and Genetics Research Complex.

Zoom meeting ID: https://ufl.zoom.us/my/wendellpereira
wendellpereira@ufl.edu

Office hours are scheduled upon request on **Thursdays from 2:00 to 3:00 pm**. UFGI (Cancer and Genetics Research Complex), **Room 309**. For those located outside Gainesville, Zoom office hours will be scheduled upon request on **Thursdays, 4:00-5:00 pm**

Course Requirements

1. Prerequisites

There are no prerequisites, but a general understanding of the methods used in genomics, proteomics, and molecular biology is desired.

2. Article Presentations

- **Frequency**: Each student is required to present to the class once or twice during the semester. The exact number will depend on the class size and will be confirmed at the start of the course. The order of presentations will be defined randomly at the first class, but adjustments will be made to accommodate students who may not be able to present on a determined date.
- **Selection of Articles**: Students can select articles from the literature. However, the article of choice must be submitted to the instructor for approval no later than two weeks prior to the presentation date. The instructor will evaluate if the article follows rigorous scientific methods and if the content is relevant to the course. Only approved articles can be used for the presentation.
- **Content**: Presentations should focus on research articles that detail newly developed single-cell technologies or the application of well-established methods to generate breakthrough scientific knowledge.

3. Reading and Discussion Participation

- **Pre-Class Preparation**: Students are expected to read the designated papers for each class session in advance. Unless unexpected circumstances occur, students should receive each article one week before it is presented/discussed. To ensure a lively and in-depth discussion during the class, students are required to submit two questions to the presenter by the weekend before the class in which the article will be discussed.
- **Engagement and Active Participation**: Students are encouraged not only to ask questions but also to contribute their thoughts and insights on the topics being discussed. In particular, focus on how those technologies can be applied to improve the research findings in your field.

Course Schedule

In the first two weeks of class, students and the instructor will review the fundamentals of research using single-cell technologies and discuss emerging topics in single-cell genomics that extend beyond RNA sequencing. In addition, presentation dates will be assigned to the students. From then on, there will be one presentation per week, followed by a discussion on the topic.

Tentative Schedule

The table shows the date of each class and the topic that will be discussed. Additionally, the deadlines for submitting the article for instructor approval are also listed.

Lecture	Date	Topic	Presenter	Deadline To Submit Article for Approval
1	1/15/26	Course introduction and scheduling of presentations	Wendell	N/A
2	1/22/26	Introduction to Single-cell Genomics	Wendell	N/A
3	1/29/26	Presentation of article – 1	TBD	Article selected by the instructor
4	2/05/26	Presentation of article – 2	TBD	1/22/26
5	2/12/26	Presentation of article – 3	TBD	1/29/26
6	2/19/26	Presentation of article – 4	TBD	2/05/26
7	2/26/26	Presentation of article – 5	TBD	2/12/26
8	3/05/26	Practical considerations when designing and executing experiments using single-cell technologies	Wendell	N/A
9	3/12/26	Presentation of article – 6	TBD	2/26/26
10	**3/19/26**	**Spring Break**	**NA**	**NA**
11	3/26/26	Presentation of article – 7	TBD	3/12/26
12	4/02/26	Presentation of article – 8	TBD	3/19/26
13	4/09/26	Presentation of article – 9	TBD	3/26/26
14	4/16/26	Presentation of article – 10	TBD	4/02/26
15	**4/23/26**	**Reading Day**	**NA**	**NA**

Grading

Students' grades will be divided into two components: engagement (weekly preparation in advance of the class, as well as presence and participation during the classes) and presentation.

- **Engagement:** Every week, students will be graded (0-6) based on whether they read the publication to be presented, prepared the two questions on the content of the publication in advance of the class, and engaged in the discussion after the

presentation. The sum of the weekly grades will compose 60% of the final grade (60 points).

- **Presentation:** In the assigned week, the student will present the content of a publication describing a new single-cell technology or the application of such technology to answer a biological question. The student will be graded based on whether the deadlines to choose the publication were followed and on the quality of the presentation. The grade obtained on the day of the presentation(s) will compose 40% of the final grade (40 points).

Grading Scale

A: 95-100, **A-:** 92-94, **B+:** 89-91, **B:** 86-88, **B-:** 83-85, **C+:** 80-82, **C:** 77-79, **C-:** 74-76, **D+:** 71-73, **D:** 68-70, **D-:** 65-67, **E (Failure):** Lower than 65.

Recommended Textbooks

There are no recommended textbooks for this course. Selected current publications will be distributed weekly to all students, at least one week prior to the presentation of their content by one of the students.

Grades and Grade Points

For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/.

Attendance and Make-Up Work

Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality

of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at: https://gatorevals.aa.ufl.edu/public-results/.

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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*."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g., assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

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.

Professionalism Statement

Scientists are professionals guided by specific values and behaviors. These values and behaviors include respect, cooperation, active participation, ethics, intellectual inquiry, integrity, timeliness, and attendance. In addition to your performance on the graded materials, you will be evaluated on your growth as a professional. Professional characteristics include punctuality, attendance, participation, collegial attitude, and willingness to learn from and help others learn. Your attendance at all classes is a firm expectation, but if you are ill or an emergency occurs, contact your instructor PRIOR TO the scheduled class time.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the Notification to Students of FERPA Rights (https://registrar.ufl.edu/catalog0910/policies/regulationferpa.html).

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, https://disability.ufl.edu/

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,* **www.counseling.ufl.edu**

Counseling Services Groups and Workshops Outreach and Consultation Self-Help Library Wellness Coaching

- U Matter We Care, **www.umatter.ufl.edu/**
- *Career Connections Center,* First Floor JWRU, 392-1601, https://career.ufl.edu/.
- Student Success Initiative, http://studentsuccess.ufl.edu. Student Complaints:

- Residential Course: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/.
- Online Course: https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint
- Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.
- University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via email at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.