# Special Problems Syllabus

EAS 8901, 3 Credits

**Fall 2026**

## Instructor Information

**Instructor:** Dr. Ali Sarhadi
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**Office Location:** ES&T 3244
**Office Hours:** TBD

## General Course Information

### Description

This special problems course provides students with supervised, hands-on experience conducting original research within the Climate Risk and Extreme Dynamics Lab. Students will contribute to ongoing research projects in Climate AI, Physics-based Machine Learning, and Tropical Cyclone science, developing practical skills in ML/AI, computation and physics-based modeling, literature review, and scientific communication. This course is intended for students seeking to develop competencies essential for graduate study, industry research roles, or evidence-based professional practice.

### Course Learning Outcomes

Upon successful completion of this course, students will be able to:

- Apply foundational methods and tools relevant to climate AI, climate change, and tropical cyclones in a real-world research context.
- Contribute meaningfully to an ongoing research project through independent and collaborative tasks.
- Synthesize and critically evaluate relevant scientific or technical literature.
- Communicate research findings clearly through written reports and/or oral presentations.
- Demonstrate professional research practices, including data safety, ethical conduct, and reproducible computational workflows.

### Required Course Materials

There is no required textbook for this course. Students will be directed to specific journal articles, technical reports, and online resources as needed throughout the semester. All required readings and materials will be shared by the supervising faculty via email and the lab Slack workspace.

### Grading Policy

Final grades are assigned on a scale of A–F (no +/− grades at Georgia Tech). Grade determination is based on the quality and consistency of research contributions, written deliverables, and professional conduct throughout the semester:

- Research Participation & Progress — 60%
- Weekly/Bi-Weekly Meetings & Progress Log — 20%
- Mid-Semester Written Progress Report — 10%
- Final Written Report and/or Oral Presentation — 10%

**Grade Scale:** A ≥ 90;  B ≥ 80;  C ≥ 70;  D ≥ 60;  F < 60

## Description of Graded Components

### Research Participation & Progress (60%)

Students are expected to spend approximately 15-20 hours per week in active research activities. This component evaluates consistency of effort, initiative, responsiveness to feedback, and quality of work contributed to the research group. Progress is assessed through regular one-on-one or group check-ins with the supervising faculty or postdoctoral researcher.

### Weekly/Bi-Weekly Meetings & Progress Log (20%)

Students will maintain a lab notebook or digital progress log documenting tasks completed, data collected, observations, and any blockers encountered. Students must attend all scheduled research meetings prepared to give a brief verbal update on their progress. This log is subject to review by the supervising faculty at any time.

### Mid-Semester Written Progress Report (10%)

A 2–4 page written report submitted at the semester midpoint, summarizing: (1) the research question(s) being addressed, (2) methods and work completed to date, (3) preliminary results or findings, and (4) a plan for the remainder of the semester. Specific formatting guidelines will be provided at the start of the semester.

### Final Written Report and/or Oral Presentation (10%)

A final written report (~5–10 pages) and/or a short oral presentation (10–15 minutes) summarizing research completed, methods, results, and conclusions. The format (written, oral, or both) will be determined in consultation with the supervising faculty at the start of the semester.

## Additional Criteria for Successful Completion

To successfully complete this course, students must:

- Maintain consistent engagement with the research group and meet agreed-upon weekly research commitments.
- Submit all written deliverables (progress log, mid-semester report, final report/presentation) by the stated deadlines.
- Communicate proactively with the supervising faculty regarding progress, challenges, or schedule conflicts.

- Uphold all standards of research integrity, data handling, and professional conduct as outlined in this syllabus and Georgia Tech's policies.

## Course Policies

### Attendance and/or Participation

Regular attendance at scheduled lab meetings, check-ins, and research sessions is expected and required. Research is a collaborative endeavor, and consistent presence is essential both for individual progress and for the functioning of the research group. Students must notify the supervising faculty in advance if they are unable to attend a scheduled meeting or research session. Unexplained or repeated absences will negatively impact the Research Participation & Progress grade. Students are expected to comply with Georgia Tech's policies on attendance and approved absences, including provisions for illness, approved Institute activities, and religious observances.

### Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct. In the context of research, academic integrity includes the accurate reporting of data and methods, proper attribution of others' ideas and prior work, and full transparency in all research activities. Any student suspected of research misconduct, falsification of data, or plagiarism will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

### Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If this course counts toward Core IMPACTS requirements, a statement about the applicable Core area and associated career competencies will be provided separately. Contact your academic advisor to determine whether this course applies to your Core IMPACTS requirements.

### Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

### Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions

will help build the environment we seek. I encourage you to remain committed to the ideals of Georgia Tech while in this course.

## Additional Course Policies

### Pre- and/or Co-Requisites

There are no formal course prerequisites. However, students are expected to have demonstrable programming experience in Python or R, as well as prior real-world research experience (e.g., undergraduate research, industry project, or equivalent). Students who are unsure whether their background is sufficient are encouraged to contact Dr. Sarhadi before enrolling.

### Collaboration, Group Work, and Use of Generative AI

Research is inherently collaborative, and students are encouraged to learn from fellow lab members. All written deliverables submitted for a grade (progress log entries, reports, presentations) must reflect the student's own analysis and writing. Use of AI writing tools (e.g., ChatGPT, Claude, Gemini) to generate substantial portions of graded work is not permitted without explicit prior approval and proper attribution. Use of AI for literature searches, code generation, or data analysis is permitted but must be disclosed in submitted work.

### Extensions, Late Assignments, and Missed Meetings

Written deliverables submitted late without prior approval will be penalized 10% per day. If extenuating circumstances arise (illness, approved Institute activities, religious observances), notify Dr. Sarhadi as early as possible to discuss alternative arrangements. Requests made after a deadline has passed will be evaluated on a case-by-case basis.

## Campus Resources for Students

### Graduate Student Academic and Professional Success Resources

Resources for graduate students — including academic support, professional development, and student services — are available on the Office of Graduate and Postdoctoral Education website (gradpostdoc.gatech.edu).

### Undergraduate Student Academic Success Resources

Undergraduate students can access free tutoring, supplemental instruction, and academic advising through Success at Tech (success.gatech.edu).

### Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness-related resources is maintained by the Office of the Vice President for Student Engagement and Well-being in the Student Resource Guide (students.gatech.edu/student-resource-guide).