Syllabus - Future Computing with Rogues Gallery - Fall 2020

(Course number: VIP 2601/3601/3602/4601/4602/6600/6603 VWP)

The aim of the Rogues Gallery [Vertically Integrated Project (VIP)](#) class, is to train students to use novel computing architectures, tools, algorithms, and applications. Specifically, it focuses on candidate technologies for post-Moore computing and researching new ways to use these technologies.

For some more general background on VIP see the website at vip.gatech.edu and their [student brochure](#).

- Faculty advisors: [Dr. Jeff Young](#), Dr. Robert Clark

- Class time: 3:30-4:20 PM Tuesdays, Meeting online via Bluejeans

    - Bluejeans link: https://gatech.bluejeans.com/397956562
    - Via phone: Call +1.408.419.1715 and enter the meeting code: 397956562
- Office hours: 4:20-5:30 PM Tuesdays also via Bluejeans; email or use Teams for additional questions.

- A [Microsoft Teams Rogues Gallery channel](#) is also available for subteam discussion and general questions.

Fall 2020 Notes

Due to ongoing COVID-19 limitations, for Fall 2020 we are classified as a **synchronous, hybrid** class. This means that we may have a mix of in-person (with limited attendance/spacing/masks) and online instruction **(hybrid)**. Note that the initial month of classes will be **online**, and we will reevaluate the hybrid nature of the course during the semester, if and only if, conditions allow it and we can safely meet as a group. You are not required to attend in person for any lectures.

While class will be recorded, the class time will always be held at the listed class time **(synchronous)** using **BlueJeans** (web camera recommended, joining by phone is also suitable).

Please note that in person attendance for the lecture session is not a graded aspect of this class. However, *attendance at subteam meetings and regular notebook updates are graded and these two activities are the primary determinant of your grade*. If you are feeling ill for any scheduled session please let the advisor and/or your sub-team members know that you will be out. Please also reach out if you are having issues with any aspect of the online learning experience.

Class will run from August 18th (first Tuesday) to November 24th. VIP does not meet during reading days, and we look for students to finalize their semester deliverables before the Thanksgiving holiday.

Please note that we will plan to follow the expectations guidance published by the Provost as detailed [here](#). If you have questions that are not answered by these FAQs, please reach out to the instructor via email.

Class Times and Different Time Zones

During Fall 2020, many students in the class may be spread across different time zones. If you are a first time student for this VIP class, we request that you try to make the scheduled meeting time. Students during their second or later enrollments have more flexibility as long as they can make subteam meetings. If you are overseas, please let the instructor know in case we can make some arrangements to help you participate.

What is required? You **must** be able to make your subteam meetings, which are typically 1-2 hours per work. If you cannot find a time to meet with the rest of your subteam each week, you may want to rethink being part of VIP as this is a key graded component of the course.

Learning Objectives

As part of this class, you will learn about four different types of "post-Moore" technologies at a high level, and you will investigate one area in more detail via directed research. Currently our sub-teams are looking at near-memory, neuromorphic, reconfigurable, and quantum computing. You'll learn about each of these areas, and we will discuss tools to more effectively map applications to novel architectures. Additionally, we will cover general research strategies and techniques that are applicable to a wide variety of traditional and post-Moore computing platforms.

Here is a tentative list of topics we will cover:

- Week 1 (8/18): Introductions and overview; notebooks and grading
- Week 2 (8/25): Git, wiki updates; subteam selection
- Week 3 (9/1): RG tools and VMs; subteam discussion
- Week 4 (9/8): Quantum resources; each week will include updates from each subteam
- Week 5 (9/15): Reconfigurable resources
- Week 6 (9/22): GT research funding and awards
- Week 7 (9/29): *Midterm review of notebooks; peer evaluations due 10/2/20*
- Week 8 (10/6): Neuromorphic resources
- Week 9 (10/13): *Withdrawal deadline*
- Week 10 (10/20): Quantum Efforts at GTRI with Dr. Clark
- Week 11 (10/27): Internships and summer research
- Week 12 (11/3): **Asynchronous lecture due to US elections**. Office hours will move to Thursday 4-6 for this week.
- Weeks 13-14 (11/10; 11/18): Continue working on team projects; prepare poster
- Week 15 (11/24): Poster presentations; *peer evaluations due*; finalize notebooks by end of exams

Besides these technical topics, VIP projects have these overall learning goals:

- Learn and practice professional skills (*in our case, using remote systems and development tools like Git, VNC, and debuggers*)
- Make substantial contributions to the team project (*i.e., making progress towards improving a specific area like code, testing, documentation, or background research*)

Assignments and Grading

The premise of VIP is teams working on projects. Much like a real-world team, individual members work on different aspects of the project. Team members range from sophomores through graduate students, from first-time participants to students who have been involved for four or more semesters. The number of credits for which a student is enrolled is taken into account in grading.

Your grade is based on three areas, along with three requirements. Although each student might contribute in different ways, you must demonstrate achievements in all three areas below.

1. Documentation and records (33%)
   a. VIP Notebook (**not optional**);
   b. VIP Wiki/blog documentation;
   c. Code (via GT GitHub) if team is developing software.

2. Personal accomplishments and contributions to your team's goals (33%)
   a. Learning modules and reports required by your advisor(s);
   b. Engagement in the project;
   c. Pursuit of knowledge necessary for the project;
   d. Contributions to the technical progress of the team;
   e. For more experienced members of the team, contributions to the management of the project may be expected.

3. Teamwork and interaction (33%)
   a. Peer Evaluations **(not optional)**;
   b. On-time attendance in meetings;
   c. Actively contributes to overall team goals;
   d. Coordinates activities with other team members;
   e. Assists other team members;
   f. Team presentation(s). ***Typically, this is one slide per team per week and one poster presentation at the end of the semester.***

As part of the assessment of the above, each student is required to:

1. Maintain a VIP notebook. Scans of well-maintained VIP notebooks are available on the VIP website. Each student must understand that if work is not documented in their VIP notebook, "Then you didn't do it," (i.e. work that is not documented in the notebook will not count toward your grade).
2. Complete the mid-term peer evaluation. This is a web-based form, and links are available on the VIP website. ***Failure to complete the peer evaluation will result in a full letter grade deduction. Late submissions are not accepted.***
3. Complete the final peer evaluation, which will be available for one week during the week preceding finals. ***Failure to complete the peer evaluation will result in a full letter grade deduction. Late submissions are not accepted.***

Performance assessments will be done once at mid-terms and again at the completion of the semester. The mid-term assessment is advisory.

Documentation

⌄	Notebook Maintenance
⌄	To Do Lists
⌄	Meeting Notes
⌄	Usability
⌄	Overall Design Notebook Evaluation
⌄	Wiki Content Quantity
⌄	Wiki Content Quality
⌄	SVN code logged frequently
⌄	Code Quality
⌄	**Overall Documentation**

Accomplishments and Effort

⌄	Tutorials and Learning Modules
⌄	Team and sub-team quizzes
⌄	Papers and Technical Articles
⌄	Pursues Independent Learning
⌄	Self Motivated
⌄	Independent Effort
⌄	Quality of Effort (results)
⌄	**Overall Effort**

Teamwork and Interaction

⌄	Team meeting attendance
⌄	Team meeting participation
⌄	sub-team meeting attendance
⌄	sub-team meeting involvement
⌄	Contributes useful ideas
⌄	Recognizes others ideas
⌄	Focuses effort on achieving goals
⌄	Involves others in effort
⌄	Assists others with their efforts
⌄	Manages time and tasks well
⌄	Leadership skills
⌄	Final Presentation
⌄	Peer Evaluations
⌄	**Overall Teamwork Evaluation**

OVERALL GRADE (final eval): [⌄]

Individual Comments:

Notes on documentation.

Category	Description
Notebook	Your VIP wiki subpage
To-do list	Check-box lists, including date when item is complete
Meeting notes	Collective Wiki page with meeting summaries
Usability	How useful is the notebook to future students?

| Overall | Overall rating (e.g., detailed design notes, decisions, code references, website links)
| GT GitHub | Frequency, quantity, and quality of contributions |

Academic honesty

The main principle in VIP academic honesty is that you will not present someone else's work as your own. Tests and specific assignments (homework, lab assignments, etc.) must be your own work. For other work you are encouraged to consult whatever sources are helpful in learning and understanding the issues associated with the material, but you should always provide appropriate references and citations where such material is included in your VIP notebook, programming code, presentations, etc.

Additionally, to provide a good working environment for all students, you're expected to adhere to rules given here, posted, or disseminated in class. Academic Honesty is taken seriously and failure to follow these principles will result in disciplinary actions as stated in the Student/Faculty Handbook.

Accommodations for students with disabilities

Georgia Tech offers accommodations to students with disabilities. If you need a classroom accommodation, please make an appointment with the Office of Disability Services (www.disabilityservices.gatech.edu). If you have an accommodation letter from ODS, please provide your team advisor with a copy of your accommodation letter and discuss with them how your accommodations will be applied. This should be done as early as possible in the semester.

Additional resources for students

The Canvas site also has a PDF entitled "Student Resources for Support" that has a list of campus services for academic and personal issues that may come up during the semester. Please reach out to your instructor for any class-related issues that you may encounter. For personal issues, he may direct you to the appropriate campus resource to provide you with the best level of support.

What should I know already?

(Prerequisites.)

You should have at least an undergraduate-level understanding in the following topics. You'll have about a month at the beginning of the course to get up to speed on this material if you have any gaps or haven't touched these subjects in a while.

- Programming proficiency in a "systems-oriented" programming language, like C, C++, Fortran, Rust, or equivalent.

Will I need school supplies?

(Books, materials, equipment, labs, and facilities.)

Due to our remote nature, you will mainly need your personal computer and an Internet connection. A web camera is strongly suggested but not required.

VIP Labs and facilities. VIP has rooms and equipment that are shared by many VIP teams. To provide a good working environment, the following rules apply to anyone with access:

1) The room priorities are:
a. Scheduled team meetings, lectures, and learning modules;
b. Weekly sub-team meetings (multiple groups can use rooms at same time);
c. Video conferences or special meetings with VIP stakeholders;
d. Other project-related work (multiple groups can use rooms at same time).

Room schedules can be viewed on the VIP website.

While the above priorities indicate which events take precedence, a good neighbor policy on using the rooms applies. If you need to access computers, equipment, or work on a project in the room while other activities are going on (sub-team meetings, etc.), you are welcome to do so as long as it does not disrupt a scheduled activity. Similarly, multiple groups may use a VIP room at the same time. Also, where it does not disrupt one of the above uses, VIP participants may use the rooms for other activities such as studying.

2) Everyone is expected to pitch in to keep the rooms clean. Food is allowed in the rooms provided any spills or messes are cleaned immediately. The rooms are monitored by camera, and staff will pull videos to identify offenders. Gum is a particular problem especially in carpeted rooms. Do not place used gum anyplace other than in a trash can.

3) The rooms have equipment both for general use and for specific teams. General use equipment includes the projector in Klaus 1440, and monitors in VL 465 ad VL 463B. Other equipment may be for general use or dedicated to a team specific purpose; some equipment may be general use one semester and assigned to a team another semester. If you are unsure of whether equipment is available for general use, contact the VIP trouble-ticket system at vip-request@ece.gatech.edu. You should only use equipment for the designated purpose. Some equipment may pose personal hazards if used inappropriately!

a. Equipment owned by the VIP Program may not be removed from a VIP room without completed an equipment loan agreement, which would need to be approved by one of the VIP Directors. To request permission, email vip-request@ece.gatech.edu.

b. You will be responsible for the replacement cost of any equipment not returned in good condition.

c. You must be sure you know how to operate the equipment safely. Written approval to use the equipment does not indicate that the team advisor has reviewed equipment use and safety. You are responsible for knowing the hazards and safe operation of any equipment you use.

4) Computer accounts are issued for your use only. You may not share computer accounts with anyone else, even another team member. All computer usage is subject to rules and policies of Georgia Tech, the University System of Georgia Board of Regents, and the State of Georgia. Additionally, you are expected to be considerate of other users. Computer permissions are not authoritative. For example, just because you have file access to something does not indicate that it is appropriate for you to read or modify that file.

5) Buzz-card access to VIP facilities is a privilege contingent on abiding by the above rules. Buzz-card access is logged, and rooms are video recorded. Be aware that if there is a problem (theft, vandalism, or simply a mess left in a room), the logs and video records will be consulted. Do not allow unknown people to access VIP facilities. Be sure to secure the facilities (i.e. close the door) when you leave.

About VIP

This VIP course is part of a larger program, which aims to expose students to research and development (R&D). Undergraduate students that join VIP teams earn academic credit for helping in design and discovery efforts that assist faculty and graduate students with R&D issues.

The teams aim to be:

- *Multidisciplinary* - drawing students from all disciplines on campus;
- *Vertically integrated* - maintaining a mix of sophomores through Ph.D. students each semester;
- *Long-term* - each undergraduate student may participate in a project for up to three years and each graduate student may participate for the duration of their graduate career.

There are several reasons behind the design of VIP teams.

- To provide the time and context necessary for students to learn and practice many different professional skills, make substantial contributions to the project, and experience many different roles on a large, multidisciplinary VIP team.
- To support long-term interaction between graduate and undergraduate students on the team. The graduate students mentor the undergraduates as they work on VIP projects embedded in the graduate students' research.
- To enable the completion of large-scale projects that are of significant benefit to faculty members' research programs.