VIP Voice+ Research Lab Syllabus

VIP 2601 3601, 3602, 4601, 6601 Section GR1, JR-1, JR-2, SO-1, SO-2 Variable Credits

Thursdays, 9:30-10:20, Van Leer 465

Instructor Information

Instructor	Email	Drop-in Hours & Location
Andrea Jonsson	Ajonsson7@gatech.edu	Swann 222 3:30-4:30 Thursdays
Co-Instructor(s)	**Email**	**Drop-in Hours & Location**
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General Course Information

Description

The project addresses a central research question: How do young people perceive and interpret emotional timbre in human voices compared to AI-generated voices? The collaboration between linguistics, voice and performance studies models arts-integrated learning that pushes students to bridge analytical and creative modes of thought. Students will collect and collate recordings of voices, aiming to examine how listeners (aged 10-25) distinguish emotional timbre in human voice across age, language, and identity. The result will be an interactive sound installation entitled Voice Boxes, with the goal of establishing a permanent Voice Museum at Georgia Tech. The growing capability of vocal-identity-cloning Artificial Intelligence (AI) to reproduce human speakers' identities—capturing their acoustic-articulatory patterns, cadence, pitch, and volume—has achieved remarkable accuracy. These systems can now replicate the prosody of original speech from reference audio with striking fidelity. As researchers, we seek to understand how this technological advancement influences younger listeners' abilities to recognize, interpret, and distinguish authentic human vocal timbre and emotional expression. While AI-generated voices may sound convincingly human in their prosodic mimicry—from intonation, cadence, stress, tempo and phrasing—our study aims to explore how listeners differentially perceive emotional qualities in AI versus human voices, with a particular focus on the elusive and complex dimension of timbre—perhaps the most challenging aspect of vocal expression to define and measure. In an age where AI-generated voices saturate digital environments—from Siri and Alexa to TikTok narrations and automated captions—young listeners are increasingly exposed to synthetic rather than organic human speech.

This study explores whether such exposure affects the ability to interpret emotional expression in authentic human voices. We focus particularly on vocal timbre, the subtle quality that distinguishes one voice or color from another and conveys affective depth beyond words and prosody. By comparing listeners' emotional recognition accuracy across human and AI-generated speech samples, we aim to assess how digital listening habits may be reshaping auditory empathy and the perception of authenticity in the human voice. We propose to gather about 40 hours of vocal recordings —from human and AI—across adolescent, elderly, and multilingual registers, and present them in an intimate artistic and acoustic setting to invite interpretive listening called Voice Boxes. In each box, visitors encounter both human and AI voices, and a mix of ages and languages. The intimate setting of the box is intended to limit other senses and heighten intentional listening of timbre, or the tone colors or textures of a sound. *Voice Boxes* will be set

up in a museum or gallery setting (TBD) and contain five curtained boxes arranged in a circular constellation. Each box has a dominant emotional theme that is not indicated to the listener: Joy, Fear, Calm, Anger, Surprise). **For this first semester of Voice+ Research Lab VIP we will focus on the emotion of anger.**

Afterwards, the visitors will identify what they think they hear and respond on tablets or cards outside the box. The responses will later be coded for variables, targeting intentional listening and the blurred lines between human and synthetic emotion.
Inside, participants listen to the audios with noise-cancelling over-ear headphones and respond with clicking given buttons:

Questions	Given choices
What emotion do you hear?	Joy, Fear, Calm, Anger, Surprise
Does this voice sound human or AI?	Human; AI
Does this voice suggest a particular age group?	Adolescent; Elderly; Not sure
Does this voice carry a foreign-language accent?	Yes; NO; Not sure
Does this voice seem to switch between languages (multilingual)?	Yes; NO; Not sure
What is your age?	Child; Adolescent; Adult; Elderly; Not sure
Are you familiar with AI-generated voices?	Very familiar (use/hear often); Somewhat familiar; Heard a few times; Not familiar
Do you speak and understand more than one language?	Yes; No?

Pre- &/or Co-Requisites

There are no pre-requisites or co-requisites for this course.

Course Goals and Learning Outcomes

By the end of this course sequence, students will be able to:

1. **Design and implement a recording and dataset system**
2. **Create scripted prompts for participants to record to elicit different emotional responses. 1. Anger 2. surprise**
3. Create voice/audio surveys for human participants to record
4. Create/collate AI voices reading same prompts for anger and surprise
5. Collect and categorize emotional responses
6. Create and implement surveys, aggregating them into an interactive exhibit where listeners try to identify voices and emotions.
7. **Integrate diverse technologies** to visualize pitch, formants, intensity, spectral features for machine learning
8. **Classify emotional timbre in voice**
9. **Analyze acoustic features like pitch range, energy, timbre**

10. **Apply data-driven approaches** such as machine learning and analytics to improve user engagement and operational efficiency.
11. **Develop and deploy scalable digital solutions**, including multimedia content delivery for Voice Boxes at an interactive art exhibit
12. **Understand and engage in the process**, including planning, implementing, and communication.

Course Requirements & Grading

VIP teams function like real-world project teams. Members work on different aspects of a shared project, ranging from sophomores to graduate students, and from first-time participants to those with multiple semesters of experience. Students may enroll for variable credit hours, which are considered in grading. **Note:** Zero-credit enrollment is reserved for paid participants and follows the same grading criteria.

Grading Overview

Each student is evaluated across three core areas, with three mandatory requirements. Regardless of role or experience, students must demonstrate achievement in all three areas:

1. **Documentation and Records (33%)**
   - Maintain individual documentation (required).
   - Contribute to team documentation: VIP Wiki, OneDrive
2. **Personal Contributions (33%)**
   - Complete assigned quizzes, modules, essays, or reports.
   - Engage actively in the project.
   - Pursue knowledge relevant to the project.
   - Contribute to technical progress.
   - Experienced members may also contribute to project management.
3. **Teamwork and Interaction (33%)**
   - Participate in peer evaluations. Failure to submit results in a full letter grade deduction.
   - Attend meetings on time.
   - Collaborate toward team goals.
   - Coordinate and assist teammates.
   - Contribute to team presentations.

Rubric expectations, each category out of 20 points

Participant and Weekly Engagement (20)

- Weekly tasks completed, hours and reflections logged
- Clear and sustained effort and time investment

Human Voice Recordings (20)

- Good technical quality
- Emotional contrast

AI voice recordings (20)

- Good technical quality
- Emotional contrast

Public-facing contribution (Voice Boxes) (20)

- Curation
- Audience framing
- Collaboration

Critical reflection (20)

- Conceptual depth
- Clarity
- Ethical thinking about human vs. AI voices

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Course Materials

Materials/Resources

Recording Equipment provided by the instructors/ library

Course Website and Other Classroom Management Tools

This course uses Canvas and OneDrive.

Peer evaluations are administered by the VIP Program Click Here to access peer-evaluations from off campus. Click here to access from on campus. You will be prompted to sign in. Users can only log in from on campus or via VPN. Students can only access the peer evaluation portion of the system during active evaluation periods.

Course Policies, Expectations, & Guidelines

VIP is a collaborative, multidisciplinary, project-based learning and research experience. Your success in this course depends not only on your technical contributions but also on your active engagement with your team and the broader learning process.

Your Role in the Learning Process

As a VIP student, you are expected to:

- Take initiative in exploring and applying knowledge relevant to your project.
- Collaborate effectively with team members across disciplines and experience levels.
- Document your work thoroughly.
- Reflect on your learning and contributions throughout the semester.

This course is a real-world team environment, where learning is dynamic, self-directed, and collaborative. Your growth depends on your willingness to engage, contribute, and learn from others.

Team Meetings and Participation

Attendance and active participation in **team meetings** and **sub-team meetings** are required. These meetings are essential for:

- Coordinating project tasks and timelines.
- Sharing progress and receiving feedback.
- Learning from peers and mentors.
- Contributing to team decisions and direction.

Failure to attend meetings without valid reason may negatively impact your grade and your team's progress. If you anticipate missing a meeting, communicate with your team and advisor in advance.

Use of External Resources

You are encouraged to consult external sources to support your learning and project work. However:

- Do **not present someone else's work as your own**.
- Always **cite and reference** external materials used in your notebook, code, presentations, or other deliverables.
- Proper attribution is essential to maintain transparency and integrity in a collaborative research environment.

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.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

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.

Attendance and/or Participation

Attend either the 9:30 meeting or the 3:30 Office hours

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Case-by-case basis

Inclement Weather and Digital Learning Days

Virtual meeting

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. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Student Use of Mobile Devices in the Classroom

Allowed

Additional Course Policies

VIP Room and Equipment Use Policy

VIP rooms and equipment are shared resources used by multiple teams. To ensure a productive and respectful working environment, the following rules apply:

1. Room Usage Priorities

Room use is prioritized as follows:

1. Scheduled team meetings, lectures, and learning modules
2. Weekly sub-team meetings (multiple groups may share the space)
3. Video conferences or special meetings with VIP stakeholders
4. Other project-related work (multiple groups may share the space)

Room schedules are available on the VIP website.
Note: A "good neighbor" policy applies—students may use rooms during other activities as long as they

do not cause disruption. Quiet individual work or studying is allowed when it does not interfere with scheduled uses. Similarly, multiple groups may use a VIP room at the same time.

2. Cleanliness and Conduct

- Everyone is responsible for keeping rooms clean.
- Food is allowed, but spills must be cleaned immediately.
- **Gum must be disposed of properly—do not stick it under desks or on carpets.**
- Rooms are monitored by cameras; violations may be reviewed via video.

3. **Equipment Use**

- Equipment may be designated for general use or assigned to specific teams.
  - General use examples: Projector in Klaus 1440, monitors in VL 465 and VL 463B.
  - Equipment assignments may change each semester.
- If unsure about equipment access, contact: vip-request@ece.gatech.edu
- Use equipment only for its intended purpose. Misuse may pose safety risks.

Important Equipment Rules:

- Equipment may not be removed from VIP rooms without a signed loan agreement approved by a VIP Director.
- You are financially responsible for any equipment not returned in good condition.
- You must know how to operate equipment safely. Approval to use equipment does not imply safety training has been provided.

4. Computer Accounts

- Accounts are for individual use only—do not share with others.
- All usage must comply with Georgia Tech, USG Board of Regents, and State of Georgia policies.
- Respect privacy and data integrity. Having access to a file does not mean you are authorized to read or modify it.

5. BuzzCard Access

- Access is a privilege and is logged.
- Rooms are under video surveillance. In cases of theft, vandalism, or messes, logs and footage will be reviewed.
- Do not allow unauthorized individuals into VIP spaces.
- Always secure the room (close the door) when leaving.

Campus Resources for Students

Undergraduate Student Academic Success Resources:
A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

- 1:1 Tutoring: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Georgia Institute of Technology has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit gatech.joinknack.com and sign in with your student account.

Graduate Student Academic and Professional Success Resources:
A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and

- Professional Development such as the programming from the Career Center and other professional development resources and events"]

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 has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)

Notebook Maintenance	The notebook (if hard copy) does not have removable pages. Outer Cover: Your name, your project's name. Inner or Outer Cover: Your contact info and your team members' contact info. Each Page: Numbered, dated and signed.
To-Do List Maintenance	Maintain check-boxes for items to be done that are then checked-off and dated when done.
Meeting Notes	Detailed meeting notes; Check-boxes for items for which you are responsible; Deadlines for your subteam and the overall team.
Technical Notes	Detailed VIP/design notes, VIP/design decisions, Diagrams Copies of code you wrote, or pointers to where the code is stored in a repository; Records of important websites; Ideas, even if they are only half-baked;
Usability	Will your VIP notebook be of use to people who join the team later and need to refer to it? This includes legibility, intelligible technical and meeting notes, and overall organization.

Course Schedule

Week	Date	Activity/Event
Week 1-2	Week of Jan 12-22	… Introductions Overview of team's work Discussion of semester goals Sub-team selections finalized Sub-team meeting times finalized IRB training completed IRB plan, application, overview of study's purpose, risks, benefits, and contact info Locate subject pools Script finalized
Week 2	Week of Jan 19	Verification of Student Participation in Class Due by Friday at 4pm
Week 2-3	Jan 21 – Jan 27	Script design, begin human voice collection planning Begin Working Bibliography and Lit reviews

Week 3		Assignment: Self-grade VIP notebook with rubric
Week 7	Week of Feb 23	AI Voice Generation Web-based peer-evaluations released for students to complete. Online form due by end of the day Friday. Late submissions will not be accepted.
Week 7 or 8	Week of Feb 23 or March 2	Metadata and Archiving Submit individual VIP documentation for mid-term grading. Notebook logs up to date
Week 7	Week of Feb 23	Midterm check-in
Week 8	March 2	Acoustic Analysis Midterm grades for 2000-level courses due in OSCAR (S for satisfactory, U for unsatisfactory).
	March 18	Withdrawal Deadline
Week preceding finals	Apr 20 – Apr 28 Open Close	Web-based peer-evaluations released for students to complete. Online form closes at 11:59PM on Tuesday. Late submissions will not be accepted.
Last week of class	Apr 20 – Apr 28	Final presentations plan or implementation for Voice Boxes Turn in individual VIP documentation for final grading.
Finals Week	Apr 30 – May 7	No final. No assignments.