WNR Team Contract

**Purpose of Contract:**

The purpose of this document is to outline the group dynamics and culture of team WNR (Wireless Neural Recorder). This document outlines roles, communication guidelines, participation evaluations, work products, conflict management and resolution, as well as logistics for the team. This contract will be in effect during the Rice University academic school year to fulfill the requirements of the year long engineering senior design course.

**Team Members:**

People who will contribute to the development of WNR’s wireless neural recorder will be listed in this section. This team contract will only apply to a certain subset of the entire team contributing to the project.

The members who must honor the team contract are specified below:

1. Stephen Xia
2. Tingkai Liu
3. Xin Huang
4. Yuan Gao

These four members make up the undergraduate team of WNR. These four members will be the primary developers of team WNR’s wireless neural recorder.

In addition to undergraduate members, WNR is backed by a group of mentors and sponsors with higher degrees of education and expertise. These members provide guidance to the undergraduate team members listed above and do not have to adhere to the specifications laid out in this team contract.

1. Professor Gary L. Woods: faculty mentor
2. Professor Aydin Babakhani: faculty sponsor
3. Dr. Nitin Tandon: Texas Medical Center sponsor
4. Hamed Rahmani: Ph.D mentor

**Expectations:**

Team members are expected to:

1. Attend each meeting **on time** and be respectful to other participants.
2. Execute responsibilities and tasks to the best of their abilities.
3. Be alert to any change in schedules or events and notify the entire team immediately.
4. Communicate with each team member efficiently and promptly.

**Leadership and Roles:**

Documentation, housekeeping, and administrative tasks have been split up into the following roles with the corresponding owners. The roles listed in this section will remain static throughout the year.

* **Secretary** - Stephen Xia
  + Keep track of work progress through Gantt Chart, weekly minutes, and agendas.
  + Prepare weekly progress reports
  + Keep track of task ownership
* **Task Manager** - Tingkai Liu
  + Keeps track of documentation and task requirements and deadlines
  + Remind the team of required tasks in a timely manner
  + Tidies Google Drive and reviews documents
* **Liaison & Photographer** - Xin Huang
  + Communicate with corporate sponsors, academic sponsors, and mentors
  + Take pictures of team working, data results, and relevant team event participation
  + Keeps track of web documentation and pictures
  + Work on competition requirements and proposals
  + Start poster design and finalized product housing design
* **Treasurer** - Yuan Gao
  + Order requested components
  + Keep track of expenditures
  + Maintains list of purchases/expenditures and parts list

The engineering component of the project are segmented into the following components:

* **Analog Front-End (AFE)** - Stephen Xia, Tingkai Liu
  + This component of our project interfaces directly with the electrodes that collects neural data.
  + Coordinate with the microcontroller component to process data for wireless transmission.
  + Accurately sample and digitize data, while rejecting noise and DC offset.
* **Microcontroller** - Tingkai Liu, Stephen Xia
  + This part of the project is responsible for the control and coordination between AFE and Wireless communication modules.
  + Work closely with AFE and the wireless communication portions to achieve integration of the system.
  + Optimize code to minimize power consumption.
* **Wireless Communication** - Xin Huang, Yuan Gao
  + Understand capabilities of various wireless communication protocols.
  + Lead research and design on decided wireless protocol.
  + Research wireless protocol (TCP/UDP) transmission schemas.
  + Conceive compression & buffering algorithms for BLE bandwidth limitation.
* **Receiver and Server** - Yuan Gao, Xin Huang
  + Process the received data packets on server end.
  + Coordinate wireless transmission handshake and error correction.
  + Store and display data for analysis by medical professionals.
* **PCB design** - Xin Huang, Tingkai Liu, Stephen Xia
  + Create PCB schematics for Nordic NRF 52 chip and intan chip
  + Create custom battery holder
  + Connect Nordic 52 PCB to intan chip breakout board

**Communication:**

Communication between the team members are absolutely vital to the success of any project team. To accomplish that, we use the following communication media:

1. Email - Formal, Occasionally
   1. Email correspondence provides a mean of formal communication where exchanges of messages are recorded on the server
2. Slack - Intra-team, Very Frequently
   1. Communication between undergraduate team members only for project management
3. Texts & phones calls - Intra-team, Rarely
   1. This is mainly for urgent contact when a team member is not responding on other channels
4. WeChat - Intra-team, Very Frequently
   1. General teammate connection and mood relaxation
   2. Convenient for instant image transmission
   3. Exchange instant thoughts and notifications
5. In-person - Used for everything, Frequently
   1. Clarification of written messages
   2. Task assignments and verbal confirmations
   3. Collaboration on tasks requiring multiple people from the team

The entire team, undergraduate and mentor members, will meet once per week to discuss work progress. The undergraduate team members will meet at least once more per week to reflect on the feedback during the mentor meetings and assign tasks for the following week. Decisions will be made by consensus of all undergraduate team members, with consideration of the feedback received from the mentors. The agendas and minutes for each meeting will be recorded by the Secretary for future references.

**Participation:**

All members are expected to participate equally on the design and engineering portions of the project while also completing their individually assigned tasks relating to their non-engineering roles. All work done during team meeting and assignment hours should be related to senior design. Members should contribute verbally during in-person team and sponsor meetings offering input, constructive feedback, and suggestions, while also limiting needless phone or computer distractions. If a member does not appear to be meeting his or her deadlines, then procedures outlined in the **Conflict Management and Resolution** section will be enforced.

**Work Process:**

Work involved in the senior design project usually fall under two categories: documentation and engineering design. We have established the following work processes for the two categories of work:

1. Documentation Work:
   1. The Task Manager will frequently consult Owlspace to keep track of upcoming documentations. If a documentation is required to be completed, the Task Manager will send out a message to team to inform members about the documentation requirements. The task manager will also upload relevant requirements and rubrics of the documentation onto the team Google Drive for references of team members.
   2. A team meeting will be scheduled collectively by the team members and the meeting location will be confirmed by the Liaison.
   3. During the team meeting, documentation tasks will be fairly distributed among the team members based on consensus and discussion. Members are encouraged to volunteer for documents that are personally interesting to them. Additionally, documentation that requires the contributions of each member on the team will be addressed.
   4. In the case that any task remains unassigned, the Task Manager will assign the remaining tasks as fairly as possible.
   5. Each person will complete their assigned documentation task by the agreed upon deadline.
   6. A second meeting will be scheduled collectively by the team members and the meeting location will be confirmed by the Liaison. In this meeting, all the individually completed documentation will be compiled for submission.

1. Engineering Design Work:
   1. Team members will meet regularly to discuss product design and identify components of final design - compartmentalizing the larger project.
   2. During meetings, team members will divide the responsibilities according to specialty and discuss individual deadlines.
   3. In the case that there are unassigned tasks remaining, the Task Manager will assign the remaining tasks as fairly as possible.
   4. The team will then proceed to work on each member’s part separately while regularly updating the team on any progress and/or questions.
   5. In case there is a need for consultation from other team members of sponsors, a meeting will be scheduled. Means of communication with team members and sponsors are listed above in the **Communication** section.
   6. Team meetings will be held again a week before the team deadline for Prototyping to integrate each member’s components together.

**Conflict Management and Resolution:**

In case of potential conflicts, proper communication between members involved and the rest of the team is the key. Team should always gather and discuss the issue, analyze the reason of conflict and try to resolve the problem as quickly as possible.

In regards to conflicts or disagreements between 2 members, conflict should be resolved quickly by bringing in 1 or more other team members are mediators to quickly resolve conflict by voting on an agreement.

In regards to intractable conflicts or disagreements between the entire team or in case of ties for voting decisions, a mentor will be consulted to resolve the conflict and be the tie-breaker.

In case of a severe conflict that greatly impedes the progress of the entire team, mentor will be consulted and the involved teammates will be requested to fill out an argument form which records reasons of conflict, evaluation of both sides, and peer evaluations from other teammates for possible solutions. Involved teammates should sign the form to accept the responsibilities caused by the tension, and the form will be handled to the advisor. An intermediate resolution shall be concocted and announced to the entire team. The event will be logged in team history.

**Logistics:**

Logistics should be well planned in advance and followed according to predetermined plans. We have collective created a shared calendar, project timeline, and Gantt chart. Important deadlines and self-set prototype goals have been marked and laid out such that every member will give their best efforts to meet the agreed upon timeline for team tasks and meetings.

In addition to the timeline and calendar, the Task Manager also sends out weekly or twice-weekly emails reminding team members of important weekly requirements and any upcoming tasks not yet completed. While the primary form of communication for task reminder communication from the Task Manager will be disseminated through email, WeChat and Slack will also be used occasionally by other members to confirm tasks and meeting times. Phone calls and texts will be used for contacting in cases of emergencies and necessary last-minute meetings.

Any and all changes to the agreed upon timeline of tasks or meeting times will require the approval of all 4 team members and occasionally the approval of a team mentor or sponsor depending on the severity of the change.

In cases of time and task conflicts, such as interviews or tests, at least 1 week notice should be given to the rest of the team and other affected parties. The member should give their best efforts to minimize impact to the project deadline by working on their assigned task before the conflict or making up the work as soon as possible immediately after the conflict.

In cases of emergencies, such as personal or family matters, 24 hours notice or notice as soon as possible is encouraged to notify other team members of the issue. Arrangements and contingency plans will go into effect to ensure minimal disruption to the team’s progress.

By signing this contract, I hereby honor the Team Contract for Team WNR and pledge to uphold my responsibilities with my best efforts.

Member Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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