

NTX - Student Club Competition(s)

1. DIY Competition (student only)

Build your own electrophysiological signal (aka biosignals) board. (EEG, EMG, EOG, EEC)

2. Consumer Competition (student only)

Make a project using consumer technology.

3. NTX Online Competition

This is the general & annual NeuroTechX competition. This is not only for student club. S

- The participating student club must be “registered” in NeuroTechX.
 - Can have Masters/PhDs/Profs involved, but not during the presentation.
 - The work can be “challenged” on the spot and people must be able to answer questions.
 - Student Clubs doesn’t have to be “officially approved” by the school, but need to have the clearance from the school to use “their university name”.
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- Student Clubs have to display NeuroTechX logo on their website and sponsor material (t-shirt, banner, etc.) as a global sponsor (highest level of sponsorship package).
 - Resources can be found here: <https://github.com/NeuroTechX/Resource-Kit>

1. DIY Competition

Build your own electrophysiological signal (aka biosignals) board. (EEG, EMG, EOG, ECG)

Objectives

- The real value of student clubs is in “engineering”.
- Learning / Understanding the full pipeline.
- Show the very multidisciplinary aspect of neurotech.
- School will see the value of these clubs. (Better wording for “internal value”)
- Industry / Internships / Opportunities. (Professional experience)

Rough Ideas

- Budget Limit (~500\$, the value of the final board with its components.)
- 1st competition, you can use TGAM / ADS1299
(less points than custom circuits of course!)

Choosing one of the following:

- EEG (Brain activity) : (Difficulty bonus: 1)
 - worth more points (way harder)
 - can you get a good alpha? (peak alpha)
- ECG (Heart activity) : (Difficulty bonus: 1)
 - Can you show a clean signal (SNR)
 - Can you get the heartrate? (can we compare with a real device?)
 - Can you show the PQRST curve?
- EOG (Eye activity) : (Difficulty bonus: 2)
 - Can you show a clean signal (SNR)
 - Can you detect eye blinks?
 - Can you detect left/right eye movement?
 - (bonus points, go beyond)
- EMG (Muscle activity) : (Difficulty bonus: none)
 - Can you show a clean signal (SNR)
 - *Can you detect contraction?*
 - *Can you establish a Force gradient in %?*
 - (bonus points, go beyond)

Evaluation

- Live Demo in front of judges (during conference) - with an evaluation grid.
- Technical Document (electrical schematics, algorithm details, etc.)
- Oral Presentation (+Q&A)
 - Points given for presentation, and answering questions**
 - 2 questions per judges

2. Consumer Competition

Make a project using consumer technology.

Objectives

- Inspire people (we all watch video on youtube and dream of hacking 'em)
- Have "fun"
- Explore Bio-Input consumer tech (BioSignals, Eye-Tracking in VR)
- Work closer with these companies. (visibility, possibility for internship)

Rough Ideas

- Budget limit (~1500\$ worth of tech - to avoid \$\$ to be the determining factor)
- Evaluation Grid (see model later in this document)
- You do whatever you want, there is no specific "goal".
- Innovative -> Points ++
- Nice UX -> Points ++
- Useful -> Points ++
- Hard -> Points ++
- Subjective average of the judges (min 2 judges)

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Table 1. Grid Example - preliminary evaluation matrix

Category	Sub-category	Elements	Score
Hardware	Signal quality	Amplification Noise	/10
	Viability	Form factor Ease of installation Price	/10
Software	Robustness	Artifact detection and correction Works for multiple users	/15
	Computing load	Responsiveness Introduced delay Necessary computing power	/10
User experience	Usability	Induced fatigue Ease of use Required training Design	/10
Challenge-specific task completion	EEG / ECG / EMG / EOG / ... (Live Demo)	Time taken to complete the path Accuracy in completing the path	/10
Written technical report and oral presentation	Technical content	Technical accuracy Depth, width and clarity of description	/20
	Presentation	Professional and clear language Engaging the audience and readers	/15
Total			/100

Questions

- When do we get to start?
- how many members? (min, max)
- do we have to do both competitions?
- (will we get travel reimbursement?)