# Mirage91: The Graz BCI-Racing Team - making students familiar with BCI research

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*Introduction:* The field of Brain-Computer Interface (BCI) research [1, 2] is very interdisciplinary as it needs knowledge and expertise from many areas: neurophysiology, anatomy, psychology, neuroscience, computer science, biomedical engineering, electronics, software engineering, machine learning, statistics and so on. Bringing students into the field usually involves disproportional effort, not only for the educator but also for students themselves.

The newly founded Cybathlon [3] tournament will take place in Zürich (Switzerland) in October 2016. This is a championship for end users with disabilities who are using advanced assistive devices. The competitions are comprised of different disciplines which will test the ability of end users to navigate through a series of everyday tasks while using a wearable arm prosthesis, powered knee prosthesis, powered exoskeleton, powered wheelchair, electrically stimulated muscles of the lower extremity and brain-computer interfaces.

One of our strategies to introduce students early into BCI is to offer classes at Master Level in several study programs. As a next step, the BCI Lab of Graz University of Technology has founded the Graz BCI Racing Team Mirage 91.

*Material, Methods and Results:* During courses in our study programs Information and Computer Engineering and Biomedical Engineering, we announced the idea of the Racing Team and asked for interested students. In October 2014 we started with first informative meetings with interested students; we introduced the idea further, explained the idea of the Cybathlon and were highlighting several tasks to be done in such a team: BCI development, paradigms for training, analysis of the BCI challenge, search for potential pilots, organization of pilot training, website, public relations, sponsoring and team outfit. In this way we were able to form a loose group of students into the Graz BCI Racing Team, named Mirage91 (Motor Imagery Racing, Graz, established 1991, the year when in Graz BCI research started). We already participated in the Cybathlon rehearsal in July 2015 in Kloten (Switzerland), where we were able to test the environment, our BCI, and all infrastructure. This was of special importance, since for the actual tournament in October 2016, we need to know how to organize performance including a tetraplegic end user (see Figure 1).
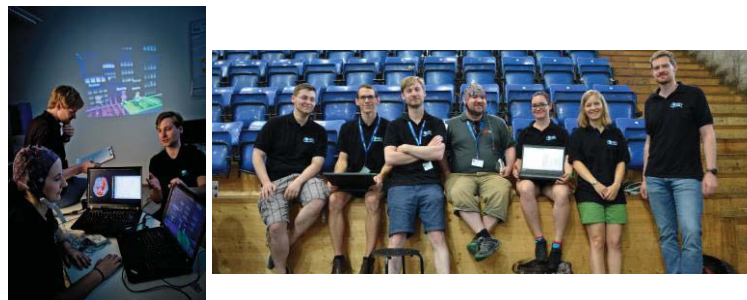


**Figure 1.**     *Left Photograph: Setup of the system by Team members. Right: Team at the Rehearsal.*

*Discussion:* So far, our BCI Racing Team consists of PhD students, Master and Bachelor students of study programs Information & Computer Engineering, Biomedical Engineering and Computer Science. The team was announced officially by the University and has its own website (http://bciracing.tugraz.at/).

*Significance:* With this activity, we were able to attract students to make first experiences with BCI research, to work with end users, and to meet other young scientists in an international setting.

References

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[2] Rupp, R.; Rohm, M.; Schneiders, M.; Kreilinger, A.; Müller-Putz, G. Functional rehabilitation of the paralyzed upper extremity after spinal cord injuryby noninvasivehybrid neuroprostheses. *Proceedings of the IEEE,* 103(6), 2015.

[3] http://www.cybathlon.ethz.ch/