FCBG Virtual Reality & Digital Engineering Guidelines

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A. General Description

A.1. Mission

The Virtual Reality (VR) & Digital Engineering Platform provides researchers with equipment and methods to conduct neuroscience experiments in realistic, controlled, measurable and safe virtual environments. The VR systems can be combined with other neural recording/stimulation devices from the other FCBG platforms: EEG, psycho-physiology, neuromodulation, MRI, etc..

Several types of services are offered depending on the researchers' needs:

- Technical and scientific expertise in designing VR-based experiments
- Access to standard VR hardware and software
- Development of special hardware or software (specific to a research project)
- Co-development of hardware/software solutions (partially reusable in other research projects)
- Innovation projects in preparation for research applications

Services dedicated to individual research projects must be fully covered by the principal investigator (PI), according to the guidelines and the VR & Digital Engineering platform price list. Co-development activities are financed on a shared basis with the PI, according to special prior agreement. Innovation projects are financed internally.

A.2. Management

The platform is managed by the VR & Digital Engineering Head of Platform. Scientific guidance is provided in coordination with the Platform Advisory Committee (PAC) including faculty of the EPFL , University of Geneva (UNIGE) or Geneva University Hospitals (HUG). Faculty PAC members are appointed by the FCBG Academic Council. The staff members as well as the current faculty advisors are listed in Appendix C.1.

A.3. Study Eligibility

The platform will support research projects in human neuroscience according to its mission as defined above. Animal studies are not permitted at the VR & Digital Engineering platform.

All human studies must have a current, valid, Ethics Committee Approval. It is the responsibility of the Principal Investigator (PI) to ensure that a valid Ethics Committee Approval is in place, and that all aspects of the human study are performed consistently with that approval.

In case of limited resources, priority is given to projects proposed by principal investigators (PIs) based at Campus Biotech (from UNIGE, EPFL and HUG).

A.4. Getting approval to conduct a study

To obtain access to the platform, the researchers must follow the procedure outlined below and regulated in detail in the following sections:

To rent equipment:

- The PI fills out the online application form available at https://platforms.fcbg.ch/form/ or sends a signed application form via email to vr@fcbg.ch, indicating the required resources and time, as well users (researchers) involved.
- The PAC evaluates the project based on its scientific relevance and available resources.
- When approved by the PAC, the project receives a project code.
- Users contact vr@fcbg.ch to request training on the requested resources.
- Once fully trained, users can book the required resources in our online booking system using the project code.

To request software development:

- The PI sends a signed application form via email to vr@fcbg.ch, with a description of the study and the required software as precise as possible.
- A meeting between the PIs and the VR staff is organized to talk about development, cost and time.
- After receiving a quote for the development, the PIs must return it signed to the VR team in case it is accepted.
- The PAC evaluates the project based on its scientific relevance and available resources.
- When approved by the PAC, development can begin.

The PAC may at their discretion require additional information, assurance or documents before approving a project. They may also make such requirements of an already ongoing project and suspend it until they are satisfied.

Please note that:

- We do not intend to scrutinize your research plans, but we do need some control over what happens in our platform.
- We are well equipped, but our resources are not unlimited. If we exceed our capacity, we may have to introduce additional rules.

B. VR & Digital Engineering Platform Use Policy

B.1. Training

Using the platform resources requires prior training. Depending on the complexity of the relevant equipment and experience of the user, the required full training may require numerous sessions. Researchers requiring training should contact the team indicating the project they are involved in. You can ask the training price to the platform team (vr@fcbg.ch).

B.2. Responsibilities

The employer of the PI bears the general responsibility for the study.

It is the responsibility of the PI that any experiment conducted at the VR & Digital Engineering platform, for which an ethical approval is required, has obtained it and is performed in accordance with it.

The participants are under the responsibility of the researchers and should never be left unattended.

B.3. **Equipment**

The equipment available at the VR & Digital Engineering platform is listed in Appendix C.2

Caring for equipment

Users are responsible for the proper use of the platform resources.

It is understood that equipment in constant use might wear out or occasionally experience a break down. You will not be held responsible, but we cannot fix items unless we know they are broken.

Please, report all broken equipment and equipment failures immediately to the VR & Digital Engineering platform staff via email (vr@fcbg.ch).

Computers should be turned off after experiment(s). No software shall be installed, and no external devices (USB drives etc.) shall be plugged in the VR & Digital Engineering platform computers by the users.

Setup and cleanup

Any researcher using the VR & Digital Engineering platform is required to set it up and clean it up properly. If the area is untidy when you arrive, or if equipment has not been returned to its proper position or default state, inform the platform staff by email.

Food and Drink

No food or drinks are allowed in the rooms. The only exception is that research subjects may have a drink of water prior to or immediately following an experiment.

Use of non-standard equipment

Research involving hardware modifications or installation of non-standard equipment requires the prior approval of the VR & Digital Engineering platform staff.

B.4. **User Fees**

The fees for the use of VR & Digital Engineering platform equipment, such as software development are detailed in https://platforms.fcbg.ch/form/ .

Cancellations

Reservations can be cancelled without a fee up to 24 hours prior to the start of the allotted time slot by deleting the reservation on the booking system. After this deadline, the reserved time will be charged at the rate of 50% unless it is used by another study.

Billing

Invoices are sent to researchers every three months at the beginning of March, June, September, and December. Charges are based on the number of hours reserved on the calendar system or accepted quote. In case of pending payment for prior invoices, FCBG may revoke the access to the VR & Digital Engineering platform.

The income from VR & Digital Engineering platform fees will be used for covering the operational costs of the platform, buying consumables, upgrading the equipment of the platform, based on the needs evaluated by the PAC.

B.5. Safety

Guidelines

Please note that Head Mounted Devices are generally for adults only. You can refer to the website or to the documentation of each device for more details.

In case of Emergency

In case of accident, please:

- Step 1: Do not move the subject but secure the place
- Step 2: Call 058 944 03 33 (security lodge) and/or 144
- Step 3: Contact the technical staff (079 246 12 53)

B.6. Booking system

The VR & Digital Engineering platform equipment can be booked via the Campus Biotech Calpendo system.

Researchers can book the equipment only after the PAC has approved the study.

Never use platform resources for experiments other than those associated with the project code used for the booking.

Never use the platform if you have not scheduled the time in the system.

Remember to save enough of your time slot to tidy up the equipment used.

B.7. Data access

FCBG provides a data access system on each computer of the VR & Digital Engineering platform to import and export your data. Users must connect to the computer with the specific account of their lab. Different users on different projects initiated by the same lab share the same account. Please contact the platform staff via email (vr@fcbg.ch) if you have not received or are not aware of the credentials associated to your lab.

Once connected to your lab session, a specific folder (specific to your lab, accessible from the root and mapped as a network drive) is used to safely import and export data on an external server. The same folder is accessible from your university network to retrieve the data later on.

Important:

- No external devices (USB drivers etc.) shall be plugged in to the VR & Digital Engineering platform computers.
- This folder is only for temporary transfer of data to/from the VR & Digital Engineering platform. Data should not be stored long term on this server. It is the responsibility of the user to back-up his data in his own institution's server once the transfer is done and clean his folder. The FCBG is not responsible for the loss of data that would not have been backed up by the

user. The Head of VR & Digital Engineering platform can at any time clean the collaborative institutions folders of old data, if the rules are not being followed.

B.8. Data management

Data collection and documentation

It is the responsibility of the users to comply with the official regulation on data management, including data full anonymization. Good practice is for instance to attribute a code to your participant/subject, with the correspondence between the code and participant information only known by the principal investigator and stored in a safe place. All procedures must comply with the research protocol validated by the local ethics committee.

Copyright and Intellectual Property Rights

The data and the results of the research are property of the PI. The FCBG does not claim any property right on the data or the results.

Policies for data sharing and re-use

From the FCBG perspective the PI is the owner of the data and hence can share are reuse the data. If a late download of the data is necessary for sharing purposes, the FCBG will remit the data only to the PI staff upon written request of the PI.

B.9. Authorship and Acknowledgments

All articles and publications that use any FCBG resources (e.g. equipment, protocol assistance and expertise, analyses) must be communicated to the Platforms upon final acceptance.

Authorship:

FCBG adheres to the basic rules of Scientific Integrity regarding authorship of scholar work, in accordance with the Swiss Academy of Science regulations available at https://www.samw.ch/en/Projects/Overview-of-projects/Scientific-integrity.html

To be considered as an author, a researcher must fulfil the following criteria:

- having made an essential contribution to the planning, carrying out, evaluation and verification of the research work;
- having participated in the writing of the manuscript;
- and having approved the final version of the manuscript.

Other people who have contributed to the study, but only partially fulfil the above criteria, must be acknowledged ("Acknowledgements"), but are not designated as authors.

When appropriate, the member(s) of the FCBG team who is/are listed as co-author(s) shall have the following affiliation:

- VR & Digital Engineering Platform, Fondation Campus Biotech Geneva, Geneva, Switzerland

Acknowledgments:

When the FCBG provides a standard platform contribution (standard data acquisition, assistance in setting up procedures for presentation and collection of behavioral data, etc.), a co-author from FCBG is not required. However, we ask to add a sentence in the **acknowledgments**.

For acknowledgements in articles, publications, projects, presentations..., the following text must be added (choose the text most adapted to the situation and space):

- This study was supported by the VR & Digital Engineering Platform, Fondation Campus Biotech Geneva, Geneva, Switzerland.

Or

- The authors thank XX (VR & Digital Engineering Platform, Human Neuroscience Platform, Fondation Campus Biotech Geneva) for his/her/their help with ...

Or

- This work was supported by the VR & Digital Engineering Platform, Fondation Campus Biotech Geneva (FCBG), Geneva, Switzerland. The institutional members of the FCBG are the Swiss Federal Institute of Technology Lausanne (EPFL), the University of Geneva (UNIGE), and the Geneva University Hospital (HUG).

C. Appendix

C.1. Staff

Faculty Advisors:

- Prof. Alexander Mathis (EPFL)
- Prof. Daphné Bavelier (UNIGE)

Head of VR & Digital Engineering Platform:

- Margaux Dubessy (margaux.dubessy@fcbg.ch)

VR Engineers :

- Nathan Attia (nathan.attia@fcbg.ch)
- Maël Lacour (mael.lacour@fcbg.ch)
- Arthur Trivier (arthur.trivier@fcbg.ch)

C.2. Equipment List

VR booth: Experimental booth dedicated to VR experiment, computer VR ready available (~7m2)

Motion Capture room: Experimental room dedicated to VR and motion capture, computer VR ready available (~50m2)

VR laptop: Alien ware Area-51m (i7, RTX 2080 Super)

Samsung Tab 7: android tablet

Pico Neo 3 Pro Eye: Stand-alone head mounted display with Tobii eye traking (90Hz) (https://www.picoxr.com/global/products/neo3-pro-eye)

Pico 4: Stand-alone head mounted display with integrated eye tracking, face tracking and hand tracking (https://www.picoxr.com/global/products/pico4)

Meta Quest 2: Stand-alone head mounted display (https://www.meta.com/fr/quest/products/quest-2/)

HCT Vive Pro Eye: Head Mounted Display to be use with a PC (https://dl4.htc.com/Web_materials/Manual/Vive_Pro_Eye/VIVE_Pro_Eye_user_guide.pdf?_ga=2.120901512.1442302517.1596551369-1238038613.1588930841)

MRI compatible VR Setup:
VisualSystem HD NordicNeuroLab: capable of stereoscopic vision, with a resolution of 1920x1080 refresh rate 60Hz and integrated eye-tracking cameras (https://www.nordicneurolab.com/product/visualsystem-hd)
Motion Capture System Qualisys: 7 cameras compatible with the MRI (https://www.qualisys.com/cameras/oqus-mri/)

HoloLens 2: Standalone Mixed Reality Display (https://www.microsoft.com/en-us/hololens/hardware)

Stereoscopic screen: 4x2.5 m, dual Barco F50 projectors, Infitec passive stereo, resolution 2560x1600 at 120Hz

Motion Capture System Optitrack: the setup is composed by 12 cameras, 2 equipped suits and various rigidbody setup (https://www.optitrack.com/products/primex-13/)

Motion Capture system Xsense: inertial sensor modules

C.3. Use and training fares

Please refer to the price list available in https://vr.fcbg.ch/fees/ for the fees regarding each equipment or service.

Please refer to the VR team for training.

Pilot studies: to pilot new experiments, researchers have up to 4 participants (healthy and adults) free of charge. Filling the protocol application form is nonetheless required for pilot studies.

Late cancellation will be charged at rate of 50% (under 24 hours before).