Building a new laboratory is a wonderful opportunity to lay the foundation for one’s future research. Nevertheless, it also poses a number of challenges. We visited the Clinical Psychophysiology Laboratory at the University of Luxembourg, which was founded in 2010 and entirely rebuilt after moving to a new campus in 2015. Lab manager and SPR member André Schulz (https://wwwen.uni.lu/recherche/flshase/inside/people/andre_schulz/) shared his experiences throughout the lab-building process with us.

When planning a new psychophysiology lab - what should I start with?

The most important question to ask yourself is: “Which goals do I want to achieve with my laboratory?” This includes immediate as well as long-term goals. Ideally, you should try to anticipate the development of (1) your research topics, (2) the equipment you wish to use, and (3) your personnel. Concerning equipment, it is advisable to contact researchers working in a similar domain as well as manufacturers. Try to keep up to date with current technological and methodological developments. With regard to personnel, you should take into account how many people will be working in the lab in the coming years and what kind of research they will carry out. Of course, predicting the future is a tricky business; flexible equipment, which can be adapted to unforeseen needs, may be helpful.

Which location should I choose for my lab?

If you have the option, choose a location that is well screened from electrical noise, sound, extreme temperatures, light, and other environmental influences. Be aware that new buildings may cause problems, as the requirements of a psychophysiology lab are rarely respected during construction. In any case, knowing your future lab rooms well in the early planning phase is an advantage. The location has consequences for the
equipment to be purchased. For example, in EEG research, a poorly shielded room might require actively shielded electrodes, whereas passive ones are best used in well-shielded rooms. Spend as much time as possible in your future lab rooms and at different times of day to become aware of unforeseen environmental influences. These may include high temperatures in the afternoon, students passing by and making noise after classes, etc.

**How should I set up the interior of my lab?**

A typical psychophysiology lab contains two spaces, one for the experimenter and one for the participant. These can have varying degrees of separation, for example by using screens or different rooms. In a strictly separated setup, for example, the participant might be placed inside a special chamber eliminating electrical noise (Faraday cage), but also sound and visual distractions. This, however, makes it more difficult to interact with the participant and to check that the participant is following the instructions. It also reduces the experimenter’s ability to detect adverse events, such as panic attacks or vaso-vagal syncopes, and confounding events, such as the participant using their phone or sleeping. These disadvantages can be partly overcome through video surveillance and intercom systems. How strict the separation should be is, therefore, a trade-off between security and monitoring on the one hand, and standardization and shielding on the other. Concerning equipment and infrastructure, a modular approach simplifies the adaptation of the lab to the needs of individual studies. This concerns stimulation (auditory, visual, tactile, etc.), measurement (psychophysiological, behavioral, etc.), seating, and others. If multiple studies are running in the same lab simultaneously, experimenters should be able to switch setups quickly and safely.

**Which problems may be encountered when building a psychophysiology lab?**

A major problem is communicating the requirements of psychophysiological research to non-psychophysiologists. This concerns practical aspects, such as talking to students in the department, who might need to be quiet when close to the lab, or technicians and construction engineers, who are responsible for the lab and shared infrastructures. One of the biggest challenges is explaining to your colleagues from the faculty why a psychophysiology laboratory requires so many resources and why they are good investments. A psychophysiology laboratory should be an asset to all of the faculty. Psychophysiological methodology allows the investigation of a wide range of research questions. In consequence, this goal should be considered in advance so that lab infrastructure may serve either one department or work group, or several departments / work groups. In any case, organizational problems must be tackled. Good communication within the faculty is key.
How do I connect my lab to teaching?

Student support is an important resource in research. Yet, students also present an element of uncertainty due to their limited experience and training. To prepare them adequately, psychophysiology should be included in basic psychological education. For students with a deeper interest, additional optional psychophysiology courses should be offered. Practical teaching sessions in the lab are ideal to convey: (1) what a psychophysiological lab looks like, (2) how psychophysiological assessment can be implemented, (3) how to answer research questions with psychophysiological methods and (4) how to formulate one’s own psychophysiological research questions. Ideally, at the end of the process we will have young academics producing a wealth of psychophysiological research.

What makes my lab a success?

Whether or not things work well in your lab is determined by the equipment in it just as much as by the people who use it. This makes investment in team building just as important as investment in state-of-the-art technology. In addition, an infrastructure for coordination and mutual exchange is invaluable, for example lab coordination meetings, lab booking systems, and shared documents. Of course, respect for the needs of other lab users goes without saying.

Tips & tricks

- Before you do anything else, spend an entire day in the room that was designated for your lab to check noise, temperature, etc.
- Get an electrical engineer on board who is able to build custom solutions.
- Find a supplier who supports you and your equipment well.
- Know the technological equipment you are working with inside and out.
- Get those who are responsible for the infrastructure at your institution on board.
- Respect organizational aspects as soon as possible, e.g. lab booking system, shared communication, safety requirements for ethics approval, etc.
- Whatever technical issue you might have, it’s likely that others have solved it before. Don’t be shy in regard to contacting suppliers, other researchers, or online groups if you encounter a lab problem.

Any final recommendations?

Spend time in your lab! Even after everything has been setup and is running smoothly, regular visits to the lab by the principal investigator will help to detect unforeseen issues in time.