**CEM Summer School 2025 – Summary of Day 1 (July 3rd)**

The first day of the Cutting Edge Microscopy (CEM) PhD program Summer School began with the first keynote lecture by **Jens Stein** from the University of Fribourg, who discussed the differential affinity of CD8+ T cells to MHC-bound viral peptides. His talk highlighted how variations in peptide-MHC binding dynamics influence immune recognition and activation. Using two-photon and light sheet microscopy, his group aims to dissect these interactions at the single-cell level. Recently, they have shown that low-affinity CD8+ T cells egress quicker from the lymph node and represent the first T cell population to arrive at the site of infection.

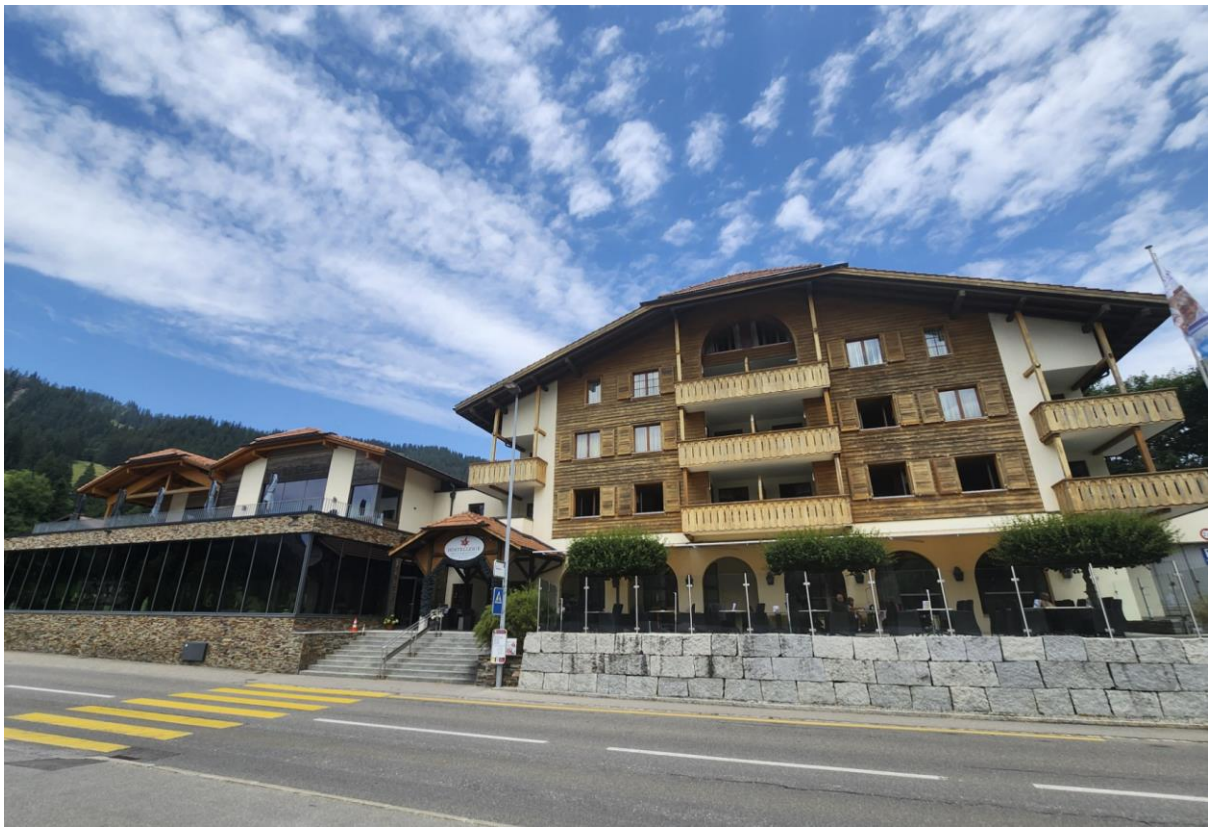

*Image 1: Hostellerie am Schwarzsee, the location of the 2025 CEM summer school.*

Following the keynote, three PhD students presented their current research projects:

- **Calvin Klein** gave a talk on subtomogram averaging of the apoptosome *in situ.*
- **Florencia Kloster** presented a multimodal imaging approach titled *"Combining confocal, two-photon and electron microscopy to characterize a novel fluorescent mouse reporter."*
- **Petr Pleskac** presented his work in which he develops a novel approach of imaging CSF flow by using *"In vivo synchrotron radiation-based µCT imaging of CSF outflow."*

After lunch, we had the opportunity to build our own brightfield microscope and image our own samples for an imaging competition. This hand-on session was hosted by **Felix Meyerhofer** and **Boris Egger** from the University of Fribourg.

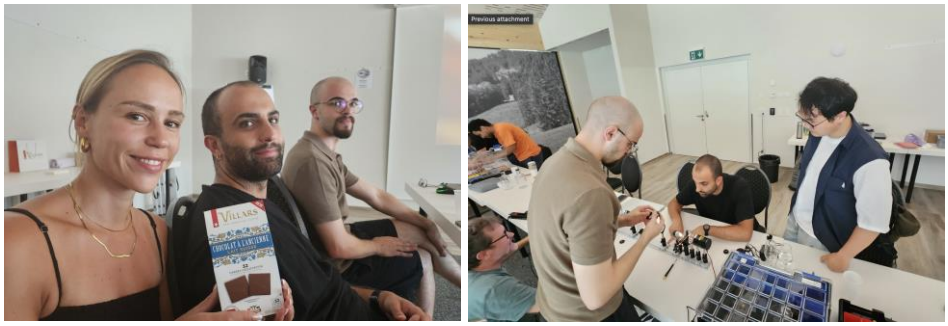

*Image 2: Hands-on session and the winners of the best image competition.*

The afternoon continued with three presentations of PhD students:

- **Tangtang Xiang** presented his work and gave a deep-dive into distribution of leaked red blood cells following subarachnoid hemorrhage using confocal microscopy.
- **Linh Tran Hoang Khanh** presented an approach on two-photon imaging regarding CSF drainage accross the cribriform plate.
- **Roxana Manaila** presented novel insights into the mechanism of a congenital renal disorder using a multi-omics approach.

After these three presentations, five new participants in the CEM program briefly introduced their PhD projects.

The first day of the CEM Summer School concluded with the second keynote lecture by **Maria Rosito** from the Link Campus University, Rome, Italy. She gave insights into the imaging of calcium signalling and tumour microtubes in glioblastoma using two-photon and confocal microscopy.

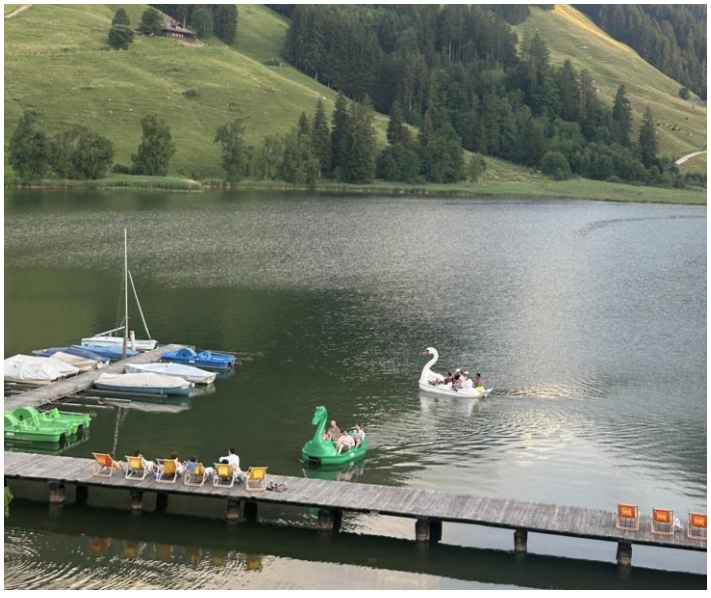

*Image 3: Boating activity on the Schwarzsee.*

**CEM Summer School 2025 – Summary of Day 2 (July 4th)**

The second day of the CEM Summer School began with a range of outdoor activities according to participants' preferences. Options included a refreshing swim in the nearby lake, a scenic hike through the surrounding alpine landscape, and an exhilarating downhill scooter ride from Riggisalp. After the morning's physical adventures and a well-deserved coffee break, the focus shifted back to scientific presentations by CEM students.

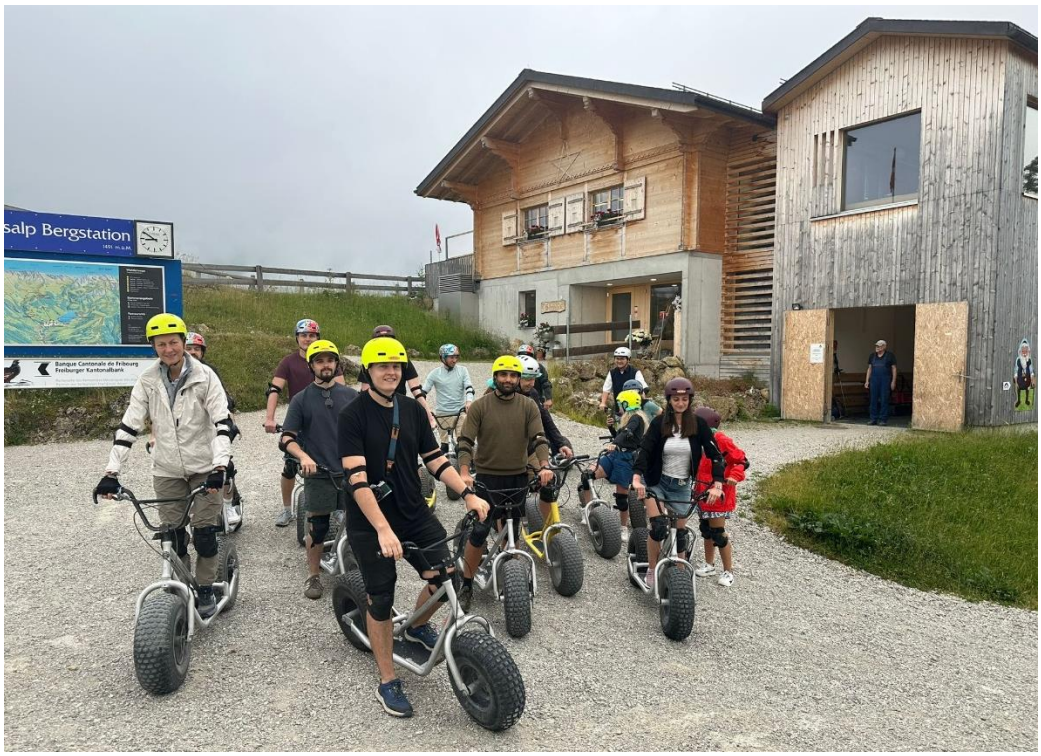


*Image 4: Participants just before starting the downhill scooter ride from Riggisalp.*

The following PhD students presented their research projects:

- **Martin Gonzalez** explored the early stages of coronavirus infection *in vitro*.
- **Robin Eberle** investigated the structural biology of *Trypanosoma brucei* using Cryo-Electron Microscopy (Cryo-EM).
- **Jana Leuenberger** presented a multimodal approach to visualizing synaptic structure and function.
- **Linus Rechsteiner** examined bacterial interactions through advanced imaging techniques.

Following the morning session, the student body elected new representatives. Calvin Klein was voted the new student representative and Florencia Kloster his deputy. Congratulations to both of you! The previous CEM representatives, Marwa Mangattu and Yasmina El Fata, were warmly thanked for their commitment over the past 12 months.

After lunch, Ana Stojilijkovic and Ruben Lopez from the Data Science Lab of the University of Bern introduced the newly launched ***V**irtual **I**maging at Uni**BE** (VIBE)* platform. The construction of the VIBE platform started in March 2025. In its final form, VIBE will provide microscopists at the University of Bern with remote access to high-performance computing infrastructure and a suite of pre-installed tools for advanced bioimage analysis. The initiative addresses the current fragmentation of image analysis solutions at the University of Bern by offering a centralized, interactive, and user-friendly platform. By streamlining data processing workflows, VIBE aims to accelerate scientific research, enhance collaboration across disciplines, and reduce overall energy consumption.

The afternoon continued with two additional scientific presentations:

- **Anastasiia Berezenko** presented her work on the adaptation of gonads in zebrafish following heat shock.
- **Yasmina El Fata** discussed how she correlates *in vitro* and *in vivo* findings using patient-derived neuroendocrine tumor cells in zebrafish.

To conclude the day, participants joined a quiz featuring three questions from each scientific presentation. In an unexpected twist, the two competing teams finished in a tie and both were rewarded with a chocolate prize.

The day concluded with a farewell and a final group photo to commemorate the experience.

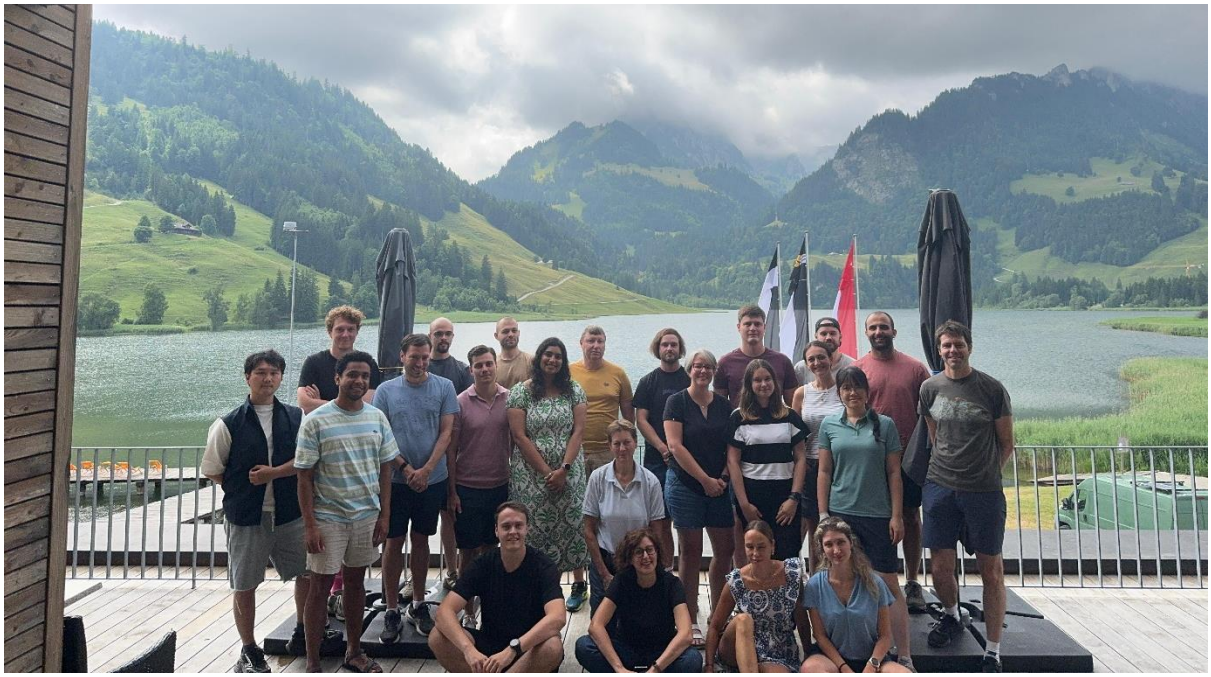

*Image 5: The participants of the 2025 CEM Summer School with the beautiful Schwarzsee in the background.*