

Open PhD student position

The Department of Infectious Diseases, Virology at the University Hospital Heidelberg offers a position for a **PhD student** working on **HIV-1 cDNA-host interactions** in the group of **Hans-Georg Kräusslich** within the DFG funded collaborative research center 1129 (<https://www.sfb1129.de/>).

Our group studies the fascinating events occurring in the early phase of the HIV-1 replication cycle. After delivering its cone-shaped capsid to the cytosol of a host cell, HIV-1 needs to convert its RNA genome into dsDNA, translocate the genome into the nucleus, release it from the capsid (uncoating) and integrate the viral DNA into the host chromatin. The role of the capsid in these steps has recently undergone a major paradigm shift - from a passive delivery container to a key organizer of HIV-1 post-entry. This opened up many interesting new questions.

The highly complex post-entry events cannot be analyzed in detail by traditional bulk approaches. We therefore use advanced microscopy approaches to visualize HIV-1 post entry events at the single particle level with high temporal or spatial resolution. We complement these studies with virological and biochemical methods, and also integrate novel approaches from chemical biology. In this project we study the fate and interactions of newly reverse transcribed viral DNA in the nucleus of the host cell. We will employ our previously established system to visualize HIV-1 DNA (Müller *et al.*, eLife 2021) and investigate interactions using live imaging, super-resolution nanoscopy and correlative light and electron microscopy (Zila *et al.*, Cell 2021) to elucidate the mechanisms and ultrastructure of HIV-1 uncoating and integration in a wide range of cell types. These studies will be complemented with an untargeted proteomics approach to discover new host proteins binding to viral DNA.

We offer an interesting, interdisciplinary research topic with biomedical relevance in an interactive scientific environment, including collaborations with national and international partners, at an internationally competitive level. The PhD project is part of SFB1129 and involves close interactions with groups from different disciplines within the SFB. The lab is located in Center for Integrative Infectious Disease Research (www.ciid-heidelberg.de) which also houses the unique state-of-the-art IDIP imaging platform (www.idip-heidelberg.org). Successful candidates will be enrolled in the HBIGS International Graduate School to benefit from the excellent scientific training of this program.

Applicants should have a master's degree (biology, biochemistry, biophysics or molecular medicine). They should be interested in addressing basic virological questions using different methods, with a strong focus on imaging techniques and image analysis. A good background in standard molecular biological methods is expected. Ideal candidates already have some experience in fluorescence microscopy and image analysis, together with a background in cell biology, biochemistry or biophysics.

We are looking forward to meet curious and motivated students who are excited about science. They should enjoy working independently, but also love to interact, discuss and collaborate with scientists from different disciplines and nations.

The position is open immediately. Please send your application (CV, academic transcript, motivation letter and reference letters or contact details of two referees) as a single pdf file to **martina.nierle@med.uni-heidelberg.de**.

Relevant recent publications:

Müller *et al.* (2021) HIV-1 uncoating by release of viral cDNA from capsid-like structures in the nucleus of infected cells. *eLife* 10, e64776 doi: 10.7554/eLife.64776

Zila *et al.* (2021) Cone-shaped HIV-1 capsids are transported through intact nuclear pores. *Cell* 184, 1032-1046.e18 doi: 10.1016/j.cell.2021.01.025

Zila *et al.* (2019) Analysis of CA Content and CPSF6 Dependence of Early HIV-1 Replication Complexes in SupT1-R5 Cells. *mBio* 10 doi: 10.1128/mBio.02501-19

Bejarano *et al.* (2019) HIV-1 nuclear import in macrophages is regulated by CPSF6-capsid interactions at the Nuclear Pore Complex. *Elife* 8, e41800 doi: 10.7554/eLife.41800

Review:

Müller *et al.* (2019) A Spotlight on Viruses - Application of Click Chemistry to Visualize Virus-Cell Interactions. *Molecules*; 24(3), E481. doi: 10.3390/molecules24030481