Tuesday
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Fast multi-scale imaging inside and outside the optics lab

Fast multi-scale imaging is needed to study biological processes in single cells across an entire living embryo. Light sheet microscopy (SPIM, LSFM) has changed the field of 3D imaging dramatically by offering a versatile and simple technique to obtain optical sectioning deep inside biological specimens. By illuminating the sample with a thin sheet of light and collecting fluorescence with a fast and sensitive camera, phototoxicity is minimal and high speed acquisitions of long developmental processes have become possible. The ability to custom design an instrument around a sample has empowered many research labs to do experiments that have been impossible with commercial instruments. We have expanded the capabilities of the light sheet microscopy platform by developing optical and computational tools to address fundamental questions in cell and developmental biology.

Typically, in order to get access to cutting-edge technology, the biologist visits an engineer's lab or a facility that offers the technology. However, the experiments may be severely compromised by the fact that living biological samples die or otherwise degrade in transit. Experiments also need to be conducted in a short, predefined amount of time; experiments may be rushed and essential controls skipped. We aim to foster a new model of advanced microscopy, based on shareable, modular instruments configurable to a broad range of applications. Employing modularity in the design facilitates reconfiguration and allows easy upgradability and an expanding functional palette. In turn, shareability provides financial prudent widespread access to cutting edge technologies.

Host: Stefan W. Hell

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