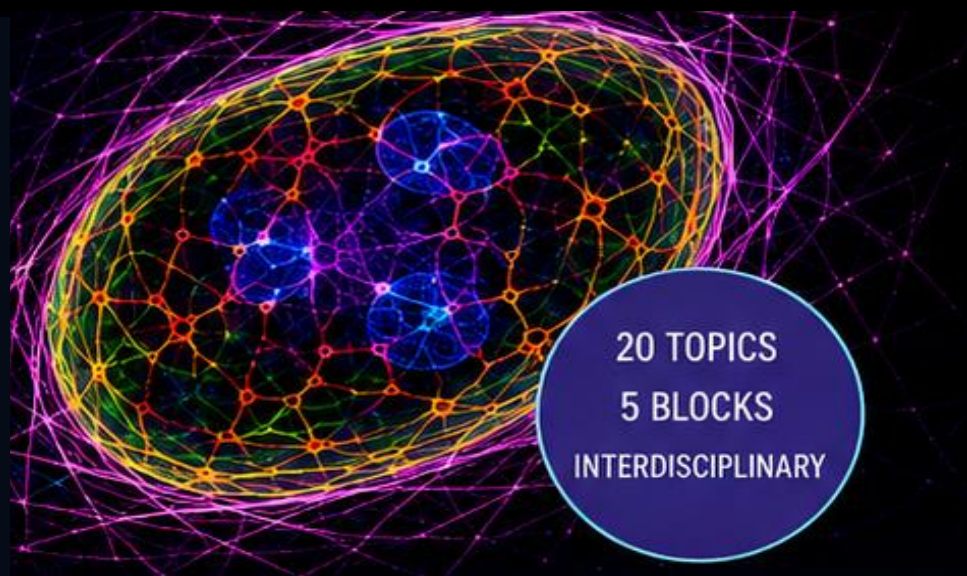


SUPERRESOLUTION MICROSCOPY

FROM PHYSICAL PRINCIPLES TO GENOME
ORGANIZATION AND FUTURE APPLICATIONS

Physics meets Biology. Light creates insight.



A PHYSICAL PRINCIPLES

(1–4)

- Diffraction limit & information limit
- Photon statistics & measurement uncertainty
- Fluorescence & photoswitching
- Information content: resolution vs. accuracy

B SUPERRESOLUTION METHODS

(5–9)

- Deterministic approaches
- PALM, STORM & localization microscopy
- SIM & hybrid techniques
- 3D superresolution
- Cryo-superresolution

C RECONSTRUCTION & DATA ANALYSIS

(10–13)

- Localization algorithms
- Drift correction & calibration
- Artifacts & algorithmic illusions
- Quantitative resolution metrics

D NUCLEUS & GENOME

(14–18)

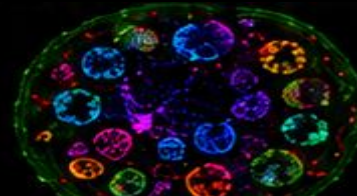
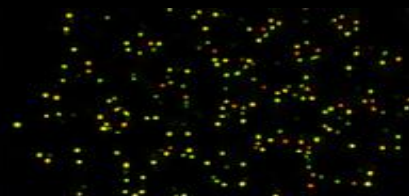
- Chromosome territories
- Functional nuclear nanostructure
- DNA density maps
- Replication & transcription domains
- Pathological changes of nuclear architecture

E EVALUATION & FUTURE

(19–20)

- Superresolution vs. electron microscopy
- Future: AI, adaptive optics, hybrid systems

[REGISTER HERE](#)

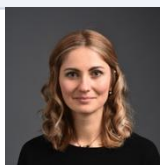


YOUR LECTURERS



Dr. Wladimir Schaufler

Physicist, expert in optical microscopy and imaging. Research focus: optics, superresolution, instrumentation



Dr. Olga Bogatyrova

Computer scientist, expert in data analysis and machine learning. Research focus: algorithms, data analysis, AI for biomedicine



Prof. Dr. Dr. Christoph Cremer

Biophysicist, pioneer in chromosome research and genome organization. Research focus: nuclear architecture, chromosome territories, genome function

SEMINAR DATES

(10:30 AM – 12:00 PM)

- | | | |
|--------------------|---------------------|-----------|
| 1. Tue 20 Oct 2026 | 10:30 AM – 12:00 PM | (BLOCK A) |
| 2. Tue 17 Nov 2026 | 10:30 AM – 12:00 PM | (BLOCK B) |
| 3. Tue 24 Nov 2026 | 10:30 AM – 12:00 PM | (BLOCK C) |
| 4. Tue 08 Dec 2026 | 10:30 AM – 12:00 PM | (BLOCK D) |
| 5. Tue 19 Jan 2027 | 10:30 AM – 12:00 PM | (BLOCK E) |

FOR WHOM?

Master students in Physics, Informatics, Biology, Medicine and related fields
Interdisciplinary thinking and methodological competence

LOCATION

Seminar Room, IMB (2nd floor)
Institute of Molecular Biology
Ackermannweg 4, 55128 Mainz

Contact: wladimir.schaufler@kip.uni-heidelberg.de

WHY PARTICIPATE?

- ✓ Understand the physics behind light
- ✓ Learn state-of-the-art microscopy methods
- ✓ Analyze and evaluate real data like a professional
- ✓ Discover genome organization in a new dimension

INTERDISCIPLINARY – PRACTICAL – FUTURE-ORIENTED
JOIN THE JOURNEY FROM LIGHT TO INSIGHT!