

MONDAY, AUGUST 3

09:15	Welcome Philip Tinnefeld
09:30	Measuring Life at the Quantum Limit: Quantum Sensing for Biology and Health Lincoln Carr
10:10	Session 1 • Lukas Milles: Reconstructing biological function with de novo protein design • Jonathan Levine: <i>Ensembles of predicted structures enable T cell peptide-MHC binding prediction</i> • Andrey Sysoev: <i>Engineering Entropy-Driven FtsZ Contractility with De Novo Proteins</i>
11:00	Coffee
11:30	Session 2 • Wolfgang Losert: Astrocyte Biocomputing: Reimagining information flow in the brain • Eden Zhu: <i>Semantic Compression in Narrative Memory</i> • Mao Yasueda: <i>From Structure to Function: Cortical Structural Constraints Shape Dynamical Regimes in Decision Making</i> • Allison Cairns: <i>Molecular Topology of the Postsynaptic Density in Shank2 Knockout Circuits</i>
12:35	Lunch
14:00	Keynote Peter Maurer
14:40	Session 3 • Armine Dingilian: <i>Quantifying classical and quantum bounds for resolving closely spaced, non-interacting, simultaneously emitting dipole sources in optical microscopy</i> • Anna Emenheiser: <i>Network-Level Characterization of Spontaneous Calcium Activity in an In-Vitro Alzheimer's Disease Model</i> • Steffen Rulands: Non-equilibrium physics of the epigenome
15:30	Coffee
16:00	Session 4 • Zan Luthey-Schulten: 4D simulations of a growing and dividing minimal cell • Ariana-Dalia Vlad: <i>Can Synthetic Cryo-EM Maps Replace Experimental Training Data for Atomic Model Building?</i> • Andreas Riedlberger: <i>Covalent, yet reversible: De novo design of autocatalytic ester-bond-forming enzymes</i>
16:50	Poster Flash Talks A1 – A29 (each presenter 1 min & 1 slide)
17:20 - 19:30	Poster Session and Welcome Reception

TUESDAY, AUGUST 4

- 09:00** **Keynote**
Barbara Treutlein
- 09:40** **Session 5**
- **Ralf Jungmann: *Molecular Physics of Life: Towards Single-Molecule Spatial Proteomics***
 - Iris Seitz: *Functionalization of DNA origami with monotypic RNA libraries for multivalent display*
 - Leon Kaub: *Nitrogen-vacancy magnetometry of magnetic nanoparticles across biological systems*
- 10:30** **Coffee**
- 11:00** **Session 6**
- **Herbert Levine: *Computational Model of Cellular Blebbing***
 - Veena Naveen: *Mathematical Modeling of Macrophage Polarization Dynamics and Molecular Feedback to Predict Immune Modulation Strategies*
 - Yu Fu: *Signal transduction through nonequilibrium nucleation of surface condensates*
- 12:00** **Poster Flash Talks B1 – B29** (each presenter 1 min & 1 slide)
- 12:30** **Poster session with lunch buffet**
- 14:30** **Session 7**
- **Seth Kenkel: *Nanoscale Molecular Mapping of Single Cells with Near Field Infrared Spectroscopic Imaging***
 - Salah Hassan: *Simulating structural transitions of HIV-1 Env glycoprotein during refolding*
 - Fabio Morella: *From Low Concentrations to Ternary Complexes: A Combined FLCS and 3-Color FCS Approach.*
 - Samrat Basak: *Quantitative Nanoscale Mapping with Local PAINT and pMINFLUX*
- 15:35** **Coffee**
- 16:05** **Session 8**
- **Arpita Upadhyaya: *Mechanical cues modulate transcription factor dynamics, binding and activity***
 - Agathe Jouneau: *Investigating the dynamics of cellular rearrangements in minimal four-cell clusters*
 - Matthew Connell: *Role of substrate stiffness on cytotoxic T lymphocyte activation and differentiation*

TUESDAY, AUGUST 4

- Gillian McMahon: *4D mitochondrial network assumes distinct and predictive phenotypes through human lung and intestinal epithelial development*
- Halona Dantes: *Inferring Structure Factor of Living, Disordered Hyperuniform System*

17:10 **Hydration Break**

17:30 **Session 9**

- Marie-Christin Spindler: *Spatial Organization Modulates Cellular Processes: Towards More Realistic Whole-Cell Models of Yeast*
- Matheus Mello: *Cascade of conformational changes during the pre-B-to-B transition of the human spliceosome*
- Alexander Floroni: *Protocells assemble in heated rock pores*

18:30 Walk / Individual Transfer to Conference Dinner

19:00 **Conference Dinner Löwenbräukeller Beer Garden**
Stiglmaierplatz / Nymphenburger Str. 2, 80335 München
registered participants only

WEDNESDAY, AUGUST 5

- 09:00** **Pattern Formation Beyond Turing: Self-Organization Principles of Living Matter**
Erwin Frey, LMU Munich
- 09:40** **Session 10**
- Noa Goldberg: *The role of geometrical confinement on self-oscillating active matter*
 - Jinseok Lee: *From Soft Particles to Living Cells: A Framework for Tracer Diffusion in Crowded Environments*
 - Aalhad Bhatt: *Effects of spatial structure on selective sweep inference*
 - **Don Lamb: *SmFRET on Ssc1: From in vitro to in organello***
- 10:45** **Coffee**
- 11:15** **Session 11**
- **José Onuchic: *Elucidating Cancer Metabolic Flexibility: When Genetic and Metabolic States Converge***
 - Ji Park: *Modeling a Continuum of Drug-Induced Persistence in Cancer*
 - Darin Momayezi: *Optimal transport reveals source of stochasticity in cancer immunotherapies by rare “spark” T-cells*
 - Ilan Edelstein: *Mechanistic Insights into Non-Equilibrium Membrane Motility of Influenza A Virus*
 - Natalie LiVecchi: *Towards In Situ Observation of Compressive Forces Generated in Genomes of Dividing HeLa Cells*
- 12:30** **Group Picture**
- From 14:00** **Guided Tours**
registered participants only
- From 17:00** **Topical table discussions**
Beer Garden Chinesischer Turm, Englischer Garten
more information to be announced

THURSDAY, AUGUST 6

09:00	Session 12 • Eyal Karzbrun: <i>Self-organization of a human primitive gut tube driven by endoderm cell migration</i> • Andrea Ripamonti: <i>Transcriptional competition biases the effects of second messengers in Escherichia coli</i> • Deepthi Kailash: <i>Quantifying Spatial Correlations in Transcriptional Bursting during Embryonic Development</i> • Adam Kuhn: <i>Generative Modeling of Chromatin Conformations from High-Resolution FISH Data</i>
10:30	Coffee
11:00	Session 13 • Angel Mendieta: <i>Ensemble reconstruction of chromosome architecture from single-cell DNA traces</i> • Samuele Lipani: <i>Chromosome mechanics and relaxation from ensembles of polymer conformations</i> • Andrew Maytin: <i>Chromosome segregation in a minimal bacterial cell driven by SMC protein complexes</i> • Kurt Schmoller: <i>AI-driven automated microscopy video analysis reveals a major origin of species-level cell cycle diversity</i>
12:15	Lunch
13:45	Session 14 • Sarah Zernia: <i>Single-molecule dissection of template-dependent transcription dynamics in T7 RNA polymerase</i> • Roman Tsukanov: <i>Microfluidics-Enhanced Automated Flamingo-Based Platform for Multiplexed Super-Resolution Microscopy</i> • Julene Madariaga: <i>Single molecule studies of DNA-protein crosslink repair</i> • Claudiu Gradinaru: <i>Diffusion and activation maps of GPCRs in live cells – key insights for basal and ligand-induced signaling</i>
14:50	Coffee
15:15	Session 15 • Kuheli Biswas: <i>Elucidating the mRNA-Protein Correlations in Growing and Dividing Cells</i> • Garp Linder: <i>Single-Molecule Imaging Reveals DNA Shape Read-out by the INO80 Chromatin Remodeler</i> • Philip Tinnefeld: <i>Dynamic Structural Biology and Energy-Free DNA Computing</i>
16:15	Concluding remarks Don Lamb
16:30	End of iPoLS