Invitation to LUMICKS interactive webinar

Single-molecule studies of DNA repair and gene regulation

with correlative fluorescence optical tweezers

For more info on the C-Trap instrument, click here

Please indicate **specific research topics** that you would like us to focus on in an email to: **b-lorenz@lumicks.com**

We are looking forward to seeing you online!

February 3rd
16:00-17:00
Register here

Dr. Bärbel Lorenz | Application Scientist
Dr. Philipp Rauch | Lead Account Manager

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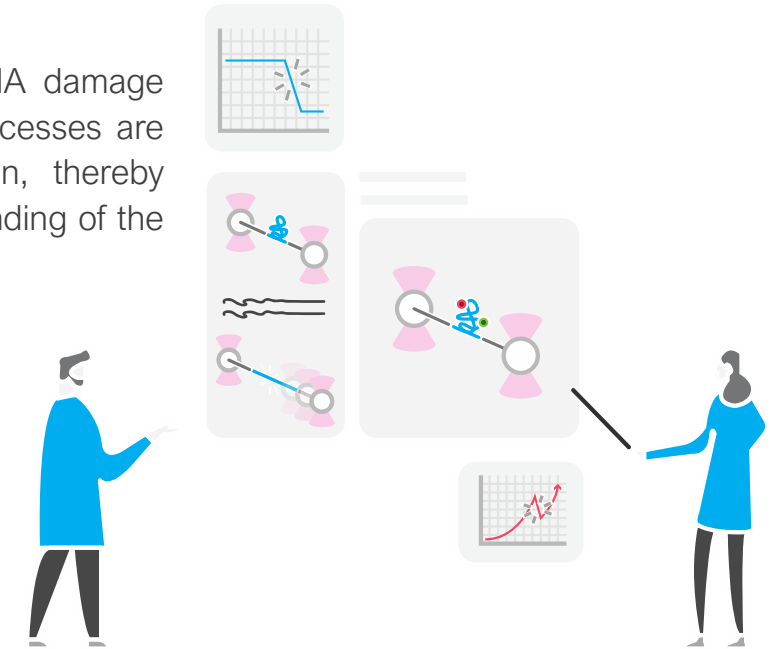
Tech Talk/ Seminar:

Single-molecule studies of DNA repair and gene regulation

with correlative fluorescence optical tweezers

Bärbel Lorenz, Philipp Rauch, Ann Mukhortava, Jordi Cabanas-Danés, and Andrea Candelli
LUMICKS B.V. Amsterdam

Biological processes performed by proteins interacting with and processing DNA and RNA are key to DNA damage response, chromatin maintenance and cell metabolism. Conventional approaches to study these delicate processes are often affected by the inability to discriminate individual interactions in a larger experimental population, thereby compromising the detection of rare events while resulting in an averaged signal. Therefore, complete understanding of the molecular basis of life strongly benefits from a complimentary single-molecule approach.



In this seminar, we will illustrate the principle of the correlative optical trapping and single molecule fluorescence method (C-Trap) and introduce selected application examples from the field of DNA repair and gene regulation, including

- Recruitment and dynamics of repair complexes to alkyl-DNA lesions [1]
- Insights into structure and dynamics of the CMG helicase [2]
- Glycation of histone proteins and its effect on chromatin architecture [3]
- Role of human replication protein A in the multi-functionality of BLM helicase [4]

[1] N. Rill, A. Mukhortava, S. Lorenz, I. Tessmer, Alkyltransferase-like protein clusters scan DNA rapidly over long distances and recruit NER to alkyl-DNA lesions, Proc. Natl. Acad. Sci. 117 (2020) 9318–9328. https://doi.org/10.1073/pnas.1916860117.
[2] M.R. Wasserman, G.D. Schauer, M.E. O'Donnell, S. Liu, Replication Fork Activation Is Enabled by a Single-Stranded DNA Gate in CMG Helicase, Cell. 178 (2019) 600-611.e16. https://doi.org/10.1016/j.cell.2019.06.032.
[3] Q. Zheng, N.D. Omans, R. Leicher, A. Osunsade, A.S. Agustinus, E. Finkin-Groner, H. D'Ambrosio, B. Liu, S. Chandarlapaty, S. Liu, Y. David, Reversible histone glycation is associated with disease-related changes in chromatin architecture, Nat. Commun. 10 (2019) 1–12. https://doi.org/10.1038/s41467-019-09192-z.
[4] Z. Qin, L. Bi, X.-M. Hou, S. Zhang, X. Zhang, Y. Lu, M. Li, M. Modesti, X.-G. Xi, B. Sun, Human RPA activates BLM's bidirectional DNA unwinding from a nick, ELife. 9 (2020) e54098. https://doi.org/10.7554/eLife.54098.