

**Defense announcement**

**Public Defense on 03 May 2024**

# Molecular interactions in bio inspired materials: why they are important and how can be studied?

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| <b>Title of the doctoral thesis</b>               | Analytical ultracentrifugation as a tool to understand interactions in biomolecular materials   |
| <b>Content of the doctoral thesis</b>             | <p>Functional, sustainable, renewable bio-based materials with good mechanical properties have been in the focus of research and industrial interests in the recent years. One of the most promising representatives is spider silk, or rather its artificial analogues created by manipulation of amino acids protein sequence. The fibers of native and artificial spider silk are formed on the basis of triblock proteins. Rational design of protein constructs requires a deep understanding of inter-molecular interactions, especially when it comes to creating biomaterials. Moreover, such an understanding can led to improved properties or expand the scope of application.</p> <p>In this work, we expand our understanding of inter-molecular interactions using analytical ultracentrifugation as a main research tool. The various spider silk protein constructs were used as the main focus of the study. This work devoted to certain gaps in the understanding of protein interactions at the molecular level, how they affect intermediate states such as liquid-liquid phase separation (LLPS), shows the importance of understanding the interactions, and also demonstrates the capabilities of Analytical Ultracentrifugation (AUC) in combination with other techniques for material science application.</p> |
| <b>Field of the doctoral thesis</b>               | Biotechnology   |
| <b>Doctoral candidate and contact information</b> | M.Sc. (Tech.) Dmitrii Fedorov<br>fedorovda93@gmail.com  |
| <b>Public defence date and time</b>               | 03 May 2023 at 12 o'clock (in Finnish time)   |
| <b>Remote defence</b>                             | <a href="https://aalto.zoom.us/j/66785484379">https://aalto.zoom.us/j/66785484379</a>   |
| <b>Place of public defence</b>                    | Aalto University School of Chemical Engineering, Lecture hall Ke2 (Komppa-Sali),<br>Kemistintie 1, (main door at Biologinkuja) Espoo  |
| <b>Opponent(s)</b>                                | Professor Kerstin Blank, Johannes Kepler University, Institute of Experimental Physics, Austria   |
| <b>Custos</b>                                     | Professor Markus Linder, Aalto University, School of Chemical Engineering   |
| <b>Link to electronic thesis</b>                  | <a href="https://aaltodoc.aalto.fi/handle/123456789/51">https://aaltodoc.aalto.fi/handle/123456789/51</a>   |
| <b>Keywords</b>                                   | Analytical Ultracentrifugation, spider silk, liquid-liquid phase separation, dimerization   |