

# CENTER FOR MOLECULAR & ENGINEERING THERMODYNAMICS SEMINAR



## JOHAN BERGENHOLTZ

*UNIVERSITY OF GOTHENBURG, SWEDEN*

### “CONCENTRATION-INDUCED ASSOCIATION IN A PROTEIN SYSTEM CAUSED BY A HIGHLY DIRECTIONAL PATCH ATTRACTION”

The protein lactoferrin (LF) is a multifunctional protein that has been widely studied. Perhaps related to its many functions in the body, it has a rather strong tendency to self associate into dimers and likely also higher-order oligomers. This self-association behavior of LF has been studied in solution using light and small-angle X-ray scattering. Effective static structure factors have been found to exhibit either a monotonic or a nonmonotonic dependence on protein concentration in the small wavevector limit, a behavior that is controlled by the salt concentration. It correlates with a nonmonotonic dependence of the second virial coefficient on salt concentration, such that a maximum appears in the structure factor at a low protein concentration when the second virial coefficient is negative and close to a minimum. The results are interpreted in terms of an integral equation theory with explicit dimers, formulated by Wertheim, which provides a consistent framework able to explain the behavior in terms of a monomer-dimer equilibrium that appears because of a highly directional patch attraction.

### BIOGRAPHY

JOHAN BERGENHOLTZ works on structural and dynamical aspects of colloidal systems at the Department of Chemistry and Molecular Biology, University of Gothenburg, Sweden. He received a PhD in Chemical Engineering from the University of Delaware in 1996. He went on to do postdoctoral work at the BASF company in Germany and as an NSF International Research Fellow at the Faculty of Physics at the University of Konstanz, as well as at the Department of Chemical Engineering at the California Institute of Technology. He joined the Department of Chemistry at the University of Gothenburg in 1999 as an Assistant Professor. In 2003 he was awarded a Research Fellowship with the Royal Swedish Academy of Sciences and he became an Associate Professor at the department in 2007. Since 2012 he is a Professor of Surface and Colloid Science. In 2013 he became a Guest Professor at the Departments of Physical Chemistry and Theoretical Chemistry at Lund University. He has also been an Adjunct Scientist at AstraZeneca R&D. At present he is a Visiting Scholar at the Department of Chemical and Biomolecular Engineering at the University of Delaware. He has been awarded the Allan P. Colburn and the Akzo-Nobel Nordic Surface Chemistry Prizes.



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**3/5/2018**

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**10:00 a.m.**

**366 Colburn Lab**

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