

CHRISTOPH FELIX WEISE

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EXPERIENCE

Lead Scientist

2012 – 2015

NMR Analytical Research Consultancy, Umeå, Sweden

- Coordinated solid-state NMR acquisition and performed spectral analysis to characterize particles and determine effects of phosphorylation on nanocrystalline cellulosic materials.

NMR Research Engineer

2010 – 2012

Chemical Biological Centre, Umeå University, Umeå, Sweden

- Applied NMR and CD spectroscopy to characterize the structure, dynamics and solvent exposure of a micelle-complexed, intrinsically denatured linker of the *Yersinia* type III secretion system switch protein YscU [2].
- Investigated the initial encounter complex between ATP and adenylate kinase by using ^{31}P NMR to quantify ATP turnover kinetics in AdK mutants [3].
- Employed NMR to assess how binding with drug candidate ring-fused pyridones alters the fibrillation pathways of the amyloidogenic proteins α -synuclein and CsgA [1][4][6].
- Described the stability of the cytoplasmic domain of *Yersinia* YscU by NMR, investigating protein dissociation *in vitro* and monitoring the effects of temperature, pH, divalent cations and interactions with the T3SS protein YscP [5].
- Modeled calorimetric data to determine thermodynamic parameters for metal transfer reactions involving the copper transporter proteins Atox1 and ATPB7 [7].

Postdoctoral Research Fellow

2008 – 2010

Chemical Biological Centre, Umeå University, Umeå, Sweden

- Assessed the effect on protein backbone dynamics of structural changes associated with the redox state of peroxiredoxin Q, using NMR spin relaxation data [8].
- Quantified the oligomerization state of the co-chaperonin protein 10 under denaturing conditions using diffusion NMR [9].
- Employed NMR to investigate binding of cisplatin to the copper-transporter Atox1 as a mechanism potentially granting drug resistance to tumour cells [10].
- Interpreted experimental data on the influence of solvent pH on the stability of amyloid precursors formed by human insulin [12].

Postdoctoral Research Fellow

2006 – 2008

Department of Physics and Astronomy, Hunter College, New York City

- Characterized thermal activation barriers to transport in novel materials for energy storage using relaxation and diffusion NMR [11] [13] [14] [15] [16].
- Implemented hyphenated imaging experiments to perform simultaneous NMR diffusion measurements on multiple samples.
- Provided assistance with other experiments including solid-state NMR of metal oxides and the implementation of a high-pressure stray-field NMR device.

Guest Researcher

2005 – 2006

Leibniz Institute for Polymer Research, Dresden, Germany

- Applied diffusion and electrophoretic NMR to elucidate the structure of complex coacervates formed by oppositely charged copolymers.
- Explored applications of low-field NMR to soft materials.

Postdoctoral Research Fellow

2003 – 2005

Department of Chemistry, Royal Institute of Technology, Stockholm, Sweden

- Quantified equilibrium constants for molecular association between cyclodextrins and surfactants using electrophoretic NMR [17].
- Developed software for control of an electrophoretic NMR power supply.

Graduate Research Assistant

1996 – 2002

Department of Chemistry, University of Wisconsin, Madison, Wisconsin

- Identified the conformational preferences of a model alanine dipeptide and small amides by NMR using residual dipolar couplings measured in liquid crystals [18] [19] [20] [21] [22].
- Developed software for the determination of conformational preferences from residual dipolar couplings.

Laboratory Assistant

1995 – 1996

Warner-Lambert Analytical R&D Division, Morris Plains, New Jersey

- Provided support for the production and consumer relations divisions by analysing incoming samples, using primarily IR spectroscopy.
- Developed a quality assurance method for the quantitation of degradation compounds in drug formulations, using capillary electrophoresis.

TEACHING EXPERIENCE

Instructor, Protein NMR

Spring 2011

Chemical Biological Centre, Umeå University, Umeå, Sweden

- Laboratory section on protein NMR applications, course leader: Prof. Gerhard Groebner

Coordinator, KBC Workshop on CcpNmr/Analysis

April 2009

Chemical Biological Centre, Umeå University, Umeå, Sweden

- Organized a short course on use of the Ccpnmr NMR suite taught by Dr. Tim Stevens and Dr. Rasmus Fogh, University of Cambridge, UK

Adjunct Professor, Advanced Biophysical Chemistry

Fall 2007

Department of Chemistry, NYU, New York City

- Section on biophysical applications of surface science, course leader: Prof. Nicolas Geacintov

Teaching Assistant, Introduction to Chemistry/Physical Chemistry

1996-1998

Department of Chemistry, University of Wisconsin, Madison, Wisconsin

- Course Leaders: Prof. Worth Vaughn, Prof. Judith Burstyn, Prof. Paul Treichel

TECHNICAL EXPERIENCE

NMR

- Determination of protein structure, includes resonance assignment, collection of structural restraints, and molecular dynamics simulations.
- Description of dynamics from spin relaxation rates; some experience with relaxation dispersion measurements.
- Measurement and interpretation of PREs, RDCs, and amide exchange rates.
- Determination of molecular transport parameters, including diffusion coefficients and electrophoretic mobilities.
- Quantification of equilibrium constants for molecular association.
- Measurement of kinetic parameters using time-resolved NMR; experience with fast NMR techniques.
- Data acquisition including pulse programming on Bruker platforms; previous experience with Agilent (Varian) and Chemagnetics.
- Some experience with methods for very large molecules such as TROSY and CRINEPT.
- Some experience with solid-state and low-field NMR techniques.

Computational and Programming Experience

- MATLAB, R, C, Python, Tcl, PERL, and others.
- Machine learning tools (ANN, SVM, KNN, PCA, PLS).
- Bioinformatics (homology modeling, secondary structure prediction, sequence alignments).
- Statistical Tools including ANOVA, regression.
- NMR data processing with NMRPipe, Ansig; some experience with CcpNmr.
- Modeling and visualization with Xplor-NIH, VMD.

Other Instrumentation

- CD, DLS, SPR, UV-VIS.
- Basic cloning and soluble protein expression in *E. coli*.
- Protein purification with FPLC.

EDUCATION

University of Wisconsin, Madison

2002

Ph.D., Physical Chemistry

Madison, Wisconsin

Thesis: "Structure and Orientation of Alanine Dipeptide and Small Amides by NMR in a Water-based Liquid Crystal" [18]

Advisor: Prof. James C. Weisshaar

Tufts University

1995

B.Sc., Chemistry and Biology

Medford, Massachusetts

GPA: 3.59 (*cum laude*)

REFERENCES

Prof. Magnus Wolf-Watz
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