Annette H. Erbse, Dr. rer. nat.

Director of SIP (Biochemistry Shared Instruments Pool) • Director of BioX Biomolecular X-Ray Crystallography Core)

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My Bibliography
ORCiD
SIP (Shared Instruments Pool)
BioX (Biomolecular X-ray Crystallography Core

Professional Career:

2016-present	**Director of the Macromolecular X-ray core in the Department of Chemistry and Biochemistry,** JSC Biotechnology Building, University of Colorado at Boulder Responsibilities: User training and support from project development and experimental design, to instrument training, experiment optimisation and data evaluation; troubleshooting of experiments and instruments, instrument maintenance and repairs; organisation and support of data collection at synchrotrons, administration and accounting, long-term planning, outreach and PR, website design and maintenance
2012-present	**Director of the Shared Instrument Core in the Department of Chemistry and Biochemistry,** JSC Biotechnology Building, University of Colorado at Boulder Responsibilities: User training and support from project development and experimental design, to instrument training, experiment optimisation and data evaluation; troubleshooting of experiments and instruments, instrument maintenance and repairs; instrument grant proposals; service measurements for in-house and commercial users; administration and accounting, long-term planning, outreach and PR, website design and maintenance
2009-2012	**Senior Research Associate,** University of Colorado, Boulder in the group of Prof J.J.Falke., Boulder, CO, USA Research project: Investigating the mechanisms of bacterial chemotactic signal sensing
2009-present	**Manager EPR facility** Department of Chemistry/Biochemistry, University of Colorado – Boulder, Boulder, CO, USA
2006-2009	**Research Associate,** University of Colorado, Boulder in the group of Prof J.J.Falke, Boulder, CO, USA Research project: Investigating the mechanisms of bacterial chemotactic signal sensing
2002-2005	**Oberassistent (Senior Staff Scientist)** at the Centre for Molecular Biology, University of Heidelberg in the group of Prof B. Bukau, Heidelberg, Germany Research project: Function and mechanism of molecular chaperons in proteolysis
1999-2002	**Post-doctoral Fellow** of the Howard Hughes Medical Institute at Yale University in the group of Prof A. L. Horwich, New Haven, CT, USA Research Project: Investigating the structure of TTR amyloid fibres using EPR-spectroscopy
1996 -1999	**Research Associate**, Department of Biological Sciences, University of Birmingham in the group of Dr P. A. Lund, Birmingham, England

	Research project: Function and mechanism of molecular chaperons of the HSP60 family

Education:

October 1996	**PhD** at the Department of Chemistry, University of Kaiserslautern, Germany
1993 – 1996	**PhD student** in the group of Prof W. Trommer and Dr P. Vogel at the Department of Chemistry, University of Kaiserslautern, Germany
	Thesis project: Investigating the structure-function relationship of different ATP binding proteins employing EPR-spectroscopy
February 1993	**Diploma in Chemistry** at the University of Kaiserslautern, Germany (equivalent to **Masters** in the USA)
1992 – 1993	**Diploma Thesis** (equivalent to **Masters Thesis**) at the University of Kaiserslautern, Department of Chemistry in the group of Prof W. Trommer
	Thesis project: Kinetic investigations on native and activated F_1-ATPase from chloroplasts
1986 – 1992	Chemistry student at the Department of Chemistry at the University of Kaiserslautern, Germany

Expertise:

- Developing biophysical/biochemical strategies and assays for the analyses of protein, DNA and RNA structure and function.
- Protein, DNA and RNA characterization. SDS gel-electrophoresis, western blotting, activity assays, mass spectrometry, Fluorescence- and EPR spectroscopy, calorimetric assays, circular dichroism, dynamic and static multi-angle light scattering, microscale thermophoresis, mass photometry.
- Enzyme kinetics and thermodynamics. Coupled activity assays, radioactively labelled substrates, different spectroscopic methods (EPR, fluorescence, FRET, anisotropy, UV-VIS, CD) in steady-state or stopped-flow experiments), SPR (Biacore), HD exchange, peptide libraries, fast kinetics (stopped-flow and chemical quench flow), Isothermal Titration Calorimetry, Microscale Thermophoresis, investigation of cooperativity and analyses of data by applying mathematical models.
- Macromolecular X-ray Crystallography: Protein, DNA, RNA and complexes; crystallisation (manual or automated), XRD data acquisition (Home Source or Cyclotron Beamline), data reduction, model building and refinement
- Protein mass spectrometry. MALDI and ESI-LC/MS, MS/MS, accurate total mass determination, peptide fingerprinting, PDS, Mass spectrometry teaching: Co-developed and team-taught a graduate mass spectrometry hands-on/theory class with Dr. M.M. Mayer (Center for Molecular Biology Heidelberg).
- Expression and purification of recombinant proteins. Purification employing HPLC and FPLC methods (gel filtration, ion exchange -, reversed-phase- and affinity chromatography), purification from inclusion bodies, and purification of radioactively labelled proteins.
- Developing structure/function-guided protein mutations.
- Protein modification. Site-specific biotinylation, PEGylation, spin labelling or fluorophore conjugation employing designed, structure/function-guided cysteine mutants via maleimide, succinimide, disulfide chemistries, genetically encoded affinity tags, enzymatic and chemical modification.
- Isolation of membrane fractions, inner membrane vesicles, trans-membrane receptors and membrane-bound, multi-protein complexes in native membranes.
- Molecular biology (sub-cloning, mutagenesis, constructing fusion proteins).