

Job title:

PhD Position in Protein Structural Biology and Biophysics: Structure–Dynamics–Function Relationship of the Chaperone Hsp90

Level of employment / date of entry

100%, starting January 2026 (negotiable)

Intro

Proteins must fold correctly to function, and this process is tightly regulated by a network of chaperone proteins. At the heart of this network is Hsp90, a molecular chaperone essential for the folding and maturation of at least 20% of all cellular proteins. Hsp90's malfunction is implicated in cancer, neurodegenerative, and metabolic diseases. Despite its importance, the precise molecular mechanisms by which Hsp90 recognizes, processes, and releases its client proteins remain elusive due to the complex and dynamic nature of these processes.

This doctoral project aims to unravel these mechanisms by combining two cutting-edge techniques:

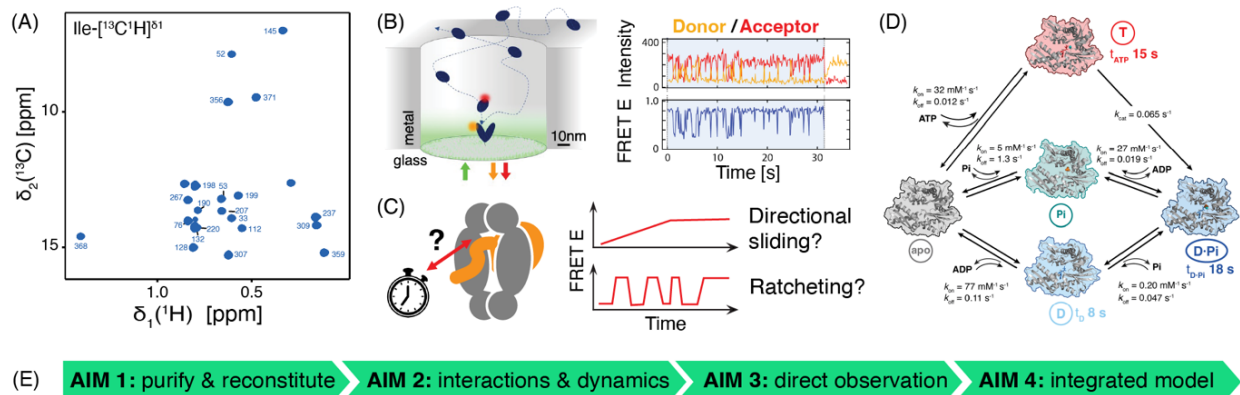
- **NMR spectroscopy** for atomic-resolution insights in solution
- **Single-molecule FRET** for time-resolved, single-molecule dynamics

This unique combination of methods is achieved by the synergy of the Hiller and Schmid labs, which both have long-term interest in studying molecular chaperones and have engaged in a long-term collaboration to combine their expertise. By integrating these complementary approaches, we aim to provide the first comprehensive picture of Hsp90's structure–dynamics–function relationship, with broad implications for understanding cellular health and disease.

Your position

As a PhD student on this project, you will:

- Design and perform experiments using NMR spectroscopy and single-molecule FRET
- Purify and biochemically characterize proteins and their complexes
- Analyze and interpret advanced biophysical and single-molecule data
- Collaborate within an interdisciplinary team of biochemists, biophysicists, and structural biologists
- Present your findings at conferences and in high-impact publications



Project strategy and prior work. (A) NMR spectrum of a large chaperone with resonance assignments. (B) Monitoring binding and conformational changes in real-time using single-molecule FRET and SNI-built ZMW devices. (C) Unverified chaperone hypotheses tested in this project. (D) Result: Functional chaperone cycle with quantitative rates from complementary NMR and smFRET data. (E) The workplan for elucidating the Hsp90 chaperone mechanism by quantitative NMR and smFRET.

Your profile

Required:

- Master's degree (or equivalent) in Biochemistry, Biophysics, Structural Biology, or a related field
- Strong background in protein science and/or biophysical methods
- Interest in protein folding, chaperone biology, and molecular mechanisms of disease
- High motivation to learn advanced spectroscopy techniques (NMR, smFRET)
- Excellent communication skills and ability to work in a collaborative environment

Desirable:

- Experience with NMR spectroscopy and/or single-molecule fluorescence techniques
- Programming/data analysis skills (e.g., Python, MATLAB)
- Previous research experience in structural biology or protein dynamics

We offer

- An exciting and fully funded PhD project at the University of Basel, Switzerland
- Embedding in the Hiller and Schmid groups, two productive, interdisciplinary research groups with open and interactive lab culture
- State-of-the-art research infrastructure and facilities at the Biozentrum and the Department of Chemistry
- A highly international and interdisciplinary setting stimulating your professional and personal development. We welcome friendly and ambitious humans from all walks of life.
- A beautiful and very livable city at the intersection of Germany, France, and Switzerland, with wide-ranging sport, leisure and cultural opportunities. Basel is a hotspot of the Life Science academia and industry and welcomes internationals broadly.

Application/contact

Please submit your application via the BIPED system at

<https://biped.sni.unibas.ch/apply/sni-phd-program-2025>, requiring

- describing your motivation and relevant experience
- CV
- Academic transcripts
- Contact details of at least 2 references incl. email addresses and phone number.

Deadline: The position is open until filled.

Contact: sebastian.hiller@unibas.ch; sonja.schmid@unibas.ch

Start Date: January 2026 (negotiable)

Join us in uncovering the secrets of Hsp90 and advancing our understanding of protein folding in health and disease!