



JAGIELLONIAN  
UNIVERSITY  
IN KRAKÓW

**DIOSCURI**  
CENTRE FOR STRUCTURAL  
DYNAMICS OF RECEPTORS



# Postdoctoral Position | Nogly Lab

## 4.5 years | XFEL | TR-SFX | crystals ready

[noglylab.eu](http://noglylab.eu)

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## POSTDOCTORAL RESEARCHER

*Time-Resolved Structural Biology*

**Molecular movies of chloride transport in a cyanobacterial halorhodopsin**

Nogly Lab · Dioscuri Centre for Structural Dynamics of Receptors  
Jagiellonian University · Kraków, Poland

[noglylab.eu](http://noglylab.eu) · [noglylab.eu/join-us](http://noglylab.eu/join-us)

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|-----------------------|---|
| <b>Position</b>       | Postdoctoral Researcher, up to 4.5 years  |
| <b>Start</b>          | Flexible; immediate start preferred   |
| <b>Salary</b>         | 130,700 PLN gross/year (≈ €30,000) — highly competitive in Poland; Kraków's cost of living is up to 40–50% lower than in major Western European cities                        |
| <b>Teaching</b>       | None — 100% research  |
| <b>Benefits</b>       | 36 days of paid leave per year · Public health insurance included; private medical care available at reduced rate · MultiSport card · English-speaking administrative support |
| <b>Infrastructure</b> | Gryphon-LCP crystallisation robot in-house · Structural Biology Core Facility (adjacent) · Solaris synchrotron in Kraków · funded conference and workshop attendance          |
| <b>Funding</b>        | NCN SONATA BIS grant (> €1 million) — fully secured and active  |
| <b>Deadline</b>       | Rolling review; apply by 31 May 2026 for full consideration.  |
| <b>Location</b>       | Jagiellonian University, Kraków, Poland   |
| <b>Language</b>       | Lab operates in English — no Polish required  |

## WHY THIS POSITION

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A fully funded time-resolved structural biology project with **diffracting crystals already in hand at 2.3 Å resolution**. Secured beamtime strategy across **European XFEL, SwissFEL, and MAX IV**. Strong international collaborations (Heberle, Schapiro, Schlesinger). A mentor committed to your independence and to placing you in your next step — alumni hold scientist positions at **SLAC/Stanford and SLS/SwissFEL**. No prior XFEL or serial crystallography experience required — full training is part of the offer.

## THE SCIENCE

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Every time a photoreceptor absorbs a photon, a cascade of atomic rearrangements unfolds — driving ions across membranes, powering energy conversion, and enabling life in extreme environments. We make molecular movies of these events, at atomic resolution, using time-resolved serial femtosecond crystallography (TR-SFX) at X-ray free electron lasers (XFELs) and time-resolved serial synchrotron crystallography (TR-SSX) at synchrotrons.

This position focuses on the **structural dynamics and chloride transport mechanism** of halorhodopsins — light-driven chloride pumps — across distinct microbial lineages. You will lead all work on our target **cyanobacterial halorhodopsin (cHR)**, a scientifically compelling target: it carries a unique **TSD** motif at its chromophore-binding positions (contrasting with the NTQ motif of marine bacteria and the TSA of archaea), can be switched to a proton pump with a single point mutation, and shows possible capacity to transport the polyatomic divalent sulfate ion — a genuinely unexpected and mechanistically unexplained capability.

Using TR-SFX at European XFEL and SwissFEL, and TR-SSX at MAX IV and ESRF, you will capture sequential structural intermediates of the cHR photocycle from **200 femtoseconds to tens of milliseconds** — the first experimentally derived molecular movie of chloride transport in a cyanobacterial rhodopsin. These data will be directly compared with the mechanistic model for the marine bacterium NmHR (Mous et al., *Science*, 2022; see key publications) to reveal how evolutionary distance translates into mechanistic diversity.

### A running start — what is already in place

The usual months-long bottleneck in structural biology — establishing protein production and crystallisation — has been substantially overcome. Expression, purification, and crystallisation protocols for cHR are established and operational in the lab. **Diffracting crystals at 2.3 Å resolution, stable at 20 °C and suitable for time-resolved experiments, are in hand**. You join a project ready to advance into high-impact structural experiments from day one.

### Already in place and waiting for you:

- ✓ **cHR overexpression and purification** — reproduced in Kraków; SDS-PAGE and SEC confirmed
- ✓ **Diffracting cHR crystals in lipidic bicelles** — 2.3 Å; stable at 20 °C for time-resolved work
- ✓ **NmHR crystallisation at 1.5 Å** — the direct mechanistic reference for cHR comparison
- ✓ **SAD anomalous dispersion methodology** — established on NmHR (*Science* 2022); ready for cHR halide-pathway tracing
- ✓ **SwissFEL beamtime rated outstanding** — plus 9 days at MAX IV (microMAX) secured in current run
- ✓ **Gryphon-LCP crystallisation robot in-house** — plus full access to the adjacent Structural Biology Core Facility

## WHAT YOU WILL DO

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You will drive the full experimental workflow for cHR — from sample optimisation to publication — supported by the PI and a strong international collaboration network:

1. Scale up cHR production for serial crystallography; optimise crystal size, homogeneity, and delivery method (fixed-target chips and high-viscosity injectors).
2. Collect radiation-damage-free resting-state SFX structures at XFEL and room-temperature SSX structures at synchrotron, as references for dynamic data.
3. TR-SSX experiments at MAX IV and ESRF to capture microsecond-to-millisecond structural intermediates of the chloride transport cycle.
4. TR-SFX at European XFEL and SwissFEL to resolve femtosecond-to-microsecond dynamics, including retinal photoisomerisation and early transport events.
5. SAD anomalous dispersion tracing of the halide transport pathway ( $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ); direct comparison of cHR pathway with that of NmHR.
6. Mutagenesis, functional transport assays (already established), and time-resolved spectroscopy (with Prof. Heberle, FU Berlin) to validate the transport mechanism.
7. Integration with QM/MM energetics (Prof. Schapiro, TU Dortmund); manuscript preparation and publication in high-impact journals.

## WHO WE ARE LOOKING FOR

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**No prior XFEL or serial crystallography experience required.** Structured training in TR-SFX and TR-SSX is part of the position, delivered hands-on at beamtimes alongside the PI and established collaborators.

### REQUIRED

- **PhD** (awarded or imminent) in structural biology, biochemistry, biophysics, chemistry, physics, or a closely related field
- **Experience** in protein expression, purification, and biochemical characterisation
- **Background** in X-ray crystallography, or a demonstrated commitment to develop these skills rapidly
- **Fluency** in written and spoken English
- **Rigour, resilience, and ownership** of a project from sample to manuscript

### VALUED (not required)

- Membrane protein biochemistry; lipidic cubic phase or bicelle crystallisation
- Serial crystallography (SFX or SSX) or synchrotron/XFEL beamtime experience
- CrystFEL, CCP4, or Phenix familiarity
- Scripting skills (Python, bash)
- Interest in photochemistry, optogenetics, or ion-transport biophysics

*You do not need to tick every box in the Valued column. If the science excites you and you can show us you have the depth to grow into it, we want to hear from you.*

## THE LAB, MENTORING, AND YOUR CAREER

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The Nogly Lab is a **Dioscuri Centre of Scientific Excellence**, co-funded by the Max Planck Society and the Polish National Science Centre — a programme designed to build fully independent, internationally competitive research groups in Poland. You get the ambition, resources, and international network of a major European research programme, combined with a genuinely collaborative group culture.

Przemysław mentors with a clear philosophy: postdocs receive **real autonomy** to develop their own scientific judgement, with direct and committed PI support during intensive phases — beamtimes, key decision points, and difficult problems. Weekly group seminars, an open-door culture, and a flat hierarchy mean people here

learn from each other. Beyond the science, regular team activities — from kayaking and go-karting to team dinners — build an environment where people thrive both professionally and personally (see [noglylab.eu/beyond-the-bench](http://noglylab.eu/beyond-the-bench)).

### Your next step

Career development is taken seriously. Alumni from this group have gone on to **scientist positions at leading institutions including SLAC/Stanford and SLS/SwissFEL**. We actively support postdocs in building their next step — independent research group, senior scientist role, or industry.

## INTERNATIONAL COLLABORATION NETWORK

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- **Prof. Joachim Heberle** · FU Berlin — time-resolved UV-Vis and IR spectroscopy in crystals and solution
- **Prof. Igor Schapiro** · TU Dortmund — QM/MM calculations and mechanistic interpretation
- **Dr. Ramona Schlesinger** · FU Berlin — halorhodopsin sample production expertise and training support

See our recent back-to-back beamtimes at European XFEL and SwissFEL: [noglylab.eu/two-xfel-beamtimes](http://noglylab.eu/two-xfel-beamtimes)

## KEY PUBLICATIONS

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**Science, 2022** — *Dynamics and mechanism of a light-driven chloride pump* — Mous, Gotthard ... Nogly. TR-SFX + TR-SSX. **Direct scientific predecessor of this position.**

**Nature, 2023** — *Ultrafast structural changes direct the first molecular events of vision* — Gruhl, Weinert ... Nogly ... Panneels. TR-SFX of visual bovine rhodopsin.

**Nature, 2020** — *Femtosecond-to-millisecond structural changes in a light-driven sodium pump* — Skopintsev ... Nogly ... Standfuss. Complete photocycle movie of KR2.

**Science, 2018** — *Retinal isomerization in bacteriorhodopsin captured by a femtosecond X-ray laser* — Nogly ... Standfuss. First capture of retinal photoisomerization.

**Science, 2019** — *Proton uptake mechanism in bacteriorhodopsin captured by serial synchrotron crystallography* — Weinert ... Nogly ... Standfuss. First TR-SSX of a rhodopsin.

## LIFE IN KRAKÓW

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Kraków is consistently ranked among Europe's most liveable cities — a UNESCO World Heritage site with a vibrant university culture, an outstanding restaurant and cultural scene, and direct access to the Tatra Mountains for hiking, skiing, and climbing. **The cost of living is substantially lower than in Western Europe**, so the salary stretches meaningfully further than the nominal figure suggests. Knowledge of Polish is not required: the lab works entirely in English, and we assist new arrivals with accommodation, city registration, and all administrative steps.

Jagiellonian University, founded in 1364, is one of the oldest universities in Europe. The Faculty of Biochemistry, Biophysics and Biotechnology occupies a modern building on the University's 600th Anniversary Campus. Researchers who come to Kraków for a postdoc often find themselves staying longer than planned.

## HOW TO APPLY

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1. **Prepare a single PDF** containing: your CV (with full publication list), a cover letter of no more than one page explaining your background and what draws you to this project, and contact details for two referees.
2. **Submit via email** to [przemyslaw.nogly@uj.edu.pl](mailto:przemyslaw.nogly@uj.edu.pl). Rolling review; apply by 31 May 2026 for full consideration.
3. Shortlisted candidates will be invited to an online interview. You are welcome to write directly before applying — we respond to all strong candidates.

MAX PLANCK  
GESELLSCHAFT



NATIONAL SCIENCE CENTRE  
POLAND



Ministry of Education  
and Science



Federal Ministry  
of Education  
and Research

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**Nogly Lab** · [noglylab.eu](http://noglylab.eu) · [noglylab.eu/join-us](http://noglylab.eu/join-us)

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