

JKU

JOHANNES KEPLER
UNIVERSITÄT LINZ

Institute of Biophysics

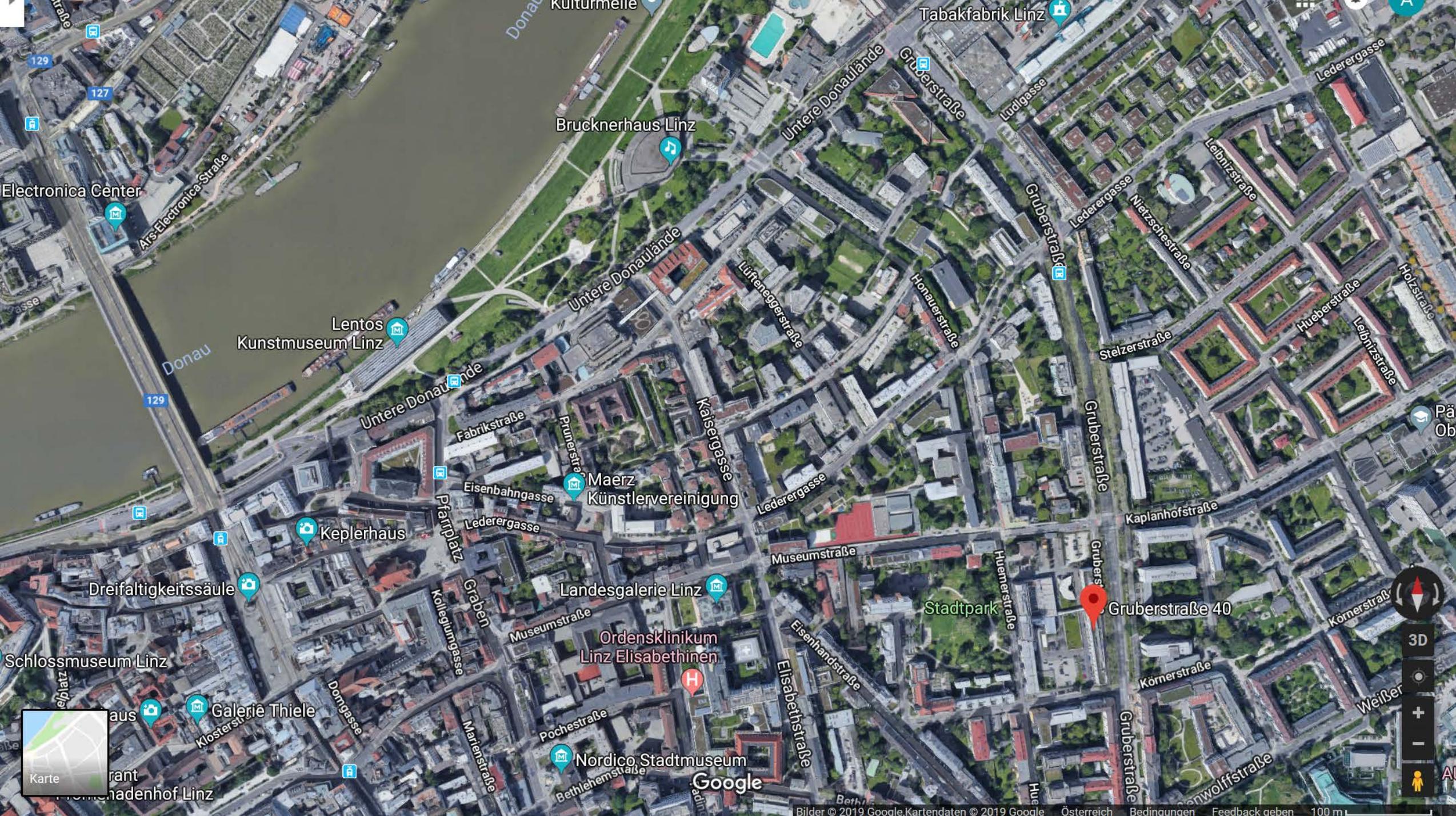
Univ.Prof. Dr. Peter Hinterdorfer

Univ.Prof. Dr. Peter Pohl

JKU Life Science Center OÖ

Gruberstraße 40, 4020 Linz





129
127

Electronica Center
Ars-Electronica-Straße

Donau

129

Keplerhaus

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Schlossmuseum Linz

Karte

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Kunstmuseum Linz

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Künstlervereinigung

Landesgalerie Linz

Ordensklinikum
Linz Elisabethinen

Nordico Stadtmuseum

Gruberstraße 40

Google

Departments

Molecular Biophysics und Membrane Biophysics

- AG Pohl: Membrane Transport
- AG Romanin: Ion Channels
- AG Horner: Protein-Engineering
- AG Tiemann-Boege: Single Molecule Genetics
- AG Gramse: Nanoelectronics
- AG Derler: Optogenetics

Applied Experimental Biophysics

- AG Hinterdorfer: Atomic Force Microscopy
- AG Ebner: Molecular Biosensing

AG
Pohl

Membrane Transport

Research areas:

Transport of various substances such as water, proteins, protons and various pharmaceuticals through biological membranes and membrane transporters in order to decipher molecular transport mechanisms.

- Water transport through ion channels
- Protein translocation complex
- Protons at interfaces
- Mechanics of bio-membranes and channels



Techniques:

- Reconstitution of proteins into model membranes
- Electrophysiology on single channels
- Fluorescence correlation spectroscopy, stopped-flow fluorimetry, fluorescence microscopy (on molecule ensembles and single molecules)

Contact:

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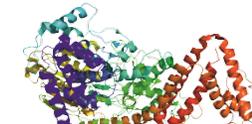
EcGlpF&AQPZ, hAQP1,5,8



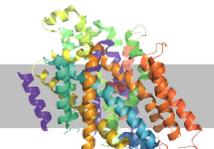
KcsA



EcSecYEG-SecA



hSGLT1



AG Romanin Ion Channels

Research areas:

Calcium transport mechanisms, in particular Orai and STIM proteins, in order to elucidate the role of cellular calcium in general, as well as in the development of various diseases (allergies, cancer).

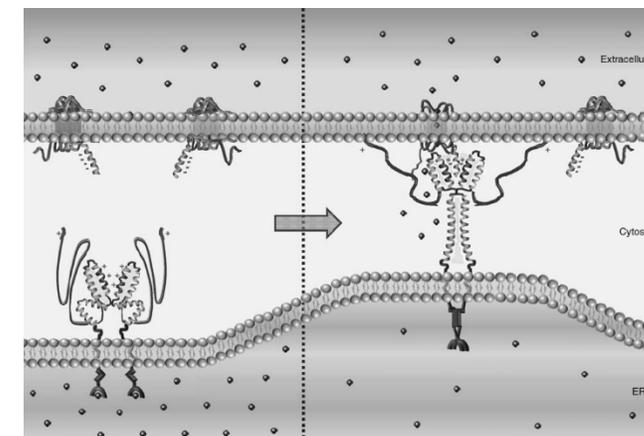
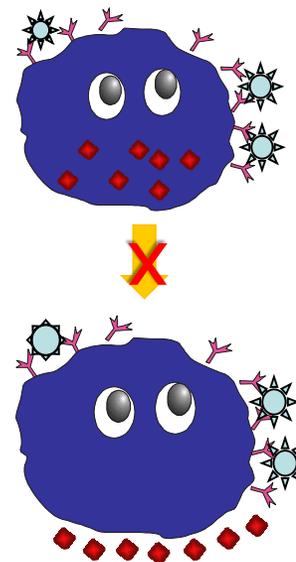
- Allergies: anti-allergic and immunosuppressive drugs
- Ion channels

Techniques:

- Patch clamp
- FRET
- Molecular biology

Contact:

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AG
Horner

Protein
Engineering

Research areas:

Objective: Production of transmembrane proteins with modified or optimized stability, permeability and selectivity.

→ For this purpose, the molecular mechanisms of substrate permeability depending on the size of the protein oligomer and the interaction of protein subunits with one another and with the biological membrane are investigated.

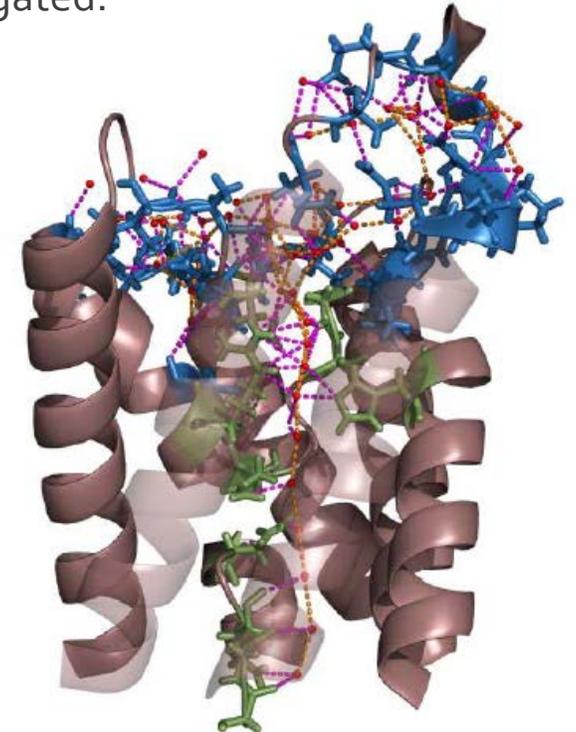
- Aquaporins
- Urea Channel *HpUrel*

Techniques:

- Molecular biology
- Protein expression, purification & reconstitution
- Fluorescence & Light Scattering (FCS, TIRFM, Stopped-Flow, DLS)

Contact:

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AG
Gramse

Nano-
electronics

Research areas:

Electrical metrology at the nanoscale: We develop new techniques / methods and apply them to solve open research questions in various fields like Biophysics, Electrochemistry, Material Science and Semiconductor-Physics - always with the focus on Nanoscience.

Techniques:

- Atomic Force Microscopy
- Scanning Microwave Microscopy
- Time Resolved Electrostatic Force Microscopy
- Broad Band Electrostatic Force Microscopy
- Electrochemical Microwave Scanning Tunneling Microscopy

Contact:

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AG
Derler

Optogenetics

Research areas:

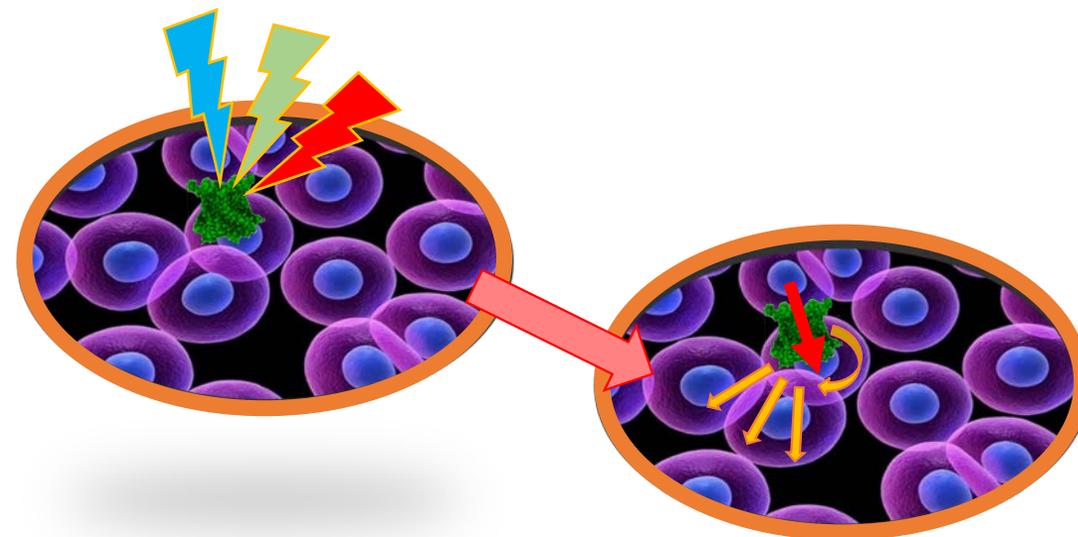
This working group uses light-sensitive structures to make transmembrane proteins switchable via light, to better understand their structure-function relationship and to precisely control downstream signaling processes in the cell.

Techniques:

- Ca²⁺ imaging
- Patch Clamp
- FRET
- Molecular biology
- Genetic code expansion/
Optoproteomic

Contact:

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Hinterdorfer
AFM

Research areas:

Structure-function relationships of individual molecules in immunology, pharmacology, microbiology and virology.

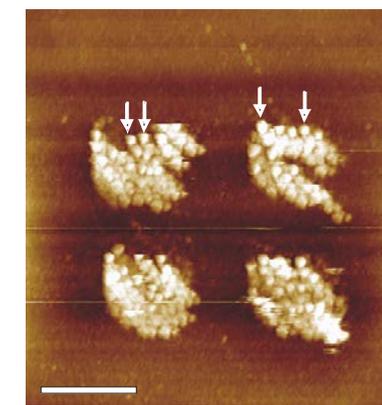
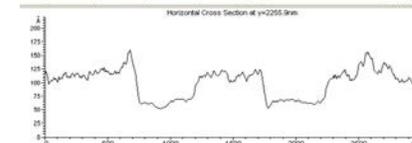
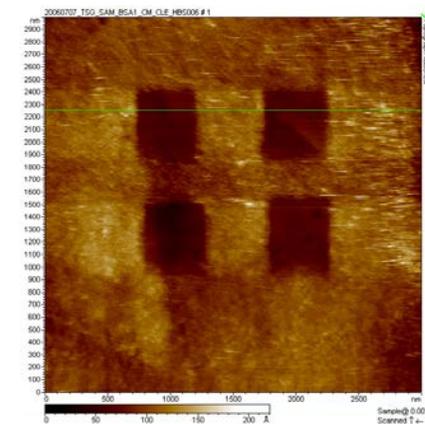
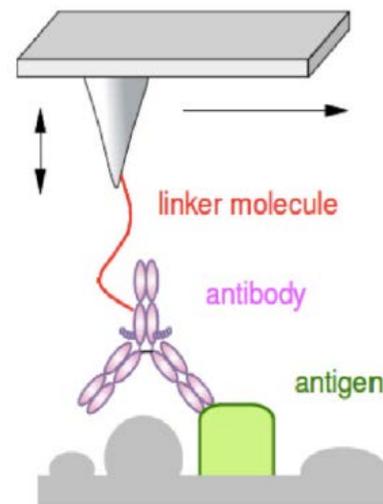
- Bio-nanostructures
- Receptor-ligand interaction
- Protein dynamics

Techniques:

- AFM imaging
- Force spectroscopy
- AFM / fluorescence combinator
- TREC
- High speed AFM

Contact:

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AG
Ebner

Molecular
Biosensing

Research areas:

Interactions between biomolecules with a focus on blood sensors and technical developments of the atomic force microscope for medical applications.

Techniques:

- Atomic Force Microscopy (AFM)
- Quartz Crystal Microbalance (QCM)
- Surface Plasmon Resonance (SPR)

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