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**Modulbezeichnung:** Orientierungsmodul Structural Biology II: Structure and function relationships in biological macromolecules (OMA-StrBio2) 7.5 ECTS  
 (Orientierungsmodul Strukturbioogie II: Struktur-Funktionsbeziehungen in Biologischen Makromolekülen)

Modulverantwortliche/r: Yves Muller

Lehrende: Benedikt Schmid, Yves Muller, Rainer Böckmann

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Startsemester: SS 2021

Dauer: 1 Semester

Turnus: jährlich (SS)

Präsenzzeit: 120 Std.

Eigenstudium: 105 Std.

Sprache: Englisch

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#### Lehrveranstaltungen:

Orientierungsmodul Strukturbioogie II: Structure und function relationships in biotechnologically relevant macromolecules (SS 2021, Übung, 8 SWS, Yves Muller et al.)

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#### Empfohlene Voraussetzungen:

none

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#### Inhalt:

**Seminar** talks cover theoretical and methodological approaches for the study of structure-function relationships in proteins with a focus on the structural determinants that are responsible for the regulation of protein function.

**Laboratory course** focuses on advanced methods to study structure-dynamics-function relationships in proteins. Both experimental (heterologous protein production in eukaryotic cells, X-ray analysis, mutation studies) as well as theoretical methods (atomistic and coarse-grained molecular dynamics simulations) will be addressed. Additionally, students are introduced to X-ray crystallography and investigating protein stability via CD spectroscopy in hands-on lab-training units. The focus of the practical course will be the active participation in ongoing research projects in the participating labs.

#### Lernziele und Kompetenzen:

The students are

- acquainted with novel insights, concepts, and methods in the study of protein-dynamics-function relationships
- understand state-of-the-art methods in the analysis of protein structure, dynamics, function and their limitations
- are able to independently develop working hypotheses, to independently design and conduct experiments
- able to present and critically discuss current research articles / their results and defend their conclusions in proper context

#### Literatur:

introductory articles will be provided electronically

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#### Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

[1] **643#65#H**

(Po-Vers. 2012 | NatFak | Integrated Life Sciences: Biologie, Biomathematik, Biophysik (Master of Science) | Modulgruppen | MG1: Mathematische Modellierung und Systembiologie | Wahlpflichtmodule der Modulgruppe1 | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[2] **643#65#H**

(Po-Vers. 2012 | NatFak | Integrated Life Sciences: Biologie, Biomathematik, Biophysik (Master of Science) | Modulgruppen | MG2: Bioimaging und Biophysik | Wahlpflichtmodule der Modulgruppe2 | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[3] **643#65#H**

(Po-Vers. 2012 | NatFak | Integrated Life Sciences: Biologie, Biomathematik, Biophysik (Master of Science) | Modulgruppen | MG3: Biologische Strukturen und Prozesse | Wahlpflichtmodule der Modulgruppe3 | Structural

Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[4] **Integrated Life Sciences: Biology, Biomathematics, Biophysics (Master of Science)**

(Po-Vers. 2015w | NatFak | Integrated Life Sciences: Biology, Biomathematics, Biophysics (Master of Science) | Module Groups | MG3: Biological Structures and Processes | Mandatory Elective Modules Group 3 | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[5] **Integrated Life Sciences: Biology, Biomathematics, Biophysics (Master of Science)**

(Po-Vers. 2019w | NatFak | Integrated Life Sciences: Biology, Biomathematics, Biophysics (Master of Science) | Module Groups | MG3: Biological Structures and Processes | Mandatory Elective Modules Group 3 | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[6] **Zell- und Molekularbiologie (Master of Science)**

(Po-Vers. 2008 | NatFak | Zell- und Molekularbiologie (Master of Science) | alte Prüfungsordnungen | Mastermodule | Biologische Mastermodule | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[7] **Zell- und Molekularbiologie (Master of Science)**

(Po-Vers. 2015w | NatFak | Zell- und Molekularbiologie (Master of Science) | Mastermodule | Biologische Mastermodule | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

[8] **Zell- und Molekularbiologie (Master of Science)**

(Po-Vers. 2019w | NatFak | Zell- und Molekularbiologie (Master of Science) | Orientierungsmodule | Biologische Orientierungsmodule | Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules)

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**Studien-/Prüfungsleistungen:**

Portfolio exam Structural Biology II: Structure and Function Relationships in Biotechnologically Relevant Macromolecules (Prüfungsnummer: 22111)

Prüfungsleistung, mehrteilige Prüfung

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

PL: written examination 90 min. PL: protocol of 15-20 pages PL: seminar talk 15 min.

Erstablingung: SS 2021, 1. Wdh.: keine Angabe

1. Prüfer: Böckmann/Muller (N40002)

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