

Graduiertenkolleg 2300

„Enrichment of European beech forests with conifers: impacts of functional traits on ecosystem functioning“ (Conifers)

Doktorandinnen und Doktoranden, die im Rahmen des Graduiertenkollegs 2300 „Enrichment of European beech forests with conifers: impacts of functional traits on ecosystem functioning“ promovieren, müssen Module im Umfang von insgesamt wenigstens 24 C nach Maßgabe der folgenden Bestimmungen erfolgreich absolvieren

a. Fachstudium

Es müssen folgende 3 Pflichtmodule im Umfang von insgesamt 11 C nach Maßgabe der nachfolgenden Bestimmungen erfolgreich absolviert werden:

- A. Interdisciplinary research on the functionality of forest ecosystems
- B. Colloquia and research seminars
- C. International conference and lecture series

Es müssen 2 Wahlpflichtmodule im Bereich spezifischer Fachkenntnisse im Umfang von insgesamt 4 C absolviert werden. Es kann dabei aus den folgenden Modulen gewählt werden:

- 1. Ecology of mixed forests and methods of ecophysiological research on trees
- 2. Concepts and tools for collecting and analyzing spatial data in animal ecology
- 3. Use of stable isotope technologies in forest ecosystem research
- 4. Molecular methods in ecology
- 5. Statistical modelling and advanced regression analyses
- 6. Applied programming of forest growth and yield modelling in Java

b. Methoden- und Schlüsselkompetenzen

Es muss das folgende Modul im Umfang von 2 C absolviert werden:

- 1. Data management with BExIS

Des Weiteren müssen mindestens 7 C in mindestens 3 Kursen oder Seminaren zu methodischen Kenntnissen und Schlüsselkompetenzen erworben werden, die von anderen Institutionen bspw. GFA, GGG oder GAUSS angeboten werden. Gewählt werden können bspw. „Academic writing and publishing“, „Transdisciplinarity and knowledge transfer“, „Basics of statistical analyses in biosciences“, „Project management“, „Presenting in English“, „Introduction in R“, „R for advanced users“. Außerdem können Kurse der Hochschuldidaktik besucht werden. Auch kann eigene Lehre und die Betreuung von Bachelor- oder Masterarbeiten als Studienleistung mit bis zu 2 C durch den Vorstand des Graduiertenkollegs anerkannt werden. Die Prüfungsanforderungen orientieren sich an den Regularien der einzelnen Anbieter.

| | | |
|--|--|-----|
| Georg-August-Universität Göttingen | | 2 C |
| Modul A <i>Interdisciplinary research on the functionality of forest ecosystems</i> <i>English title: Interdisciplinary research on the functionality of forest ecosystems</i> | | |
| Lernziele/Kompetenzen: PhD students <ul style="list-style-type: none"> - have a general understanding of the overall research question and the specific role of their subproject therein - are familiar with the research sites - have an idea about successful interdisciplinary research projects and have gathered information on how to conduct large research projects addressing tree mixtures - acquire competences in working together in a team and learn about international quality standards of scientific working, gender and equality issues | Arbeitsaufwand: Präsenzzeit: 5 days | |
| Lehrveranstaltung: <i>Introductory excursion (block)</i> <i>Inhalte: Introductory excursion to research sites, focusing on an introduction in the overall research question, visit of the project's field sites, visit of sites of other interdisciplinary research projects focusing on tree species mixtures, including a workshop on "Good Scientific Practice", "Interdisciplinarity" or "Working in a team"</i> | | |
| Prüfung: report (not graded) of 5 pages maximum Prüfungsanforderungen: PhD students <ul style="list-style-type: none"> - have a general understanding of the overall research question and the specific role of their subproject therein - are familiar with the research sites - have an idea about successful interdisciplinary research projects and have gathered information on how to conduct large research projects addressing tree mixtures - have competences in working together in a team and know about international quality standards of scientific working, gender and equality issues - can summarize those aspects of the excursion which she/he believes are most relevant for her/his own research project | 2 C | |
| Zugangsvoraussetzungen: Membership in RTG 2300 | Empfohlene Vorkenntnisse: none | |
| Sprache: English | Modulverantwortliche[r]: Serena Müller | |
| Angebotshäufigkeit: Every 3 years starting summer semester 2018 | Dauer: One semester | |

| | |
|---|--|
| Wiederholbarkeit: | Empfohlenes Fachsemester: 1 or 2 |
| Maximale Studierendenzahl: 15 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|--|--------------|
| Georg-August-Universität Göttingen | 4 C 4 SWS |
| Modul B <i>Colloquia and research seminars</i> <i>English title: Colloquia and research seminars</i> | |

| | |
|---|------------------------|
| Lernziele/Kompetenzen: | Arbeitsaufwand: |
| PhD students <ul style="list-style-type: none"> - can present and defend their research design, progress and results in front of an academic audience - improve their presentation skills - can optimize and adjust their research by integrating the feedback of fellow students and supervisors - enlarge their knowledge on state of the art research (methods) - learn to interact in academic discourses by critically reflecting and discussing their fellow PhD students' research projects | 120 Stunden |

| | |
|---|-------|
| Lehrveranstaltung: | |
| RTG 2300 internal research seminar (<i>colloquium</i>) <i>Inhalt:</i> PhD students will present and discuss their research design, progress and results at least twice in the internal RTG PhD seminar. | 2 SWS |
| Colloquium of the PhD student's supervisor's working group (<i>colloquium</i>) <i>Inhalt:</i> PhD students will present their research design progress and results at least twice in their supervisor's working group's PhD seminar. They will attend the other PhD students' presentations and comment and discuss their presentations. | 2 SWS |
| Prüfung: 1 presentation (about 30 minutes, not graded) Prüfungsvorleistung: 3 presentations (each of about 30 minutes, not graded) in both the RTG's and the respective PI's working group's PhD seminar Prüfungsanforderungen: regular attendance and active participation, very good knowledge of one's own research project | 4 C |

| | |
|--|---|
| Zugangsvoraussetzungen: Membership in RTG 2300 | Empfohlene Vorkenntnisse: none |
| Sprache: English/German | Modulverantwortliche[r]: Prof. Dr. Christian Ammer |
| Angebotshäufigkeit: Working groups' seminars every semester RTG PhD seminar every winter semester starting in 2017/18 | Dauer: 4 semesters |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 1 – 6 |
| Maximale Studierendenzahl: 15 | |

Bemerkungen:

| | |
|--|--------------|
| Georg-August-Universität Göttingen | 5 C 4 SWS |
| Modul C <i>International conference and lecture series</i> <i>English title: International conference and lecture series</i> | |

| | |
|--|-----------------------------------|
| Lernziele/Kompetenzen: PhD students <ul style="list-style-type: none"> - have built an international network with other researchers - can present and defend their research results in front of an international audience in a systematic way - can optimize and adjust their research by integrating the feedback of international scholars - have competences in organizing stays of visiting scholars and conferences - can chair other scientists' talks and the subsequent discussions - enlarge their knowledge on most current research results - have identified and are in contact with potential employers | Arbeitsaufwand: 150 |
|--|-----------------------------------|

| | |
|---|-------|
| Lehrveranstaltung: Lecture Series (compulsory) <i>Inhalt:</i> PhD students will invite at least one visiting scholar, prepare her/his stay, introduce her/him to the group and chair his/her talk in the RTG lecture series. They will furthermore organize the RTG symposium at the end of the three-years funding period. and International Conference (optional compulsory) | 2 SWS |
|---|-------|

| | |
|--|--|
| <p><i>Inhalt:</i> PhD students will present their work at least at one international conference.</p> <p>or</p> <p>Potential employer presentation (optional compulsory)</p> <p><i>Inhalt:</i> PhD students will present themselves during a meeting with potential employers. They are free to choose any suitable format (presentations and poster sessions, world-coffee or round table talks, joint workshop with the employers etc.).</p> | |
|--|--|

| | |
|--|-----|
| <p>Prüfung (not graded): presentation of 30 minutes (not graded) at an international conference or in a meeting with potential employers</p> <p>Prüfungsvorleistungen:</p> <p>Organization of a visiting scholars stay and a symposium</p> <p>Chairing a visiting scholar's talk</p> <p>Prüfungsanforderungen:</p> <p>PhD students</p> <ul style="list-style-type: none"> - have built an international network with other researchers - can present and defend their research result in front of an international audience in a systematic way - can optimize and adjust their research by integrating the feedback of international scholars - have competences in organizing stays of visiting scholars and conferences - can introduce visiting researchers to a group and chair other scientists' talks and the subsequent discussions - enlarge their knowledge on most current research results - have identified and are in contact with potential employers | 5 C |
|--|-----|

| | |
|--|---|
| Zugangsvoraussetzungen: Membership in RTG 2300 | Empfohlene Vorkenntnisse: none |
| Sprache: English / German | Modulverantwortliche[r]: Prof. Dr. Christian Ammer |
| Angebotshäufigkeit: Every 3 years starting in 2018 | Dauer: 5 Semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 2 – 6 |
| Maximale Studierendenzahl: 15 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|---|---|
| <p>Georg-August-Universität Göttingen</p> <p>Modul D1 Ecology of mixed forests and methods of ecophysiological research on trees <i>English title: Ecology of mixed forests and methods of ecophysiological research on trees</i></p> | <p>2 C</p> |
| <p>Lernziele/Kompetenzen: The students get familiar with basics on mixed forest stands such as the diversity-productivity relationship and its variation in space and time. The students will also get to know various ecophysiological methods related to tree growth, water consumption, nutrient uptake etc.</p> | <p>Arbeitsaufwand:</p> <p>60 Stunden</p> <p>Präsenzzeit:</p> <p>30 Stunden</p> <p>Selbststudium:</p> <p>30 Stunden</p> |
| <p>Lehrveranstaltung:</p> <p><i>Lecture:</i> Ecology of mixed forests and methods of ecophysiological research on trees</p> <p><i>Inhalte:</i> Ecological and physiological processes, stand dynamics, gas exchange, sap-flow, water-use efficiency, root dynamics</p> <p><i>Literatur:</i> Leuschner, Ellenberg (2017) Ecology of Central European Forests. Springer Nature, Cham.</p> <p>Pretzsch, Forrester, Bauhus (eds) (2017): Mixed-species forests. Ecology and Management, Springer.</p> <p>Von Willert, Matyssek, Herppich (1995): Experimentelle Pflanzenökologie. Grundlage und Anwendungen. Georg Thieme Verlag</p> | <p>2 SWS</p> |
| <p>Prüfung: <i>Presentation of 20 minutes</i></p> <p>Prüfungsanforderungen: The students demonstrate their ability to present the methods and results of a scientific paper thereby demonstrating their ability to critically discuss the novelty and the potential limitations of the study.</p> | |
| <p>Zugangsvoraussetzungen: membership in RTG 2300</p> | <p>Empfohlene Vorkenntnisse: none</p> |
| <p>Sprache: English</p> | <p>Modulverantwortliche[r]: Prof. Dr. Christoph Leuschner</p> |

| | |
|---|---|
| Angebotshäufigkeit: every three years starting in summer term 2019 | Dauer: 1 semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 2 or 4 |
| Maximale Studierendenzahl: 15 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|--|-----|
| Georg-August-Universität Göttingen | 2 C |
| Modul D2 Concepts and tools for collecting and analyzing spatial data in animal ecology <i>English title:</i> Concepts and tools for collecting and analyzing spatial data in animal ecology | |

| | |
|---|------------------------------|
| Lernziele/Kompetenzen: | Arbeitsaufwand: |
| This module will enable students to gather, handle, analyze and interpret data for various research questions related to spatial animal ecology. For this, the module will first cover the most important theories, concepts and methods for sampling and analyzing spatial animal data. These topics will then be illustrated through practical analytical exercises and finally applied to the students' own data, or data provided to them by the lecturers. | 60 Stunden |
| | Präsenzzeit: 19 Stunden |
| | Selbststudium: 41 Stunden |

| | |
|---|--|
| Lehrveranstaltung: Lecture, exercise and seminar (block) | |
| Lecture: Introduction to spatial data and analyses in animal ecology | |
| Overview of most important theories and concepts in spatial (animal) ecology, summary of data types, how to sample them and methodological approaches to analyze them. | |
| Exercise: Introduction to spatial data analysis in R | |
| Hands-on exercises in R to demonstrate the concepts, data and methods covered in the lecture. | |
| Seminar: Applying and evaluating spatial analytical tools in animal ecology | |
| Application and discussion of concepts and tools covered in 1.) and 2.) and critical review of their advantages and limitations for the student's own data and research questions | |

| | |
|---|--|
| Prüfung: Written assignment: Report of max. 10 pages | |
| Prüfungsanforderungen: Understanding of basic theories and concepts in spatial (animal) ecology; general knowledge of data types, sampling procedures and analytical approaches for spatial data; basic abilities in using the statistical software environment <i>R</i> to handle, manipulate and analyze spatial ecological data; PhD students write a report on their analyses including a critical evaluation of the utilized data, tools and results | |

| | |
|--|--|
| Zugangsvoraussetzungen: membership in RTG 2300 | Empfohlene Vorkenntnisse: none |
| Sprache: English | Modulverantwortliche[r]: Prof. Dr. Niko Balkenhol |
| Angebotshäufigkeit: every three years starting in winter semester 2017/18 | Dauer: 1 semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 1 or 3 |
| Maximale Studierendenzahl: 5 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|---|--------------|
| Georg-August-Universität Göttingen | 2 C 2 SWS |
| Modul D3 <i>Use of stable isotope technologies in forest ecosystem research</i> <i>English title: Use of stable isotope technologies in forest ecosystem research</i> | |

| | |
|---|--|
| Lernziele/Kompetenzen: PhD students <ul style="list-style-type: none"> - acquire knowledge of the chemical and physical background for advanced field and laboratory applications of stable isotopes in forest ecosystem research - have expertise in the evaluation of natural occurring or experimentally applied stable isotopes of H, C, N, O and S, focusing on soil science, plant physiology and food web processes - improve their review capacity by evaluating published studies on stable isotope issues. | Arbeitsaufwand: 60 Stunden |
|---|--|

| | |
|--|-------|
| Lehrveranstaltung: Seminar: Use of stable isotope technologies in forest ecosystem research | 2 SWS |
|--|-------|

| | |
|--|--|
| <p>Inhalte: In the seminar chemical and physical background for stabile isotope applications in natural science are introduced. Students will present and review their own experimental approaches and data sets as well as reviewing published studies on in situ stable isotope applications.</p> | |
| <p>Prüfung: Presentation (15 minutes) and written draft (10 pages).</p> <p>Prüfungsanforderungen: PhD students have an understanding of the chemical and physical background for advanced field and laboratory applications of stabile isotopes in forest ecosystem research. They have expertise in the evaluation of natural occurring or experimentally applied stable isotopes.</p> | |

| | |
|--|--|
| Zugangsvoraussetzungen: membership in RTG 2300. Other PhD students can be admitted if free places are available | Empfohlene Vorkenntnisse: advanced knowledge in biogeochemistry |
| Sprache: English | Modulverantwortliche[r]: Dr. Jens Dyckmans |
| Angebotshäufigkeit: every three years starting in semester WS 2018/19 | Dauer: 1 semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 1 or 3 |
| Maximale Studierendenzahl: 15 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|---|--------------|
| Georg-August-Universität Göttingen | 2 C 2 SWS |
| Modul D4 <i>Molecular methods in ecology</i> <i>English title: Molecular methods in ecology</i> | |

| | |
|---|--------------------------------------|
| Lernziele/Kompetenzen: PhD students will acquire a deepened knowledge on and competence in <ul style="list-style-type: none"> - workflow for molecular sample analyses - DNA extraction - barcoding - sequence analysis | Arbeitsaufwand: 60 Stunden |
|---|--------------------------------------|

| | |
|---------------------------|--|
| Lehrveranstaltung: | |
|---------------------------|--|

| | |
|--|--|
| Seminar with practicals: Molecular methods in ecology <i>Inhalte:</i> In this course, PhD students obtain a list of literature to prepare themselves for practical work. They draft a work flow for molecular sample analysis. In the practical part, the PhD students learn to extract environmental samples and produce clean DNA, barcode it and analyze sequences. | |
| Prüfung: Presentation of 20 minutes Prüfungsanforderungen: PhD students can draft a workflow for molecular sample analyses and are familiar with the extraction of environmental samples and can produce clean DNA, barcode it and analyze sequences | |

| | |
|--|---|
| Zugangsvoraussetzungen: membership in RTG 2300. Other PhD students can be admitted if free places are available | Empfohlene Vorkenntnisse: MSc and basic knowledge in ecology |
| Sprache: English | Modulverantwortliche[r]: Prof. Dr. Andrea Polle |
| Angebotshäufigkeit: every winter semester | Dauer: 1 block in winter semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 1 or 3 |
| Maximale Studierendenzahl: 4 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|---|-----|
| Georg-August-Universität Göttingen | 2 C |
| Modul D5 <i>Statistical modelling and advanced regression analyses</i> <i>English title:</i> Statistical modelling and advanced regression analyses | |

| | |
|---|--------------------------------------|
| Lernziele/Kompetenzen: The PhD students are familiar with various types of advanced regression models and possibilities to identify the most appropriate model for a given research question. They can apply the chosen model in the statistical software R, check the adequacy and validity of the model, and interpret the results they have achieved. | Arbeitsaufwand: 60 Stunden |
|---|--------------------------------------|

| | |
|--|-------|
| Lehrveranstaltung: Lecture: Statistical modelling and advanced regression analyses <i>Inhalte:</i> Generalized linear models, mixed models, spatial regression models, generalized additive models, quantile regression, Bayesian and likelihood-based inference, | 2 SWS |
|--|-------|

| | |
|--|--|
| structured additive regression <i>Literatur:</i> Fahrmeir, Kneib, Lang, Marx (2013): Regression – Models, Methods and Applications, Springer. | |
| Prüfung: <i>Presentation of 20 minutes</i> Prüfungsanforderungen: The students demonstrate their ability to choose, apply, check and interpret advanced regression modelling techniques in a scientific project. The results of their statistical analyses are presented in a final colloquium where the students also demonstrate their ability to discuss their results with their fellow students. | |

| | |
|--|--|
| Zugangsvoraussetzungen: membership in RTG 2300 | Empfohlene Vorkenntnisse: none |
| Sprache: English | Modulverantwortliche[r]: Prof. Dr. Thomas Kneib |
| Angebotshäufigkeit: every three years starting in the winter term 2018/19 | Dauer: 1 semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 1 or 3 |
| Maximale Studierendenzahl: 15 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|--|-----|
| Georg-August-Universität Göttingen Modul D6 <i>Applied programming of forest growth and yield modelling in Java</i> <i>English title: Applied programming of forest growth and yield modelling in Java</i> | 2 C |
|--|-----|

| | |
|--|--|
| Lernziele/Kompetenzen: PhD students <ul style="list-style-type: none"> - have knowledge in object-oriented programming using Java language - have competences in programming of forest growth and yield modelling | Arbeitsaufwand: 60 Stunden Präsenzzeit: 24 Stunden Selbststudium: 36 Stunden |
|--|--|

| | |
|---|-------|
| Lehrveranstaltung: Seminar: Applied programming of forest growth and yield | 2 SWS |
|---|-------|

| | |
|---|--|
| modelling in Java <i>Inhalte:</i> Introduction into object-oriented programming using Java language. Syntax, structured programming and program design are explained in application-oriented examples. For each learning unit the students have to fulfill a hands-on assignment in order to implement algorithms in operating computer code. The course requires a high amount of time to solve the assignments in addition to the presence during the lectures. | |
| Prüfung: written assignment of max. 20 pages (not graded) Prüfungsanforderungen: PhD students have competences in object-oriented programming using Java language. They can implement algorithms in operating computer code. PhD students have developed and presented their own programming project. | |

| | |
|---|--|
| Zugangsvoraussetzungen: membership in RTG 2300 | Empfohlene Vorkenntnisse: basic computer skills |
| Sprache: English | Modulverantwortliche[r]: Prof. Dr. Jürgen Nagel |
| Angebotshäufigkeit: summer semester 2018 | Dauer: 1 semester |
| Wiederholbarkeit: | Empfohlenes Fachsemester: 2 to 4 |
| Maximale Studierendenzahl: 25 | |

| |
|---------------------|
| Bemerkungen: |
|---------------------|

| | |
|--|-----|
| Georg-August-Universität Göttingen | 2 C |
| Modul E <i>Data management with BExIS</i> <i>English title: Data management with BExIS</i> | |

| | |
|---|--|
| Lernziele/Kompetenzen: | Arbeitsaufwand: |
| PhD students <ul style="list-style-type: none"> - learn and understand the FAIR data principles (https://www.force11.org/group/fairgroup/fairprinciples) - learn and understand basic curation tasks against the background of the data life cycle (data management planning, documentation, preservation, data publication and licenses) - understand purpose, types, and application of metadata and data standards - learn the structure of a dynamic web based data repository | 60 Stunden Präsenzzeit: 50 Stunden Selbststudium: 10 Stunden |

| | |
|---|--|
| <ul style="list-style-type: none"> - understand the “Biodiversity exploratories Information System (BExIS)” - know how to integrate BExIS with local tools or workflows - know how to manage and share data with the BExIS adaptation used in the RTG | |
| <p>Lehrveranstaltung: Seminar: Data management with BExIS</p> <p><i>Inhalt:</i></p> <p>The aim of this workshop style course is to introduce the FAIR data principle and embed resulting curation tasks into research workflows. One focus will be on data sharing and the role of data documentation and the role of respective repositories using the example of BExIS.</p> | |
| <p>Prüfung: presentation of 20 minutes and written outline (max. 5 pages)</p> <p>Prüfungsanforderungen:</p> <p>PhD students</p> <ul style="list-style-type: none"> - understand the structure of a dynamic data repository in particular the “Biodiversity exploratories Information System (BExIS)” - know how to manage and share their data with the BExIS adaptation used in the RTG - know how to meet FAIR based curation requirements with BExIS and desktop or web-based tools | 2 C |
| <p>Zugangsvoraussetzungen: Membership in RTG 2300</p> | <p>Empfohlene Vorkenntnisse: none</p> |
| <p>Sprache: English</p> | <p>Modulverantwortliche[r]: Dr. Jens Nieschulze</p> |
| <p>Angebotshäufigkeit: Every three years starting in WS 2018/19</p> | <p>Dauer: 1 semester</p> |
| <p>Wiederholbarkeit:</p> | <p>Empfohlenes Fachsemester: 1 – 4</p> |
| <p>Maximale Studierendenzahl: 15</p> | |
| <p>Bemerkungen:</p> | |