

# Overview on the Austrian Higher Education System at Doctoral Study level, with special emphasis on the doctoral programs at the University of Natural Resources and Life Sciences, Vienna, Austria (BOKU)

Margarita Calderón-Peter, Katarzyna Retzer, Elnaz Ebrahimi and Hans-Peter Kaul, 18 Aug. 2015 with updates Sept. 2016

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## 2 Introduction

This document is prepared in the framework of the TEMPUS Project “RODOS – Reform of Doctoral Studies in Serbia (544093-TEMPUS-1-2013-1- RS - TEMPUS-SMGR-2013-5028/001-001)”, to summarize the presentations given on the occasion of the visit of the RODOS-project delegation to BOKU Vienna in December 2014 and to prepare for the next project meeting in Crete in September 2015. **It was updated with recent changes for the meeting in Crete in September 2016.**

The objective is to present the Austrian regulations for Doctoral education in general, and to inform about the different Doctoral study programs offered at BOKU, putting particular emphasis on the administrative aspects of the development and implementation of study programs at BOKU.

## 3 Overview on the Austrian Higher Education System and legal framework for Austrian universities

Higher education in Austria starts after school-leaving exams (12 years of primary and secondary education, starting at the age of 6). In 2002, Austria has adopted a new University Law introducing also the Bologna System. The majority of Austrian universities has established 3 year Bachelor's, 2 year Master's and 3 year Doctoral study programs.

The Austrian University Act of 2002 gives full autonomy to the Austrian Universities for establishing curricula (UG 2002 §25 (1) Z 10)<sup>1</sup>. Contrarily to Austrian Universities of Applied Sciences (*Fachhochschulen*) which have to follow accreditation procedures for their study programs, the Austrian universities have full autonomy to develop new curricula, although the yearly performance contract negotiations with the Federal Ministry of Science, Research and Economy of course also include discussions about the existing and newly planned curricula.

Access to university studies is regulated by law (UG 2002, §64); only a few study programs (like pharmacy, architecture, biology/biochemistry, IT, economics, medicine, music and arts) are allowed to have entrance exams in specific cases (UG 2002 §14h), all other universities have to accept every applicant that meets the admission requirements.

Tuition fees at Austrian universities are also prescribed by law, and do not cover the real costs of education: According to UG 2002 §91, the tuition fees per semester are 363.36 € for EU students and 726.72 € for Third-Country-Students. Several exemptions of tuition fees apply, so that the majority of students does only pay the additional 18.70 € fee for the student union membership and insurance against accidents and for civil liability.

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<sup>1</sup> <http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20002128> – for an English translation of the University Act, please check the website [http://www.ris.bka.gv.at/Dokumente/ErV/ERV\\_2002\\_1\\_120/ERV\\_2002\\_1\\_120.pdf](http://www.ris.bka.gv.at/Dokumente/ErV/ERV_2002_1_120/ERV_2002_1_120.pdf)

The possible degrees that can be awarded are also listed in the University Act (UG 2002, § 51), however, the university can decide which of the degrees listed shall be awarded for each specific study program offered.

At universities, it is the Senate who has the power to decide about the curricula content (= entry qualifications expected, course structure and content, exam regulations, degree awarded) and the Rectorate who is in charge of taking the decision on whether or not a study program can be financed and established, as well as in charge of deciding on the final admission of each applicant.

### **3.1 Salzburg Principles and their implementations**

The Salzburg Principles build bridges between the European Research Area (ERA) and the European Higher Education Area (EHEA). The Salzburg Principles are an enhancement of the Bologna process, which was settled by the EHEA, whereby Education Ministers from 29 European countries in 1999 contributed to raise quality of the higher education system. To draft the Salzburg Principles already 48 Universities from 25 countries contributed 2005 in Salzburg. It was followed by the Salzburg II initiative 2010, to specify the optimization process, after 185 universities belonging to the Council for Doctoral Education of the European Association of Universities (EUA) had been consulted to evaluate the implementation of the ten principles. Finally in 2011 the evaluations led to seven principles of Innovative Doctoral Training.

Over the years so-called doctoral schools were founded, following the original ten principles, to allow a high quality and guided education of the PhD students, leading away from a school type education system towards raising qualified, well trained young researchers. Moreover the European Charter for Researcher and The Code of Conduct for the Recruitment of Researchers were developed, with the focus to form the PhD students as young researchers, which are able to work at the end independently.

Main achievements of the Salzburg Principles were to change the status of the PhD students from student to employee, whereon the term young researcher was defined. For this reason the PhD students are encouraged to develop more independently as researcher and start early to exchange their experience with the scientific community, to ensure a higher level of training but on the other hand to control the level of research and teach them good practice of working. With the status of an employee also the funding was determined, in general three years should be guaranteed, some PhD schools enable even four years, to finish a project and publish and thereby establish a significant reputation. Furthermore the demand for tighter supervision was described and the importance of mobility as early possible during the PhD studies.

Summarized the young researchers have the opportunity for individual development by carrying out project based, own research and thereby they will learn good practice under the guidance of experienced researchers.

### **3.1.1 Examples for PhD schools in Austria outside BOKU**

#### **3.1.1.1 IST Austria International PhD Program<sup>2</sup>**

The main difference at the Institute of Science and Technology Austria (IST Austria) to the majority of PhD schools is the funding period of 4 -5 years, depending if the students enter after Bachelor or Master Studies. The PhD students obtain employment contracts at the IST Austria and receive an internationally competitive salary. The contracts can be extended by one additional year if satisfactory progress was achieved. The PhD students must apply for the position and are selected by a committee consisting of professors of IST Austria according to their academic and research performance, which must be confirmed by three referees.

The PhD program is divided into a phase before and after the qualifying exam, whereby students with a Bachelor degree have two years and with a Master degree one year to choose a research group. During the first phase the students must do four rotations with three different professors for two month each and before they start with they own research they must pass a qualifying exam.

#### **3.1.1.2 University of Vienna: uni:docs fellowship**

The uni:docs fellowship program is an individual scholarship which aims at financing excellent doctoral candidates for a period of three years to focus exclusively on their research. The fellowship is awarded on the basis of a multilevel review process to support highly qualified, selected PhD students at the University of Vienna.

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<sup>2</sup> <https://ist.ac.at/graduate-school/>

### 3.2 uniko<sup>3</sup> - UNIVERSITIES AUSTRIA/ ÖSTERREICHISCHE UNIVERSITÄTENKONFERENZ

uniko alias Universities Austria/ ÖSTERREICHISCHE UNIVERSITÄTENKONFERENZ is a non-profit association that assists the Austrian universities in the fulfilment of their tasks and responsibilities. Universities Austria is funded through membership fees, paid by the contributing 21 public Austrian universities. The fees are graded according to the size of the institutions. One of six policy committees<sup>4</sup> deals with the improvement of Austrian and European higher education and the implementation at the contributing universities. A general guideline for the training of PhD students in Austria was summarized in the so-called Code of Conduct, which lists the minimal requirements for the completion of the doctoral thesis. Accordingly, especially mandatory is the early submission of a dissertation proposal during the first academic year. Another important aspect is that the PhD student is guided by a committee through the study, the Advisory Team, which appraises the progress at yearly meetings. Further the rules for the review of the written thesis and the requirements for the oral defense were defined, they are summarized under 4.4. Mentioned should be at this point that at least one reviewer of the written thesis must not belong to the supervisor's department.

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<sup>3</sup> <http://www.uniko.ac.at/>

<sup>4</sup> <http://www.uniko.ac.at/arbeitsbereiche/lehre/schwerpunkte/>

## 4 Doctoral Studies at the University of Natural Resources and Life Sciences, Vienna, Austria (BOKU)<sup>5</sup>

### 4.1 Historic overview

Founded in 1872, the University of Natural Resources and Life Sciences, Vienna, was awarded the right to confer doctoral degrees in 1906. Ever since then, BOKU has followed the Humboldt ideal of research-based teaching. All study programs offered at BOKU (particularly at Bachelor and Master level) include the “three pillars” of technical sciences, natural sciences, and socio-economic sciences in order to allow our graduates to meet the challenges of a globalized world. To strengthen the role of the “three pillars” in the doctoral studies, a new course was introduced in 2016 as compulsory for all PhD students entitled “Principles and challenges of research in socio-economics, natural resources and life sciences” at 4 ECTS credits.

In its doctoral studies, BOKU’s mission is to provide training and support of early stage researchers by offering “advanced education for the ability to perform independent scientific projects”.

BOKU has adopted the Bologna study structure in the academic year 2003/04, when it introduced 3-year Bachelor, 2-year Master and 3-year Doctoral studies, expressed in ECTS (European Credit Transfer System). A full student workload comprises 30 ECTS per semester and 60 ECTS per year (1 ECTS = 25 working hours for the student; therefore one academic year means 1500 hours (each: 60 minutes) workload).

### 4.2 Curricula organization – relevant bodies at BOKU

According to the University Act 2002, BOKU’s senate has established a Senate’s Study Commission that prepares all Senate’s decisions concerning curricula. This Senate’s Study Commission has different subgroups according to the broad thematic areas covered by BOKU curricula.

One of these subgroups is the Commission of doctoral studies. It consists of 6 University professors, 6 senior scientists and 6 students, and has the following tasks:

- Approval and quality check of new Doctorate/PhD Programs
- Development and adjustment of corresponding guidelines and regulations
- Advice for the Senate and Rectorate in issues on doctoral studies
- Information/advice for teaching staff and administrative personnel

### 4.3 Current Doctoral programs offered at BOKU

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<sup>5</sup> Presentation of Ao.Univ.Prof.DI Dr. Marie-Theres Hauser, Head of the Commission on Doctoral Studies, on “Doctoral Programs at the University of Natural Resources and Life Sciences, Vienna (BOKU)” for the RODOS delegation in December 2014

BOKU offers two different general tracks of Doctoral studies (that allow for flexible studies based on individual interests) and 2 Doctoral schools (with clearly defined courses to be taken by a group of students who then work individually on their thesis topic).

**The general tracks of BOKU's doctoral studies include:**

- a) **Doctoral studies of Natural Resources and Life Sciences**, finishing with the degree "Dr.nat.techn."  
(<http://www.boku.ac.at/en/lehre/studabt/studien/doktoratsstudien/h788/?selectedTypes=&selectedTGs=&selectedOEs=> )
- b) **Doctoral studies of Social and Economic Sciences**, finishing with the degree "Dr.rer.soc.oec."  
(<http://www.boku.ac.at/en/lehre/studabt/studien/doktoratsstudien/h784/?selectedTypes=&selectedTGs=&selectedOEs=> )

Both Doctoral studies comprise a total of 180 ECTS, of which a minimum of 20 ECTS has to be completed by taking courses which are pre-defined at the beginning of the individual studies in a joint decision of the student and its supervisors. 12 out of these 20 ECTS have to be specific for the individual thesis topic, the others can be more general. One lecture was recently introduced as mandatory for all students, "Principles and challenges of research in socio-economics, natural resources and life sciences (4 ECTS)"<sup>6</sup>. The past admission requirement at BOKU was based on "3 pillars", i.e. natural sciences, technology and socio-economics, and should enable a broad education. Whereas doctoral studies tend to be more specialized nowadays this approach turned out to be a competitive disadvantage for BOKU, but still the values of the "3 pillars" shall be passed on to the students by this new course.

**Admission** to doctoral studies at BOKU requires completion of at least 300 ECTS finishing with a Master degree or equivalent of an accredited Austrian or international university (usually 180 ECTS at Bachelor level and 120 ECTS at Master level); preliminary approval of a BOKU scientist **with *venia docendi*** willing to supervise the thesis and further documents as described on the website <http://www.boku.ac.at/en/lehre/studabt/themen/zulassung/internationale-vorbildung/doktorats-phd-studien/> (e.g. students from abroad must show proof of being entitled to start doctoral studies in their home country).

The admission office of the student services verifies the diplomas presented and the 300 ECTS, the BOKU scientific program co-ordinator checks the equivalence. If the equivalence of the previous studies is not fully given, the rectorate is allowed to require additional examinations **up to maximum 60 ECTS** that need to be taken in the course of studies.

The **two BOKU doctoral schools** are:

- a) **BioToP (Biomolecular Technology of Proteins)**, finishing with the degree "Ph.D."  
(<http://www.boku.ac.at/en/lehre/studabt/studien/doktoratsstudien/h794755/?selectedTypes=&selectedTGs=&selectedOEs=> )  
In this program a minimum of 42 ECTS out of the 180 ECTS has to be taken as courses. It is funded by the Austrian Science Fund (FWF)
- b) **IGS NanoBio (International Graduate School Nano-Biotechnology)**, finishing with the degree "Ph.D.", offered as joint degree by Nanyang Technological University Singapore and BOKU Vienna

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<sup>6</sup>[http://www.boku.ac.at/fileadmin/\\_/mitteilungsblatt/MB\\_2014\\_15/MB18/BOKU\\_Studienplan\\_Doktorat\\_Bodenkultur\\_2015.pdf](http://www.boku.ac.at/fileadmin/_/mitteilungsblatt/MB_2014_15/MB18/BOKU_Studienplan_Doktorat_Bodenkultur_2015.pdf)

<http://www.boku.ac.at/en/lehre/studabt/studien/doktoratsstudien/h794760/?selectedTypes=&selectedTGs=&selectedOEs=> )

**Admission** to the two doctoral schools is also based on the **(minimum)** admission requirements listed above, but in addition, specific consortia rules apply.

#### 4.4 Doctoral project, timeline, “rigorosum” / thesis defence

Within one year after admission, a research project **(max. 5 page)** has to be submitted consisting of

- Doctoral thesis subject, **including preliminary title, draft of contents, objectives, research questions and hypotheses, theory, state of the art, scheduled methods, key references**
- Name of supervisor with *venia docendi* or similar qualification
- Working plan approved by the supervisor
- Advisory team with at least one other scientists with *venia docendi*. **It must consist of minimum three persons with a related doctorate. Members can later be reviewers or examination committee members. The student has to report his/her progress to the team yearly in writing and to save this report and any comments or replies, supplying a copy to the supervisor.**
- Time schedule
- Financial/resource plan, **which has to be accepted by the management of the department (Heads of department and sub-division).**
- Proposal for 20 (or more) ECTS courses, approved by the supervisor **and reviewed by the scientific program co-ordinator. They can be taken at any university worldwide. The course “Principles and challenges of research in socio-economics, natural resources and life sciences” (4 ECTS) is compulsory. Further restrictions are: no bachelor level courses or courses at Universities of Applied Sciences, max. 10 ECTS with the supervisor, max. 2 ECTS doctoral seminar, no language courses, no excursions, max. 3 ECTS soft skill training.**

This research project is authorized by the Dean of Studies. **At least one** advisory team member with *venia docendi* should ideally be from a different BOKU department. The supervisor must not evaluate the thesis<sup>7</sup>; this is done by two independent reviewers.

The timeline for doctoral programs at BOKU is as described in Figure 1:

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<sup>7</sup>Presentation of Ass.Prof. Dr. Monika Sieghardt, Bologna-contact person of BOKU, on “Bologna at BOKU - implementation, ongoing accomplishments” for the RODOS delegation in December 2014



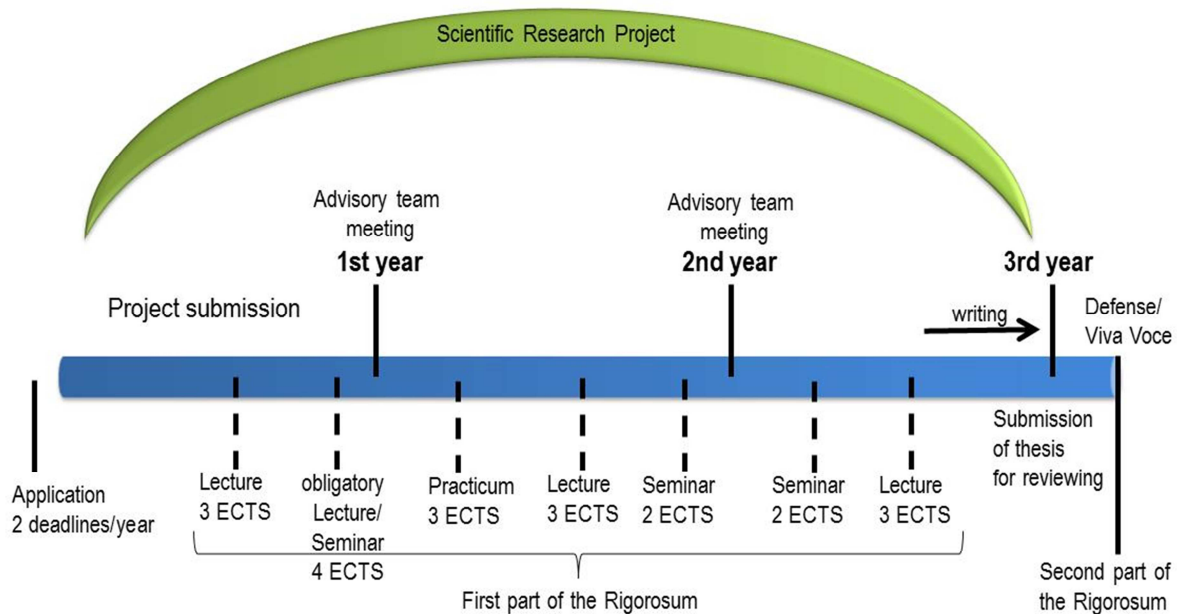


Figure 1: Timeline of Doctoral programs<sup>8</sup>

The doctoral thesis (Dissertation) is an independent scientific research work on a specific topic, that

- Must belong to a scientific subject represented by a BOKU professor **and must be related to one of BOKU's "fields of competence"**
- Can be either a monography or a cumulative thesis (with min. 2 accepted publications as first or equally contributing author in a journal with impact factor (according to Web of Science™); with a general introduction and discussion of the subject)
- **Must be written in either German or English**
- Can be carried out in a joint doctoral project, but the performance of each student needs to be judged separately.

The final version of the thesis is submitted to the Dean of studies. Two reviewers (**with thorough knowledge of the thesis subject**, not the supervisors **and they also must not be co-authors of papers relevant for the thesis**; one of the reviewers can belong to the supervisor's department, **the other must not be BOKU member**) propose the grading. If one of the reviewers gives a negative mark, a third reviewer needs to check the thesis.

The "Rigorosum" (doctoral exam) consists of two parts: the first part comprises the min. 20 ECTS coursework. The second one is the public viva voce exam (defence, **in German or English**), carried out by two examiners and one chair. **All members have to hold a venia docendi**. The advisor may serve as an examiner but not as a reviewer. **One member must belong to a different department than the supervisor or a different university**. The results of the **complete PhD exam defence** are "With distinction", "Pass" or "Fail" **and include the individual marks for both parts of Rigorosum (courses and defence, each weighted 0.25) plus the mark for the thesis (weighted 0.5)**.<sup>9</sup> **The decision on the defence shall be based on the following criteria:**

<sup>8</sup>Presentation of Ao.Univ.Prof.DI Dr. Marie-Theres Hauser, Head of the Commission on Doctoral Studies, on "Doctoral Programs at the University of Natural Resources and Life Sciences, Vienna (BOKU)" for the RODOS delegation in December 2014

<sup>9</sup>Presentation of Ao.Univ.Prof.DI Dr. Marie-Theres Hauser, Head of the Commission on Doctoral Studies, on "Doctoral Programs at the University of Natural Resources and Life Sciences, Vienna (BOKU)" for the RODOS delegation in December 2014

presentation proficiency, ability to explain the work, knowledge in thesis subject and related fields, ability to answer questions, discussion skills, convincing replies to reviewer criticism.

## 5 Funding

PhD students can obtain their salary either over third party funded research projects or they can apply for an individual fellowship.

### 5.1 Austrian funding of PhD students

#### 5.1.1 Third party funded research

- The Ministry of Science, Research and Economy (BMWFW) and the Ministry of Transport, Innovation and Technology (BMVIT) support the main funding agencies in Austria. On one hand the Austrian Science Fund (FWF, funded by BMWFW) supports mostly basic research, whereas the Austrian Research Promotion Agency (FFG, funded by BMVIT and BMWFW) provides funds dedicated mainly to applied research and thematic oriented research and development (R&D) programs<sup>10</sup>.

FWF<sup>11</sup> and FFG<sup>12</sup> impart third party funding to cover the expenses of research projects. PhD students work as financed project team members of a research group that obtained such a grant and are employed at the university, the contract period can differ according the agreement between the PhD student and the supervisor. Further conference expenses and research stays abroad in collaborating international institutions can be also funded.

- Further third-party funding for research groups can be obtained from the Vienna Science and Technology Fund (WWTF, Wiener Wissenschafts-, Forschungs- und Technologiefonds)<sup>13</sup> and the Christian Doppler Research Association<sup>14</sup>. The WWTF is a non-profit organisation established to promote science and research in Vienna, with a focus on young researchers. The Christian Doppler Research Association supports application-orientated basic research through two programs: the Christian Doppler Laboratories at universities and non-university research institutions and the Josef Ressel Centres at Universities of Applied Sciences. **In many cases the funding is not available at the desirable level (i.e. full time for min. 3 years) but only in reduced amount.**

#### 5.1.2 BOKU – PhD School BioToP

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<sup>10</sup> [http://www.parlament.gv.at/PAKT/EU/XXV/EU/03/78/EU\\_37835/imfname\\_10493006.pdf](http://www.parlament.gv.at/PAKT/EU/XXV/EU/03/78/EU_37835/imfname_10493006.pdf)

<sup>11</sup> <https://www.fwf.ac.at/>

<sup>12</sup> <https://www.ffg.at/en/funding>

<sup>13</sup> <http://www.wwtf.at/index.php?lang=EN>

<sup>14</sup> <https://www.cdg.ac.at/en/>

The BioToP<sup>15</sup> (Biomolecular Technology of Proteins) is a PhD school offered by BOKU to enable inter- and multi-disciplinary research-based doctoral education. The PhD students are selected and employed as a research group member at BOKU. Additionally to the salary the BioToP covers conference expenses and research stays abroad in collaborating international institutions.

### 5.1.3 Individual Fellowship

The Austrian Academy of Sciences (ÖAW) offers the DOC fellowship<sup>16</sup> that must be requested by the potential PhD student. The funding covers the salary for three years and to receive the DOC grant the PhD student must be employed at BOKU. The DOC fellowship covers additionally 500 € per year for travel expenses.

### 5.1.4 New BOKU doctoral schools

BOKU wants to strengthen its PhD studies and plans for internal calls for proposals to establish specific doctoral schools in various scientific BOKU fields of competence. The government has allocated some budget for that project. These schools shall be supported by the university in administrative issues and for newly designed courses, but no scholarships or funds for students or other project costs are expected. The first call shall be issued in autumn 2016, the rules and requirements for funding in detail are still under negotiation among the university management panels.

### 5.1.5 Alternative sources of funding

More people want to complete a dissertation than funding is available. Therefore some students decide either to work as scientific staff members, e.g. as a technician funded over above-mentioned third party funding, or accept part-time contracts and others are even forced to work elsewhere. All these circumstances can lead to extended duration and may affect the quality of the dissertation.

## 5.2 EU funding

Horizon 2020<sup>17</sup> is an EU program to promote research and innovation from 2014 to 2020, with the aim to support the best researchers in Europe by providing them with grants. The European Research Council (ERC)<sup>18</sup> Grants support outstanding research group leaders and the Marie Skłodowska-Curie (MSC) Actions, which offer different programs, enable the funding for international research collaborations and scholarships.

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<sup>15</sup> <https://biotop.boku.ac.at/>

<sup>16</sup> <http://www.oeaw.ac.at/en/fellowship-funding/stipendien-preise/nachwuchsfoerderung-der-oeaw/>

<sup>17</sup> <http://ec.europa.eu/programs/horizon2020/>

<sup>18</sup> <http://erc.europa.eu/funding-and-grants>

PhD students can be funded on one hand over a grant obtained by the research group leader through the ERC, up to four years. On the other hand the PhD students can apply for positions funded by the Marie Skłodowska-Curie (MSC) Actions program “Innovative Training Networks”<sup>19</sup>. The ITN is a jointly requested grant, whereby six to ten partners, including one or two private sector partners, apply together. Only early-stage researchers as PhD students can be funded, whereby each application can support up to fifteen PhD students. Each partner can hire one to two students and the funding period lasts three years. The PhD students are employed at the university and conference expenses and research stays can be covered by the grants.

## 6 Implementation of the principles at BOKU

The PhD school “BioToP” was set up to enable the contributing PhD students to develop as independent researchers and network from the very beginning of their training. But the larger part of the PhD students at BOKU are not embedded in a PhD school and the implementation of the Salzburg Principles is taken differently serious by distinct supervisors. Therefore binding guidelines to ensure the individual development and to adjust the level of all PhD students at BOKU should be fixed. Unfortunately, few supervisors view their PhD students as cheap manpower but neglect their training towards independent researchers.

Two points of conflict between the supervisor and the PhD student occasionally occur: on one hand the funding in general and the financial and moral support to attend conferences and stays in collaborating research groups, and on the other hand the issue of publishing.

The financial aspect of attending conferences and research stays can be solved by requesting travelling grants, as provided by the ÖGMBT<sup>20</sup>, or the PhD student owns a scholarship that covers these expenses.

More important is that the supervisor has the responsibility to shape the PhD student to become an independent researcher, therefore the Advisory Team Meetings are important for the scientific development of the PhD student and should be mandatory. **Recently the responsibility of the advisory team was emphasized by introducing the requirement of a yearly written report.** Additionally the funding must be guaranteed for at least three years, and afterwards the PhD student must have the possibility to defend or if possible to be funded further by the supervisor. At this moment often the issue of publishing arises, because if the PhD student cannot be funded further and must leave without a publication his/her application for a Postdoc position turns out to be difficult. On the other hand, as research groups are funded mostly over third party funds, and to apply for them requires an outstanding publication record, the group leaders are more interested in publishing in higher ranked journals, which can take much longer than the guaranteed three years of a PhD salary. Therefore the advisory team may be very important by negotiating and keeping the PhD student focused on finalizing the research project. Further the creation of additional PhD schools may support the funding of PhD students, which would strengthen not only the training of outstanding young researchers but also support the research groups involved.

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<sup>19</sup> [http://ec.europa.eu/research/mariecurieactions/about-msca/actions/itn/index\\_en.htm](http://ec.europa.eu/research/mariecurieactions/about-msca/actions/itn/index_en.htm)

<sup>20</sup> <http://www.oegmbt.at/>

## **7 Conclusions**

Bologna Process implementation in 2004 addressed first the transformation of all study programs at BOKU into bachelor and master degree programs. Step by step during the recent years also the doctoral studies were adapted according the Salzburg Principles and Salzburg II. The main changes were the definition of an advisory team, the exclusion of the supervisor as a reviewer and that the resources must be guaranteed at least for three years. Further adaptations according national and international suggestions are continually considered. Quality assurance and funding are the strongest challenges.

The BOKU team of the RODOS project hopes that this summary provides helpful recommendations for the restructuring of the Serbian doctoral programs and looks forward to a successful continuation of the TEMPUS project.