

# Guide internships Bachelor Biomedical Sciences

**Radboudumc**

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## Introduction

This guide provides information for students and supervisors on the bachelor internships Biomedical Sciences. At the end of the bachelor each student will perform a research internship of 27 EC (MED-B3BOS). The internship is usually performed from February to July (a period of 20 weeks), and it includes participation in the bachelor congress in the last week of the academic year. During the internship, each student also participates in the scientific writing course MED-B3WR. During the internship period students work full time (36-40 hours a week).

## Definitions

Internship supervisor: The internship supervisor is a senior scientist or postdoc. He/she provides the means, both material and intellectual, to enable the student to carry out his/her research project. In particular, regular meetings are arranged with the internship supervisor to discuss progress. The internship supervisor will support the student, by giving feedback and asking the student to reflect on his/her progress in achieving the end/final qualifications that are to be expressed in the report.

Daily supervisor (optional): The daily supervision of an internship can be done by a postdoc or PhD student. Daily supervision should not be done by a technician.

Second assessor: Each internship report is assessed by a second assessor. This is an internship supervisor of another bachelor internship, or, in case of an internship abroad, it might be the Radboudumc supervisor. The second assessor is appointed on behalf of the Board of Examiners.

Monitoring by Board of Examiners: A representative of the Board of Examiners is in charge of the approval of the internship (before the start). The second assessor is appointed on behalf of the Board. The final grade (after the internship) is assigned on behalf of the Board. In case of a substantial discrepancy between first and second assessor, a representative of the Board of Examiners will be appointed as third assessor.

## Learning objectives

Assessment of the bachelor internships is performed according to the learning objectives that are formulated for the students' performance during the internship and the internship report. Prior to the start of the internship, student and supervisor should have a clear idea about the learning objectives and the skills that are to be mastered at the end of the internship. The learning objectives can be found in Appendix A.

Nowadays, researchers are obliged to have research data comply with the FAIR guidelines and compose a research data management plan. For students an e-learning has been developed to learn about these FAIR principles. Please complete this e-learning (available on Brightspace) early during the internship and in your report, you should include a reflection on the research data management within your internship.

In biomedical research, patient and/or stakeholder involvement and the societal impact of a project are becoming increasingly important and form an essential part of most grant applications. Therefore, involving a patient or stakeholder and making the research understandable for people outside the field of (bio) medical science is part of the internship. Please find further information and a roadmap in Appendix F.

## Research project

Bachelor internships are performed at a department of the Radboudumc or affiliated research groups. It is optional to perform a bachelor internship abroad, however in that case extra requirements apply (see Appendix B).

Students arrange the internship themselves. It is up to the student to identify suitable workplaces, contact potential supervisors, and negotiate the assignment. Of course, the student's coach is available for support and should be timely consulted if the student fails to arrange an internship. Tips and tricks to find an internship can be found in the dedicated Brightspace course. At the end of the research project the student writes a full report in the style of an article and gives an oral presentation on his/her work at the hosting department of the internship.

## Workplan

Once the research project and supervisor are arranged, the student prepares an internship description/workplan. Hereto, the student, in consultation with the internship supervisor, writes a workplan (please follow the link displayed in appendix C for the application form). After completion, the form has to be uploaded in Osiris Case. The description is automatically sent to the supervisor (PhD degree required\*) for digital approval. Subsequently, the workplan is checked for its quality by a representative of the Board of Examiners. The student should aim to have a workplan ready at the latest mid- January, but preferably before the Christmas holidays.

\*Not all supervisors are part of the pool of assessors yet. In case you receive the notification 'behandelaar heeft geen permissie voor deze zaak', we would like to urge you to send an email to [osiriscasesupport.rha@radboudumc.nl](mailto:osiriscasesupport.rha@radboudumc.nl) to enable uptake into the pool of assessors.

### **Supervision and guidance**

Practical research will be guided closely by the internship supervisor or daily supervisor during the research project. Consultation should be possible on a day-to-day basis. Weekly meetings with the internship supervisor are scheduled to discuss results and problems. Additionally, consultations with the student's coach or Radboudumc supervisor (in case of an internship abroad) are possible during the entire internship should problems arise. The student will be encouraged to use own initiative based on acquired knowledge to proceed.

For answers to general questions that cannot be found in this guide, the student can visit the walk-in consultation hours on Wednesdays (12-12:30h) from mid-November to mid-February. From mid-February onwards questions can be sent by mail to [femke.doubrava-simmer@radboudumc.nl](mailto:femke.doubrava-simmer@radboudumc.nl). If specific help is needed as to the patient involvement part, the student is requested to contact [studentmeetspatient@radboudumc.nl](mailto:studentmeetspatient@radboudumc.nl).

### **Guidelines report**

The internship must be concluded with a full report describing all the research that was performed in the training. The structure of the report follows the structure of an article, guidelines can be found in Appendix D. Please also read the section 'Feedback on the internship report' in the 'Information for supervisors' document on Brightspace. The student has to write the full report himself/herself based upon his/her own work and will be the only author of the report. It is not permitted to reuse text, which is checked by anti-plagiarism software. The scheduled internship period includes the writing of a full report. The almost-final version of the report should be submitted to the internship supervisor in time for proper assessment and to give students the possibility to include suggested improvements in the final internship report. The deadline for the almost-final version should be determined by the student and supervisor. The final internship report is handed in through Osiris Case and will be sent automatically to first and second assessor. Students should allow sufficient time for this assessment to occur.

### **Assessment**

The internship is assessed by the internship supervisor and a second assessor. The final assessment is based on:

- Professional attitude and activities during the internship judged by the internship supervisor (50%)
- Written report judged by the internship supervisor (20%)
- Written report judged by the second assessor (30%)

Digital assessment forms are available for the assessors (for examples see Appendix C). Internship supervisor and second assessor determine their grades independently. A third assessor is appointed once the grades for the written report of first and second assessor differ more than 1.5 point. If plagiarism is detected, the Board of Examiners will take appropriate actions. For non-Dutch supervisors and second assessors, a clarification of the Dutch grading system is provided in Appendix E. Excellent students may be nominated, by supervisor and the Board of Examiners for the Dr. J. Bex award, a yearly prize for the best BMS bachelor internship.

### **Bachelor congress**

At the end of June, in the "Afluitende onderwijs week" (AFW), all third years' bachelor students present their internship results at the bachelor congress. Students present their data in a poster presentation.

### **Course on *Scientific writing***

The internship students participate in a course on English scientific writing (Bachelor writing MED-B3WR). Students will follow this course next to their internship. The course will be given by an English teacher and, additionally to the lessons, homework assignments will be given.

### **Time schedule**

4 months before start:

- Student organises a suitable internship (subject, department and supervisor)

6 weeks before start:

- Student writes an internship workplan in consultation with the supervisor. The digital workplan is handed in for approval

Whole internship period:

- Internship supervisor/daily supervisor is available for the support of the student and organises weekly meetings with the student

Half-way during the internship:

- Student and internship supervisor reflect upon the progress and share feedback about the process (please use the 'mid-term feedback form' on Brightspace to guide your discussion)

Weeks before end:

- Student and supervisor plan a date for the final presentation at the hosting department
- Student and supervisor plan a date for handing in the almost-final version of the report for review.
- Student submits poster for publication in booklet of the Bachelor Congress

End:

- Student presents the internship results at the bachelor congress and at the hosting department
- Student uploads the final report in Osiris Case for assessment by supervisor and second assessor

**Please note:**

For graduation in the same academic year, all grades, including bachelor internship grades, have to be processed at least two weeks before the August meeting of the Board of Examiners. For information on the schedule of the meetings, please follow the link: <https://www.radboudumc.nl/onderwijs/doelgroepen/studenten/academisch-onderwijs/vergaderdata-examencommissies>

Students have to apply for admission to the graduation meeting at least four weeks before this meeting This can be done via this link:

<https://www.radboudumc.nl/onderwijs/doelgroepen/studenten/academisch-onderwijs/toetsing-en-examens-en-regelgeving-biomedische-wetenschappen>

## Appendix A Learning objectives BSc internship

### The student:

1. Is able to explain the goal and the relevance of the research
2. Is able to systematically review the literature and on this basis identify relevant information
3. Is able, under supervision, to formulate a hypothesis that is in line with prior knowledge and translate this into a relevant research question
4. Can, under supervision, develop an appropriate study design involving an experimental approach to answering the research question
5. Is able, under supervision, to plan, organize, and perform an empirical/experimental study
6. Is able to employ the experimental techniques necessary to obtain relevant data (if applicable)
7. Is able to analyze data systematically and interpret them in view of prior knowledge of working mechanisms involved
8. Demonstrates punctuality in presence, participates well, and shows commitment
9. Is able to work with persons enrolled in the study respectfully and productively (if applicable)
10. Is able to involve a suitable patient or stakeholder in the study to collect feedback on the research project in the light of societal impact
11. Conducts him-\herself properly in contact with other persons involved, particularly when it comes to teamwork and approaching stakeholders
12. Improves on independence, analytical skills, and problem-solving capacities.
13. Is able to give a brief oral presentation (in English) on his\her work and discuss his\her findings with peers
14. Is able to improve him-\herself on the basis of feedback and self-reflection

### The report:

1. Complies with academic standards concerning its contents, i.e.
  - a. Is well-structured
  - b. Includes a background explaining the problem definition and an overview of prior knowledge.
  - c. Includes one or more research questions, the relevance of which follows logically from the background
  - d. For each research question clearly describes the experimental and methodological approach
  - e. Clearly and objectively describes the results, including measurement errors
  - f. Includes a discussion section, in which results are interpreted against hypotheses and rival claims of other researchers, strengths and weaknesses are reported, and appropriate conclusions are drawn.
  - g. Correctly includes references to literature supporting claims wherever appropriate.
2. Complies with academic standards concerning style and layout, i.e.
  - a. Is grammatically well-written
  - b. Includes tables and figures to summarize important findings
  - c. Uses layout to emphasize the structure of the paper and important claims
3. Reflects a systematic approach
4. Demonstrates a capacity to reflect on strengths and weaknesses of the study, and the interpretation of the results
5. The student reflects on data management according to the FAIR data principles
6. Includes a paragraph on societal impact, among others, explaining the value of the research for patients and/or other stakeholders, based on input and feedback from the patient/stakeholder the student involved in the internship project
7. Is transparent and as concise as possible

## **Appendix B Requirements for Bachelor internship outside of Radboudumc**

If a student wishes to perform his or her bachelor internship at a location different from the Radboudumc, the following terms should be met:

1. The student contacts an external researcher, research department, organisation or university. The external researcher acts as the primary supervisor.
2. In addition, the student contacts a Radboudumc supervisor, active in a similar field, in Nijmegen. The external supervisor and the Radboudumc supervisor are jointly responsible for the quality of the workplan (p.2 and appendix C) and should ensure the student is adequately prepared for his or her internship abroad. During the internship, the Radboudumc supervisor can be consulted if necessary.
3. Together with the supervisor(s), the student formulates a subject of study and a research design. To do this the student completes the application form (appendix C)
4. The student should communicate clearly about the expectations and learning goals of a bachelor internship to the external supervisor (e.g. practical work at the department, an oral presentation and a written report). Half-way during the internship an evaluation should be sent to the Radboudumc supervisor with an update of both student and external supervisor.
5. The Radboudumc supervisor will be invited to join the presentation the student will give at the external department.
6. The Radboudumc supervisor operates as the second assessor. The external supervisor (not the daily supervisor) operates as the primary assessor.

If the bachelor internship is rated as insufficient the student has to do a second internship in Nijmegen.

## Appendix C Application and assessment forms

<https://www.radboudumc.nl/onderwijs/scholingen/bachelor-biomedische-wetenschappen/voor-alle-studenten-van-de-bachelor/stageplan-en-beoordelingsformulier/aanmeldingsformulieren-osiris-case>

<https://www.radboudumc.nl/onderwijs/scholingen/bachelor-biomedische-wetenschappen/voor-alle-studenten-van-de-bachelor/stageplan-en-beoordelingsformulier>

## Appendix D Full report

The student has to write the report himself/herself based upon his/her own work and will be the only author of the report. After uploading the report in Osiris Case, a plagiarism check is automatically started. The software Urkund/Ouriginal is used. The internship supervisor will check the report for reuse of text.

The report should be written according to the following guidelines:

- Full title page (title, author, supervisor(s), department, start and end dates of internship, date of the report).
- Abstract: This is a short but full description of all the important aspects of the research internship (250 words maximum) containing: aim, research question, methods, results and conclusion.
- Contents with numbered pages.
- List of non-common abbreviations.
- Chapter 1: Introduction. The introduction provides an overview into the field so that the reader can understand the motivation for conducting the research. Furthermore, it contains a brief introduction of the literature in the field concerned. The introduction concludes with stating what the most relevant open questions in the field are.
- Chapter 2: Research question. This chapter explains the specific research question(s) and the relevance of this/these research question(s) to progress in the field. NB: the research question may also be part of the introduction, as it should logically follow from the background presented in this section.
- Chapter 3: Methods. This chapter describes how the research was conducted. The following points will be addressed:
  - Research design
  - Materials, techniques and instruments
  - Methods of analysis
  - Ethics (were appropriate)
  - Research data management
- Chapter 4: Results. This chapter presents the results. The results should be described in the text and this description should be supported with figures, graphs and tables. Figures including legends should be self-explaining, results should become clear from interpretation.
- Chapter 5: Discussion. In this chapter, the following points need to be addressed:
  - Results versus research question and hypotheses
  - Possible restrictions due to methods or execution
  - Consideration of the results relative to the present literature
  - Possible adjustments and future experiments
- Chapter 6: Conclusions and translational aspects. Overall conclusions and the translational and/or societal aspects of this research project should be specified in this paragraph, for example implications for diagnosis and treatment of specific diseases. Include in this chapter the perspective of the patient/stakeholder on your research.
- References: Should be consistent, but the following design is advised:
  - Books: Surnames of authors with initials and if possible name suffixes (year, edition). Title, Place: editor.
  - Articles: use Vancouver style (for more information: <https://libguides.ru.nl/medical/citing>).
- Appendices: for example: research instrument, letters, tables and figures, glossary, etc.; supplement with description of method development and results that did not reach the requirements to be used in the main text. Use appendices to showcase activities performed that would normally not occur in a scientific publication, e.g. optimizing protocols or performing additional analyses.

There are no strict rules as to the length of the report.



## Appendix E Dutch grading system

Dutch universities mark according to a system from 1 - 10 (1 = abysmal, 10 = absolutely outstanding). Besides full grades, half grades are given by adding 0.5 to the grade. The grade 5.5, however, is not awarded. Students in the Netherlands must gain 6 or more to pass. The frequency of the grades is indicated in Table 1. The following provides some insight into the meaning of Dutch marks:

**Table 1.** Comparison of the Dutch grading system with US and UK systems, including frequencies of Dutch marks. The grade A++ does not exist in US/Canada or UK, but it is an indication of the acquired level. As half grades are not always allowed, frequencies are only given for round marks.

Source: "Cijfers ontcijferd", Nuffic afdeling Diplomawaardering en certificering, 2006.

Netherlands	Frequency	US/Canada	UK (marks)	UK (grades)
10	0.6%	No equivalent (A++)	96%-100%	No equivalent (A++)
9.5		No equivalent (A++)	90%-95%	No equivalent (A++)
9	6%	A+	80%-89%	A+
8.5		A+	70%-79%	A+
8	28%	A/A-	60%-69%	A/A-
7.5		A/A-	54%-59%	B+/B
7	34%	A-/B+	50%-53%	B/B-
6.5		B+/B	45%-49%	C+
6	31%	B/B-/C	40%-44%	C/D
5.5 not allowed		D	35%-39%	Pass
5	0.5%	F	30%-34%	F

The explanation of the grades as it accounts for internships are described in Table 2.

**Table 2.** Explanation of the Dutch grades for internships

Grade	Explanation
≥9	<i>excellent, demonstrating confidence and insight in handling the subject, showing excellence and own ideas</i>
8	<i>good performance, good overall ability and grasp of subject</i>
7	<i>fair; reasonable level of performance, unexceptional with average grasp of the subject</i>
6	<i>sufficient performance, with scope for improvement</i>
5	<i>insufficient performance</i>
≤4	<i>severely inadequate performance</i>

## Appendix F Patient participation in your internship

The direct involvement of stakeholders contributes to enriching research agendas. It ensures that research results better match the needs and wishes of the end users. Nowadays, the involvement of patients in biomedical research is a requirement for many research grants. Therefore, the aim is to enrich the bachelor internship through patient or stakeholder participation. To successfully fulfil this aim, please follow the roadmap provided below:

- involve a suitable patient or stakeholder in your internship project (e.g. through a patient association or your internship supervisor). The involvement of a patient is encouraged. If including a patient is undesirable, a stakeholder can be used for the translational part of your project. The stakeholder should be an external member, so not anyone participating in your research team.
- schedule 2 visits with your patient/stakeholder during your internship. First visit is used to discuss the plan and ask for feedback and input from patient/stakeholder perspective on the research plan. During the second visit the results, interpretation and/or implementation of the research is discussed. Prepare both conversations with the patient/stakeholder, making use of the research proposal (workplan/stageplan) and/or the results of your research project. It is important to translate your research into laymen terms, in order to enable the patient/stakeholder to understand the research project during your conversation and ask for input/feedback from the perspective of the patient/stakeholder. In the second visit, also make clear to the patient/stakeholder how the feedback in the first visit helped you with your project or gave you new input to think about.
- process the information you obtain from the patient/stakeholder and include it in the paragraph about societal impact (see appendix D). To complete the patient contacts (SMP) partial exam in S6, please write a reflection in which you look back on the process of involving the patient/stakeholder in your research (including making your research comprehensible). Ask yourself the questions: what worked? What did not work (and what did you learn from it)? What do you take from this conversation to future research on the role of a patient/stakeholder and their perspective on research? Upload this reflection as partial exam S6 for SMP within the learning trajectory PCP (this exam is a separate assignment from "Professionaliteit S6". Be aware of 2 assignments (SMP and Professionaliteit) in S6 and have a close look to the deadlines).