Cooperation Agreement on an Examination Project

The project may be a thesis, a diploma programme or a master's degree programme

between

Department: Electrical and Photonics Engineering

.....

Technical University of Denmark

Address: Ørsteds Plads, Building 343

.....

Postcode and Town: DK-2800 Lyngby

("U")

and

Company: Novo Nordisk A/S

Address: Novo Allé

Postcode and Town: DK-2880 Bagsvaerd

("the Company")

U and the Company are hereinafter collectively called "the Parties" and separately "the Party".

1 Background and purpose

1.1 The main purpose of the present agreement is to secure that the Student may perform the examination project specified in paragraph 1.3 below as the concluding part of his/her programme, , hereinafter called ”The Purpose”

1.2 The examination project will be conducted within a collaboration between U and the Company by: Ivan Serrano Subtil

1.3 The details of the examination project are: Optimization in automation design for laboratory liquid handling devices and their human machine interface, from 01-02-2023 to 16-07-2023 (description as specified in Appendix 1) (“the Project”).

1.4 The Student’s U supervisor(s) will be:

Xinxin Zhang and Ole Ravn

1.5 The Student’s Company supervisor will be:

Diego Olivares Garcia

1.6 External supervisor from another company or institution (if appointed):

2 Field

The Field describes the scientific area of the Project:

Optimization in automation design for laboratory liquid handling devices and their human-machine interface

3 Secrecy

3.1 Information received by U, whether in writing or orally, concerning the Company’s business, operations, plant, production methods, research, research findings, knowhow, etc., shall be regarded as Confidential Information and shall be used for the purposes of the Project only.

3.2 Information received by the Company, whether in writing or orally, concerning U’s production methods, research, research findings, know-how, etc., in connection with the Project shall be regarded as trade secrets and shall be used by the Company for the purposes of the Project only.

3.3 The Parties shall be obliged to keep secret Confidential Information received in the course of the Project, so that this information does not come to the knowledge of

extraneous third parties. The Parties shall ensure that persons to be involved in the Project are made subject to the same duty of secrecy as the Parties themselves.

3.4 The duty of secrecy shall not apply to information which:

- at the time it was received had been published or was otherwise available to the public;
- is of an apparent non-confidential nature;
- has been published or otherwise become available to the public after it became known to the receiving Party, without this being due to any disregard of the duty of secrecy on the part of the receiving Party;
- was already in the possession of the receiving Party lawfully and without being subject to requirements of secrecy at the time it was received;
- was received from a third party who appeared to be entitled to pass on the information;
- is subsequently developed by the receiving Party, who shall be able to document that it was developed independently of the Project, or
- the receiving Party is obliged by law or judicial decision to disclose in whole or in part

3.5 On receipt of information which the receiving Party considers to fall within the scope of paragraph 3.4, the receiving Party must without delay give notification in writing to the Party from which the information was received. In the event of disagreement between the Parties, it shall rest upon the receiving Party to prove that the information received is covered by paragraph 3.4.

3.6 The duty of secrecy imposed by the present paragraph 3 shall lapse five years after conclusion of the Project. The duty of secrecy shall also apply to a Party who for any reason has withdrawn from the collaboration. Should the collaboration end before the agreed date of termination, or should one of the Parties withdraw from the Project, the five-year period of confidentiality shall run from the actual date of termination or withdrawal.

3.7 In the case of information falling within the scope of the exceptions set out in paragraph 3.4, and after the expiry of the secrecy period, the present agreement does not imply consent to the receiving Party's making use in a manner that conflicts with other rules, including rules on intellectual property rights, of the information received.

4 Publication of the Project Report

4.1 The Project concludes with the writing of a report (hereinafter called "the Report"). U's supervisor shall forward the Report to the Company. The Company shall within 14 days of receipt communicate whether the Company wishes that parts of the Report to be treated as confidential or whether it can be published freely.

4.2 If the Company wishes that parts of the Report to be treated as confidential, the exam will be held as a closed exam.

4.3 For the parts of the Report that is treated as public, the Company shall recognise the right of U's supervisor and the Student to freely publish the public findings of the Project, provided that the rules set out in paragraph 3 above on the keeping of Confidential Information are observed.

4.4 If the Company requires that parts of the Report to be stored as confidential material, this shall take place in the following manner:

4.5 The requisite number of copies of the Report shall be kept in U's archives, and shall not be accessible to the public. The Student and U's supervisor will also each hold a copy. Further, a copy of the Report can be lent to an external examiner, who shall, if required by the Company, sign a separate confidentiality agreement. For a five-year period the Report shall not be further reproduced or distributed except by agreement with and following acceptance by the Company. After said period the Report can be freely published.

5 Rights

5.1 The rights to research findings and inventions made by U's supervisor (or other U employees, who shall be identified in writing on a continuous basis as contributing to the supervisor function) in connection with the performance of the Project and within the Field shall belong to U in accordance with the Act on Inventions at Public Research Institutions in force at the time in question, provided that the conditions stated in the said Act are fulfilled. The Company has, on the conditions stated in paragraph 5.6 below, the right of first refusal to commercial use of such inventions.

5.2 The rights to research findings and inventions made by the Company's supervisor within the Project shall be the property of the Company, in accordance with the Act on Employees' Inventions, provided that the conditions stated in the said Act are fulfilled.

5.3 The rights to research findings and inventions made by the Student in the performance of the Project shall be the subject of specific agreement between the Student and the Company. Any possible form of remuneration for the Student, including remuneration for work done by the Student and any inventions made by the Student, shall thus be a matter between the Student and the Company and shall be of no concern to U.

5.4 The Company shall itself be responsible for signing agreements on responsibilities, distribution of rights, etc., with any external co-supervisor that may be involved from another company or institution. Accordingly, claims from such external cosupervisor/company/institution shall be of no concern to U.

5.5 Research findings and know-how, including inventions and other intellectual property rights, which falls outside the Project, belongs to the Party generating such results and knowhow. The same applies in situations, where the Act on Inventions at Public Research Institutions or the Act on Employees` Inventions is not relevant.

5.6 The Company is hereby given the right of first refusal to an exclusive license for the commercial use of inventions made by the U's supervisor within the Project, in return for a fee. This first right of refusal applies in relation to inventions generated by U´s supervisor alone as well as such supervisor´s share of inventions generated together with the Student and/or the Company supervisor. The detailed terms of an agreement, if applicable, will be negotiated with U. Should the Parties be unable to reach agreement on the terms of the transfer of the rights of commercial use, the rights of commercial use must not subsequently be offered to a third party on more favourable terms than those offered to the Company.

6 External Examiner

6.1 U's supervisor nominates the external examiner. A copy of the Report may be lent to the external examiner. U's supervisor ensures that the Report is returned after evaluation, and also that the external examiner is aware that the Report is confidential. No formal agreement will be signed with the external examiner about this, except in those specific cases where the Company requests it.

7 Publicity concerning the collaboration

7.1 Both Parties shall be free to refer publicly to the collaboration on the Project – that is, to cite the title and Purpose of the Project, and the names of the Parties.

8 Amendments

8.1 No amendment to this agreement shall be valid or binding on the Parties unless in writing.

9 Responsibilities

9.1 As the Project is for an examination, neither Party shall bear any responsibility for the Project leading to a specific desired result.

10 Attendance at the Company

10.1 When the Student is at the Company, he/she shall comply with the instructions and safety regulations that apply at the Company.

10.2 It shall be the responsibility of the Company to instruct the Student, and U shall not be held liable for any injury or damage caused by the Student while at the Company.

10.3 If the Student is not covered by the Company's industrial injury insurance while with the Company, it shall be the duty of the Company to inform the Student to that effect.

11 Applicable law and venue

11.1 This agreement shall be governed by Danish law except for Danish rules of international private law and choice of law to the extent that they would lead to the application of another State's law.

11.2 Any dispute between the Parties arising from this agreement, including questions of interpretation and application thereof, which cannot be settled by negotiation

between the Parties shall be brought before the Maritime and Commercial Court in Copenhagen as court of first instance.

12 Duration and competition

12.1 The agreement shall run until the Project is completed or terminated.

12.2 The requirement for secrecy specified in paragraph 3 above shall remain in force throughout the Project period and for five years after the end of the Project, see also paragraph 3.6.

12.3 No limitations of any kind on competition are imposed upon the Parties by their entry into this agreement.

12.4 This agreement does not limit U's possibilities for collaboration with other companies.

13 Signatures

13.1 The obligations placed on U in this agreement, relates only to the U supervisor and other employees. U bears no responsibility for the student's obligations in relation to this agreement.

Appendix 1: Description of the Examination Project

Signatures

For U

At (location): Kgs. Lyngby

on the 01 of February 2023

Department Director: Lars-Ulrik Aaen Andersen

For the Company Novo Nordisk

At (location): Måløv

on the of 202330-01

Name Hanne Winning

Associate Manager
Position

The following persons are not parties to this agreement but confirm by their signatures that they accept it's content and will work for its implementation:

The Student

At (location): Måløv
on the of 30-01
2023

Name: Ivan Serrano Subtil

Position

University Department Supervisor 1

At (location): Kgs. Lygnby on the

of 30-01 2023

Name: Xinxin Zhang

Associate Professor
Position

The Company's Supervisor

At (location): Måløv

on the of 30-01
2023

Name Diego Olivares Garcia

IT/OT Architect

University Department Supervisor 2

At Lyngby on the 31-01 2023

Name: Ole Ravn

Professor
Position

Appendix 1: Description of the Examination Project

1. **Title:** Optimization in automation design for laboratory liquid handling with a robotic arm
2. **Start date**: 01.02.2023
3. **ECTS**: 32.5
4. **Student ID**: Ivan Serrano Subtil - s212477
5. **Problem**:

Currently, lab technicians handle the recipients containing the necessary substances to conduct their work manually, which can prove to be a tedious and repetitive task resulting in a loss of valuable time and resources. Moreover, accidents may occur whenever a substance is handled manually. In order to solve this problem, the objective of this project is to build a system capable of operating different containers and transferring their content.
In the interest of simplifying the end experience, a data-managing framework will be implemented, as the information regarding these recipients and their content is valuable in other areas of the laboratory.

6. **Method**:

The proposed idea involves many different engineering topics, with the ultimate task of automating the liquid-transferring process by pouring the contents of a variety of different recipients into the appropriate containers. In order to achieve such task, a robotic arm capable of handling these recipients will need to be programmed accordingly.

A second challenge to be addressed is the optimization of this process, given the number of identical recipients to be handled and the wide array of unique solutions that can be provided to solve the task at hand.

Finally, keeping track of each individual task is important for the future use of these liquids. As such, a system capable of autonomously reading and storing the necessary data will also be implemented alongside the robotic solution.

7. **Goals and Outcome**:

Short-term:

- Integrating the proposed solution in its simplest form by having a robotic arm automatically pour a fluid from a specified container at the user's command.
- Design a clear pathway to achieving a working and applicable system in the lab.
- Develop usable pieces of code integrating all components required for the system, from the robot's movement to the UI. Long-term:
- Analyze potential regulatory issues concerning GMP approval as well as any potential hazards.
- Develop a framework by which this project can be integrated with all the other equipment in the laboratory.
- Create a working version of a prototype ready for testing and examination concerning its functionality.