**Project in Bioinformatics @ BiRC**

A Project in Bioinformatics (PiB) is a 5 or 10 ECTS project related to the research at BiRC. The project work is carried out in consultation with a project supervisor at BiRC, and is documented in a written report and at an oral exam. If you are interested in doing a PiB, you should start by contacting a potential supervisor at BiRC.

**Signing up for a project:** You sign up for a PiB in the same manner as you sign up for a regular class, i.e. during the first week of November, if you are doing a project in the Spring, or during the first week of May, if you are doing a project in the Fall. When you sign up, you can choose between “A”, “B” and “C” versions of PiB. This reflects whether the PiB that you are signing up for is the (A) 1st, (B) 2nd, or (C) 3rd PiB in your Study program.

Working in a group: You can do a PiB in a group of up to three students. Each group member must sign up for the PiB individually cf. above and each group member must make an individual contract cf. below (note in the contract that you are working in a group, and list your group members). The group hands in a single combined report and each group member has an individual oral exam cf. below.

**Project contract:** After you have signed up for a PiB, you must make a project contract in coordination with your supervisor. As part of the project contract, you must attach a pdf-document describing the problem statement, activity plan, and supervision plan for you project, i.e. fill out the information and paragraphs on the next page, and attach it to your contract.

The project contract, including attachment, must be submitted via <https://kontrakt.nattech.au.dk/> before **September 1**, if the project is done in the Fall semester, and **February 1**, if the project is done in the Spring semester. Note that you in the project contract must agree on a**submission date**in the exam period immediately following the project work. The submission must be chosen such that it is possible to do the exam in the same exam period.

**Project work:** When a project contract has been submitted, and approved, it is your responsibility, under supervision, to do the described project, and hand in the report (10-15 pages, if a 5 ECTS project, and 20-25 pages, if a 10 ECTS project) via Digital Exam no later than the agreed submission date. If you are working in a group, the volume of the work and report must reflect this.

**Exam:** The exam is a 15 min presentation of the project, followed by a 15 min discussion of the presentation and the report. Besides the supervisor, an internal co-examiner (another BiRC researcher) must be present at the exam. The final grade is based on an overall assessment of the written report, the presentation, and the following the discussion, where the assessment of written report contributes the most. If you are working in a group, all group members have individual exams.

**Supervisor responsibility:**It is the responsibility of the supervisor to conduct the exam during the exam period immediately following the project period, and plan accordingly with the student(s) and internal examiner. The supervisor must submit name of the internal examiner to Christian Storm Pedersen ([cstorm@birc.au.dk](mailto:cstorm@birc.au.dk)) before **Dec 1**, if the project is done in the Fall semester, and **May 1**, if the project is done in the Spring semester. The supervisor and internal examiner get the project report via Digital Exam, and must submit the final grade via Digital Exam.

See <http://birc.au.dk/studies/pib/> for more information.

**Project in Bioinformatics @ BiRC**

Student ID: AU679425\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student name: Marc Solé Estragués .

Group members: Sergio Fernández Adán\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Supervisor: Palle Villesen .

Project title: Find the fake signature - forensic spectometry\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Start date: 01/09/2021 .

Submission date: January 15th\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ECTS: ☒ 5 ECTS ☐10 ECTS

**Problem statement / project description:**

5-7 lines describing the overall aim of the project. Make it clear what the objectives are, e.g. analyse data sets, implement an algorithm, develop or use theory. Remember that the project should be doable in 7 weeks (~137,5 hours of work, including the final exam) for a 5 ECTS project, and 14 weeks (~275 hours of work, including the final exam) for a 10 ECTS project, and that it should be possible to document it in a report of 10-15 pages for a 5 ECTS project, and 20-25 pages for a 10 ECTS project. If you are working in a group, the volume of the work and report must reflect this. **Think of the text as how you would explain your project and its objectives to others.**

Given datasets containing spectrometry data from the ink found on certain documents use concepts of machine learning and statistical modelling in order to relate different pens with different ink strokes and identify possible manipulation on real forensic documents. The first step is to identify the pens used on six strikes, and then move the information gathered in order to identify if a document from a real crime scene has been manipulated, if so on which pages, identify the data that implies there is manipulation and identify which of the pens where used for the document’s signatures.

**Problem statement / project goals:**

A brief and clear presentation of what the student should be able do to after the project. Formulated as 3-5 items, e.g.:

- The student should be able to describe ...

- The student should be able to implement ...

- The student should be able to analyse ...

- The student should be able to discuss ...

**Think of these items as what you and your project will be evaluated by at the exam.**

The student should be able to explain the methods used for the analysis of the data.

The student should be able to explain the theoretical background of the project

The student should be able to discuss the results of the analysis.

More specifically the student should be able to analyse the data provided in order to:

On the squares dataset: determine the pens used for each strike and the “1-6” writing.

On the contract dataset: identify if there is contract manipulation, on which page and which pen was used, identify the ions that indicate manipulation, and identify which of the 5 pens used in the squares were used for the initials and signatures of the documents.

**Activity plan:**

A few lines describing the overall the timeline of your project activities, e.g. formulated bi-weekly milestones. **Think of the text as how you plan to do the project outline in the problem statement.**

1-2 weeks to familiarize with the dataset.

2 weeks to analyse the squares dataset and determine the pens used for each strike and the “1-6” writing.

2 weeks to analyse the contract dataset and identify if there is contract manipulation, on which page and which pen was used.

2 weeks to analyse the contract dataset and identify the ions that indicate manipulation, and identify which of the 5 pens used in the squares were used for the initials and signatures of the documents.

2 weeks to recap on the results and identify problems that need to be solved.

2 weeks for the discussion on the results.

**Supervision plan:**

A few lines describing the overall structure of your supervision as agreed upon together with your supervisor, e.g. “We plan bi-weekly meetings of ~45 minutes. Specific questions to be addressed at the meeting must be e-mailed to the supervisor at least a day before the meeting in order to give proper time for preparation.”. **Think of the text as an alignment of expectations between you and your supervisor.**

We plan bi-weekly meetings of 45 minutes, where specific question to be addressed at the meeting must be emailed to the supervisor at least a day before the meeting in order to give proper time for preparation. If no questions are addressed beforehand, a general assessment of the progress and discussion can be carried out in order to make sure the student follows the activity plan.