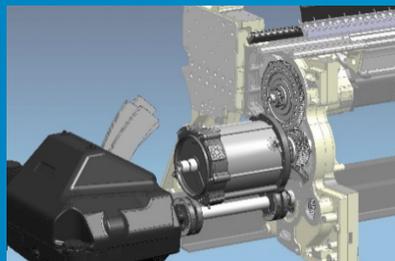


# PICANOL

Let's grow together



## Picanol R&D Internship and thesis opportunities

2021-2022

# General information

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## Why is an internship or a company-hosted thesis valuable for you?

Firstly, an internship or thesis needs to be worthwhile for the student, i.e. you! Everyone deserves the opportunity to participate in a project that is both captivating and educational, in order to receive a positive, **hands-on work experience**.

This will help you to obtain a better **insight into your chosen field of study** and the possible **career paths** that come with it. You will not only be able to gain new skills and **improve your existing skills**, but you will also get to interact with people who practice this profession on a daily basis. They should be able to answer all of your questions and will be pleased to help you further **discover your strengths and possible new interests**.



## Why consider doing an internship or thesis at Picanol?

At Picanol R&D, we believe that we can help you to grow. We will **assist you in terms of defining the subject of your thesis** by talking about your interests and aligning them with our expertise. Hence, we will be able to offer you a project that will not only suit you, but also one that you will be **passionate** about.

In addition, interns or thesis students are welcomed as member of our team and are given tasks that closely relate to our ongoing projects. A **personal coach** will guide you along every step of the journey with a view to both realizing your goals and optimizing your experience.

## What does Picanol do?

Picanol develops, produces and markets high-tech weaving machines, based on air (airjet) or rapier technology.

We have been playing a **pioneering role** as both a developer and manufacturer of highly productive weaving machines since 1936. Ever since starting out, we at Picanol have remained committed to our core mission: developing and assembling **innovative and reliable** high-tech weaving machines. And the experience we have accumulated following the production of over 360,000 machines provides the clearest guarantee to our customers that when they choose Picanol they will be getting **the very best weaving machine**.

In addition to the head office in Ypres (Belgium), we also have production facilities in Asia and Europe that are linked to our own **worldwide** service and sales network.

Picanol NV is part of Picanol Group ([www.picanolgroup.be](http://www.picanolgroup.be))



## How can you apply for an internship or thesis?

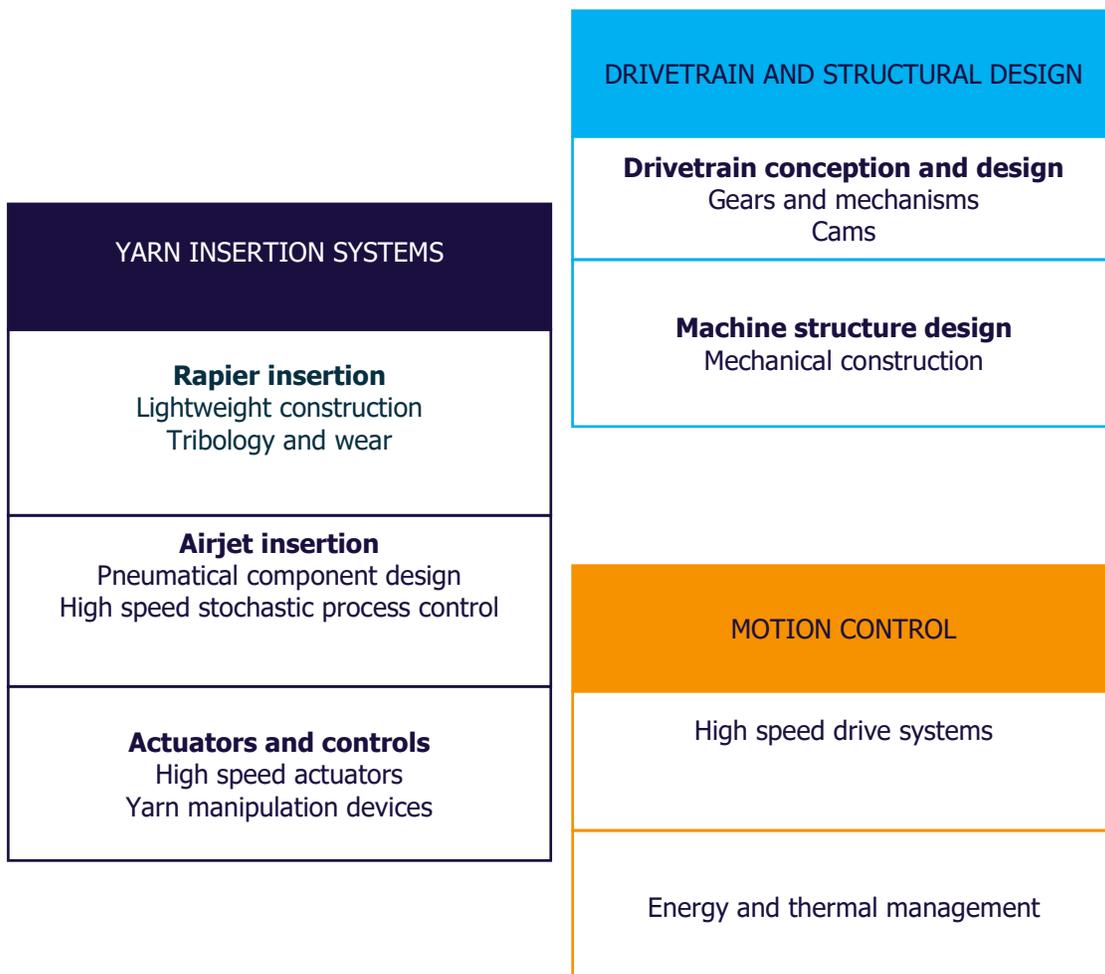
You can contact us by e-mail or telephone to **set up a meeting in which you can tell us about your interests**. We have listed in this folder some topics that are related to our activities and which you can use as a guideline. With this information, we can propose a suitable subject for you!

Contact us via [jobs@picanol.be](mailto:jobs@picanol.be)

# Picanol Research Topics



We have listed a number of topics and skills related to the Picanol R&D activities. You can review these themes to ascertain whether they align with your interests and, if so, we invite you to come and have a chat with us! Together we can **define your ideal internship or thesis subject**.

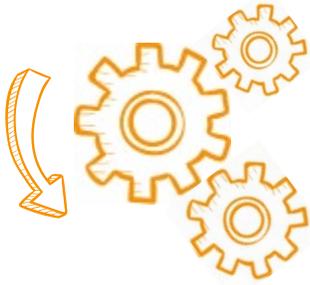


## TEXTILE RESEARCH

Fabric formation  
Weaving process  
Yarn behavior and characterization

## SENSORS AND SIGNAL PROCESSING

Customized sensors  
Vision systems  
Signal processing and control



## SIMULATION AND MEASUREMENT

Structural analysis - CAE  
Flow simulation - CFD  
Thermal simulation

## BIG DATA

Analysis  
Model construction  
Dashboards  
Connectivity and infrastructure

# Testimonials



**Cédric Ally**  
**MSc Electromechanical Engineering (Control Engineering and automation) (UGent)**

“My master’s dissertation involved a study of the energy flow in the electromechanical drivetrain of air jet weaving machines. I was able to put my knowledge of modeling, energy conversion and control engineering into practice. Therefore, working on a master’s dissertation in cooperation with a company bridged the gap between my studies and working life.

The Picanol team members of the research project, which my dissertation formed part of, were always happy to share thoughts and provide guidance throughout the measurement sessions. Outside of work, the trainees are immediately included in activities, after-work drinks, etc. The young team is fully aware of the importance of positively integrating the newcomers.

In summary, I would really recommend a master’s dissertation in cooperation with Picanol to anyone. As soon as I completed my master’s dissertation, I was given the opportunity to work as an R&D Junior Engineer at Picanol. Clear proof that this is a great place to do your dissertation.”

**Robbe Moerman,**  
**Mechanical Design and Production Technology - Odisee Technologicampus Gent**

“During my 15 week internship, I researched the possibilities of a modern interpretation of a weaving technique used on older shuttle looms; specifically on a Picanol Optimax-I gripper loom. A first prototype was built and tested, which proved the viability of this weaving principle.

This internship gave me the opportunity to use my creativity and further develop my designing skills. I met a lot of great colleagues from different fields who were more than willing to help and assist wherever possible. When I reflect on my internship, I always think of the welcoming and friendly-yet-professional atmosphere in R&D.

I’ve accumulated really valuable knowledge and good contacts who I can keep in touch with in the future in my profession as a R&D designer at Picanol.”

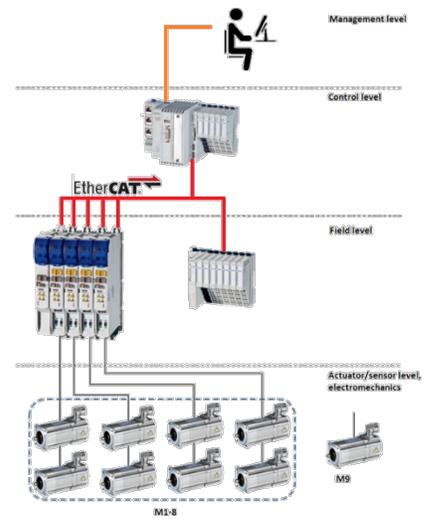
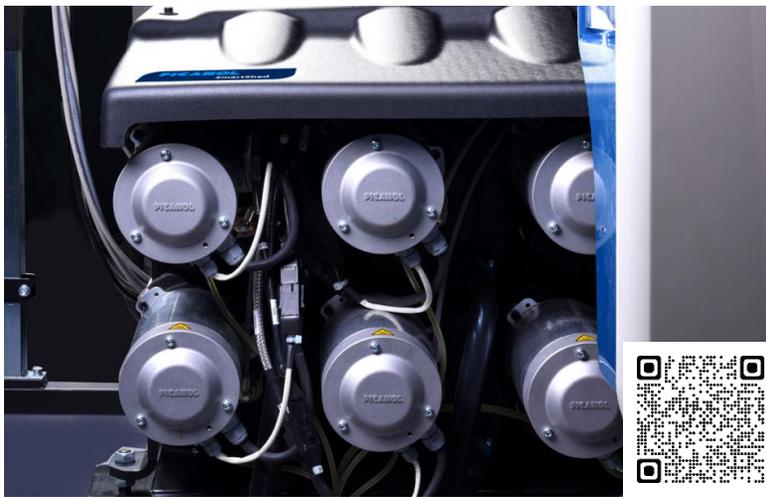


# Proposed Topics



The following section contains additional information on the research topics that can serve as a guideline for your internship or thesis at Picanol R&D. If you are interested, let us know!

MOTION CONTROL AND OPTIMIZATION .....	8
YARN INSERTION SYSTEMS .....	9
DRIVETRAIN AND STRUCTURAL DESIGN .....	10
SENSORS AND SIGNAL PROCESSING .....	11
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# MOTION CONTROL AND OPTIMIZATION

## Description

Picanol’s weaving machines consist of several reciprocating mechanisms with strongly varying inertia. These mechanisms are typically coupled to one or more drive motors. Work in this research field aims to drive these mechanisms at high speeds, while meeting stringent boundary conditions in an energy-friendly manner.

## Your task

- You will help to set up system simulations and/or measurements that provide insights into challenging control problems.
- Together with colleagues, you will set out alternative, optimal control scenarios.

## Skills and Tools

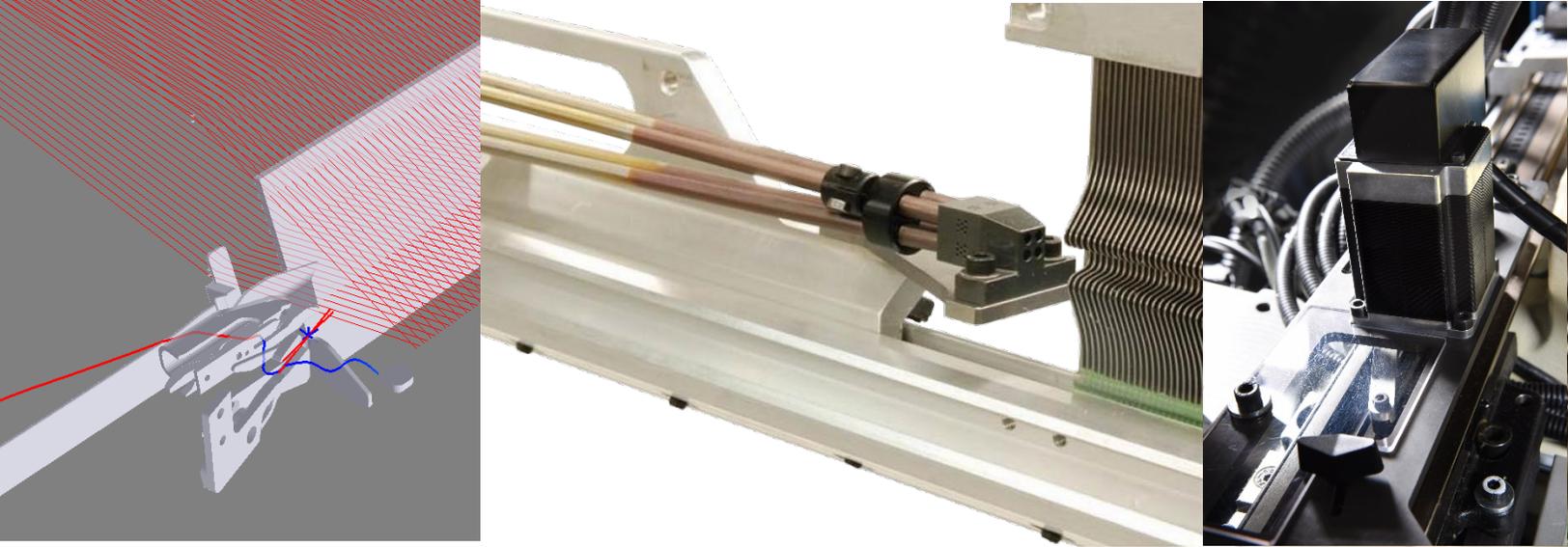
- Control engineering
- Matlab/Simulink
- Labview



## Contact



For more information, please contact Emmanuel Delboo:  
 e-mail: [Emmanuel.Delboo@picanol.be](mailto:Emmanuel.Delboo@picanol.be) or Tel. +0032/57222169



## YARN INSERTION SYSTEMS

### Description

Manipulating yarns is a core competence for Picanol; with yarn speeds reaching up to 100 m/s and accelerations over 4,000 m/s<sup>2</sup>, this represents a continuous field of research. The yarn propulsion systems of the weaving loom can be either reciprocating mechanical clamps or a jet of air surrounding the yarn and pulling it forward. Work in this research field aims to increase the speed of the insertion while keeping control over the yarn behavior and minimizing the forces acting on the yarn in order to obtain good quality fabric.

### Your task

You will help in terms of designing, conceiving and studying mechanical, electromechanical or pneumatical systems that contribute to an improved and better performing yarn insertion system.



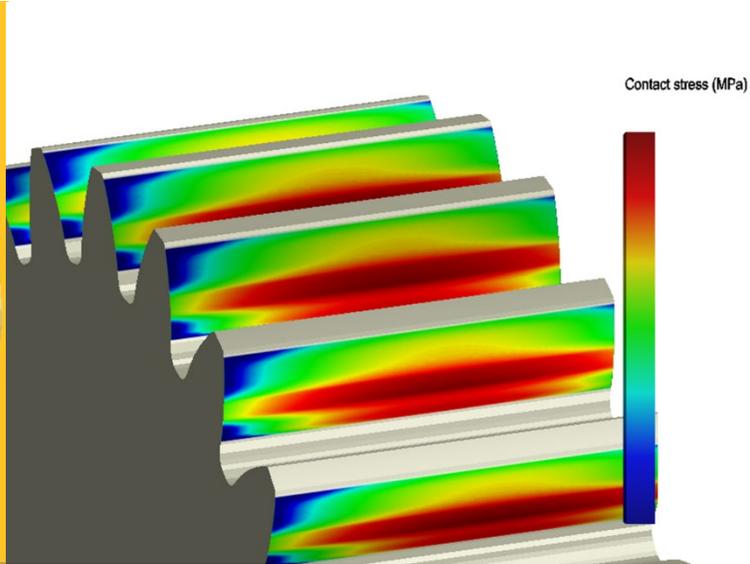
### Skills and Tools

- Interest in mastering highly dynamic processes that are often of a stochastic nature
- Multidisciplinary skills in mechanics, electromechanics, pneumatics and/or process control
- Tools to understand and improve the insertion process, such as high speed cameras and measurement systems

### Contact



For more information, please contact Jozef Peeters:  
e-mail: [Jozef.Peeters@picanol.be](mailto:Jozef.Peeters@picanol.be) or Tel. +0032/57222821



## DRIVETRAIN AND STRUCTURAL DESIGN

### Description

The weaving machine consists of drive groups that require a reciprocating movement of components. The drivetrain that connects the drive motor to the load needs to be designed in an optimal way in order to achieve the desired reciprocating movements, while withstanding the high forces related to these movements. Work in this research field aims at designing the drive train and machine structure to optimally transmit the drive forces to the load, thereby ensuring possible vibrations to the surroundings (noise, ground forces) are kept as low as possible.

### Your task

You will help in designing, conceiving and studying drivetrains and related components and/or structural machine parts.



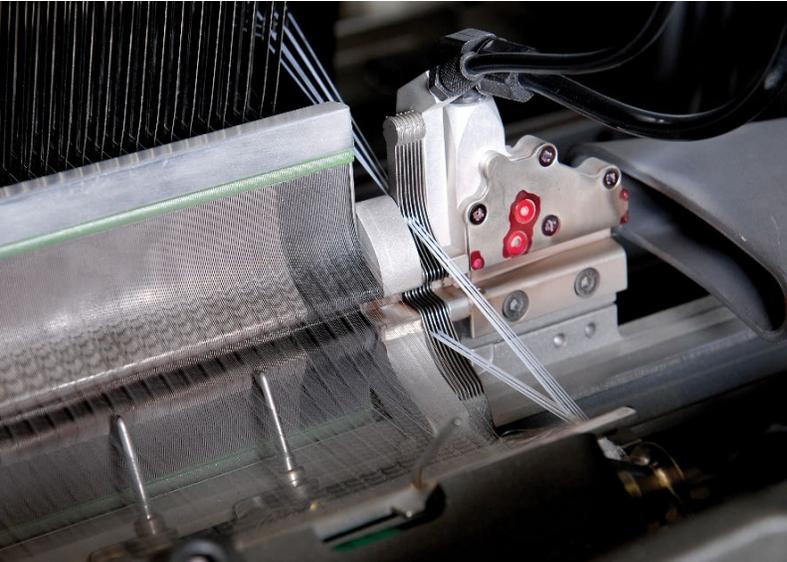
### Skills and Tools

- Interest in machine drivetrains and/or structural machine design
- Skills in mechanical design or analysis on components such as gears, bearings, cams, machine structure, etc.
- Measurement systems to perform vibration and noise analysis
- Matlab-based tools for motion law design, component lifetime Calculations, etc.

### Contact



For more information, please contact Kristof Roelstraete:  
e-mail: [Kristof.Roelstraete@picanol.be](mailto:Kristof.Roelstraete@picanol.be) or Tel. +0032/57222866



## SENSORS AND SIGNAL PROCESSING

### Description

Picanol's highly dynamic weaving machine processes textile into woven fabric. The yarns, the weaving process itself and the fabric have a stochastic nature. For this reason, performant detection systems (optical, piezo, strain, etc.) are needed to safeguard the quality throughout the weaving process. Work in this research field aims at designing sensors that are capable of capturing and evaluating yarn behavior, yarn tension, and fabric formation related parameters. Due to the high speeds involved, such sensors require both performant hardware and processing algorithms.

### Your task

You will help in terms of designing, conceiving and studying sensors for the weaving machine.



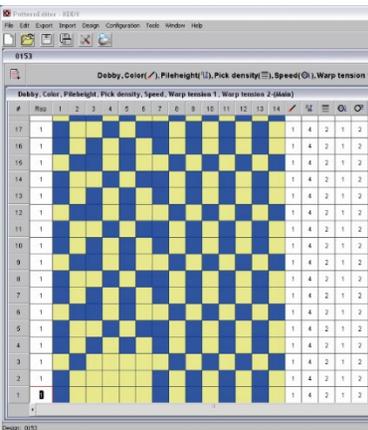
### Skills and Tools

- Interest in sensor design and/or processing algorithms
- Skills in optics, sensor technology and/or signal processing
- Measurement systems to perform measurements on existing or new sensors
- Data processing tools, both offline and online – Matlab

### Contact



For more information, please contact Bram Cuvelier:  
e-mail: [Bram.Cuvelier@picanol.be](mailto:Bram.Cuvelier@picanol.be) or Tel. +0032/57222839



## TEXTILE RESEARCH

### Description

Picanol's highly dynamic weaving machines process textile yarns into woven fabric. The yarns, the weaving process itself and the fabric have a stochastic nature. An in-depth understanding of the weaving process is necessary in order to determine the requirements for the machine and to find optimal settings to produce the highest quality fabric. Work in this research field aims at measuring and observing the weaving process and its parameters with two main purposes: to obtain a better understanding and to evaluate the textile performance of the loom.

### Your task

You will assist or perform weaving tests. You will then interpret data from such tests and monitor a proper set-up for the experiments.



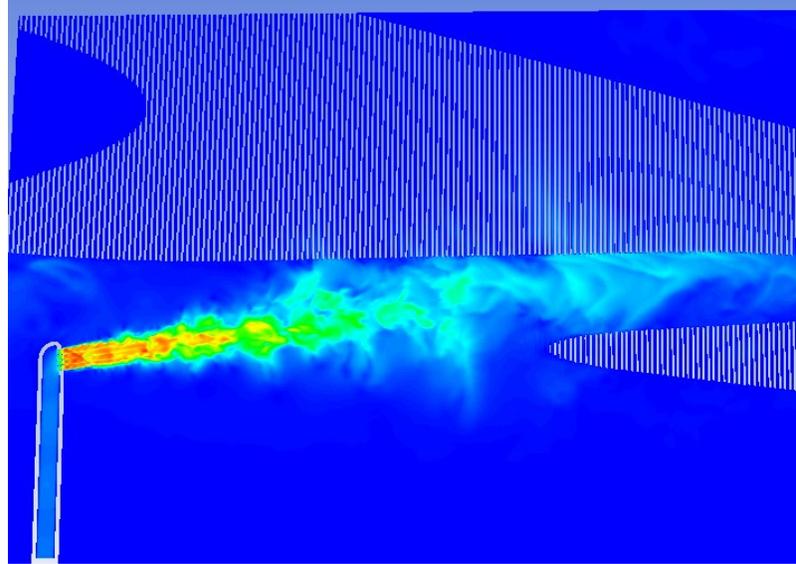
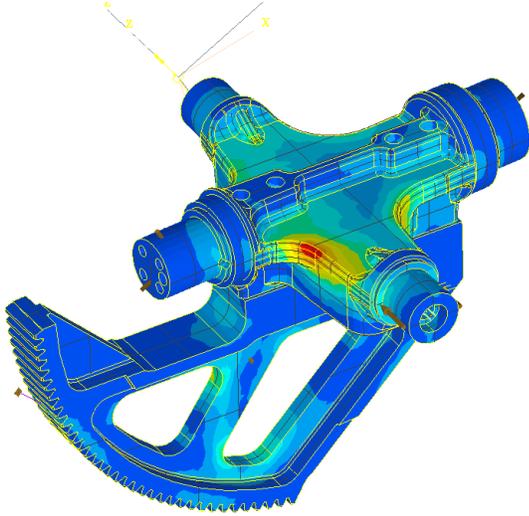
### Skills and Tools

- Interest in the weaving process
- Skills in textile technology and/or data processing
- Measurement systems to perform measurements on yarns and machine components
- Data processing tools, both offline and online – Matlab

### Contact



For more information, please contact Veerle Regoudt:  
e-mail: [Veerle.Regoudt@picanol.be](mailto:Veerle.Regoudt@picanol.be) or Tel. +0032/57222894



## SIMULATION AND MEASUREMENT

### Description

Picanol's weaving machines are pushing the technical boundaries in many domains. To this end, computer aided simulation tools are essential if we are to obtain improved and better performing products. This is because they enable us to understand and improve the behavior and performance of the machine. Work in this research field aims at creating digital models of (parts of) the weaving machine to perform various forms of analysis and optimization. These simulations are often validated by measurements.

### Your task

You will perform simulations in a specific domain of interest (thermal, mechanical, flow, etc.) to obtain a better understanding of problems or opportunities of the loom. You will perform or assist in measurements in order to validate digital models or to understand phenomena that cannot be modeled in an accurate manner.



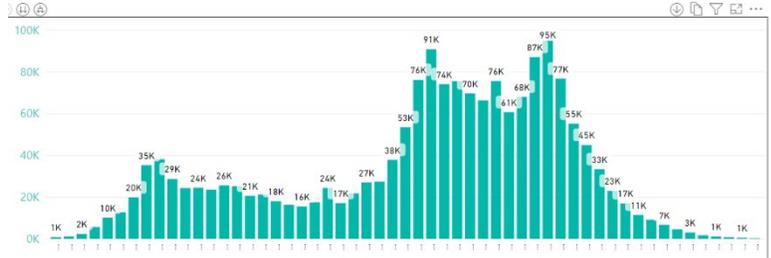
### Skills and Tools

- Interest in machines and their behavior
- Skills in measurement and/or simulation in one of the following domains:
  - o Mechanical simulation (stress, strain, modal, etc.)
  - o CFD
  - o Thermal simulation
  - o Topology optimization

### Contact



For more information, please contact Dimitri Coemelck:  
e-mail: [Dimitri.Coemelck@picanol.be](mailto:Dimitri.Coemelck@picanol.be) or Tel. +0032/57222886



# BIG DATA

## Description

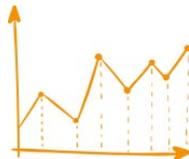
Many Picanol weaving machines are installed world-wide in a wide variety of working conditions. This means a massive amount of data is generated from the sensors and control systems it has onboard. Recent developments have opened up the possibility of harvesting this data remotely. This can create new opportunities for Picanol since it allows us to gain better and more in-depth insights into the performance of the machine in real conditions. Work in this research field aims to use this data to translate it into a better machine and improved machine control design.

## Your task

You will perform data analysis on large data sets with the aim of finding trends, verifying hypotheses and/or creating models. You will help to develop tools to visualize data in an easy way, allowing fast and easy follow-up.

## Skills and Tools

- Interest in machines and their behavior
- Interest in data processing and statistical analysis
- Familiar with tools such as Python, R, Matlab, Azure, PowerBI



## Contact



For more information, please contact Patrick Puissant:  
e-mail: [Patrick.Puissant@picanol.be](mailto:Patrick.Puissant@picanol.be) or Tel. +0032/57222872



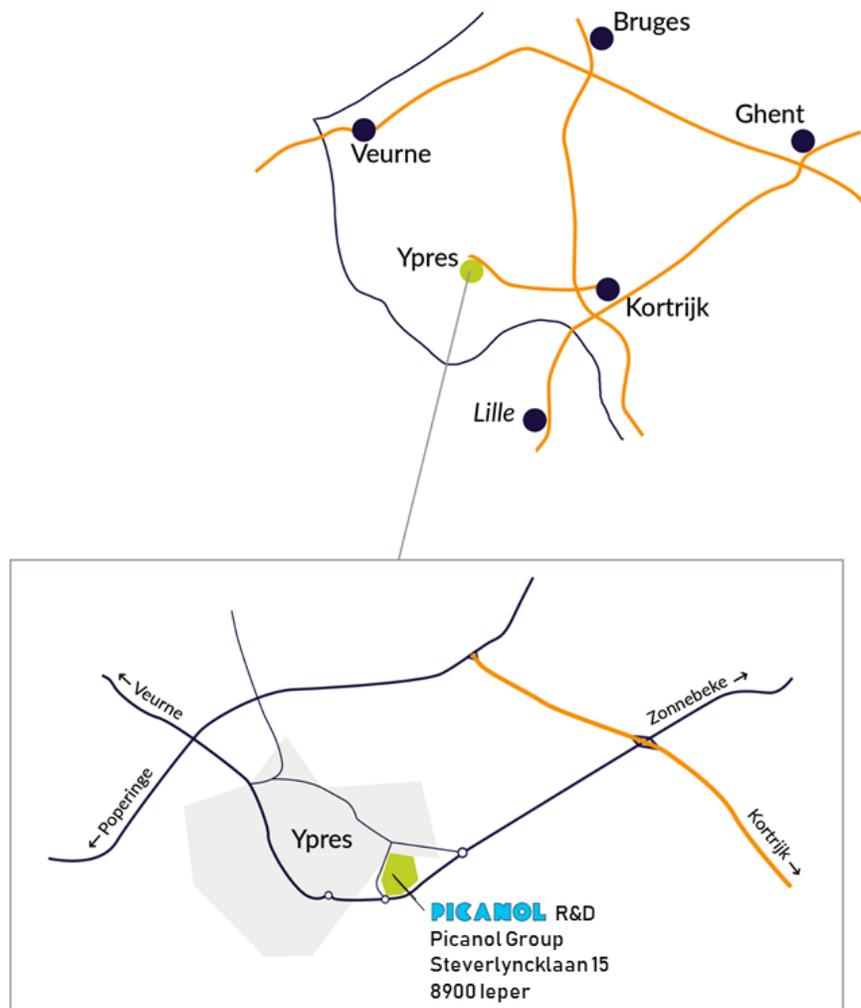
## PROPOSE YOUR OWN SUBJECT

Technology is evolving rapidly and we are always interested in new projects relating to our machines! Do you already have an idea that you want to work on, or a subject that really interests you? If so, let us know and we can do our best to define your internship or thesis together.

Contact us via [an.dehem@picanol.be](mailto:an.dehem@picanol.be)



# Location



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Steverlyncklaan 15, 8900 Ieper | +32 57 222 111 | [www.picanolgroup.com](http://www.picanolgroup.com)