

## Predictive Quality & Process Optimization – Predict Quality & Minimize Scrap.

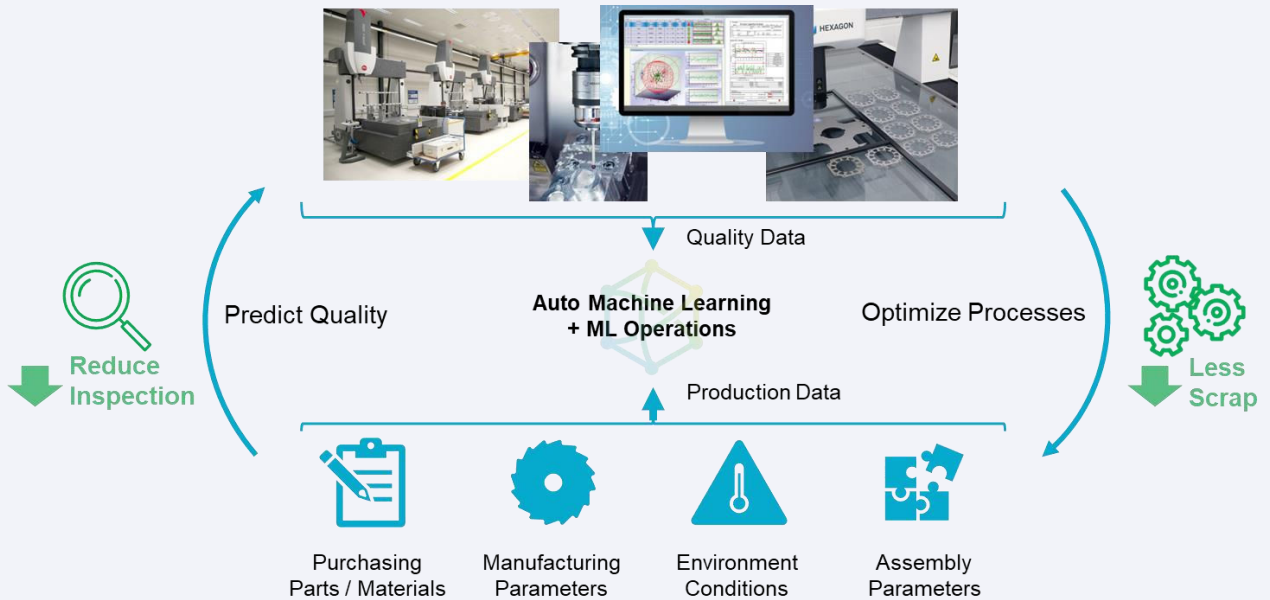
We guide you in less than 14 weeks in six systematic milestones to a cost-efficient proof-of-concept.

Individual workshop concept for your use case with our production and AI experts.



# What is Predictive Quality & Process Optimization?

Predictive quality is used to predict the quality of products during production. By calculating process correction values, quality is increased, and scrap is reduced.



**Figure:** Only inspect parts predicted as critical or optimize processes for less scrap.



## How does Predictive Quality work?

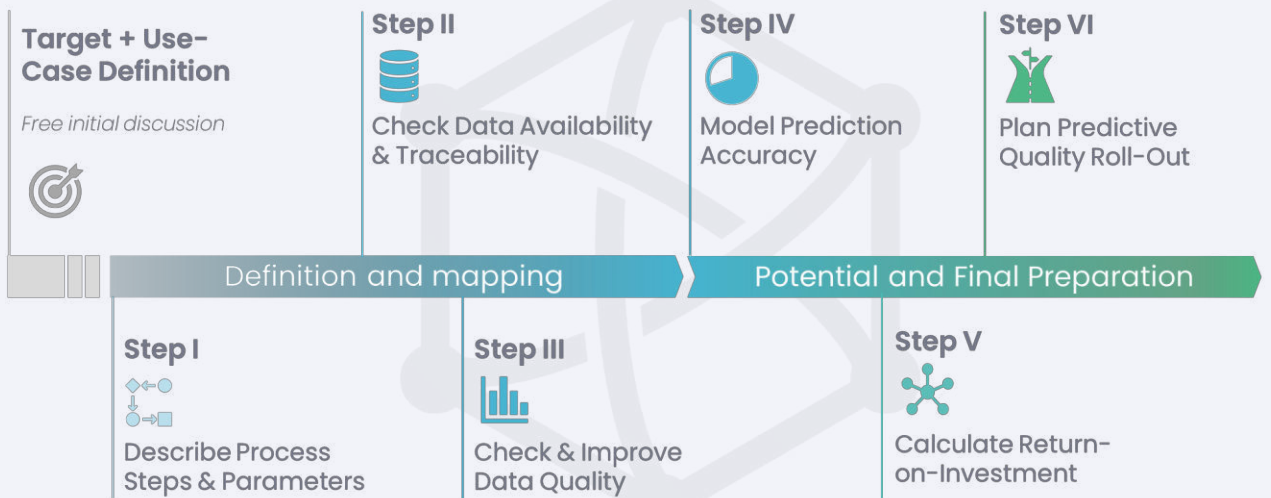
Production data and quality data of produced units are correlated to find correlations.

Correlation models found predict quality for new production units or calculate process correction values.

Thus, inspection efforts can be saved by more targeted inspections or scrap and quality can be optimized.

# What are the 6 milestones for Predictive Quality?

Production engineering use cases are individual but pose the same challenges. Regardless of the industry or manufacturing technology, the steps are always the same.



**Figure:** Systematic workshop concept by IconPro for a cost-efficient proof of concept

## What are the workshop goals?

- ✓ You know which process parameters are relevant for predictive quality
- ✓ You know to what extent quality can be predicted / optimized with your data
- ✓ You have visualized results from the POC & know the potential for savings
- ✓ You have a roll-out concept for the integration into your production



# What do you need to know about the Predictive Quality Workshops?

To achieve a successful proof-of-concept, your cooperation is needed. The right experts on both sides and a minimal basis of production and quality data are the prerequisites.

## How do the workshops work?

For each of the six steps there are several remote meetings between defined experts of the producing company and IconPro. Between the workshops, there are usually 2-3 person days on both sides for the completion of necessary to-dos.



## Do data have to be available?

A perfect database would contain all relevant process and quality parameters that are referenced to each other or to a product or batch ID. For the start, a subset of the parameters in any data source is sufficient. It can be further expanded

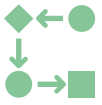


## Which people are needed?

From your side, a responsible person for the Predictive Quality project has to be defined, who collects internal information as well as invites process, quality or IT experts to the meetings as required.







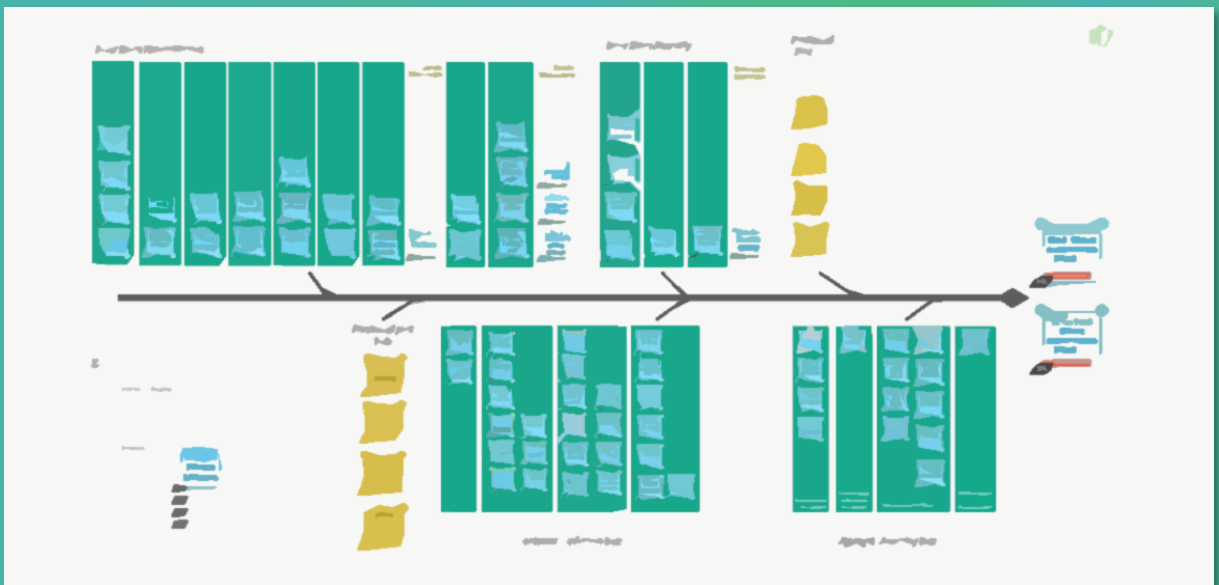
# 1. MILESTONE

## TO A DEEP UNDERSTANDING OF USE-CASE & PROCESS STEPS

**Problem:** Often, the use case is unclear regarding the production and quality steps to be considered and optimized. The same applies to the availability of relevant process and quality data.

**Solution:** Our production experts guide your process experts through systematic workshops for detailed process recording and visualization e.g., by creating Ishikawa and process flow diagrams with focus on relevant parameters & data.

**Value:** The quality and production parameters to be correlated are precisely defined. It is clear which data and which parameters are available in which source and whether important data are missing.





## 2. MILESTONE

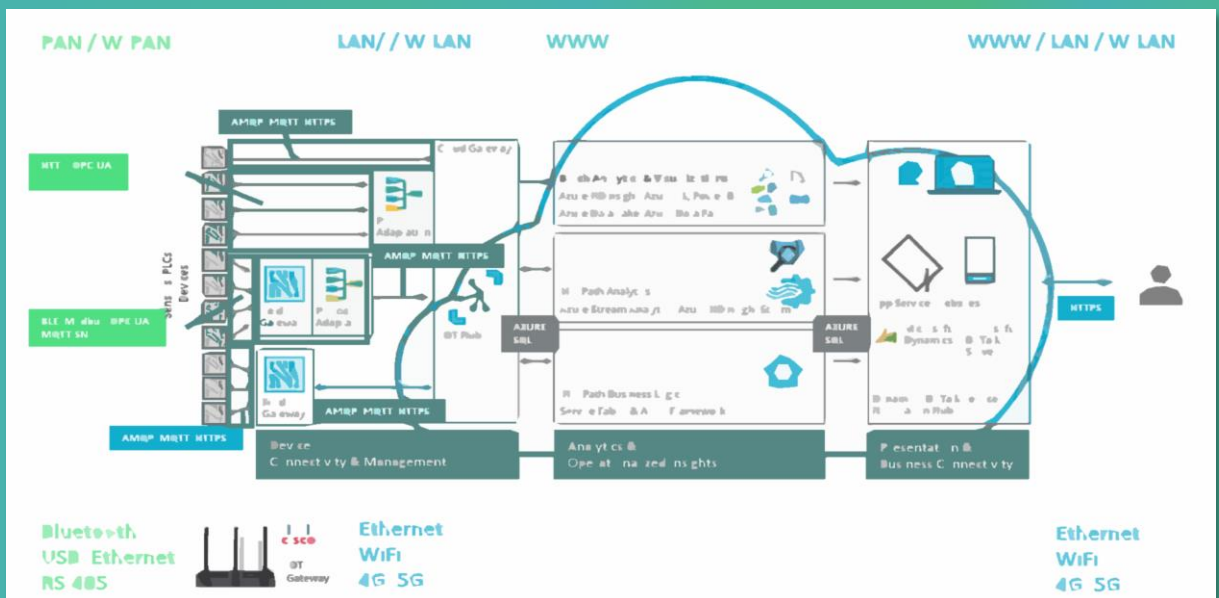
# TO A CLEAR PICTURE OF DATA SITUATION & IT INFRASTRUCTURE



**Problem:** Data for process and quality parameters are often available, but they cannot be readily correlated because they cannot be referenced to each other or are "trapped" in data silos.

**Solution:** Our IT experts, with the help of your IT managers, guide you through systematic workshops to create a detailed IT map. Data silos are identified, and data extracted & referenced using automated scripts.

**Value:** For the first time, the available relevant process & quality data are merged and available as a data set related to products or batches.





## 3. MILESTONE

# TO A SUFFICIENT AMOUNT OF DATA & DATA QUALITY

**Problem:** Knowledge of the relevant process and quality parameters and the consolidation of existing data are necessary conditions for predictive quality. However, only a sufficient quantity and quality of data is sufficient. What sufficient means, is unknown.

**Solution:** With our IconPro ARES software, we evaluate merged production data quickly and intuitively in terms of quantity and quality for individual use cases and visualize the results.

**Value:** Quantity & quality of existing merged data becomes known and improved if necessary. The data becomes correlation capable.



IconPro ARES

Jobs

Training

1. Upload Data
2. Select Features
3. Configuration
4. Training
5. Results

Post-Process

Optimize

Deployments

Predict

Troubleshoot

Tutorial

Step 2: Select Features

34 features selected (1941 rows)

<input checked="" type="checkbox"/>	Feature Name	# Unique Values	Missing	Mean	SD	Min	Max	Type	Target
<input checked="" type="checkbox"/>	Luminosity_Index	1522	0.0%(0)	-0.13	0.15	-1.00	0.64	numerical	<input checked="" type="checkbox"/> SET AS TARGET
<input checked="" type="checkbox"/>	SigmoidOfAreas	388	0.0%(0)	0.59	0.34	0.12	1.00	numerical	SET AS TARGET
<input checked="" type="checkbox"/>	Pastry	2	0.0%(0)	0.08	0.27	---	---	categorical	SET AS TARGET
<input checked="" type="checkbox"/>	7_Scratch	2	0.0%(0)	0.10	0.30	---	---	categorical	SET AS TARGET

Histogram

Correlation

FAQ | ABOUT | LEGAL | PRIVACY | CONTACT | V1.0.0



## 4. MILESTONE

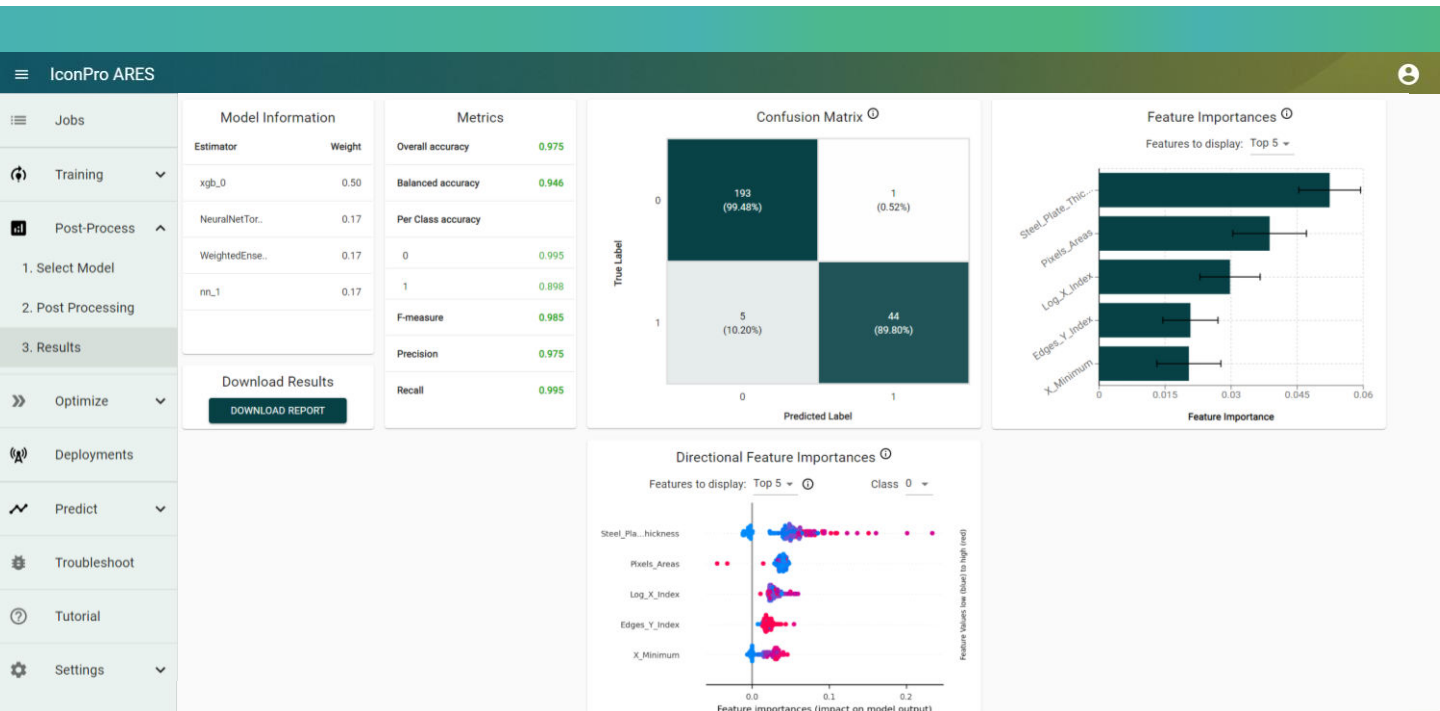
# TO VALIDATED PREDICTION ACCURACIES & PROCESS INFLUENCES



**Problem:** Training machine learning models to correlate quality and production data can take experts and time. Results in the form of statistical parameters are difficult to inspire confidence in process experts.

**Solution:** With our software IconPro ARES we effortlessly correlate merged production & quality data and visualize the most important process influences for the algorithm including directional dependencies for optimization.

**Value:** Predictions about quality become explainable and can be validated with the help of the process experts.







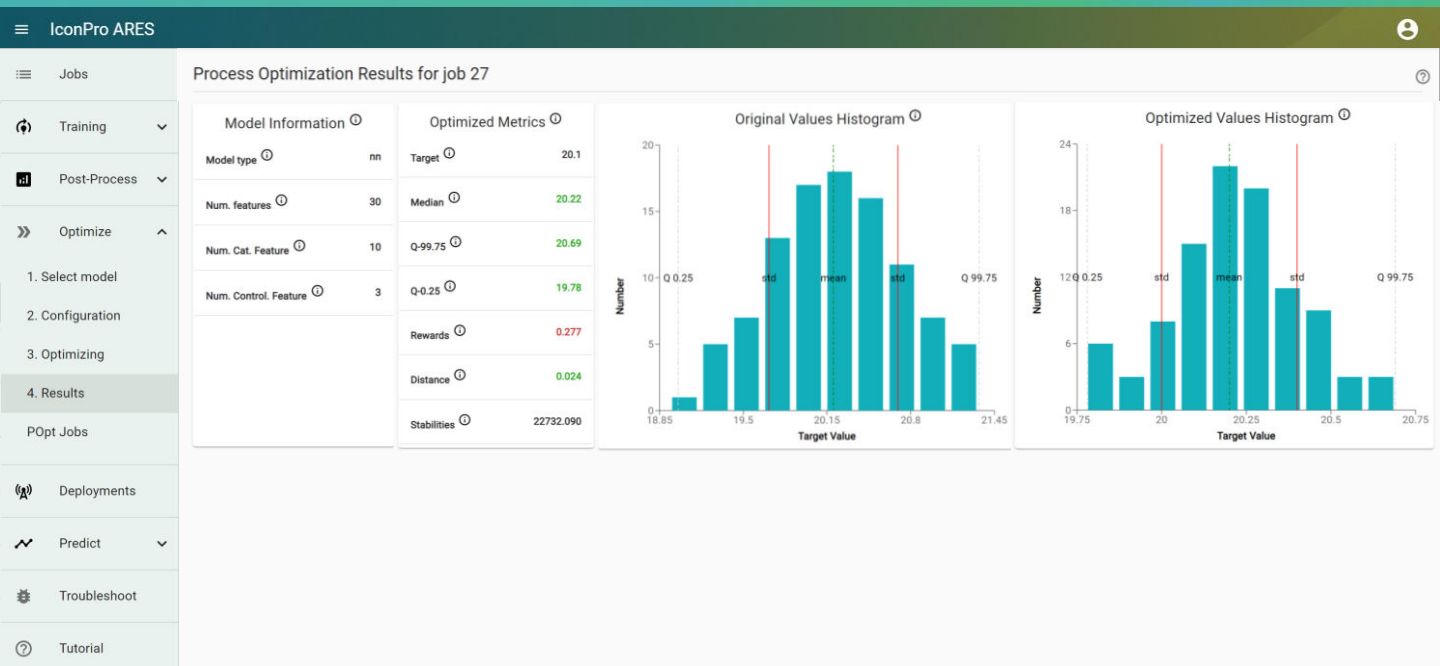
## 5. MILESTONE

# TO A DETERMINATION OF PROCESS OPTIMIZATION & POTENTIAL SAVINGS

**Problem:** As soon as correlations are found in the data and quality becomes demonstrably predictable, the question arises as to the concrete added value to be derived from it.

**Solution:** Together with you, we determine the savings potential for potentially reducible inspection efforts or with regard to process optimization for less scrap, which becomes possible with IconPro ARES. The basis is the determined prediction accuracies.

**Value:** The savings potential of predictive quality through reduced inspection efforts or fewer rejects is becoming known.





## 6. MILESTONE

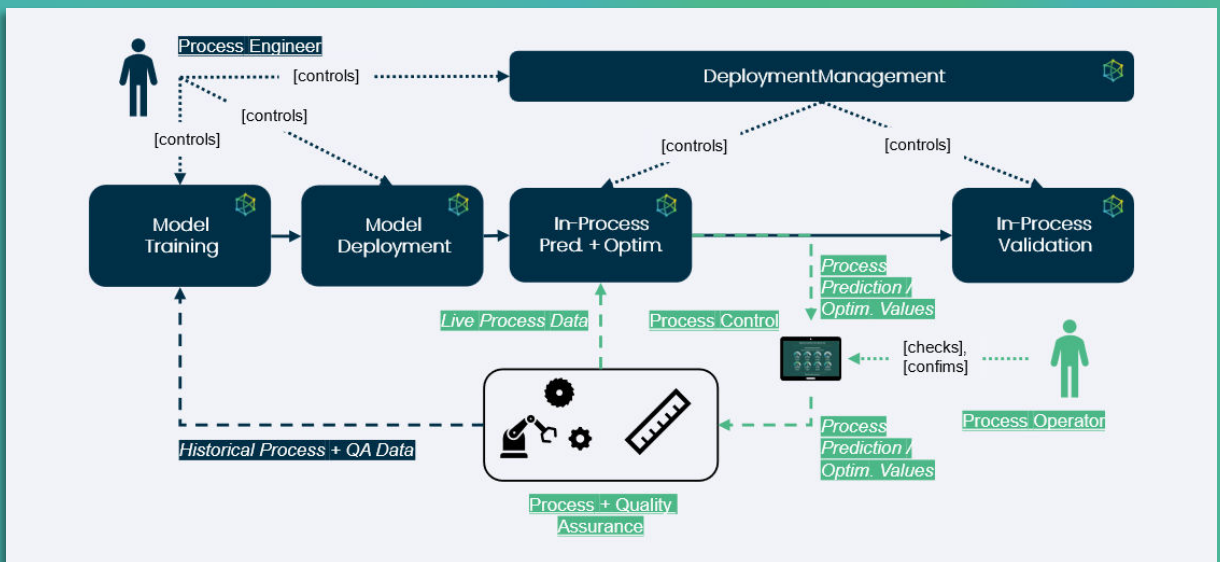
# TO A COST-EFFICIENT ROLL-OUT CONCEPT



**Problem:** In order to smoothly introduce software with a connection to production data or even controls, a precise knowledge of the IT environment is necessary. Only then can the necessary steps be planned.

**Solution:** Our IT experts, with the help of your IT managers, guide you through systematic workshops for detailed recording of the IT environment and network structure.

**Value:** It will be known exactly which steps are necessary for the introduction of Predictive Quality into your IT/OT infrastructure and what efforts are involved. We provide extensive support for the implementation.



# Why is it worth starting with Predictive Quality?

Testing efforts or rejects can be reduced in almost all cases with a systematic approach. In addition, you benefit from increased process transparency and process insights.



## Highest cost efficiency

By starting with a preparatory workshop project instead of directly allocating larger internal or external projects, you ensure the highest cost efficiency with the lowest risk.



## Deep production expertise

Benefit from our manufacturing expertise and years of experience in implementing industrial AI to convince and engage operators and process engineers.



## Excellent software solutions

Our software solutions are ready to use, automated and work on-premise or in-cloud. Minimize the effort required to implement industrial AI after a successful POC.



## How to start with IconPro?

We will be happy to take 30 minutes of your time in an initial non-binding meeting to discuss your application and make initial recommendations.

Contact us by mail and take the first step towards predictive quality & process optimization today: [info@iconpro.com](mailto:info@iconpro.com)



IconPro is a leading technical provider of software solutions for predictive quality & predictive maintenance as well as process & energy optimization in production.

IconPro software helps manufacturing companies of all sizes to achieve more efficient and sustainable processes and machines. Our customers produce more competitively with less costs and resource usage.

Originating from the Machine Tool Laboratory of RWTH Aachen University, the largest institute for production research in Europe, we offer in-depth production expertise and software tailored to the shopfloor.

Learn more about IconPro at [iconpro.com](https://iconpro.com) or follow us on [LinkedIn](#). Please feel free to write to us at: [info@iconpro.com](mailto:info@iconpro.com).