ELEGANCE: machinE LEarning for inteGrated multi-parAmetric eNzyme and bioproCess dEsign

DC15: Hybrid machine learning models for data-driven bioprocess optimisation

Organization

- **Industrial host:** DataHow (www.datahow.ch)
- **Main / Industrial supervisor:** Dr. Alessandro Butté (CEO DataHow)
- **Academic awarding institution:** University of Padova (www.UniPd.it/).
- **Academic supervisor:** Prof. Fabrizio Bezzo (personal page)
- **Workplace:** Italy, preferably either Milan or Padova (final location to be agreed with the host and academic supervisor).

DataHow is a pioneering company, leader in ML/AI-driven process modeling, combining first-principles process knowledge with data-driven machine learning to extract maximum insight from experimental and manufacturing data.

We are a Swiss technology company founded as a spin-off of ETH Zurich in 2017, and our mission is democratizing the use of AI/ML, enabling non-experts to extract meaningful value from process data through hybrid modeling technologies. We have embedded this technology into our flagship intelligence platform, DataHowLab, which is supporting multiple bioprocess modalities, such as mammalian, microbial, mRNA, CGTs, as well as unit operations, such as upstream, chromatography, and UF/DF.

We are proud of serving 14 out of the 20 largest world biopharmaceutical companies, and we are engaged into several industrial partnerships to translate advanced modeling methods and reliable digital twin technologies into practical, deployable solutions that advance the Pharma 4.0 agenda.

Today, DataHow operates out of four sites (Zurich/CH, Milan/IT, Lisbon/PT, and Philadelphia/US), with more than 40 collaborators coming from 11 different countries, and a highly interdisciplinary environment (engineers, biotechnologists, data scientists and software engineers). As witnessed by this project, we are effortlessly dedicated to continuous innovation, supporting multiple academic collaborations with prestigious institutions like ETH Zurich, Imperial College, and TU Berlin.

In this project, the University of Padova (UniPd) will be our academic partner and academic awarding institution for the PhD title. One of the oldest universities in the world, founded in 1222, UniPd is internationally recognized for its long history of scholarship, academic freedom and contributions to science. It is a large public research university with a comprehensive set of departments and programs spanning the natural sciences, engineering, medicine and the humanities.

Roles and responsibilities

The PhD will be carried out in 3 years at UniPd under the supervision of Prof. Fabrizio Bezzo and as employee of the Italian branch of DataHow (DataHow S.r.l.) with a permanent contract, under the supervision of Dr. Alessandro Butté. Within this time, it is expected that two research stays (3-4 months each) will be conducted at UniPd and Aarhus University, Denmark (AU). The employment contract might be extended beyond the duration of the project. The Horizon Europe Marie SkłodowskaCurie Action (MSCA) doctoral network (DN) project starts in January 2026. The date of recruitment is planned for Sep/Oct 2026. Your PhD degree will be awarded based on successful completion of the research work at UniPd and you will be involved in other industrial projects as DataHow's employee. You will also be required to participate in the training events

organized by the consortium and by DataHow (see here) and you are expected to contribute with the dissemination of your PhD results via publications and conferences.

PhD Project

The PhD project will develop hybrid models for the different bioprocesses developed within the consortium combining AI/ML tools with kinetic models (hybrid models). Initially, existing data within the partners (AU) will be used, but then models will be used to design additional experiments to develop and optimize the process according to the Quality-by-Desing (QbD) principle in collaboration with the other partners. In the later stages of the process, scale-up and scale down models will be used to support the tech transfer of the process to production, in addition to the use of the models to support real-time process monitoring and control.

The PhD project will focus on:

- Development of hybrid models for bioprocesses (Bayesian Neural ODEs)
- Optimal design of experiments using Bayesian optimization
- Knowledge transfer across products and scales
- Model driven process characterization (critical process parameters, design space, etc.)
- Model driven process validation
- Model driven process monitoring and control

Main supervisor: Dr. Alessandro Butté, DataHow (LinkedIn, Google Schoolar)

Co-supervisor 1: Prof. Fabrizio Bezzo, UniPd (LinkedIn, Google Schoolar)

Co-supervisor 2: Dr. Harini Narayanan, DataHow (LinkedIn, Google Schoolar)

Co-supervisor 3: Selin Kara, Aarhus University (LinkedIn, Google Schoolar)

Qualifications:

- MSc (or equivalent) in computer science, biochemical engineering, biochemistry, or related area, preferably with experience in machine learning and artificial intelligence.
- Coding experience, preferably in Python or Julia.
- Experience or training in data science and machine learning.
- Excellent English proficiency in written and oral form.
- Excellent communication skills for working within an interdisciplinary research team.
- Strong analytical skills, high motivation, and ability to work independently.

Preferred qualifications but not mandatory:

- Direct experience with developing machine learning models and in hybrid models
- Motivation in working in a highly interdisciplinary environment and in close contact with important pharmaceutical companies and original equipment manufacturer (OEMs).
- Interest in advanced computational methods to improve and understand bio manufacturing processes.
- Interest in entrepreneurship to make a positive impact on planetary and human health.

Conditions of employment

You must have a two-year master's degree (120 ECTS points) or a similar degree with an academic level equivalent to a two-year master's degree.

Approval and Enrolment

The scholarship for the PhD degree is subject to academic approval, and the candidate will be enrolled in one of the general degree programs at UniPd. For information about our enrolment requirements and the general planning of the PhD study program, please check here.

We offer

DataHow is a leading company in the development of digital twins and ML/AI solutions for biopharma. UniPD is a leading technical university globally recognized for its excellence in research, education, innovation and scientific advice. Your work will link academic research and industrial applications. We strive for excellence and innovation, and we offer the possibility of having a direct impact on industry and how drugs will be manufactured in the future. We offer the possibility of working in an international and multidisciplinary environment, with several possibility of traveling among our different sites for the different training, work, and meeting activities we regularly plan as company.

Salary and appointment terms

The preferred starting date is 1st September 2026 (or according to mutual agreement). You will be employed with a permanent Italian work contract by DataHow S.r.l., and you will be enrolled as doctoral student at UniPd, starting on 1st November 2026. The salary will be based on the Marie S. Curie compensation scheme conditions and according to the grant agreement. The minimum period of employment is 3 years. The gross monthly salary will start from 4'531€ to 5'054€ if eligible for family allowance (12 monthly installments). Finally, it is possible to apply for family allowance.

Further information

- Dr. Alessandro Butté: a.butte@datahow.ch
- Prof. Fabrizio Bezzo: fabrizio.bezzo@UniPd.it
- DataHow – www.datahow.ch
- Website about MSCA doctoral network ELEGANCE: https://elegance.dtu.dk/

Application procedure

Your complete online application must be submitted no later than January 31st, 2026 (23:59 Danish time). Applications must be submitted as one PDF file containing all materials to be given consideration. To apply, please click the link "Apply now", fill out the online application form, and attach all your materials in English in one PDF file. The file must include:

- A letter motivating the application (cover letter)
- Curriculum vitae
- Grade transcripts and BSc/MSc diploma (in English) including official description of grading scale
- Names and contacts of 2–3 referees willing to provide confidential letters

Clearly indicate “DC 15 — Hybrid Models” in your application and send the application to Dr. Alessandro Butté for reference (a.butte@datahow.ch). You may apply prior to obtaining your master's degree but cannot begin before having received it.

Applications received after the deadline will not be considered.

All interested candidates irrespective of age, gender, disability, race, religion or ethnic background are encouraged to apply. As DataHow works with major research and pharmaceutical institutions and UniPd works with research in critical technology, all subject to special rules for security, open-source background checks may be conducted on qualified candidates for the position.