



EXPLICABILITY CAUSALITY

DATAIA PARIS-SACLAY INSTITUTE

Located within the **Paris-Saclay University** (16th in the Shanghai ranking, 1st in mathematics), it is the **first French ecosystem in Data Sciences, AI and their societal impacts**.

MISSION

To bring together **multidisciplinary expertise and boost the collective strength of its partners** in the Paris-Saclay cluster with the aim of combining big data and AI technologies with social sciences and humanities for an AI at the service of humans.

IN FIGURES

12

DATAIA members

42

laboratories
partners

1,2k

full-time
researchers

10

IA chairs out of
40 national

30

IA theses

450

PhD students
per year



The Industrial Affiliation Plan (PAI) aims to **boost the collective strength of the Institute's academic ecosystem and its industrial members**. The services offered in response to the respective needs expressed include:

- Joint actions to support research;
 - Sharing of experiences and collective needs;
 - Facilitated access to recruitment;
 - Access to training, seminars, workshops, etc.;
 - Implementation of dedicated events (hackathons, challenges, etc.);
 - Access to working places to increase exchanges.
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The D2C system aims **upstream**, to present the priority research issues and to match them with the problems of industry. **Downstream**, to monitor contacts and opportunities for collaboration identified until they are set up and launched. It is part of the ambition to facilitate the establishment of several levels of collaboration and create a constructive dynamic:

1. Expertise / Student projects / Internships
2. Research collaborations / CIFRE theses
3. Joint laboratories / Joint teams
4. Multi-partner chairs

OBJECTIVES & PROGRAM



The main objectives of this D2C are focusing on aspects of causality, from predictive models to causal ones.

- Common definition to make clear the difference with explainability issues;
- Why: what some can do and not others;
- How to build a causal model?

2pm - 2:05pm

Introduction by **Bertrand Braunschweig** - Inria Director and President of the DS&AI Systematic Hub

2:05pm - 3:05pm

State of the art by **Michèle Sebag** (CNRS, Université Paris-Saclay, LRI) « *Causal modelling & machine learning* » and **Julie Josse** (Inria, CMAP) « *Causal effects treatments theory* »

3:05pm - 3:45pm

Pitch: points of view of researchers and industrialists - research angles, needs, issues

3:45pm - 4:45pm

Brainstorming: collective construction of topics of general and shared interest

4:45pm - 5:45pm

Deepening in small committees in order to identify topics for bilateral projects

5:45pm - 5:50pm

Conclusion and action plan

DATAIA RESEARCHERS



**Solving discrimination and regression problems,
studying causal relationships**

Isabelle Guyon (Université Paris-Saclay, LRI)
*Support Vector Machines (SVM), statistical data analysis,
pattern recognition, statistical learning automation*



Counterfactual inference to estimate treatment effects

Blaise Hanczar (Evry University, IBISC)
*Deep learning, supervised learning, prediction systems,
performance evaluation*



How to estimate a causal effect from observational data?

Julie Josse (Inria, CMAP)
*Missing data, causal inference, estimation of heterogeneous
intervention effects, personalized medicine*



Causale inference in information theory and statistics

Pablo Piantanida (CentraleSupélec, L2S)
Deep learning, information representation, inference mechanisms

DATAIA RESEARCHERS



Causal modelling & Machine learning

Michèle Sebag (CNRS, Université Paris-Saclay, LRI)

Inference and learning, symbolic and numerical approaches to AI



Identification of causal factors/variables in a model

Myriam Tami (CentraleSupélec, MICS)

Modeling, machine learning, complex and heterogeneous data



Causal inference from a statistical perspective: estimation and model selection

Bertrand Thirion (Inria, Neurospin)

Statistical modeling and machine learning applied to brain imaging data

DATAIA CLUB PAI COMPANIES



GE Healthcare

Elements of causality to understand predictions from medical images

Nicolas Gogin - Deep learning and image analytics
Jorge Hernandez Londono - Staff Software Engineer

**GROUPE
RENAULT**

Interpretation of car crash calculation results, search for root causes

Yves Tourbier - Optimization and decision support expert
Benoît Laussat - PhD Student

Causal inference to inform Model Based Clinical Drug Development

Departement R&D Digital and Data Sciences

Franck Auge - Translational sciences, Bioinformatics
Caroline Cohen - Strategy and Business Lead Europe
Paolo Piro - Clinical Data Sciences

Bernard Sébastien - Clinical Modeling and Evidence Integration

Departement Molecular Design Sciences

Hervé Minoux - In-Silico Science activity
Bruno Filoche - Compounds Data-Science activity

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Charles Hebert - Director of R&D Data Driven Program

GUEST COMPANIES



Number of criteria for estimating strong causality towards more in-depth models

Yannick Grelot



Using causal models to value companies

Delphine Monti



Causal inference and treatment/
action estimation solution

Jean-Yves Gerardy
Léo Dreyfus-Schmidt

INSTITUTIONAL PARTNERS



université
PARIS-SACLAY



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