

**Dottorato in Intelligenza Artificiale
(Dottorato Nazionale)
Italian National PhD in Artificial
Intelligence**

Welcome event - Incontro inaugurale

Monday, 20th November 2023

09:30-12:30, University of Pisa,

Aula Magna Storica del Palazzo della Sapienza



National Ph.D. in Artificial Intelligence

WELCOME MEETING (39° Cycle)

**Aula Magna Storica, La Sapienza, University of Pisa, Via
Curtatone e Montanara 15, Pisa, Italy**

November 20th h 09.30

University of Pisa

Agenda

09:30-09:45: **Institutional Greetings:**

- **Prof. Bernardo Tellini**, Prorector for P.h.D., University of Pisa
- **Prof. Maria Grazia Scutellà**, Vicedirector of the Department of Computer Science, University of Pisa
- **Dr. Marco Conti** Delegate of the President of National Research Council (CNR)

09:45-10:15: **The Italian National PhD in AI & its Scientific Vision**

- **Prof. Dino Pedreschi**, Coordinator of the National Ph.D. in AI, University of Pisa

10:15-10:45: **Tour de Table of the PhD Students & Board Members**

10:45-11:30: **PhD Programme Organization**

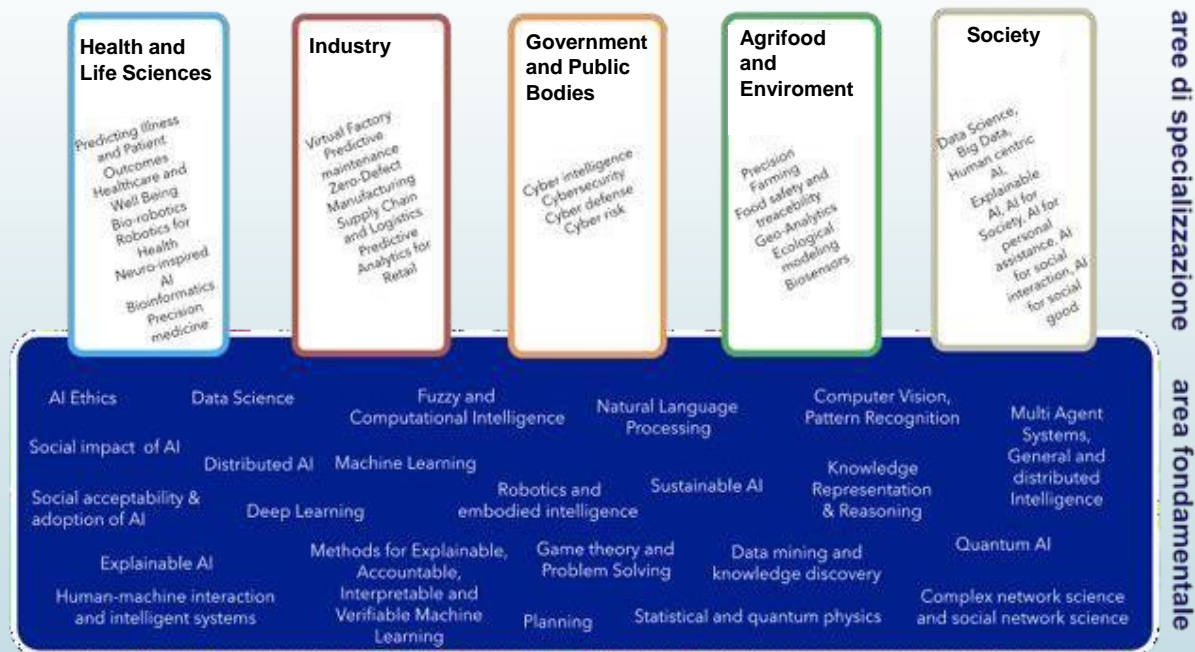
- **Prof. Dino Pedreschi**, Coordinator of the National Ph.D. in AI, University of Pisa
- **Prof. Anna Monreale**, Coordinator of the National Ph.D. in AI, University of Pisa
- **Dr. Simone Farinella**, University of Pisa

11:30-12:30: **BabelNet to the Test of Time: Extracting Language-Independent Meaning from Text in the Era of Large Language Models**

- **Prof. Roberto Navigli**, Sapienza University of Rome

12:30-14:30: **Networking Lunch**

PhD-AI.it: Scientific Model



Italian National Ph.D. in AI

The Italian National Ph.D. in Artificial Intelligence (AI) deals with topics central to the digital transformation of society. It aims to boost research, industrial and social innovation in the country. The Italian National Ph.D. in Artificial Intelligence & Society (University of Pisa) is part of a federation of 5 Ph.D. programs in the field of Artificial Intelligence. Each of them is organized by a lead University and a broad consortium of Universities and research centers. The 5 Ph.D. programs have both a common basis focused on the foundational aspects of AI and 5 areas of specialization:

Campus Bio-Medico Roma

Federico II University of Naples

La Sapienza University of Rome

Politecnico Torino

University of Pisa

Health and Life Sciences

Agrifood & Environment

Government & Public Bodies

Industry

Society

Partner Institutions



Associated Universities, Institutions and Companies



Ph.D. AI & Society - University of Pisa

Federated Universities and Research Centers:

University of Florence, University of Siena, University of Trento, University of Bari “Aldo Moro”, Alma Mater Studiorum University of Bologna, University of Modena and Reggio Emilia, Università Cattolica, L’Orientale University of Naples, Scuola Normale Superiore, School for Advanced Studies Sant’Anna, School for Advanced Studies IMT, Gran Sasso Science Institute, INFN, University of Aquila, University of Sassari, University of Messina, CNR/ISTI, CNR/IIT, CNR/ILC.

Company:

Energiee3 s.r.l.

AI & Society 39° Cycle's Numbers:

Available Grants: **52**

Applications: **140**

Ranked Candidates: **71**

Awarded Grants: **45**

Extra Positions: **2 Supernumerary Candidates**

Awarded PNRR Grants

- 14 Grants funded by PNRR (**Decr. n. 118/2023**)
- 7 Grants funded by PNRR (**Decr. n. 118/2023, Public Administration**)
- 2 Grants funded by PNRR (**Decr. n. 118/2023, Digital and Environmental Transitions**)
- 2 Grant funded by PNRR (**Decr. n. 117/2023**)
- 7 Grants funded by **FAIR**: 3 University of Bari “Aldo Moro”, 1 University of Pisa, 1 University of Modena and Reggio Emilia, 1 University of Bologna and 1 NextGenerationEU (CNR/IIT)

Other Awarded Grants

- 8 grants funded by **Scuola Sant'Anna (2), University of Modena and Reggio Emilia (2), University of Pisa (2) and INFN (2).**
- 2 grants funded by **SoBigData (1 CNR/ICAR e 1 CNR/IIT).**
- 3 grants funded by **ITSERR (2 CNR/ISTI e 1 UniMore).**

Ph.D. AI & Society – University of Pisa

The study of society and the **complexity of social and economic phenomena** has received a strong boost in the last decade thanks to **AI and Data Science** methods, powered by the social microscope of **big data analytics** and **social mining** through **interdisciplinary hybridisation with social and economic sciences**. The combination of the model-driven and data-driven approaches of **data mining, machine learning and network science** is progressively increasing the ability to observe, measure, model and predict complex socio-economic phenomena, such as **human mobility** and the dynamics of cities, **migration** and its economic determinants, the **wellbeing** dimensions of communities, the formation and dynamics of opinions and **online conversations**, and the **social impact of AI** systems. This scientific line is intertwined with that of **human-centered AI**, the development of advanced forms of **human-machine interaction** capable of improving the quality of individual and collective **decision making** in sensitive fields, from **health to justice**, economic transactions, and risk assessment in various social and economic domains. The AI for Society specialisation area will focus on crucial topics such as **explainable AI**, AI for personal assistance, AI for social interaction, **AI for social good**, following an approach aimed at incorporating shared ethical values (**ethics-by-design**) in AI systems and at achieving common goals, with a view to sustainability, diversity, respect for human dignity and autonomy, inclusiveness and social acceptability.



<https://www.humane-ai.eu/>

Shaping the AI revolution in a direction that is beneficial to humans on both **individual** and **societal** levels



Call for tender for the presentation of intervention proposals for the Creation of Enlarged Partnerships extended to Universities, Research Centres, Enterprises and funding basic research projects to be funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3 funded from the European Union - NextGenerationEU.



Piano Nazionale di Ripresa e Resilienza



National Research Council of Italy

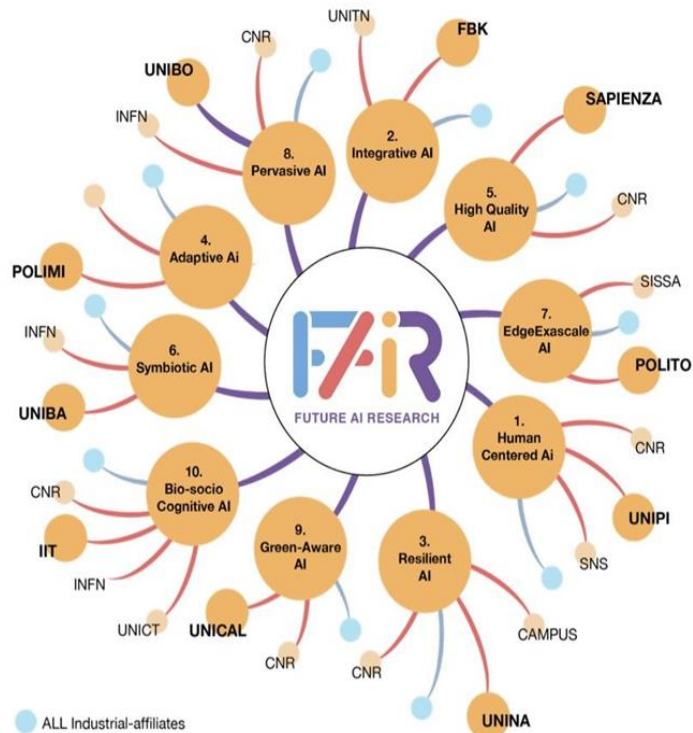


Fig. A.2 Spokes and Affiliates



FUTURE AI RESEARCH

Spoke 1 – Human-centered AI Università di Pisa



Spoke 1 - Human-centered AI - Partners



UNIVERSITÀ DI PISA



Consiglio Nazionale
delle Ricerche



SCUOLA
NORMALE
SUPERIORE

Spoke 1: the research questions

- 1) **“human-in-the-loop” machine learning and reasoning:**
how humans and AI interact synergistically in complex (decision making) tasks
- 2) **social-aware AI:**
how to understand and govern the societal outcomes of large-scale socio-technical systems of humans and AIs
- 3) **design of trustworthy AI systems:**
how to the responsibly (co-)design, develop, validate and use trustworthy AI systems

Extensive **experiments, case studies and pilots** of H-AI systems

WP1.1 - **Explainable AI for synergistic Human-AI collaboration**

Task lead: SNS, co-PIs: **Fosca Giannotti, Riccardo Guidotti.**

i) **conversational explainable AI**

ii) engaging users with factual, counterfactual and other **high-level explanations**

iii) novel **self-aware ML models** that “*know what they don't know*”, that are capable to recognize when and why to defer decisions to humans and to interact with human cognition both at intuitive (system1) and rational (system2) level.

Connected to TP Learning and Reasoning from individual to communities to society (TP3).

WP1.2 – “System1 and System2” Machine Learning and Reasoning

Task lead: CNR, co-PIs: **Umberto Straccia, Salvatore Ruggieri.**

i) **bridging neural (System 1) and symbolic (System2) learning and reasoning**; design representational systems with inference and learning algorithms that can support human centered AI.

ii) **exploring the foundations of learning and reasoning**; investigate models from statistical physics and mathematics for idealized and practical learning

WP1.3 - Human centered Lifelong Learning for Complex Data

Task Lead: UNIFI, co-PIs: Alessio Micheli, Fabrizio Sebastiani.

- how deep learning architectures (transformers, graph NN, GANs, autoencoders, ...) can **continuously and incrementally learn new concepts**.
- push forward the frontier of **learning in complex dynamic domains** (streams; time series; trajectories; graphs; knowledge graphs; multimedia, time-varying networks)
- **Cross-modal/cross-language lifelong learning**.

Connected to TP Frontiers of Machine Learning (TP6).

WP1.4 - Human-AI Socio-technical Complex Systems

Task lead: UNIPI, co-PIs: **Dino Pedreschi, Chiara Boldrini.**

- analysis of **large-scale, networked socio-technical systems**
- understand how **users and AIs interfere and influence each other**, shaping individual and collective outcomes.

Connected to TP Learning and Reasoning from individual to communities to society (TP3).

WP1.5 – Decentralized, Cooperative Learning

Task lead: CNR, co-PIs: Raffaele Perego, Francesco Marcelloni.

- how a complex network of **distributed interactive learning agents** cooperate in a collective ML task.
- novel models and architectures for **networked, decentralized, federated, cooperative, privacy-preserving machine learning**

WP1.6 - Co-design methodologies for trustworthiness-by-design

Task lead: UNIPI, co-PIs: Adriano Fabris, Anna Monreale.

- design methodologies for trustworthy AI systems
 - a. sustainability of the Human Oversight principle of the **AI Act**.
 - b. **trustworthiness by-design and in-design** methodologies
 - c. **ethics-for-designers** methods and tools for **auditing and monitoring AI systems** and verifying their compliance with ethical values and legal norms

Connected to transversal project TP *Legal & Ethical Design for Trustworthy AI systems*. (TP1).

WP1.7 – Empirical studies and pilots of human centered AI

Task lead: UNIPI, co-PIs: F Marcelloni, R Perego, S Ruggieri

experimenting and prototyping H-AI systems in real scenarios

i) **massive observational and interventional studies** on real and simulated platforms, validation trials for AI-based socio-technical ecosystems, AI-based methods for fighting misinformation online;

ii) **AI-assisted decision making systems** in healthcare, urban mobility and geography, recruitment, public policy, finance, justice, engineering, scientific research (such as high-energy physics and archaeology).



PNRR has activated 18,770 doctoral grants in 2023-2024.

The resources are allocated as follows:

- 13.292: Grants for innovative Ph.D.
- 2.539: Grants in the fields covered by the PNRR, the so-called 'generic' ones
- 2,140: Grants for Public Administration
- 389: Grants for Cultural Heritage
- 410: Grants for Digital and Environmental Transitions

sobigdata.IT

■ ■ ■ ■ ■ Social Mining & Big Data Analytics

SoBigData

RESEARCH INFRASTRUCTURE



Tour de

table

PhD Students and Board Members

PhD course organization

Dino Pedreschi, Anna Monreale and Simone
Farinella

Assignment of PhD Students to Grant/Institution

- Formal assignment to grant/institution approved by the PhD Board (30/10/2023)
- From an administrative point of view, each Ph.D student belongs to UniPi
- From a scientific point of view, each Ph.D. student develops their research activity at the university/institution that finances or co-finances the Ph.D. grant.
- The reference workplace (desk) of each Ph.D. student is provided by host institutions
- UNIPi/Computer Science Department (Largo Bruno Pontecorvo 3, Pisa) provides open space desks for temporary visiting PhD students

Training Activities: requirements

Minimum **140 hours** of courses to be attended (overall in 3 years, the earlier the better):

- **Courses with exams: at least 80 hours.** These courses should be selected among those made available by our PhD programme ([Training - National Ph.D. in Artificial Intelligence for Society \(unipi.it\)](#)), partners institutions or other PhD-AI.it programmes (La Sapienza, Campus Bio-medico, Politecnico Torino and Federico II).
- **Courses without exams: at least 60 hours** of training activities provided by PhD-AI.it universities/research institutions or from other Italian/International institutions.
- **PhD Summer Schools organized by PhD-AI.it:** These activities should be included within the 60 hours mentioned before.

Training Activities

Seminars, “Summer School” and other training activities

Additional 60 hours of training activities (without exams) may include:

- **Cycles of seminars** and **doctoral schools** organized by universities or research institutions external to PhD-AI.it and aimed exclusively or mainly at doctoral students

Additional 60 hours of training activities may include up to a maximum of 20 hours:

- Activities on soft skills, research management, European and international research systems, entrepreneurship, intellectual property, etc., organized by the universities or research institutions of the PhD-AI.it.

AI & Society Summer School 2022/23

Where: Le Nereidi Hotel, La Maddalena, Italy

When: 04-09th June 2023

The second edition of the “AI & Society Summer School”, organized by the Italian National PHD program in Artificial Intelligence, PhD-AI.it is dedicated to the PhD students of the “AI & Society” branch of PhD-AI.it, and open to PhD students of the other branches. Five thrilling days of lectures, panel, poster sessions and proactive project work, to advance the frontier of AI research together with internationally renown scientists. And plenty of social activities to mix up and build the community of next-generation AI researchers, innovators and professionals

Study Plan

- Each PhD student drafts a study plan in collaboration with their supervisors **within December 15th 2023**.
- Each PhD student **must** send her/his **study plan to coordinator-ai-society@phd-ai.it** and **secretariat-ai-society@phd-ai.it**. Write an email with your supervisor in cc. In the email write that the reference person (supervisor) finds the study plan matching with your research.
- The coordinators will approve/reject the study plan.
- The study plan can be modified: send an email to **coordinator-ai-society@phd-ai.it** and **secretariat-ai-society@phd-ai.it** with your supervisor in cc.
- Supervisors/Coordinators can indicate for a specific student additional courses for alignment purposes (up to a maximum of 60 hours)

PhD Course 2023/24

- Training activities are both onsite and online.
- You can find the update list of Ph.D. courses at: [Training - National Ph.D. in Artificial Intelligence for Society \(unipi.it\)](#)
- To certify the attendance at the courses (without exam) and the passed exams, each PhD student must send to **secretariat-ai-society@phd-ai.it** the dedicated form signed by the professor that held the course.

Research Activity & PhD Thesis

Supervisors

- The PhD Board will assign to each Ph.D. student two supervisors by May/June 2024.
- One of your supervisors is the reference person of your grant (start working/collaborating with them asap)

Individual Panel for each PhD student

- The Panel has an advising role for the yearly PhD student assessment.
- The Panel is approved by PhD Board
- Panel composition:
 - 2 supervisors
 - 2 additional members
 - at least 2 members should be part of the PhD Board
 - foster diversity in terms of interdisciplinarity and collaboration between different research groups

Evaluation Steps for the PhD activities

End of the first year: Definition of the Panel & Thesis Proposal

- Submission of the proposal to the panel + presentation and evaluation (September-October 2024)
- The panel will send the assessment to the PhD Board
- The PhD Board will decide on the admittance to the second year

End of the second year: Thesis Progress

- Presentation of the research progress to the panel + evaluation
- The panel will send the assessment to the PhD Board
- The PhD Board will decide on the admittance to the second year

End of the third year: Final Thesis

- Presentation of the final thesis to the panel
- Evaluation from 2 external reviewers
- **Defense** and final evaluation to get the PhD degree

Available funding for PhD students

- **Grant:** over 3 years: 48.729,00 €
- **Budget 20% for research activity** (overall 3 years): 9.745,80 €
- **Functioning funds** (available since the first year): 1.264,01 €
- Possibility of periods of study/research abroad: up to 18 months,
Fellowship increased 50%

PNRR GRANTS

Duties related to doctoral grants **d.m. 117** and **d.m. 118** (generic, public administration and environmental and digital transition):

- **117:** 1) study and research periods of 6 months abroad and 2) study and research periods of 6 months in a company.
- **118 generic:** 1) research periods of 6 months abroad.
- **118 public administration:** 1) research periods of 6 months abroad and 2) study and research periods of 6 months in companies or research centers or public administrations.
- **118 Digital and Environmental Transitions:** 1) study and research periods of 6 months abroad and 2) study and research periods of 6 months in companies or research centers.

Missions in Italy or Abroad

- Send a preliminary email to coordinator-ai-society@phd-ai.it and secretariat-ai-society@phd-ai.it asking the authorization for the mission in Italy or abroad.
- The **request for authorization** should always be made on the **Ugov Web** at least **five days before the start of the mission**. Specify what project will cover the expenses.
- **Keep all receipts**. If you are in a non-euro zone and you pay by electronic means, remember to attach the bank statement to the **mission reimbursement**. In this way you can overcome the exchange rate problem and be reimbursed for what you actually spent.
- When you are back and you create a request for reimbursement, upload all the mission expenses and attach the scans of ALL receipts.
- Further information at: [Secretariat - National Ph.D. in Artificial Intelligence for Society \(unipi.it\)](http://unipi.it)

Contacts

Coordinator PhD-AI for Society	<u>coordinator-ai-society@phd-ai.it</u>
Secretariat PhD-AI for Society	<u>secretariat-ai-society@phd-ai.it</u>
PhD Students PhD-AI for Society <u>39th cycle</u>	<u>phdstudents-39-ai-society@PHD-AI.IT</u>
PhD Students PhD-AI for Society	<u>phdstudents-ai-society@PHD-AI.IT</u>

Q&A

Welcome & best wishes to our PhD students!