UNIVERSITÀ DI PISA

DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

"Science of science – Making sense of big scholarly data"

Prof. Andrea Mannocci

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Short Abstract:

Over the last decade, research has scaled up tremendously in complexity. The number of contributing institutions, collaborations, projects, and funding opportunities has grown exponentially, thus characterising research as a multifaceted, high-frequency, global-scale phenomenon deeply bonded to a delicate socio-economical and geopolitical context. Researchers nowadays produce millions of articles, data, software, patents, preprints, and grant proposals each year, leaving explicit digital fingerprints of their daily endeavour.

The ever-increasing availability of this data has catalysed the emergence of a new multidisciplinary field, called Science of Science, which, by helping us to comprehend the evolution of science and its dynamics quantitatively, has the potential to unlock enormous scientific, technological, and educational value. A blend of methodologies, tools and theoretical frameworks from multiple fields, such as data science, network science, artificial intelligence, and social science, offers novel opportunities to make sense of these millions of data points. Together, they unfold a complex yet compelling story on scientific career pathways, scientific collaborations, knowledge shaping and production, and the manifold, competing factors leading to scientific advancement.

Such opportunities – and the challenges here stemming – are feeding a growing community of researchers aiming at understanding scientific progress and its inner mechanisms, and providing insight on the factors that can generate successful science, allocate better the available resources, increase equality and fair access to opportunities, and therefore benefit science as a whole.

Course Contents in brief:

- Science of science
- Scientometrics
- Bibliometrics
- Data science
- Open science

- Scholarly communication

Total # of hours of lecture: 20

References:

[1] Wang, D., & Barabási, A. L. (2021). The science of science. Cambridge University Press.

[2] Fortunato, S., Bergstrom, C. T., Börner, K., Evans, J. A., Helbing, D., Milojević, S., ... & Barabási, A. L. (2018). Science of science. Science, 359(6379), eaao0185.

[3] Sugimoto, C. R., & Larivière, V. (2018). Measuring research: What everyone needs to know. Oxford University Press.

[4] Bornmann, L., & Mutz, R. (2015). Growth rates of modern science: A bibliometric analysis based on the number of publications and cited references. Journal of the Association for Information Science and Technology, 66(11), 2215-2222.

[5] Tansley, S., & Tolle, K. M. (2009). The fourth paradigm: data-intensive scientific discovery (Vol. 1). A. J. Hey (Ed.). Redmond, WA: Microsoft research.

[6] Borgman, C. L. (2017). Big data, little data, no data: Scholarship in the networked world. MIT press.

CV of the Teacher

Dr. Andrea Mannocci is a Research Fellow of the InfraScience laboratory at the Institute of Information Science and Technologies (ISTI) of the Italian Research Council (CNR) in Pisa, Italy.

He currently works as a data scientist within the framework of the EU projects EOSC (European Open Science Cloud) and OpenAIRE Nexus. Here, he takes part in the construction and analysis of the OpenAIRE Research Graph, an Open Science Graph mapping scientific production, services, projects, and repositories so to enable sharing, discovery, and monitoring of research activities for communities, institutions, and funders.

His research interests span from the development of Open Science enabling technologies to Science of Science and the analysis of research as a global-scale phenomenon with geopolitical and socioeconomic implications.

He holds a PhD in Information Engineering from the University of Pisa. Previously, he was a Research Associate at the Knowledge Media Institute (KMI) of the Open University in Milton Keynes, UK. Here, he joined the SKM3 (Scholarly Knowledge Modelling, Mining and sense Making) group and worked on data science applied to scholarly big data and research analytics.

Final Exam: project

Room and Schedule

Room:

Aula Riunioni del Dipartimento di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa – Ground Floor

Aula Riunioni del Piano 6 del Dipartimento di Ingegneria dell'Informazione, Largo Lucio Lazzarino 1, Pisa

Schedule:

19/06/2023: 9:00 - 13:00, Aula Riunioni del Piano 6 - Largo Lucio Lazzarino

20/06/2023: 9:00 - 13:00, Aula Riunioni del Piano 6 - Largo Lucio Lazzarino

21/06/2023: 9:00 - 13:00, Aula Riunioni del Piano Terra - via Caruso

22/06/2023: 9:00 - 13:00, Aula Riunioni del Piano Terra - via Caruso

23/06/2023: 9:00 - 13:00, Aula Riunioni del Piano Terra - via Caruso