

# DATA DRIVEN R&D FOR MATERIALS: COGNITIVE DISCOVERY

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Innovation in many key industrial sectors is demanding new materials with lower manufacturing costs, improved performance, and a reduced environmental footprint.

Decades of deep experimental as well as computational research for the discovery of novel materials have been creating vast amounts of data and supporting information. Indeed, hundreds of thousands of related papers and patents are published every year nowadays, while academic institutions and the Industry create Petabytes of crucial data by means of high fidelity materials simulations. Thus, a new opportunity arises today: extract the available knowledge from the literature, curate and connect it with the simulation structured data and therefore create a positive feedback loop that can dramatically accelerate the pace of discovery.

Of course there are several challenges in this quest. However, recent advances in Data Science and Machine Learning offer a very promising way forward. In this talk, I will describe this new approach, that we call Cognitive Discovery. We harness the power of Machine Learning, Natural Language Processing and novel knowledge representation and analysis methods to extract and curate knowledge and create data driven models. I will discuss applications of Cognitive Discovery in materials research and show its wider applicability in technical R&D.