4. To arrive at powerful discovery computing principles for cooperative forecasting in federated networks, models of evolutionary neural biology-inspired to investigate cooperative forecasting for ecosystem sustainability when changes in learning, interactions and traits occur in a large and diverse pool of species, technologies and human groups.

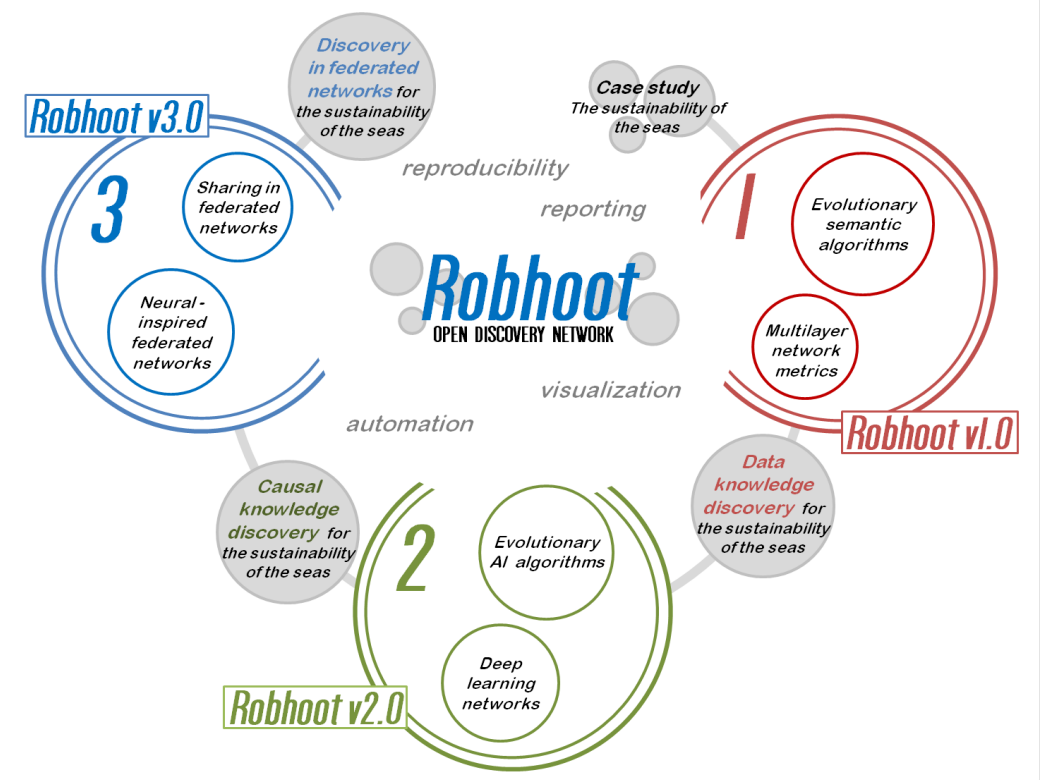

Figure 1: **Discovery in Evolutionary Biology-Inspired Federated Networks**. ROBHOOT targets knowledge discovery in federated networks. Federations are composed by highly heterogeneous groups sharing ecosystem resources for a sustainable knowledge-inspired society: ROBHOOT introduces three science-enabled technologies: Evolutionary biology-inspired semantic algorithms for ROBHOOT v1.0: data knowledge discovery (red), evolutionary-biology inspired AI-deep neural networks for ROBHOOT v2.0: causal knowledge discovery (green), and evolutionary neural biology-inspired ROBHOOT v3.0: discovery in federated networks (blue).

1.2 Science-to-technology breakthrough that addresses this vision

Data knowledge discovery (WP1)

Evolutionary biology-inspired semantic algorithms (WP1): The majority of studies of data discovery focus on add-hoc algorithms, ignoring ecological and/or evolutionary biology-inspired solutions. Currently, only a few databases are semantically annotated (e.g. , gene ontology database, COVID-19). This is because ontology development is time-consuming, requires expert knowledge and community commitment, and is ideally paired with data-driven research that iteratively checks the soundness of the ontology as it simultaneously seeks discovery. Thus, software tools for mapping and linking the terms between different ontologies are still to be developed, although Semantic Web technologies are included in programs such as the U.S. National Science Foundation's proposed CyberInfrastructure (refs +++).

Going beyond ROBHOOT will go beyond state-of-the-art to implement evolutionary computation concepts (i.e., genetic algorithms with different rules and selection modes) to investigate new data properties along many data-sources. ROBHOOT will provide a detailed understanding of the replicability of accounting for many data-sources on the global data architecture map contrasting different evolutionary algorithms.

Causal knowledge dicovery (WP2)

Eco-evolutionary biology-AI-inspired discovery computation algorithms (WP2): Many studies of causal discovery (i.e., explainable or interpretable discovery), focus on genetic programming (refs