

AI

FOR



PLANETARY

STEWARDSHIP

AI

FOR

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**CATAPULT**  
Satellite Applications

PLANETARY

STEWARDSHIP

# AI FOR PLANETARY STEWARDSHIP REFORESTATION



MAPPING FORESTS  
ENVIRONMENTS  
AND LANDSCAPES

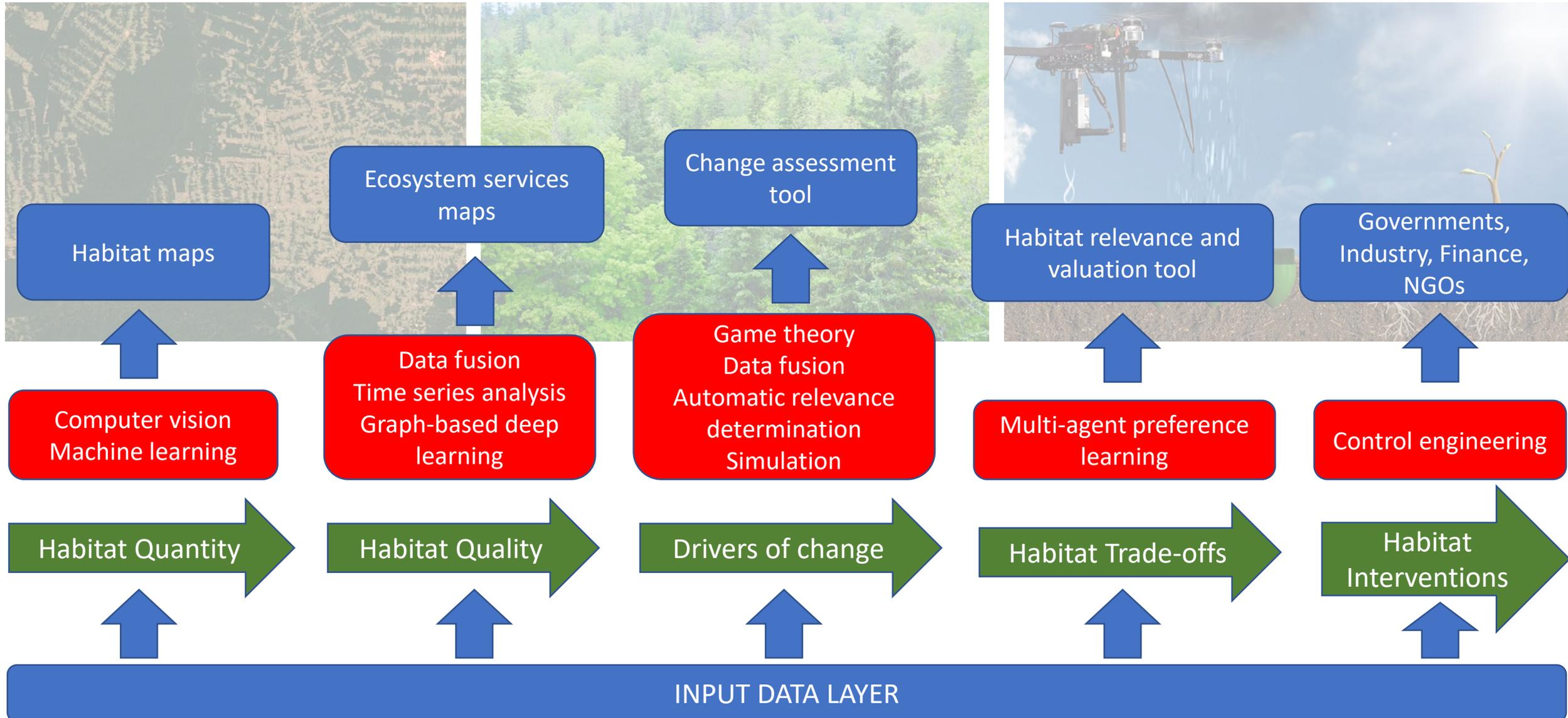


ECOSYSTEM  
DYNAMICS AND  
MODELLING



REPLANTING OF  
FORESTS

# AI FOR PLANETARY STEWARDSHIP REFORESTATION





WEATHER/CLIMATE  
WATER  
FORESTS  
OCEANS  
CROPS  
CITIES



CONSUMPTION  
SUPPLY CHAINS  
ECONOMICS  
BEHAVIOUR  
MIGRATION



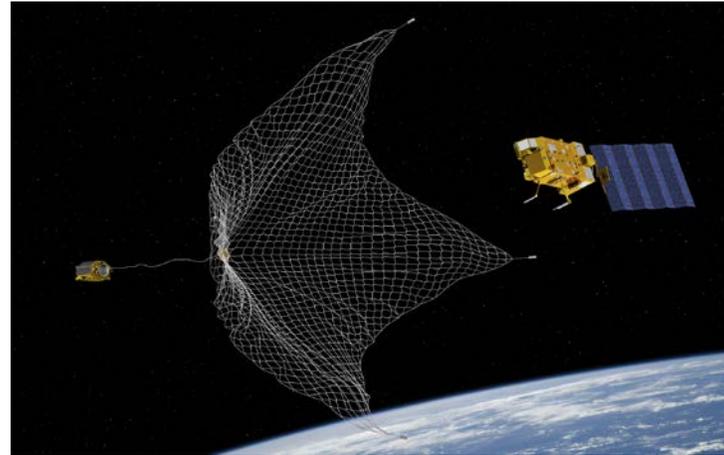
HUMAN HEALTH  
WELL-BEING  
ANIMAL HEALTH



DATA INTEGRATION  
SYSTEM ANALYSIS  
TRADE-OFFS  
DECISION-MAKING

AI TOOLKIT

DATA  
SOURCES



ON-BOARD AI  
ADAPTIVE OPTICS

NOVEL  
INSTRUMENTS

DEBRIS  
MONITORING  
AND REMOVAL

CONSTELLATION  
MANAGEMENT

IN-ORBIT  
SERVICING

# \$160m AI for Planetary Stewardship facility





# DIGITAL TWIN EARTH

- Precursor Project – supporting definition of a digital twin
- Establishing solid scientific and technical basis
- Working towards a roadmap
- Four precursor projects:

- FOREST
- CLIMATE
- HYDROLOGY
- FOOD SYSTEMS

## Benefits:

- Routine monitoring
- Short term policy development
- Long term policy development





# DIGITAL TWIN EARTH

# FOOD SYSTEMS



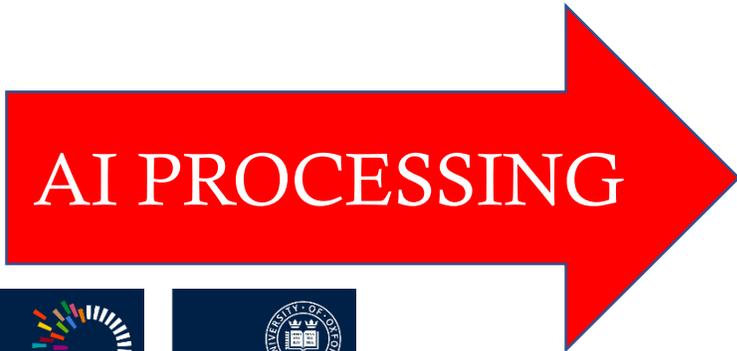
### EXTREME PRECIPITATION



### GLOBAL CROP GROWTH MODELS



### CROP LAND USE ASSESSMENT





# DIGITAL TWIN EARTH

FOOD  
SYSTEMS

Months 0 to 3  
Definition of requirements  
and technical specifications

Months 3 to 9  
Demonstration exercise and  
prototyping

Month 9 to 12  
Scientific & Technical  
Roadmap



# COLLABORATIVE MECHANISMS AND PEOPLE



 esa\_LAB@Oxford

- Prof. Yarin Gal
- Prof. Michael Obersteiner
- Dr Duncan Watson-Parris
- Dr Steve Reece
- Dr Gunes Baydin



- Dr Nafeesa Dajda
- Peter Beaumont



- James Parr



- Dr Gabriele DeCanio

