Introducing complexity-oriented methods into life-cycle thinking
enhancing the study of sustainable socio-technical systems

June 7th,2024

Organized by:

Life -Cycle Thinking for Complex Systems Initiative

Today's agenda

> Kasper Lange (AUAS)

15:00 (CET)	Introduction to the initiative
15:15	Keynote presentations
16:05	*Short break*
16:10	Panel discussion and Q&A
16:40	Interactive discussion
16:55	Next steps
17:00	*End*

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01

Introduction

> Gustavo Larrea Gallegos (LIST)

Life-Cycle Thinking for Complex Systems initiative

- **Life-Cycle thinking** for **sustainability** (e.g., LCA, Input-Output, etc)

- **Complex Adaptive Systems** (CAS) (e.g., socio-technical systems, techno-ecological networks)

- Complexity-driven **methodologies** (i.e., agent-based modelling, network analysis, simulation methods)

Life-Cycle Thinking for Complex Systems initiative

- Open initiative consisting of researchers:

    - Industrial ecologists
    - Computer scientists
    - (computational) social scientists including psychology, economics, ethics
    - Sustainability design science researchers.

- Other researchers or professionals are welcome to join!

Initiative objectives

- **Promote** the use of **complexity-oriented methods** in combination with **life-cycle thinking approaches** in the study of the sustainability of complex systems.

- **Provide** a **platform** to that allows the discussion and the further development of the methodologies used in complexity-oriented life-cycle studies.

- Be a **facilitator** for **communication** and dissemination among interested researchers transcending domains and academic societies.

First initiative members

Kasper
LANGE

**Amsterdam
University of
Applied Sciences**

Ryu
KOIDE

**National Institute
for Environmental
Studies, Japan**

Tianran
DING

**Luxembourg
Institute of Science
and Technology**

Gustavo
LARREA
GALLEGOS

**Luxembourg
Institute of Science
and Technology**

Michał
BąCZYK

**Utrecht
University**

Jonathan
COEN

**Chalmers
University of
Technology**

Thanks!

Contact:
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(more information, at the end of the webinar)

02

Keynotes

Keynote

Tomás Navarrete Gutiérrez

> Luxembourg Institute of Science and Technology (LIST)

Algorithmic complexity and computational difficulties in linking ABM to LCA

Keynote

Julien Walzberg

> National Renewable Energy Laboratory (NREL)

Agent-based modelling and simulation for the circular economy

03

Break

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Panel discussion

> Moderator: Kasper Lange (AUAS)

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05

**Discussion:
Advancing Life-Cycle
Thinking for Complex
Systems**

> Moderator: Kasper Lange (AUAS)

2. What are your application areas of your research?

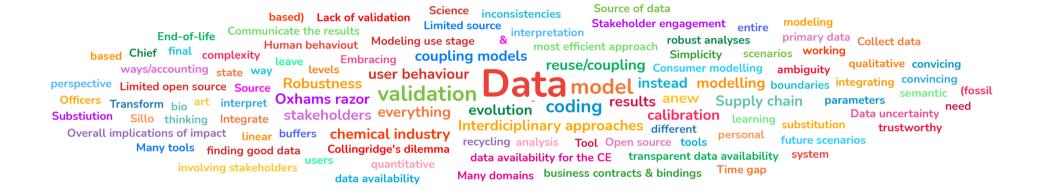☁ **3.** **What challenges do you face in your research addressing life cycle thinking and complexity?**

72 respondents

based) Lack of validation Science inconsistencies Source of data

End-of-life Communicate the results Limited source Stakeholder engagement entire modeling

based Chief final complexity Modeling use stage interpretation & most efficient approach robust analyses primary data Collect data

perspective ways/accounting leave Human behaviout Embracing coupling models reuse/coupling Simplicity scenarios working qualitative convicing

Officers Limited open source Source user behaviour **Data** model instead modelling boundaries integrating convincing

Substiution Transform bio art interpret Robustness validation coding results anew Supply chain parameters semantic (fossil

Overall implications of impact Sillo thinking Integrate Oxhams razor everything evolution calibration learning substitution need

Many tools finding good data buffers chemical industry Interdiciplinary approaches different personal future scenarios trustworthy

involving stakeholders users Collingridge's dilemma recycling analysis Tool Open source tools system

data availability quantitative data availability for the CE transparent data availability

Many domains business contracts & bindings Time gap

levels state way Consumer modelling ambiguity Data uncertainty

4. Which future activities of the initiative are you interested in? Please select as many options as you would like to participate.

Webinar with (ongoing) research presentations — 84% — 21 votes

Face-to-face workshop — 44% — 11 votes

Special sessions in related conferences — 48% — 12 votes

Co-authoring papers — 40% — 10 votes

Co-development of methodology, tools, data, platform, etc. — 56% — 14 votes

Co-developing research funding proposals — 40% — 10 votes

Facilitating research visits/recruitment — 48% — 12 votes

E-mail list for exchanging information — 52% — 13 votes

06

Next steps

> Gustavo Larrea Gallegos (LIST)

Next steps

Do not forget to fill the survey !
- Help us to improve!

Register to our mailing list !
- Position paper workshop
- Newsletters
- Future events

Thank you!

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