

# Self-replicating machines that can assemble themselves out of a set of elements using AI

## Summary

Profile type	Company's country	POD reference
<b>Research &amp; Development Request</b>	<b>Poland</b>	<b>RDRPL20240131022</b>
Profile status	Type of partnership	Targeted countries
<b>PUBLISHED</b>	<b>Research and development cooperation agreement</b>	<b>• World</b>
Contact Person	Term of validity	Last update
<b><a href="#">Sabrina WODRICH</a></b>	<b>31 Jan 2024</b> <b>30 Jan 2025</b>	<b>31 Jan 2024</b>

## General Information

### Short summary

The company is looking for organizations that want to join the project about self-replicating machines that can assemble themselves out of a set of elements using AI. Proposed Call: EIC Pathfinder Open 2023 Visionary projects Early stage (TRL1-3).

### Full description

The company is led by a team of founders. Since its inception, they have been committed to making advanced AI technology accessible to everyone. The company is the first spin-off of the Faculty of Mathematics, Informatics and Mechanics at the University of Warsaw. The main reason for creating the company was the desire to transform existing scientific excellence and knowledge about heuristic algorithms into practical solutions. The company provides organizations with the most efficient and, at the same time, the safest ML technology, remaining at the forefront of scientific research in this field.

The company offers artificial intelligence solutions to the toughest problems faced by healthcare, retail, government and automotive organizations. The goal is to create added value for the business, for society and the human condition. In work, the team uses primarily scientific method, critical thinking and correctness. The company has one of the most experienced teams of AI and ML specialists in Poland ready to support any organization in AI transformation.

The company is looking for organizations: AI partner, 3D reconstructions partner, a robotic partner - for the design and creation of hardware system to collect the real-world data and test different solutions, professional LEGO construction designers, In-Silico simulations partner, an High Performance Computing (HPC) partner, that want to join to the project DeepAssembly. The project is to create a proof-of-concept self-replicating machines that can assemble themselves out of a set of elements using AI. Proposed Call: EIC Pathfinder Open 2023 Visionary projects Early stage (TRL1-3).

#### Advantages and innovations

The hypothesis is that with the use of AI it is possible to automate and scale the design and manufacturing process. However training of the system will require a huge amount of resources (both in the terms of hardware and software). As a result of the process. The research consortium will create a proof of concept machine/machines that will self-assemble itself out of pre-build intermediate elements. The consortium will also determine parameters for a full scale project that will allow for creation of commercially applicable systems both in the terms of optimal sets of input components and in the terms of resources needed for the project.

#### Technical specification or expertise sought

1. Creation a proof-of-concept of self-replicating machine from a pre-assembled intermediate components
2. Explore, how the level of complication of the machinery depends on number on complexity of components
3. Build and test a perception and decision models that will allow machines to make own assembly actions
4. Finding optimal form and material used for building blocks (e.g Lego-like, Meccano-like etc or custom made) for a full scale project
5. Finding the optimal set of sensor, power supply and communication for the full scale project
6. Design an automated design-build-test-train loops and AI training stands for a full scale project
7. Assessment of possibility of using evolution-like algorithm to further evolve the system
8. Estimate the size, time and cost of a full scale project that will crate a system that will allow for evolve and train commercially applicable solutions with self-replicating machines

#### Stage of development

##### Concept stage

IPR Status

**No IPR applied**

#### Sustainable Development goals

• **Not relevant**

## Partner Sought

#### Expected role of the partner

The expected role of the partners:

1. 3D reconstructions partner
2. Robotic partner - for the design and creation of hardware system to collect the real-wold data and test different solutions
3. Professional LEGO construction designers
4. In-Silico simulations partner
5. High Performance Computing partner.

Type of partnership

**Research and development cooperation agreement**

Type and size of the partner

- **SME 50 - 249**
- **Big company**
- **SME <=10**
- **University**
- **R&D Institution**
- **SME 11-49**
- **Other**

## Call Details

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Framework program

**Future and Emerging Technologies**

Call title and identifier

**Self-replicating machines that can assemble themselves out of a set of elements using AI**

Submission and evaluation scheme

Anticipated project budget

Coordinator required

**No**

Deadline for EoI

**1 Sep 2025**

Deadline of the call

**16 Oct 2024**

Project duration in weeks

Web link to the call

Project title and acronym

## Dissemination

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### Technology keywords

- **005004002 - Mathematical modelling**
- **005010 - Micro- and Nanotechnology related to physical sciences**
- **005007001 - Micro-Mechanics**
- **005004001 - Algorithms and Complexity**

### Targeted countries

- **World**

### Market keywords

- **02007020 - Artificial intelligence programming aids**
- **02007019 - Computer-aided instructions**
- **02007016 - Artificial intelligence related software**
- **02007021 - Other Artificial intelligence related**

### Sector groups involved

- **Digital**