



Artificial Intelligence for Image Data Analysis in the Life Sciences

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Euro-BioImaging ERIC

AI4Life WP7 lead (Communication, Outreach & Training)



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Bridging the Life & Computer Science Communities



The goal is to radically **reduce the disparity** between the theoretical applicability and the practical use of AI-based image analysis methods in the life sciences. AI4Life will bridge the gap between the two rapidly developing fields of **AI/ML methods** development and **biological imaging**.

Goals

1

Democratized **availability** of **AI-based image analysis methods**

2

Establish **standards** for the submission, storage and FAIR access

3

Simple **model deployment, sharing, and dissemination** through a developer-facing service

4

Organize **Open Calls and Challenges** for image analysis problems

5

Empower common image analysis platforms with AI integration

6

Organizing **outreach and training** events i.e. image analysis workshops, participation in conferences

Structure



Activities

AI Models Format & Zoo



AI ready datasets



Open Calls & Challenges

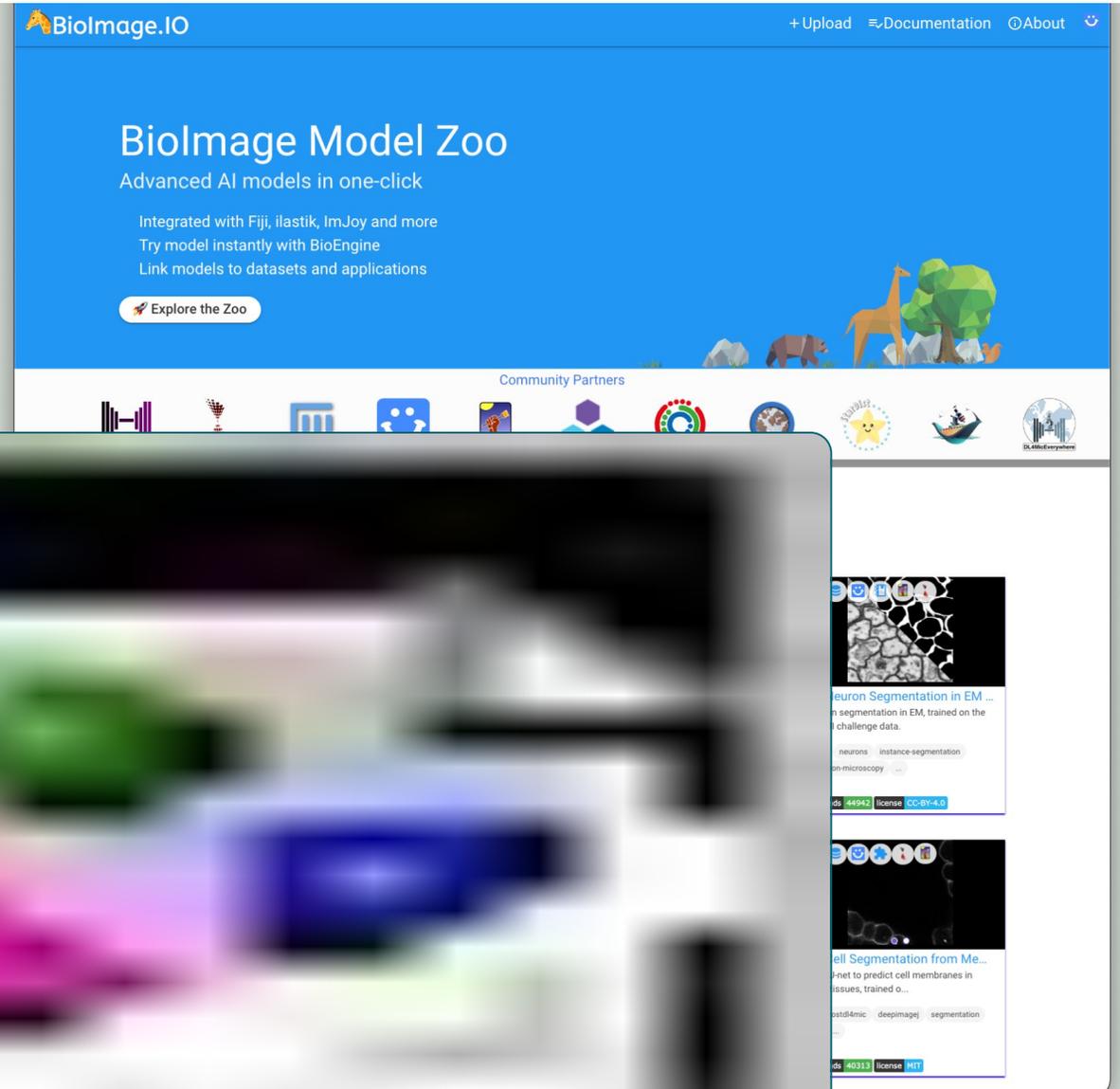
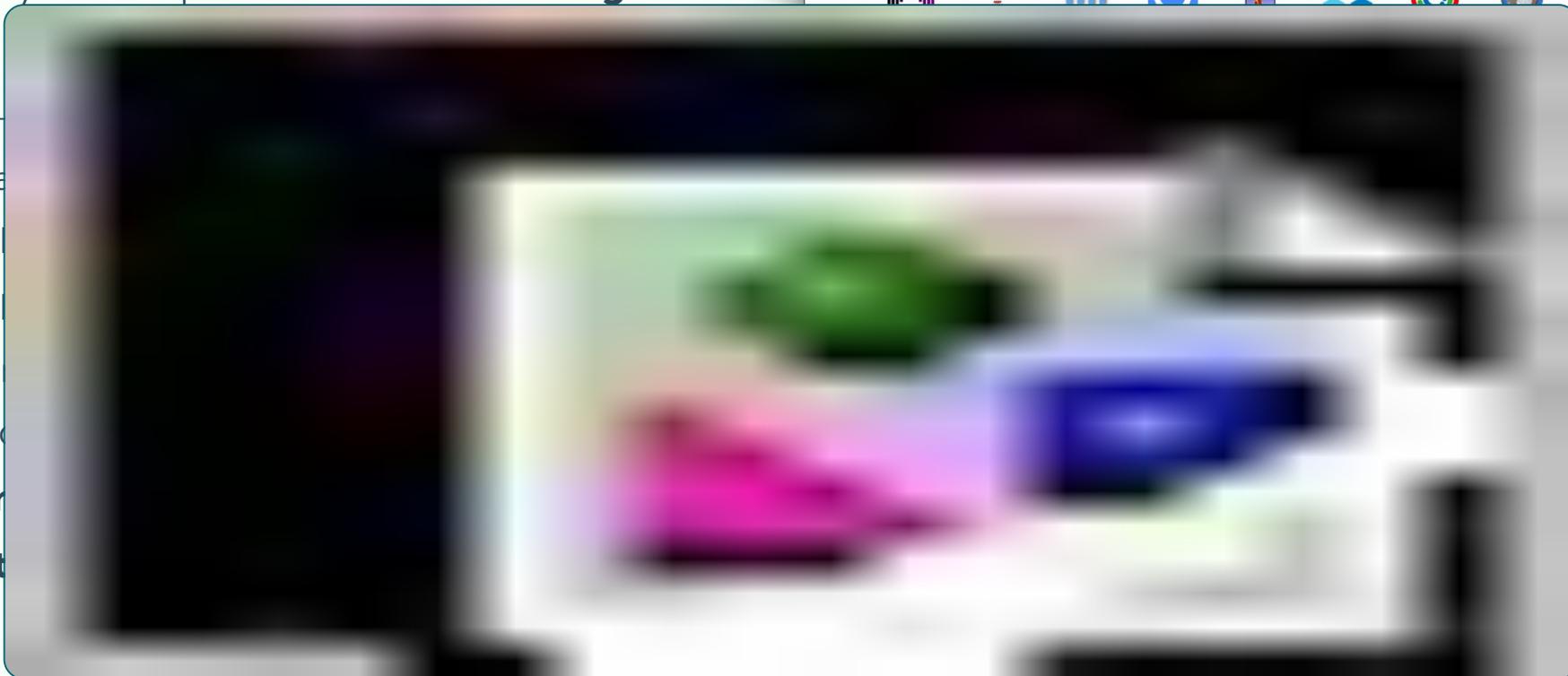


Workshops



BioImage Model Zoo

- **Community-driven**
- **Open source**
- Community-based process for **contributing models**
 - Cross-software
 - Model
 - Model chose
- Users cho
- Make **share** neural net



OPEN CALL for Bioimage Analysis Support



- I need help analysing image data
- I need help creating training data
- I need help applying Deep Learning to my research data

Apply by
March 31

AI4Life



ai4life.eurobioimaging.eu

OPEN CALL for Bioimage Analysis Support



Apply by
March 1st

Deadline extended
March 8

Do you need help applying Deep Learning to your research?

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https://bit.ly/AI4Life-2nd-open-call

OPEN CALL

Bioimage Analysis Support



Apply by
January 10

Do you need help applying Deep Learning to your research?

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https://bit.ly/AI4Life-3rd-open-call

Open Calls & Challenges

DENOISING CHALLENGE

Submit until
Su/ ~~June 10~~ July 31

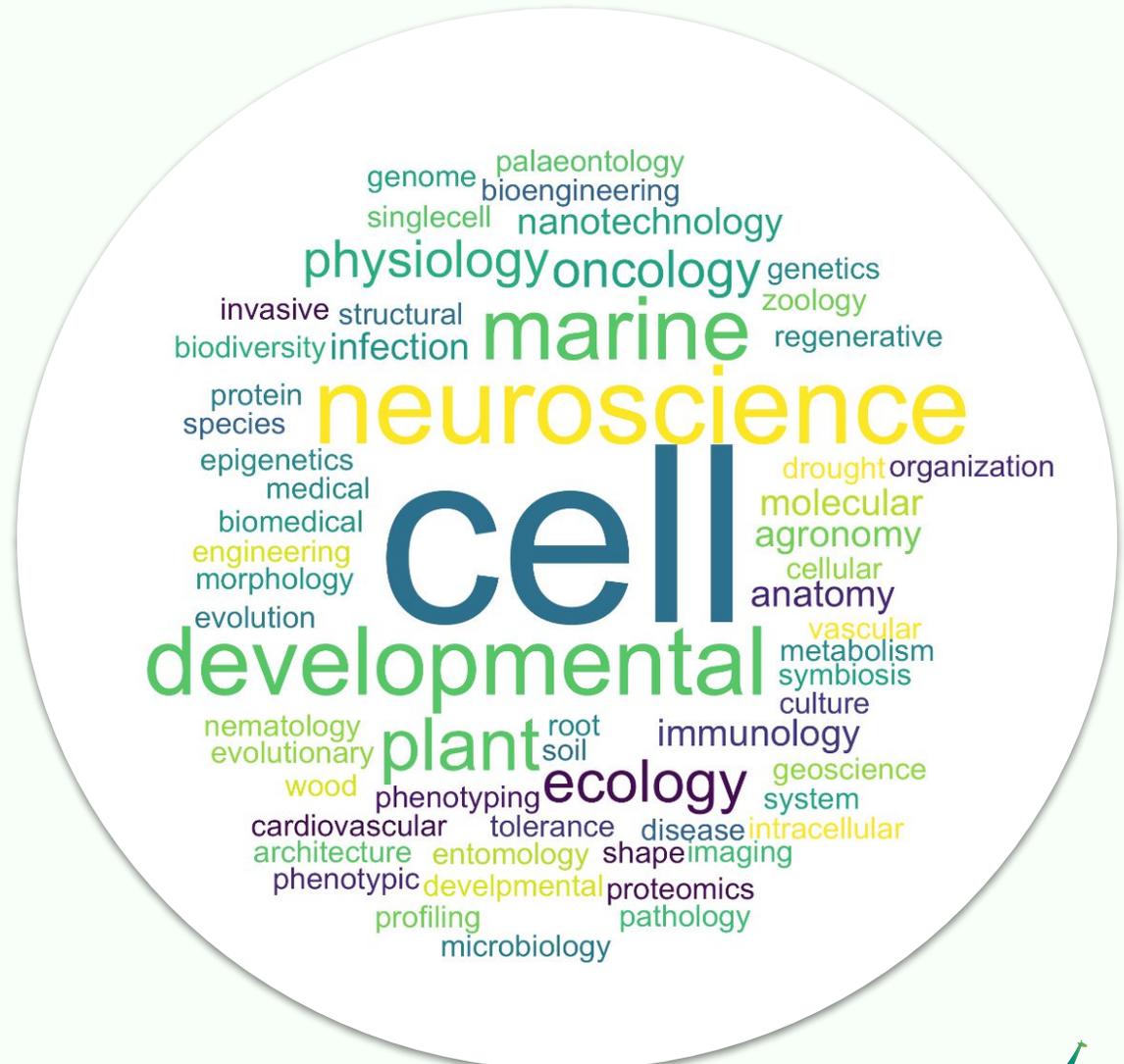
ai4life.eurobioimaging.eu https://ai4life.eurobioimaging.eu/denoising-challenge ai4life@eurobioimaging.eu

Funded by the European Union

More in 2025!

72 applications

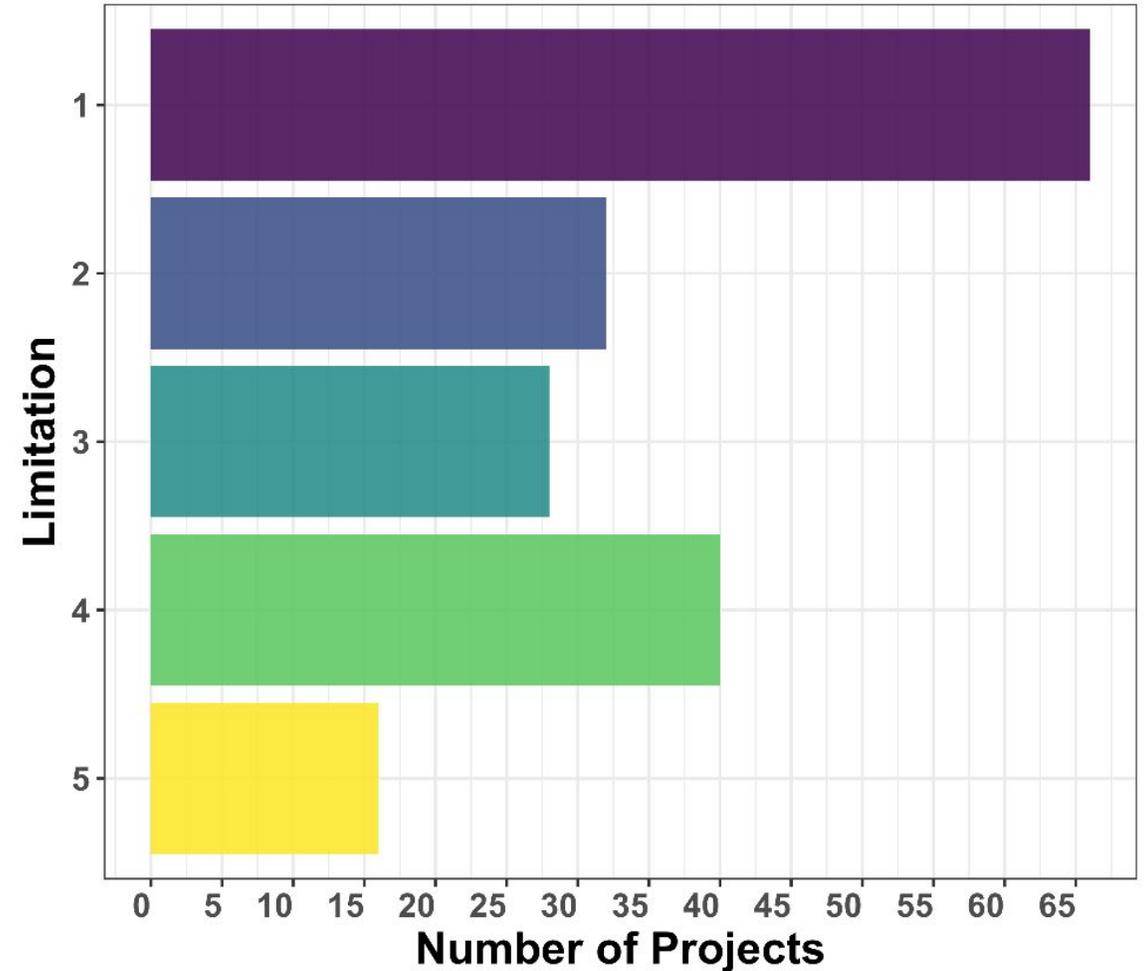
First Open Call



Why did they apply? What challenge are they facing?

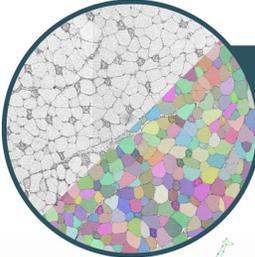
Limitation in analyzing data

- Example 1: Improving your image analysis workflow
- Example 2: Improving your image analysis data and/or data storage strategy
- Example 3: Training data creation
- Example 4: Consultancy on available tools and solutions
- Example 5: Catering your problem to other experts



First AI4Life Open Call: 8 projects selected

OPEN CALL
for Bioimage Analysis Support



Analysis of the fiber profile
of skeletal muscle

Emiliana Giacomello
University of Trieste (Italy)

stitching instance segmentation tracking quantification

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OPEN CALL
for Bioimage Analysis Support

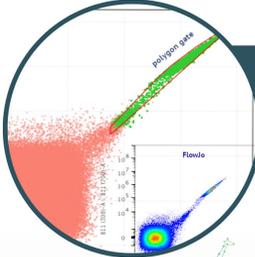


Image-guided gating strategy
for image-enabled
cell sorting of phytoplankton

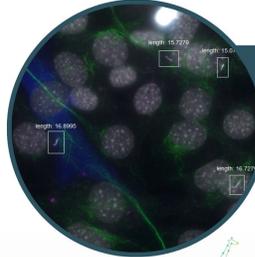
Moritz Winker
EMBL Heidelberg (Germany)

feature selection classification

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OPEN CALL
for Bioimage Analysis Support



Automated and integrated
cilia profiling

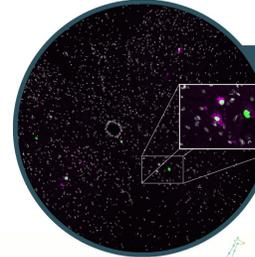
Shivani Batra, Lindsey Margewich,
Jessica M. Adams, Martin F. Engelke
Illinois State University (USA)

detection instance segmentation quantification

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OPEN CALL
for Bioimage Analysis Support



Identifying senescent cells
through fluorescent microscopy

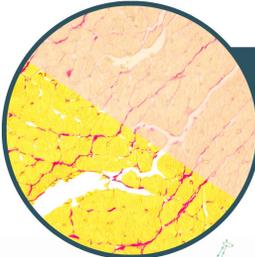
Ana Filipa Isidro
Instituto de Medicina Molecular João Lobo Antunes (Portugal)

detection instance segmentation quantification

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OPEN CALL
for Bioimage Analysis Support



Treat
Chronic Kidney Disease

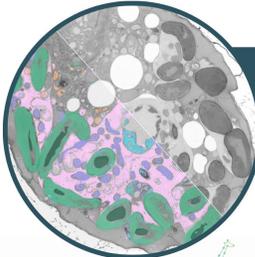
Nathalie Gayraud, Juliana Boukhaled, Irene Cortijo
RD Néphrologie (France)

semantic segmentation quantification

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OPEN CALL
for Bioimage Analysis Support



Atlas of microalgae in plankton
symbioses revealed
by 3D electron microscopy

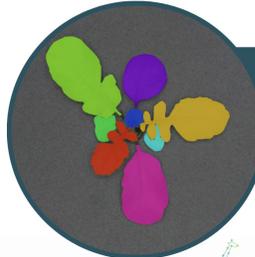
Johan Decelle, Ananya Rao Kedige, Gaëlle Toullec
LPCV, CNRS (France)

semantic segmentation 3D images

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OPEN CALL
for Bioimage Analysis Support



Leaf tracker
plant species pool

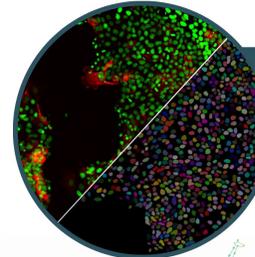
Sofia Bengoa Luoni
University of Wageningen (Netherlands)

tracking instance segmentation

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OPEN CALL
for Bioimage Analysis Support



SGEF, a RhoG-specific GEF, regulates
lumen formation and collective cell
migration in 3D epithelial cysts

Madeline Lovejoy and Rafael Garcia-Mata (PhD)
The University of Toledo, Garcia-Mata Lab

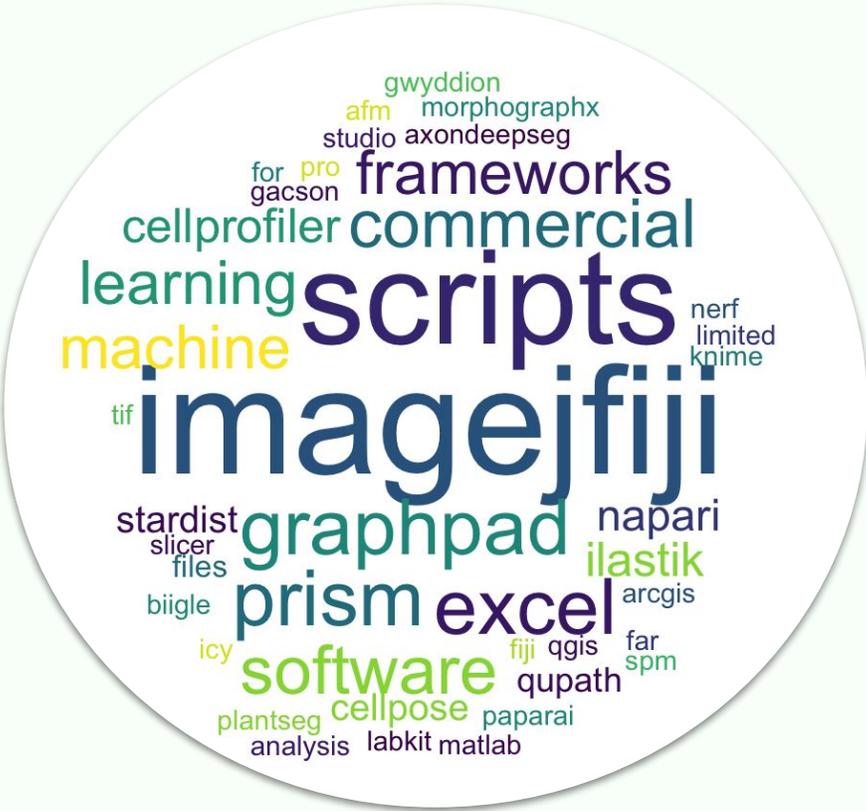
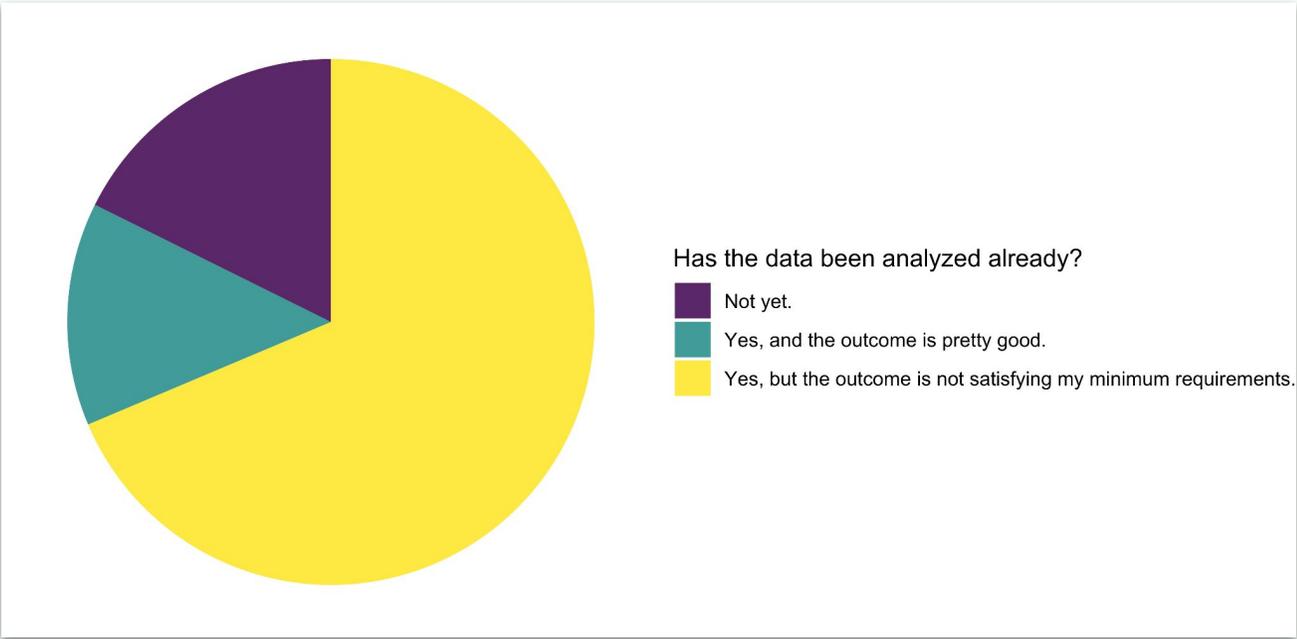
tracking instance segmentation

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<https://ai4life.eurobioimaging.eu/use-cases/>

How have they addressed the problem so far?



Second AI4Life Open Call: 20 + 7 projects selected

Consultation phase: **20** projects selected

Deep Learning support phase: **7** projects selected

1. Automated species annotation in turbid waters (#11*)
2. Optimizing calcium image acquisition with machine learning denoising algorithms (#13)
3. Diatom symbioses at planetary scale (#14*)
4. Automated segmentation of actin filaments in intact cells (#21)
5. Enhancing the effective resolution of intravital microscopy with digital expansion microscopy (#23)
6. Ultrastructural protein mapping through Correlation of Light and Electron Microscopy (#26)
7. NeuroScan – A 3D human motor neuron disease platform for high throughput drug screening (#38)

OPEN CALL

Bioimage
Analysis
Support



Apply by
December 10

Do you need help applying Deep Learning to your research?



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2024			2025							
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug





8
Countries

36
Months

10
Partners

4M
Euros

63
AI models

42
Training datasets

19K+
Unique visitors

7
Curated AI-ready datasets

2
Model / Data community standards

4
Records on FAIRsharing



in numbers

AI4Life

Last update 11.10.2024

2 (of 3)
Open Calls

1 (of n)
Challenges

123
Applicants to the Open Calls

15
Selected projects on the Open Calls

9
Hackathons

134
Dissemination activities

4
Workshops

3
Training videos

7
Preprints

9
Peer-reviewed publications

27
Zenodo records

60
News

8
Newsletters

251
Subscribers

2172
Followers on social media



Thank you!

- AI4Life website:
www.ai4life.eurobioimaging.eu
- Subscribe to the AI4Life newsletter:
<https://bit.ly/ai4life-newsletter>