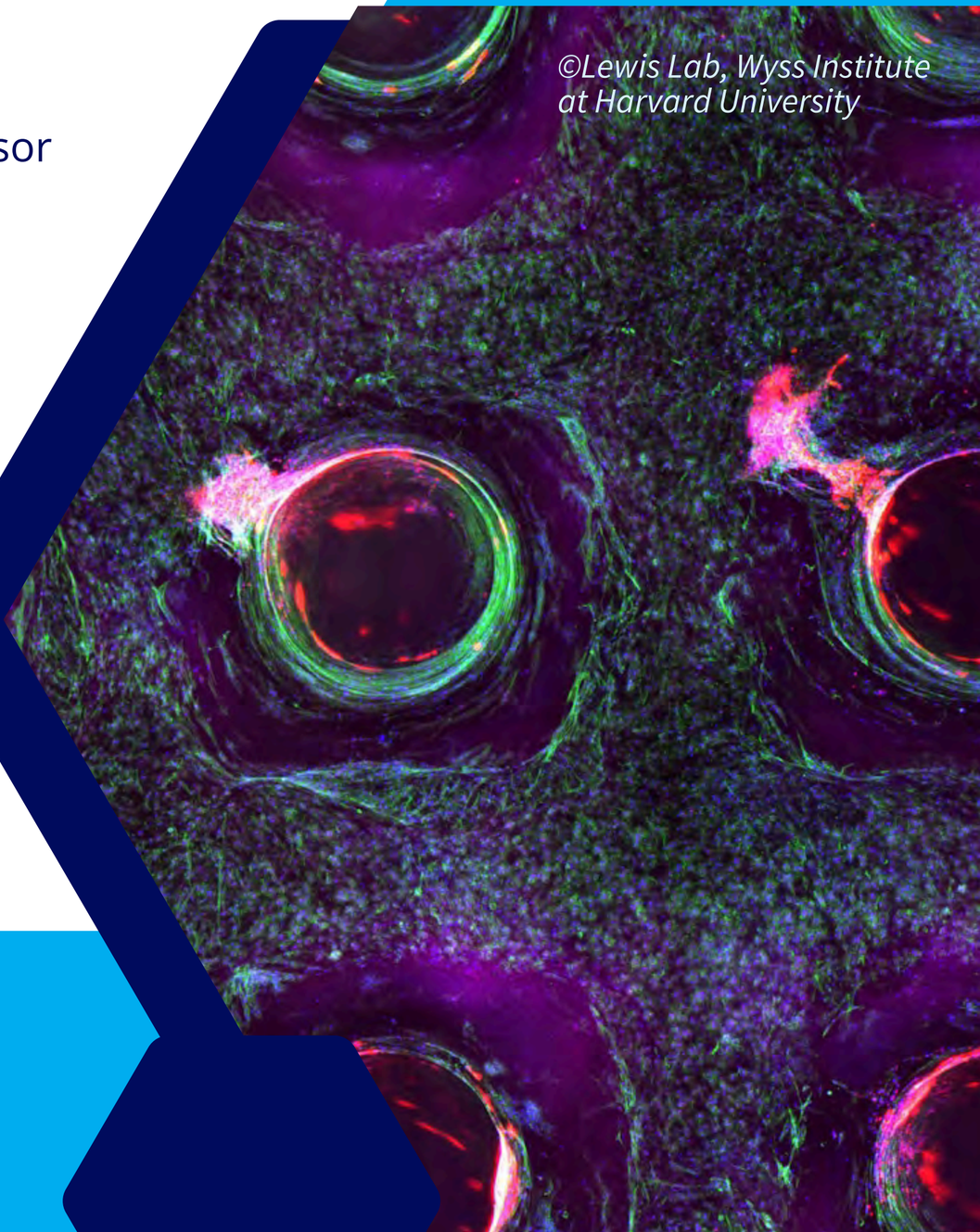
COMITÉ SCIENTIFIQUE PRO ANIMA

Dr Lilas Courtot - Scientific Advisor



How alternatives to animal models can shape the future of biomedical research and medicine

3d.FAB Days à Lyon
9 et 10 juillet 2024

3D.FAB days

9-10th July 2024

www.proanima.fr

PRO ANIMA SCIENTIFIC COMMITTEE: MULTI-LEVEL ACTIONS

COMITÉ SCIENTIFIQUE PRO ANIMA

RAISE AWARENESS

CITIZENS, SCIENTISTS, REGULATORS, POLITICAL AND ECONOMIC ACTORS

FINANCE

NON-ANIMAL RESEARCH WITH THE DESCROIX-VERNIER ETHICSCIENCE PRIZE

PUBLISH

SCIENCE, ISSUES, HEALTH
The only French journal dedicated to non-animal research

DIALOGUE

KEY PLAYERS IN THE SECTOR
Industrial researchers, regulators

BIOMEDICAL RESEARCH AND PHARMA: LIMITED BY OBSOLETE MODELS?

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Drug development

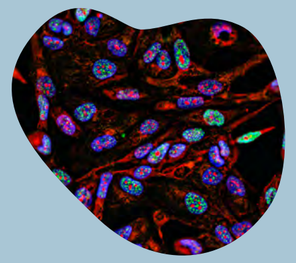
>10 MILLIONS

~2 MILLIONS

Sources: circabc.europa.eu & enseignementsup-recherche.gouv.fr

Results that are not easily transposable and reproducible

Overall attrition rate of 95%



Basic Research (~40%)

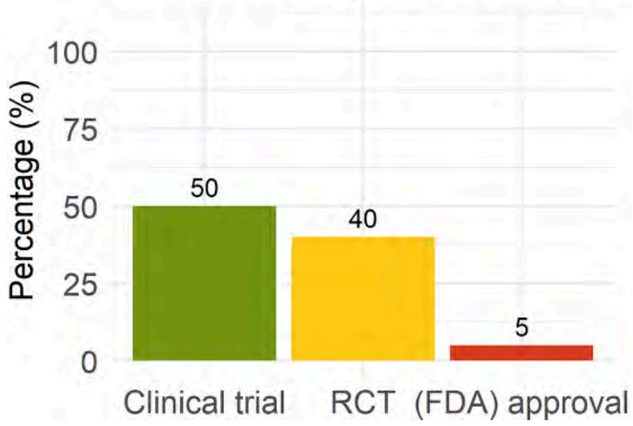
Applied Research (~30%)

Regulatory and Toxicology (<30%)

Clinical Trial

10 to 12 years for a drug to be approved (~$2.6 billion)

Translational proportions since the first published animal study



Source: Ineichen BV, et al., PLoS Biol (2024)

BIOMEDICAL RESEARCH AND MEDICINE: LIMITED BY OBSOLETE MODELS?

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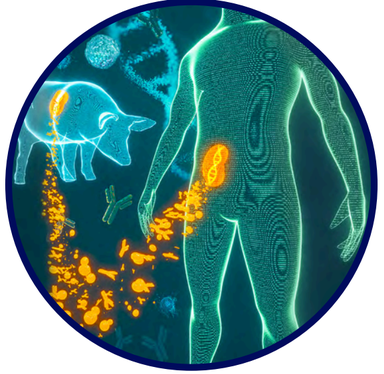

(Xeno)Transplantation

Worldwide shortage of organs for transplantation → **Clinical xenotransplantation has been a goal for more than a century**

The reason

- Anatomically similar organs
- Advances in immunology and gene editing

Heart valves from pigs and cows are routinely grafted into patients

Failure and risks

- Immune rejection
- Immunossupressive drugs leading to death
- Zoonoses
- Waste of resources and a disservice to patients

Surgeries involving pigs organs had resulted in failure

3D BIOPRINTING: A POTENTIAL REVOLUTION FOR RESEARCH AND PERSONALIZED MEDICINE

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Medical devices

- Training and education
- Facilitate surgery
- Educate patients

Organ transplantation

- Overcoming the shortage
- Reducing the cases of rejection
- Overcoming Gender Differences
- Enhancing the survival of patients
- More ethical and promising than xenotransplantation

Understanding of disease

- Disease/tumour models
- Organ-on-chip models (tissue and material / scaffold)
- Reducing gender, age and other genetic biases

Tissue regeneration

- Removal of congenital defects
- Regenerate tissue for hearts, corneas, and other
- Personalised implants

Drug development

- Toxcicity testing / metabolism studies
- Target identification and validation
- Prioritization of lead candidates
- Personalized medicine

Sources:
. Imagining futures of 3D bioprinting. World Health Organization; 2023
Shopova D, et al. Bioengineering (2023)

NON-ANIMAL METHODS:
IN VITRO, IN SILICO, EX VIVO…

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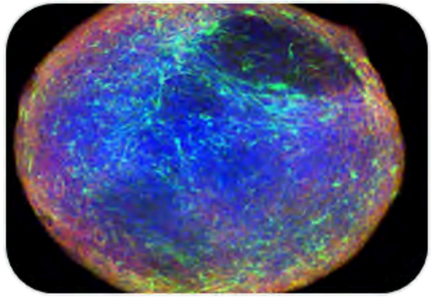
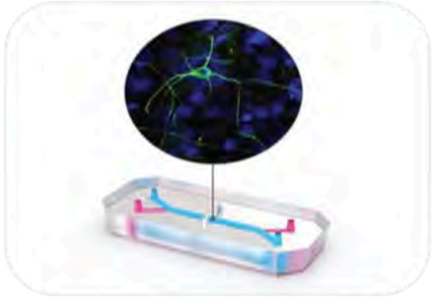
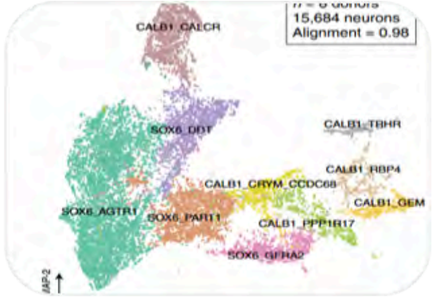


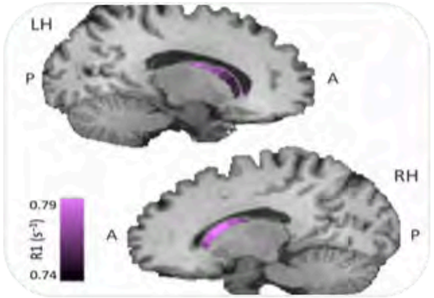
3D organoids



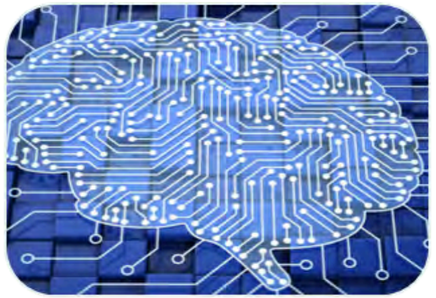
OoC



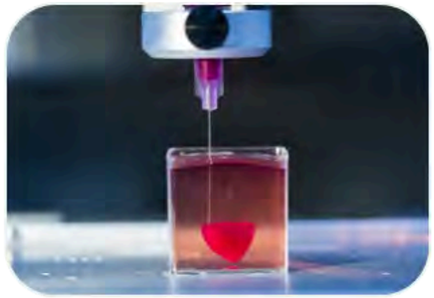
Single-cell Multi-omics



Advanced imaging



AI, Machine Learning



3D-printed organs

Combinatorial effect

Better predictivity, efficiency, and reproducibility

Saving time and money

Benefit for patients

3D BIOPRINTING & NAMS: CHALLENGES AND OPPORTUNITIES

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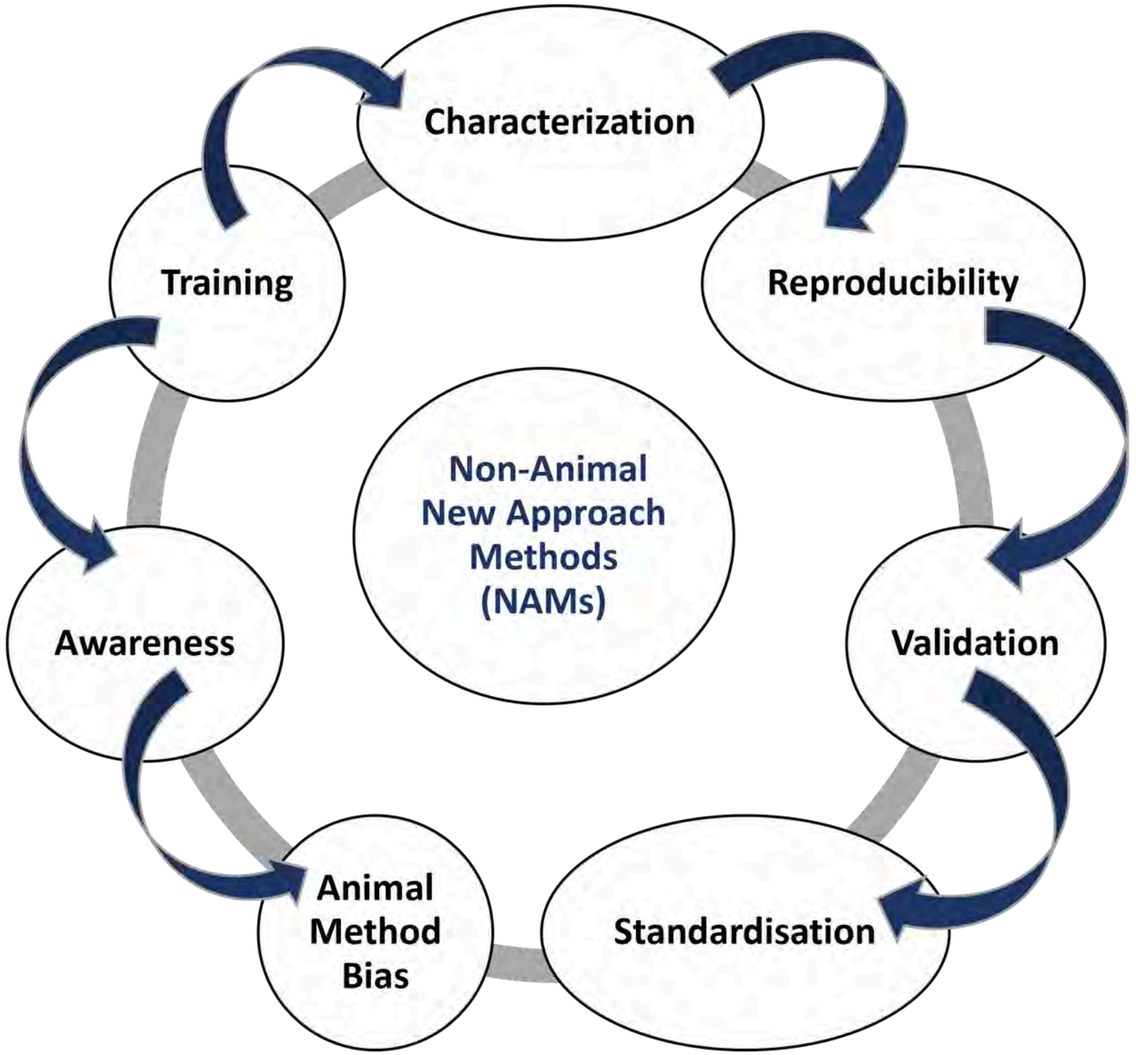


The aim

- identify present **actions** to ensure
- future availability of **safe, effective** applications
- **equitable distribution** of its benefits.
- identify any **risks or dual-use issues**

Imagining futures of 3D bioprinting. World Health Organization; 2023

- # DESCROIX-VERNIER ETHICSCIENCE PRIZE 2025

PRIX
DESCROIX-VERNIER
ETHICSCIENCE
LA SCIENCE A UNE ÂME

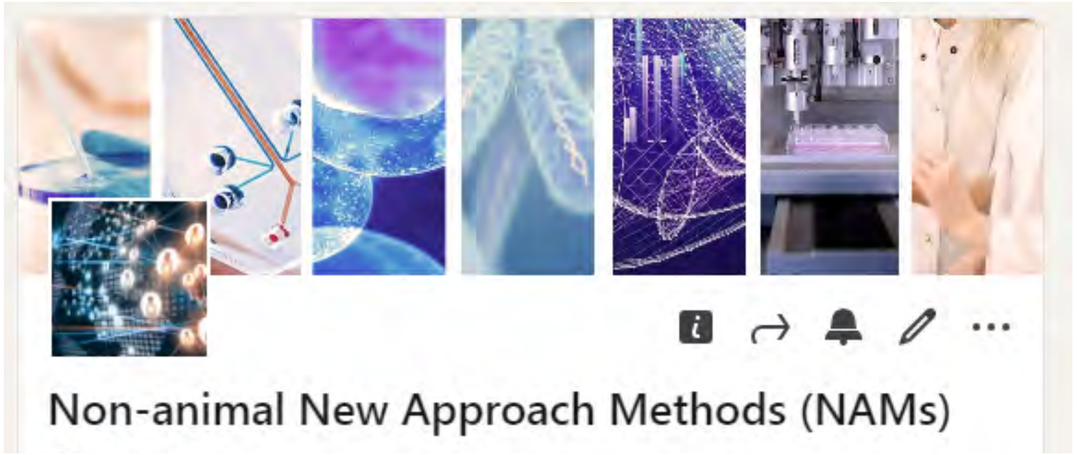
APPLICATION OPEN

Deadline August 30, 2024

- # NAMS NETWORK

A LINKEDIN GROUP

<260 members
different sectors and countries



- # WEEKLY NEWSLETTER ON NAMS

For researchers/scientists, citizens, media, public authorities, economic actors

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THANK YOU

FOR YOUR ATTENTION

lilas@proanima.fr

www.proanima.fr

THE DESCROIX-VERNIER ETHICSCIENCE PRIZE 2025

PRIX
DESCROIX-VERNIER
ETHICSCIENCE
LA SCIENCE A UNE ÂME

Categories

Innovation 50k€ - aims to acknowledge disrupting, innovative and/or high risk research tool or discovery ; open to any research field (biomedical and toxicology)

Development & Applicability 50k€ - focus on existing data and tools integration (i.e., method that integrates available toxicology tests with epidemiology, that can be applied for human health) ; open to any research field (biomedical and toxicology)

Forward-Looking Project 10k€ - aims to encourage a young outstanding and promising researcher with regard to the exceptional quality of his/her work and engagement

APPLICATION OPEN

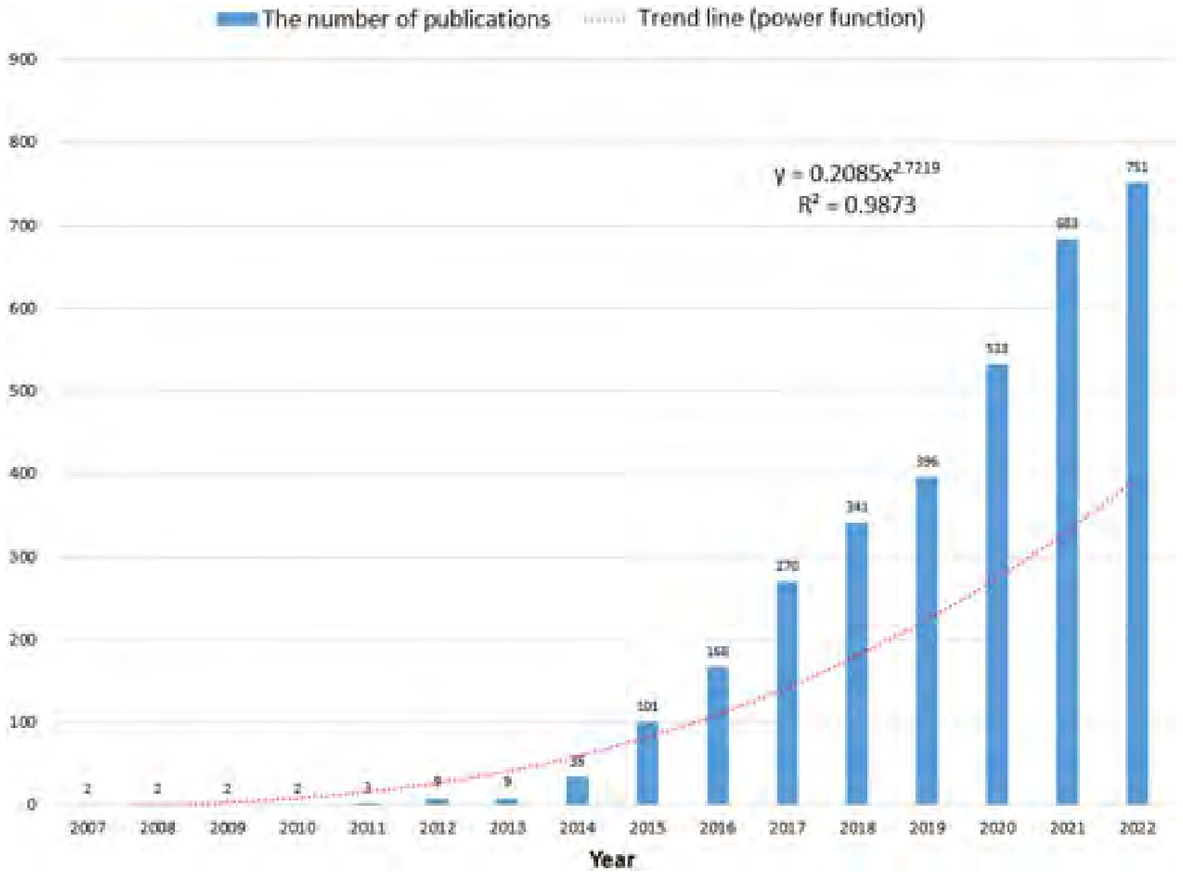
Deadline August 30, 2024

Awards ceremony in March 2025

3D BIOPRINTING: A POTENTIAL A REVOLUTION FOR RESEARCH AND PERSONALIZED MEDICINE

COMITÉ SCIENTIFIQUE PRO ANIMA

3D bioprinting annual publications from 2007 to 2022



Source: Ding, Zhiyu et al. Frontiers in bioeng and biotech (2023)

Precise, controlled, reproducible

Bio-available, patient-dervied

More ethical and affordable

Complex, vascularized

NON-ANIMAL METHODS (NAMS): GAINING INTERNATIONAL MOMENTUM

COMITÉ SCIENTIFIQUE PRO ANIMA

FDA Modernisation Act 2.0

US

NAMs can be used to instead of animal studies for drug development.

Roadmap

European Commission

Replacing the use of animals in next-generation chemical risk assessment.

Transition centre

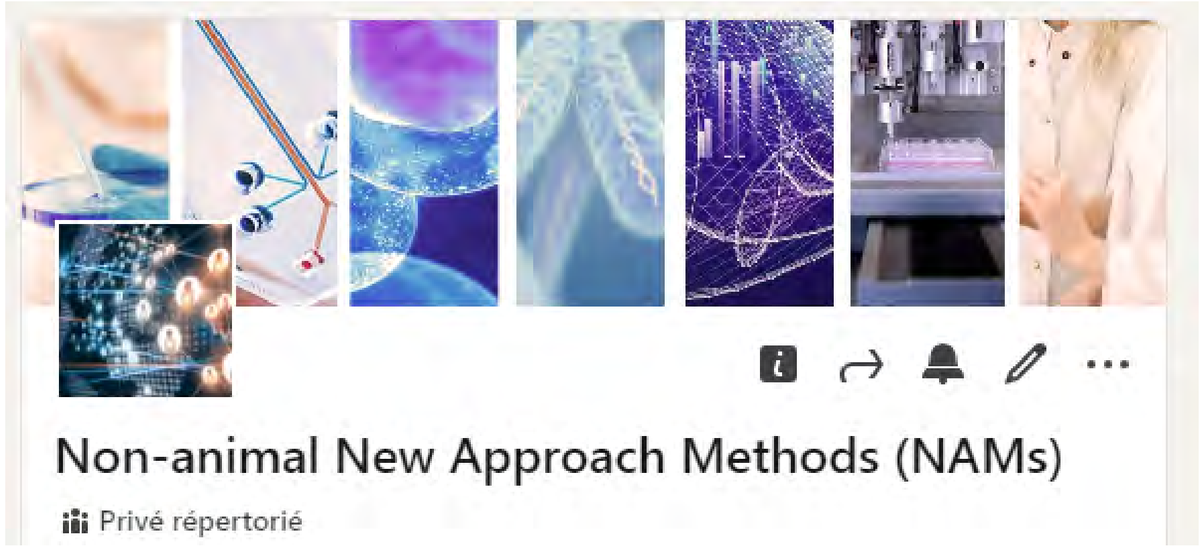
The Netherland

Dutch National Growth Fund invests 124,5 million in transition to animal-free innovation

> The Netherlands is setting the stage for transition science, but The Netherlands cannot achieve the change alone, as regulations usually work on a global scale.
>
> **Prof. Merel Ritskes-Hoitinga**

NAMS NETWORK

A Linkedin group

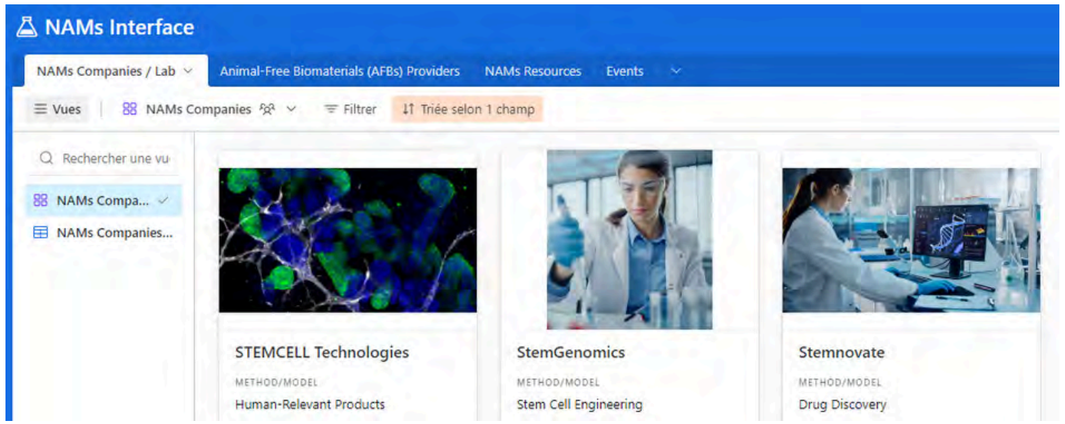


<260 members

Different sectors

27 countries

Tools



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