

# Enabling Scientific Breakthroughs with Open Source AI Releases

UT System AI Symposium in Healthcare

Kristin Lauter

Senior Director, FAIR

May 2025

# Goals

**Overview of FAIR's open source history and today's releases**

**Open source releases fueling advances in science:**

- AI4Health
- AI for Neuroscience
- AI for Drug Discovery

# FAIR @Meta

## Fundamental AI Research

### 2013 Founding of FAIR

**FAIR Labs** in Menlo Park, California, Seattle, NYC, Montreal, Pittsburgh, Paris, London...

### 2016 Introduction of Open Source Tools: PyTorch

FAIR introduced PyTorch, open source machine learning library, now widely used in the AI research community.

PyTorch Documentary, June 2024

**Strong commitment to Open Source and history of releasing many AI Foundation models**

2023

# Foundation Models

---

Llama, 2, 3, 4 1bn downloads

Toolformer

CM3Leon 230k downloads

I-JEPA, V-JEPA

SAM: Segment Anything 7k citations

DINOv2 2.4 M downloads, 4k citations

ImageBind

VoiceBox powered MovieGen

Massively Multilingual Speech

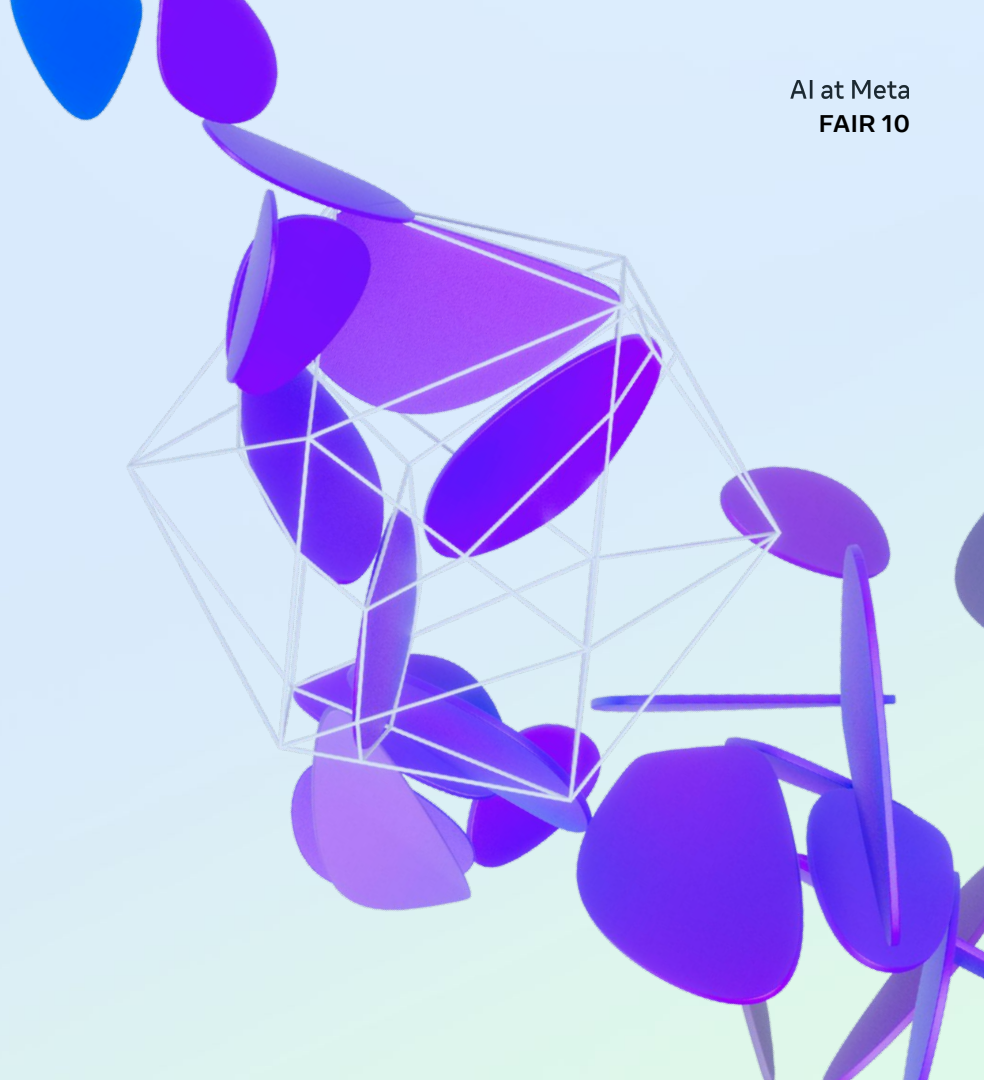
MusicGen

Seamless Time Magazine 2023

Code Llama 9m downloads

# SAM: Segment Anything

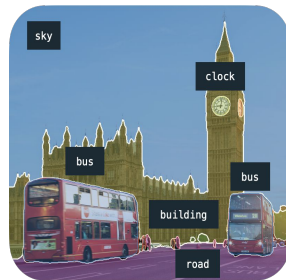
Kate Saenko, Nikhila Ravi, FAIR



# Segmentation powers perception



## VISUAL PERCEPTION



2012

**ALEXNET**  
(U. Toronto)

2015

**FASTER R-CNN**  
(Microsoft,  
Facebook)

2019

**PANOTOPIC  
FPN**  
(Facebook)

2023

**SEGMENT  
ANYTHING**  
(Meta)

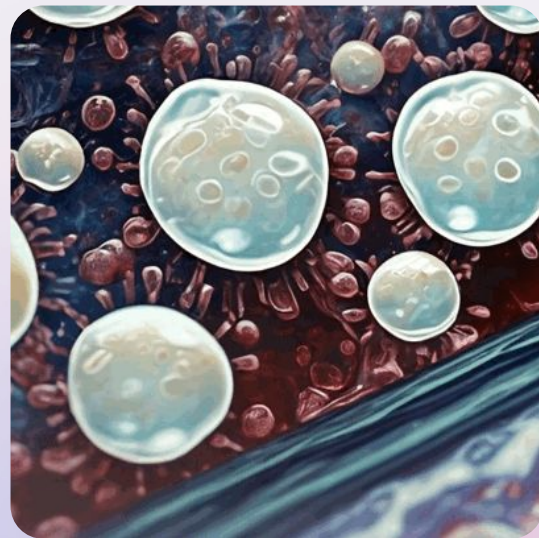
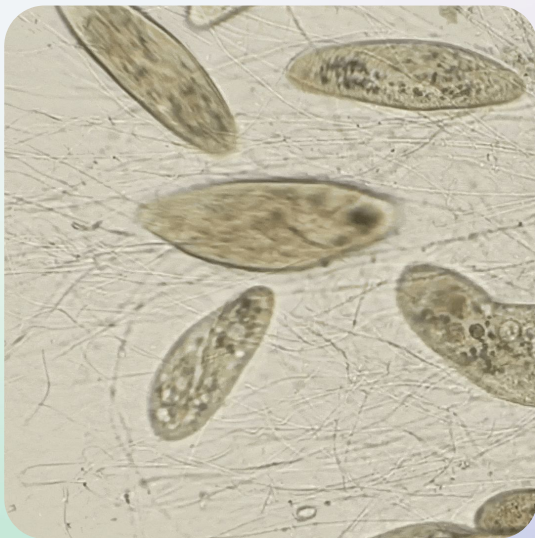
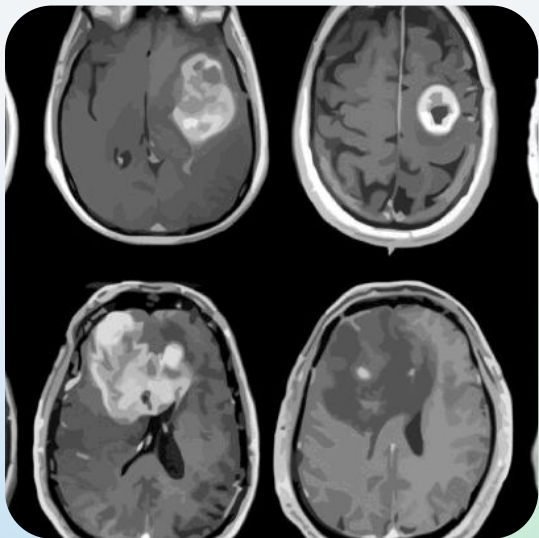
2024

**SEGMENT  
ANYTHING 2**  
(Meta)



# SAM 2

Real life impact in the fields of science and medicine





## SAM 3 **will enable text prompts** in addition to click and box prompts



### SAM 1

- ✓ Prompt with clicks
- ✓ Segment objects in static images



### SAM 2

- ✓ Prompt with clicks
- ✓ Segment objects in static images
- ✓ Track objects across videos



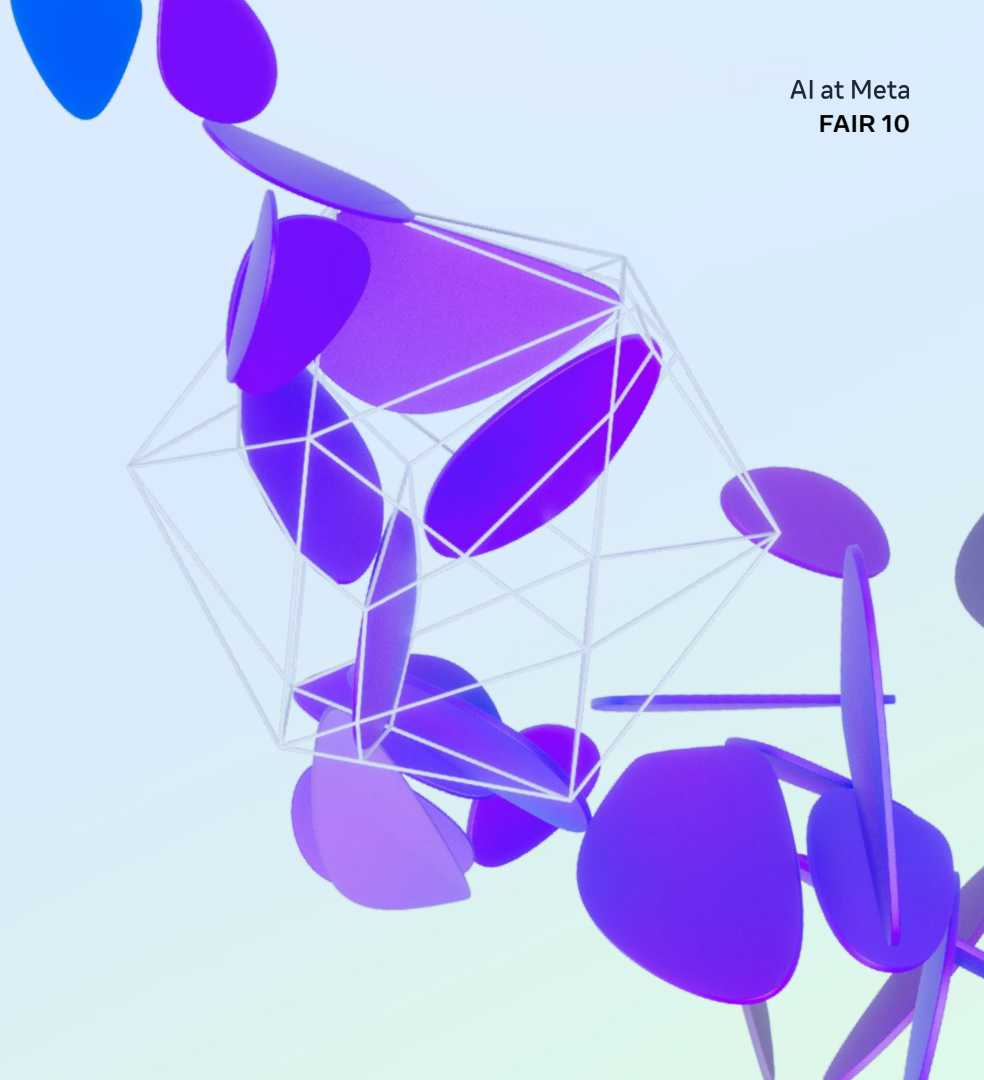
### SAM 3

- ✓ Prompt with clicks
- ✓ Segment objects in static images
- ✓ Track objects across videos
- ✓ **Prompt with text or visual examples**
- ✓ **Detect all instances of target category**



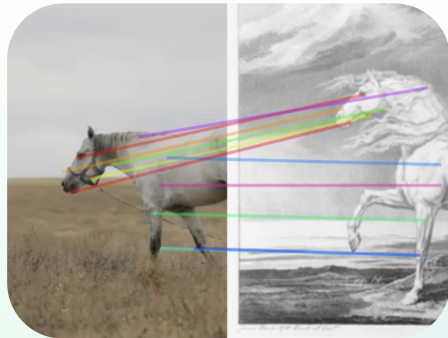
# DINO

Patrick Labatut, Research Engineering Manager





## Self-supervised Learning unlocks vision tasks



Depth estimation

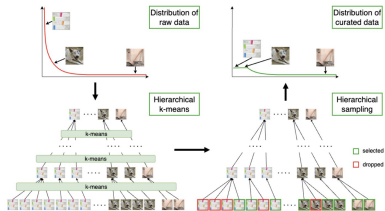
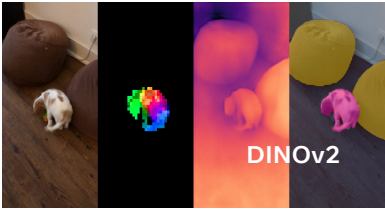
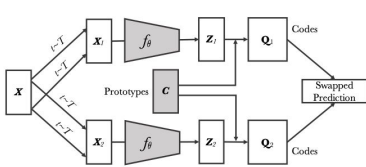
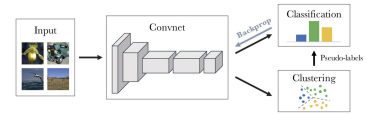
Semantic segmentation

Instance retrieval

Dense / sparse matching

...

DINO - ORIGINS



2019-2020

DeepCluster /  
DeepCluster-v2

SwAV

2021-2022

DINOv1

SEER / SEER 10B

2023-2024

DINOv2

ViT Need Registers

Automatic Data Curation

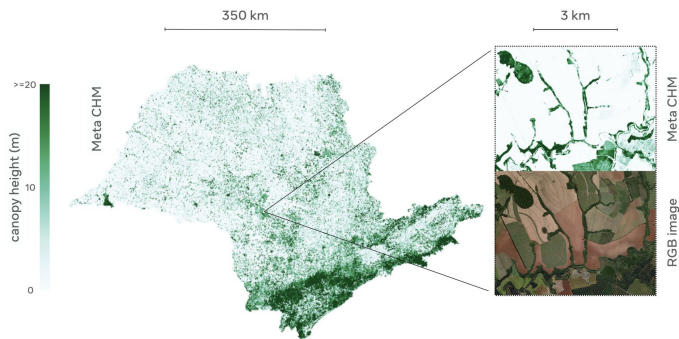
2025-

... ?

dino.txt

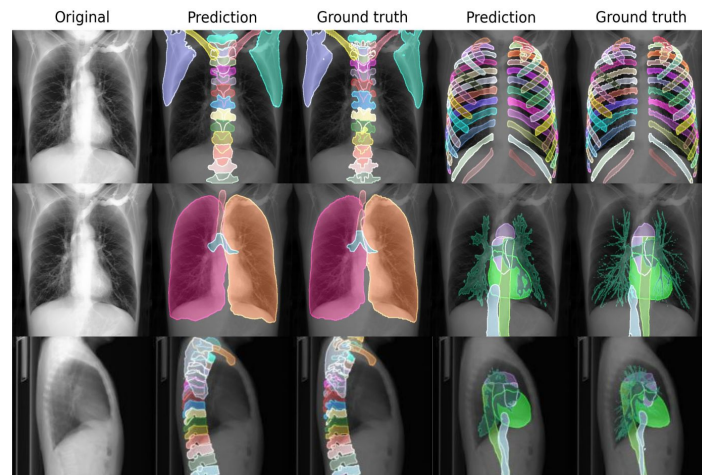
## Remote Sensing:

Canopy height prediction  
(in collaboration with WRI)



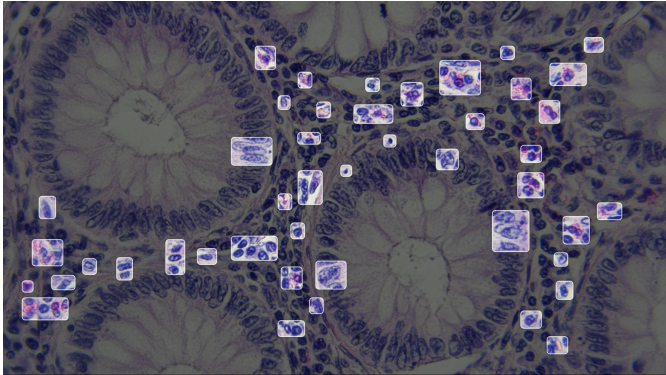
## Medical Imaging:

X-rays analysis and disease detection  
(in collaboration with MICS/AP-HP)

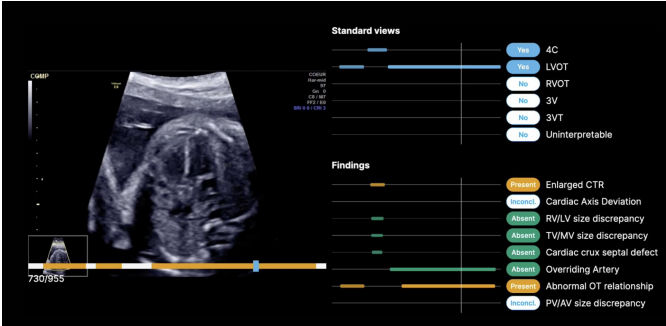




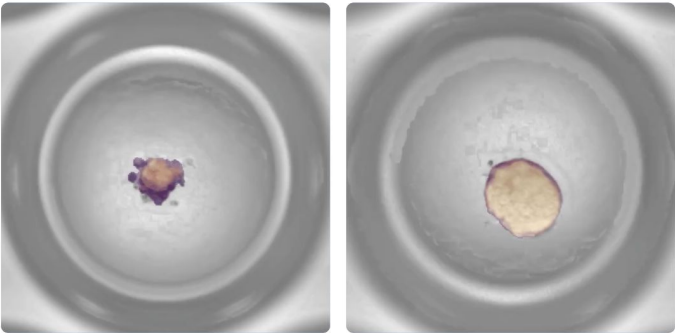
Mahmood Lab:  
Human Pathology



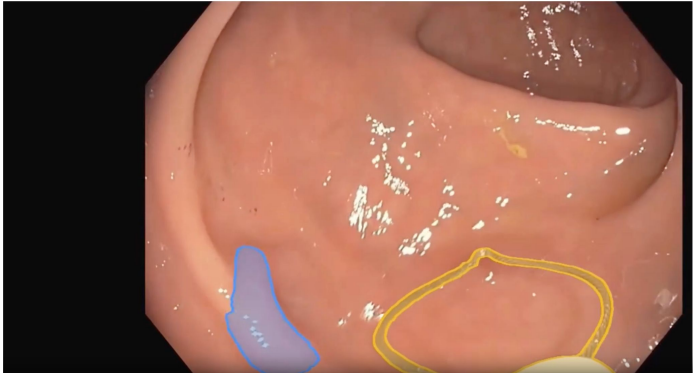
BrightHeart:  
Fetal Heart Screenings



Orakl:  
Oncology



Virgo:  
Endoscopy





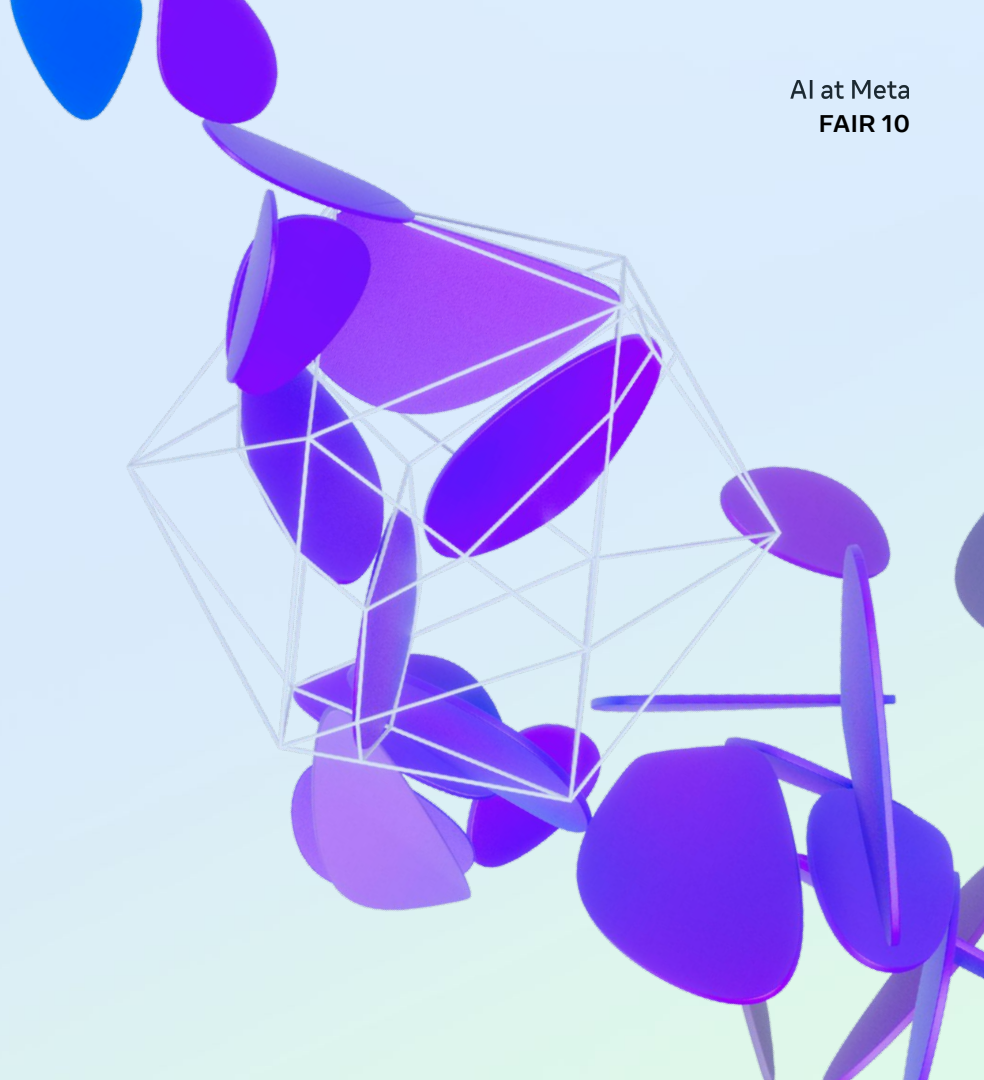
# FAIR Chemistry

OMol Dataset

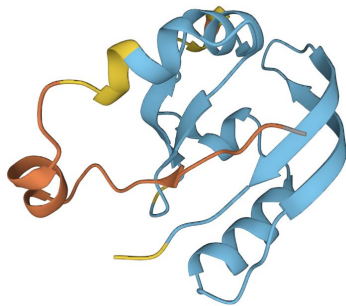
UMA Model Releases

Larry Zitnick, Director, Research Scientist

Zach Ulissi, Research Manager



Solving many real-world problems requires working at the atomic level



Drug Discovery

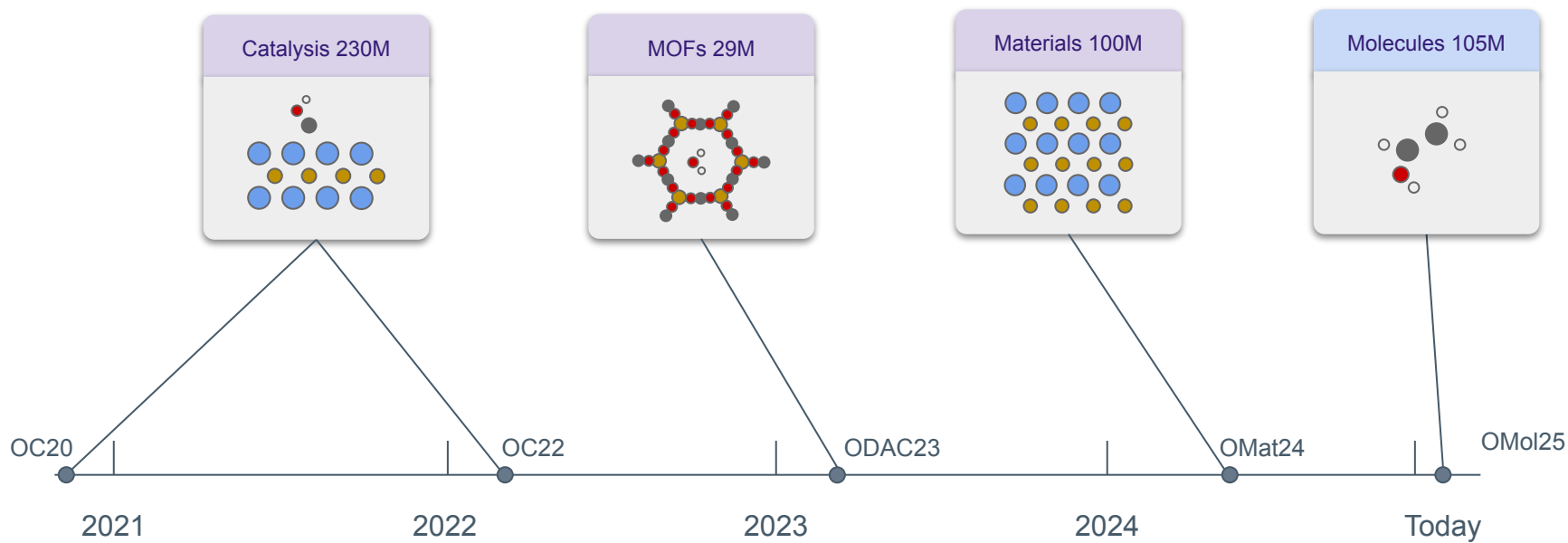


Climate



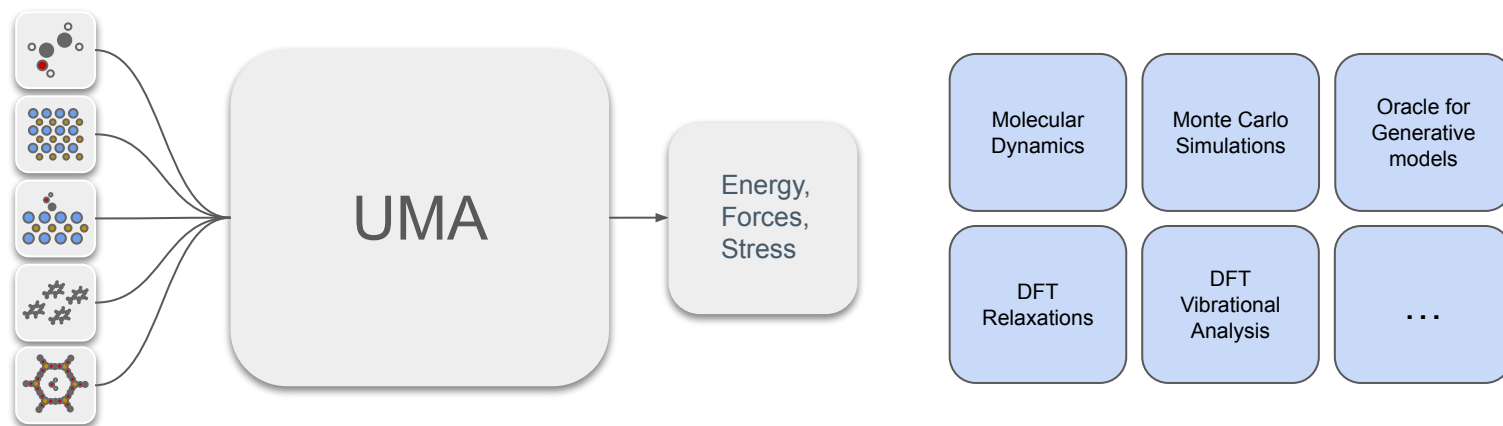
Augmented Reality

# Data



# Universal Model for Atoms (UMA)

10,000x faster than DFT

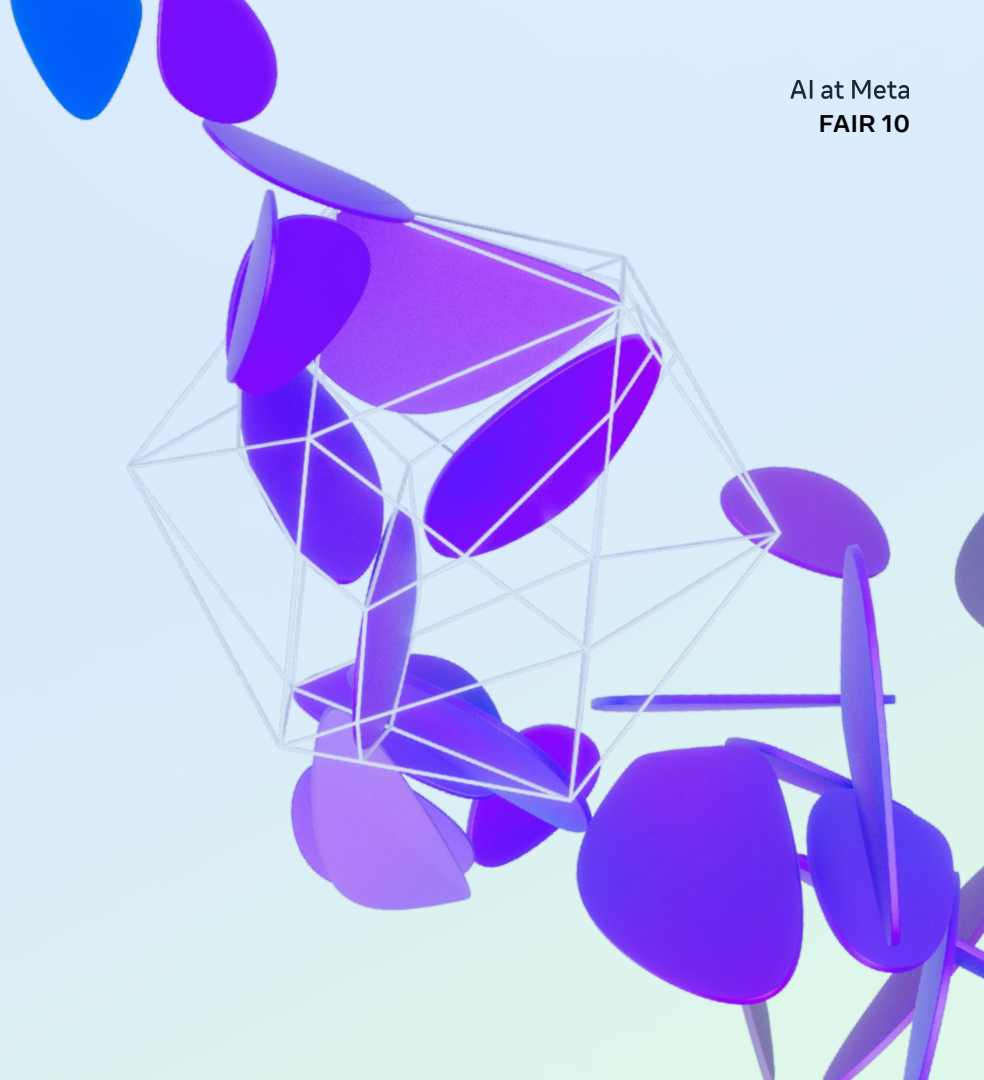


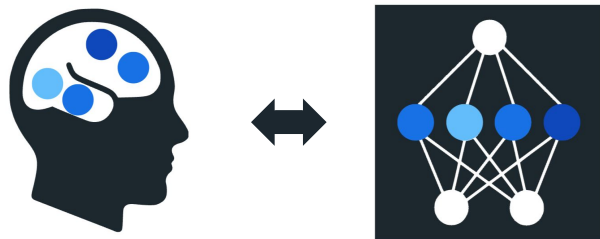
# Brain and AI


**Dynadiff: Model Release**

**Developing Brain: Publication**

Jean Remi King, Research Scientist





 **Brain**  
Model the brain with ai.

2022



wav2vec 2.0



2023



DINO V2



2024



Llama 2



2025



Brain2Qwerty



February  
2025 release





2022



wav2vec 2.0



2023



DINO V2



2024



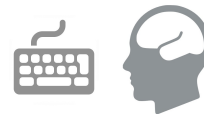
Llama 2



2025



Brain2Qwerty



Today

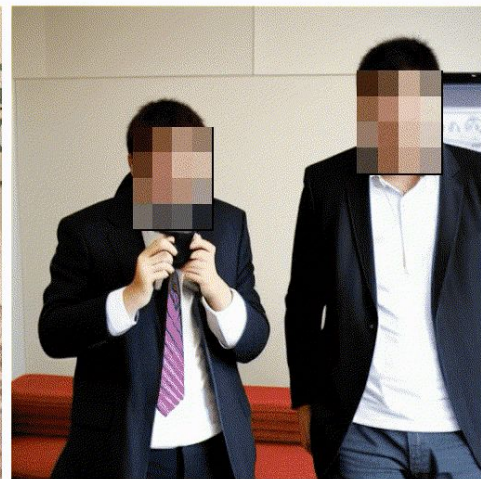


Dynadiff



**Today's release: Dynadiff**  
A single stage model to decode images from  
real-time fMRI

<https://github.com/facebookresearch/dynadiff>

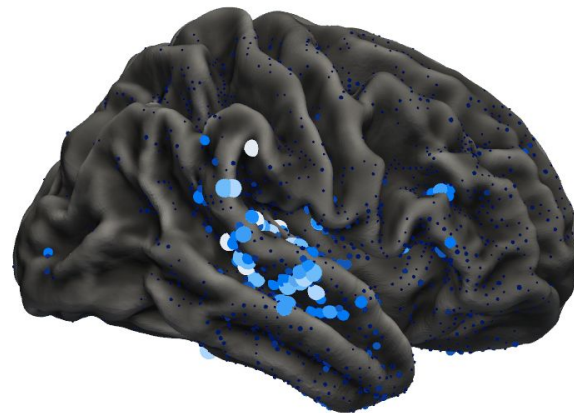


viewed image



brain decoding

# Today's paper release: The Emergence of Language in the Developing Brain.



# THANK YOU

