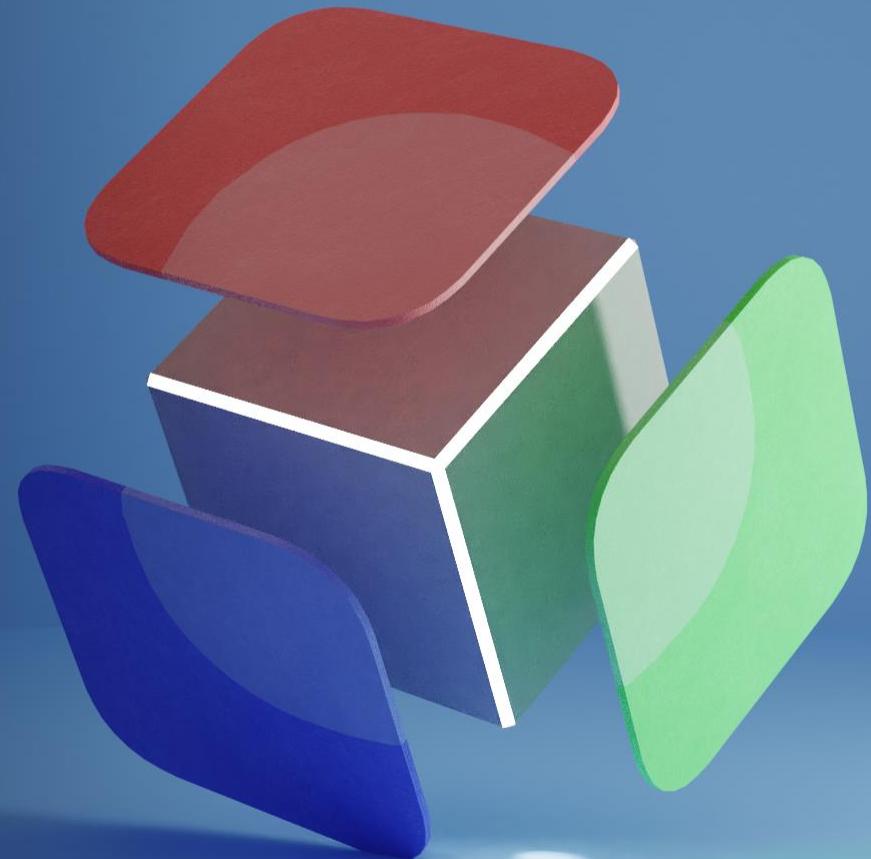


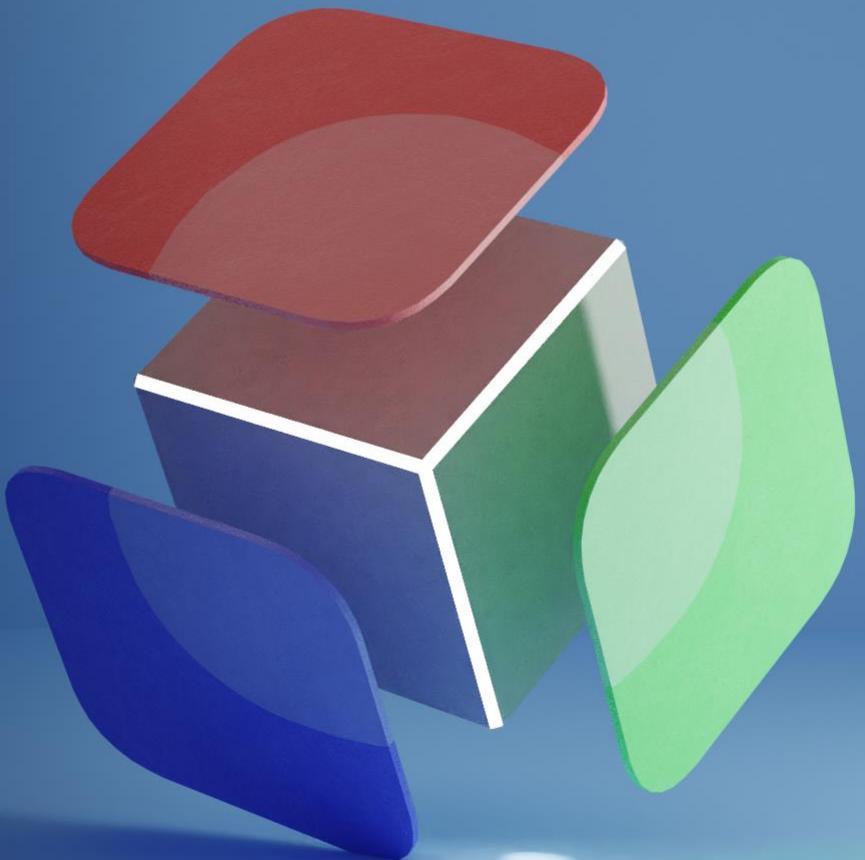
# Perth Machine Learning Group

**Current state of AI and  
where we are going  
with PMLG**

**2023**



# **Perth Machine Learning Group**



**Started 6 years ago**

**Community ~3k members**

**Research and Development**

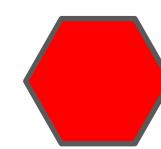
**Research Collaborations**



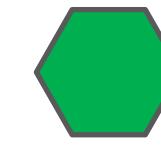
**AI ..  
where are  
we currently**



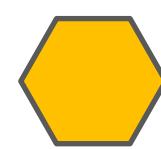
# Unimodal



vision



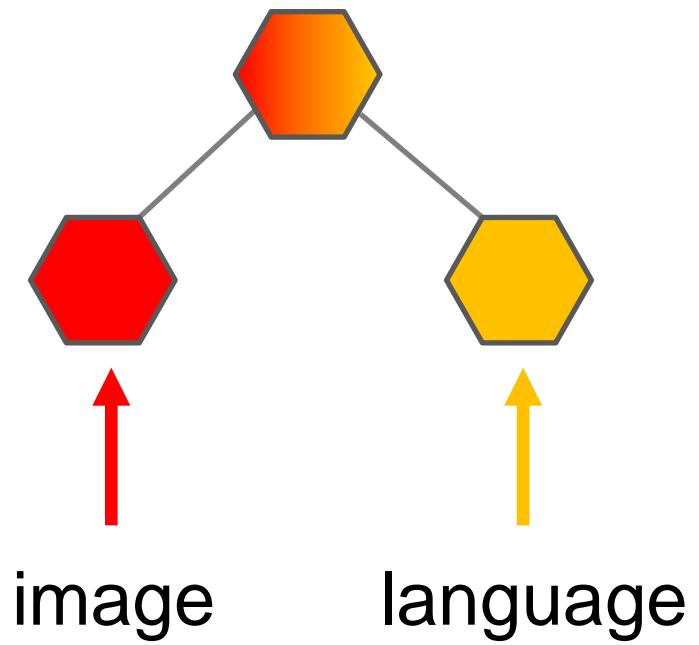
audio



language

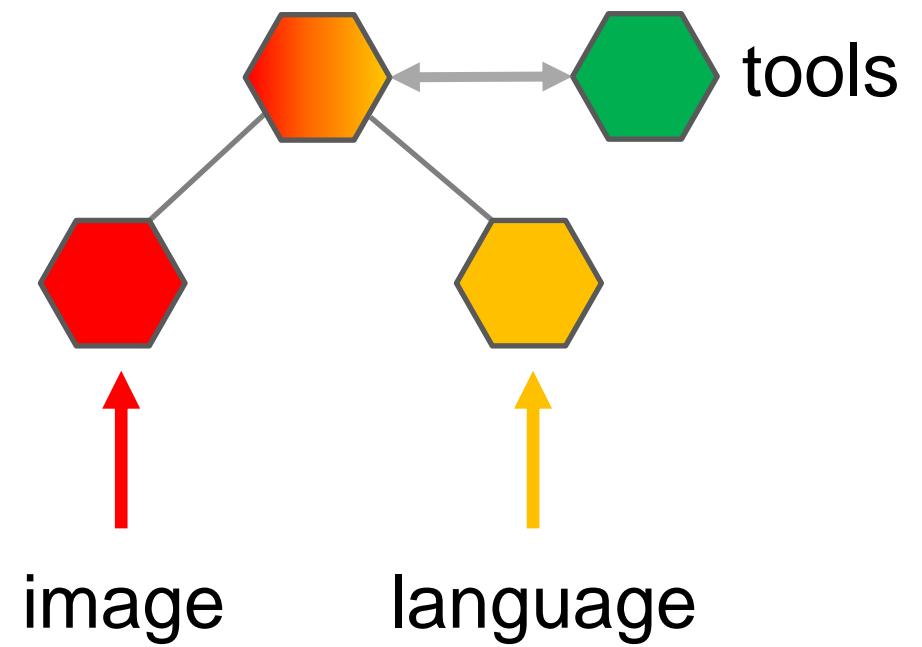


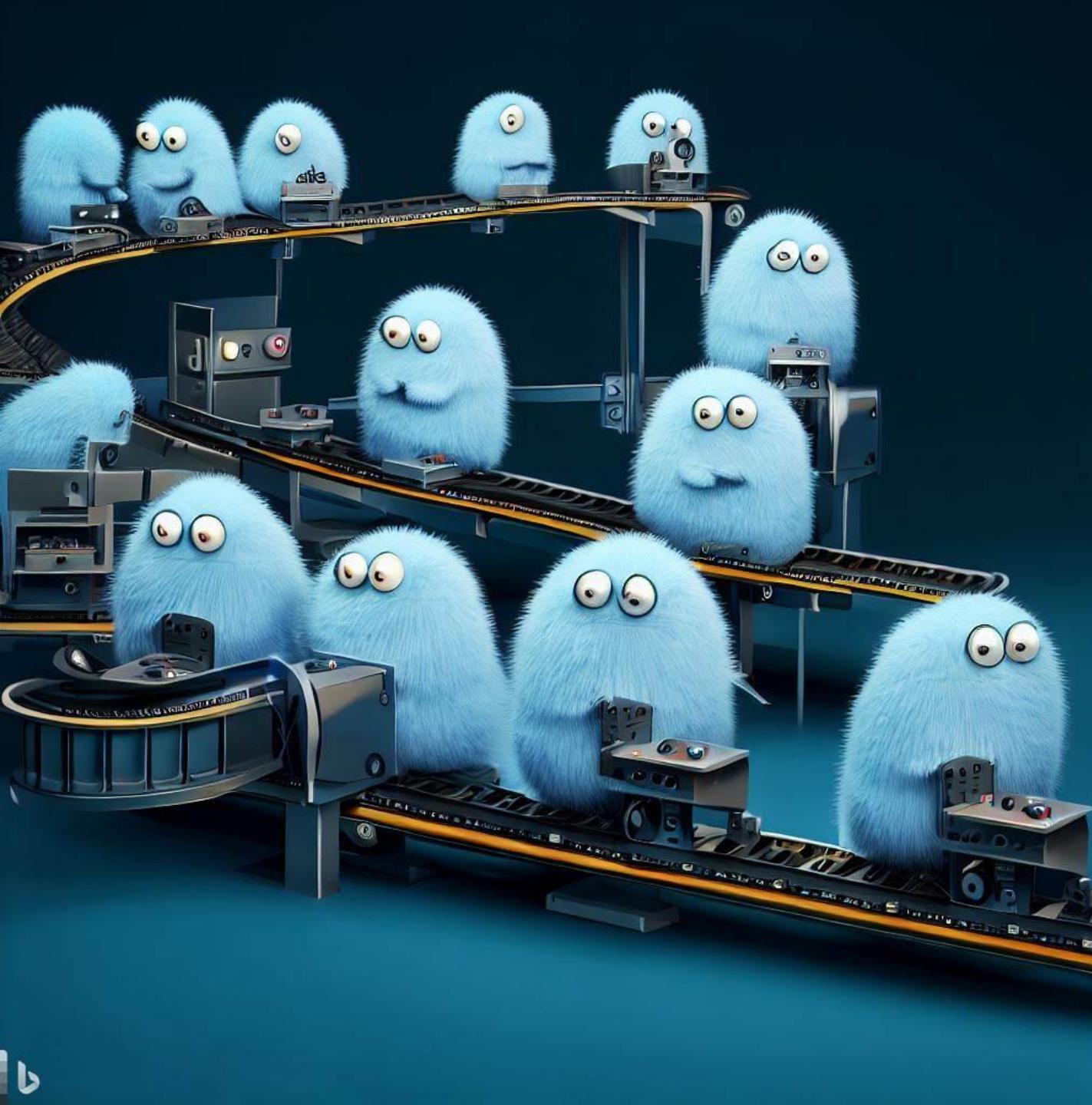
multimodal





# Tool use





**knowledge based  
AI automation**



**expanding  
memory, task  
management,  
and planning**

**..to make agents**

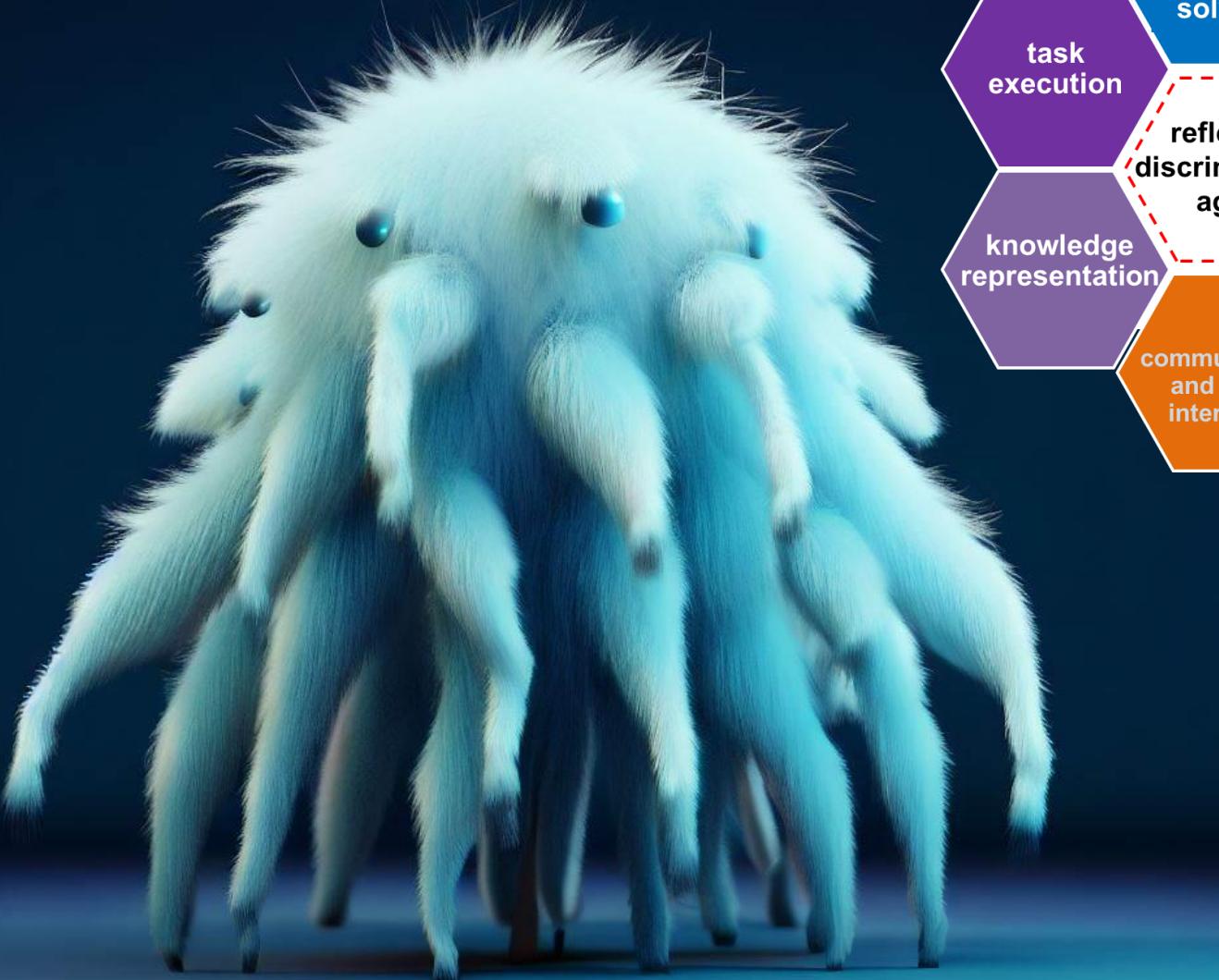


# systems of systems cognitive architecture





**how to connect  
them is still an  
open question**



Differentiable Neural Computer,  
Recursive RvNN,  
Neural Theorem Provers

Monte Carlo Tree Search,  
World Models, etc.

Convolutional Networks (CNs),  
Transformer-based LLM, etc.

Temporal Convolution networks,  
Transformer-based LLM

Graph Convolutional Networks,  
Knowledge Graph Embeddings,  
Transformer-based LLM

Hierarchical Deep RL,  
Dynamic Skill Acquisition



**language  
models**



**1 trillion tokens  
≈ 10 million books**

~ 0.014% of currently available data



**trained with  
human feedback**



**scaling**



**emergent  
capabilities  
with scaling**



**slow to train**



**expensive to train**



**Consume a lot of  
power**



**expensive to run**



**Is this the future  
or is there a  
better way?**



**smaller**



**1000 x faster**



**1000 x energy  
efficient**



**and maybe work  
more like the  
brain**



**we started to look  
at optical compute**

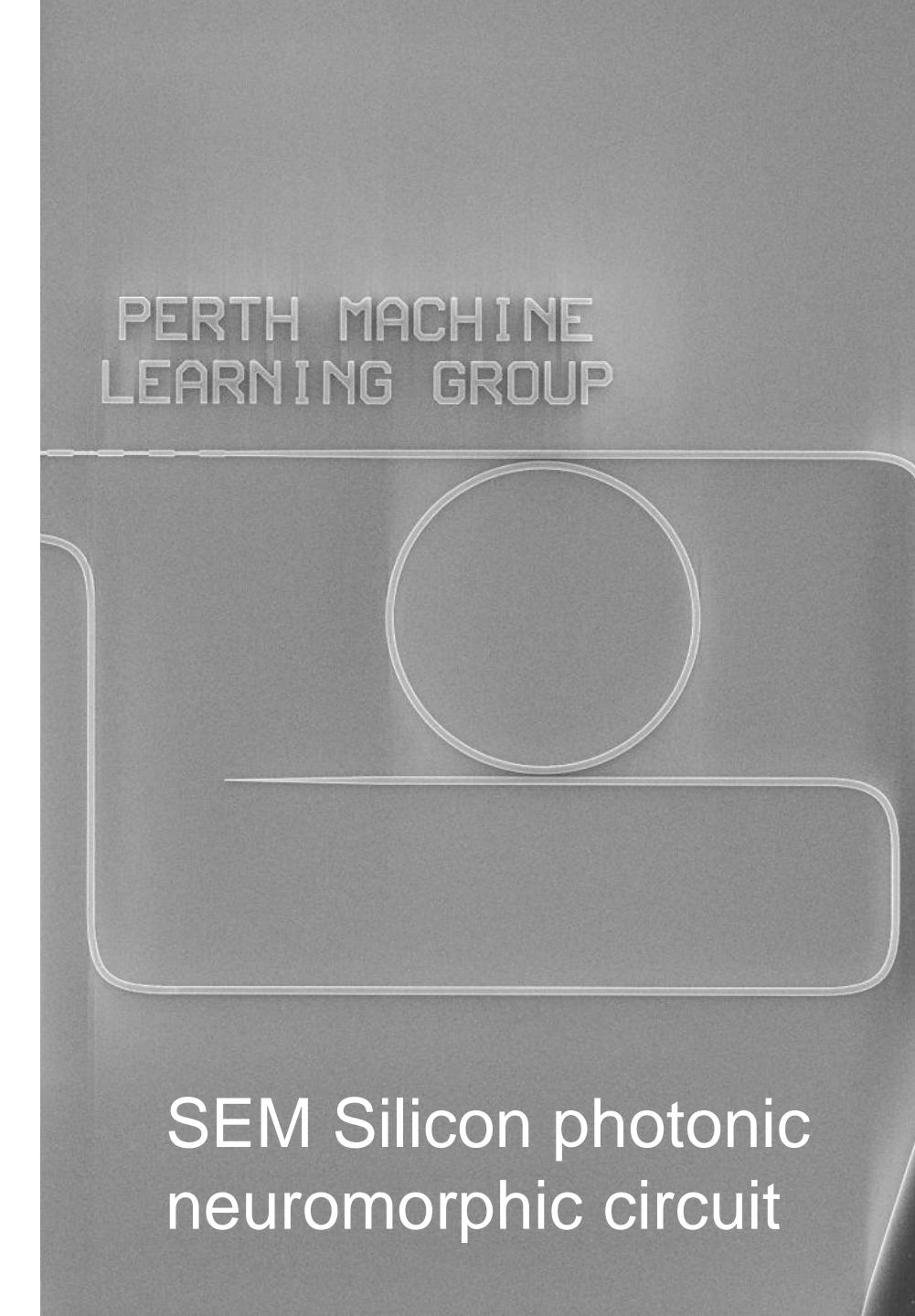
**...computing with  
light**



**the long journey**



**silicon photonic /  
plasmonic  
designs**





**Opportunity for  
disruption**



**2 years into  
the journey**

**.....still work  
in progress**



**what changes  
might an AI  
future bring**



**impacts**

**economic  
societal**

**+**

**environmental  
demographic**



UTOPIA

DYSTOPIA

Interactive talk on:

## AI Governance, Risk and Regulation

May 11<sup>th</sup> 6pm (tomorrow)

State Library of WA  
Perth Cultural Centre,  
25 Francis Street  
Level 4: Great Southern Room

*meetup*

<https://bit.ly/3HMRH6j>



AI to AI interactions  
change the internet

some impacts:

- search
- advertising
- marketing
- social media
- surveillance/tracking
- **identity**



**AI + Crypto**

**self-sovereign  
identity?**



# DAOs

# Distributed Autonomous Organisations



# AI safety and alignment



**caring,  
balanced  
aligned, fair &  
...pro-human**



**self - awareness?**

**...raises moral  
questions about  
exploitation**

# Find out more about PMLG

## Collaborate

[www.pmlg.com.au/about](http://www.pmlg.com.au/about)  
[pmlg@assistedevolution.net](mailto:pmlg@assistedevolution.net)

## Events

[www.meetup.com/perth-machine-learning-group/](http://www.meetup.com/perth-machine-learning-group/)

