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24 October 2024

4DS Memory presenting at Semiconductor Australia 2024

4DS Memory Limited (ASX:4DS) advises Chief Strategic Officer Mr Peter Himes will present at Semiconductor Australia 2024 today, Thursday, 24 October 2024, at 11:45am AEDT. Peter's presentation for the conference is attached to this announcement.

The one-day Conference is held at Deloitte, Quay Quarter Tower from 8am – 6pm. This inaugural event brings together Australia's deep-tech entrepreneurs, industry experts, innovation policy makers, and investor community to explore opportunities and chart the roadmap to secure Australia's semiconductor future.

4DS Interactive Investor Hub

If you have any questions on this announcement or any past 4DS announcements, check out our Investor Hub. Like, comment, ask a question and view video summaries on important announcements. Shareholders can link through to the Investor Hub via: announcements.4dsmemory.com

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Authorised for release by the Board.

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About 4DS

4DS Memory Limited (ASX: 4DS), with facilities located in Silicon Valley, is a semiconductor technology company bringing high bandwidth, high endurance, persistent non-volatile memory to advanced CMOS process nodes. Its technology, known as Interface Switching ReRAM, features tunable persistence and low energy per bit for today's most challenging compute intensive and AI processor applications. Established in 2007, 4DS owns a patented IP portfolio, comprising 34 USA patents, and is the first company to develop PCMO ReRAM, on an advanced CMOS processing node. 4DS has a development agreement with Belgium based imec – a world leading research and innovation hub in nano electronics and digital technologies, as well as a joint development agreement with Western Digital subsidiary HGST, a global leader in storage solutions.

For more information, please visit www.4dsmemory.com

Disclaimer

This release contains certain forward-looking statements that are based on the Company's management's beliefs, assumptions and expectations and on information currently available to management. Such forward looking statements involve known and unknown risks, uncertainties, and other factors which may cause the actual results or performance of 4DS to be materially different from the results or performance expressed or implied by such forward looking statements. Such forward looking statements are based on numerous assumptions regarding the Company's present and future business strategies and the political and economic environment in which 4DS will operate in the future, which are subject to change without notice. Past performance is not necessarily a guide to future performance and no representation or warranty is made as to the likelihood of achievement or reasonableness of any forward-looking statements or other forecast. To the full extent permitted by law, 4DS and its directors, officers, employees, advisers, agents and intermediaries disclaim any obligation or undertaking to release any updates or revisions to information to reflect any change in any of the information contained in this release (including, but not limited to, any assumptions or expectations set out in the release).

You should not place undue reliance on these forward-looking statements. Except as required by law or regulation (including the ASX Listing Rules) we undertake no obligation to update these forward- looking statements.



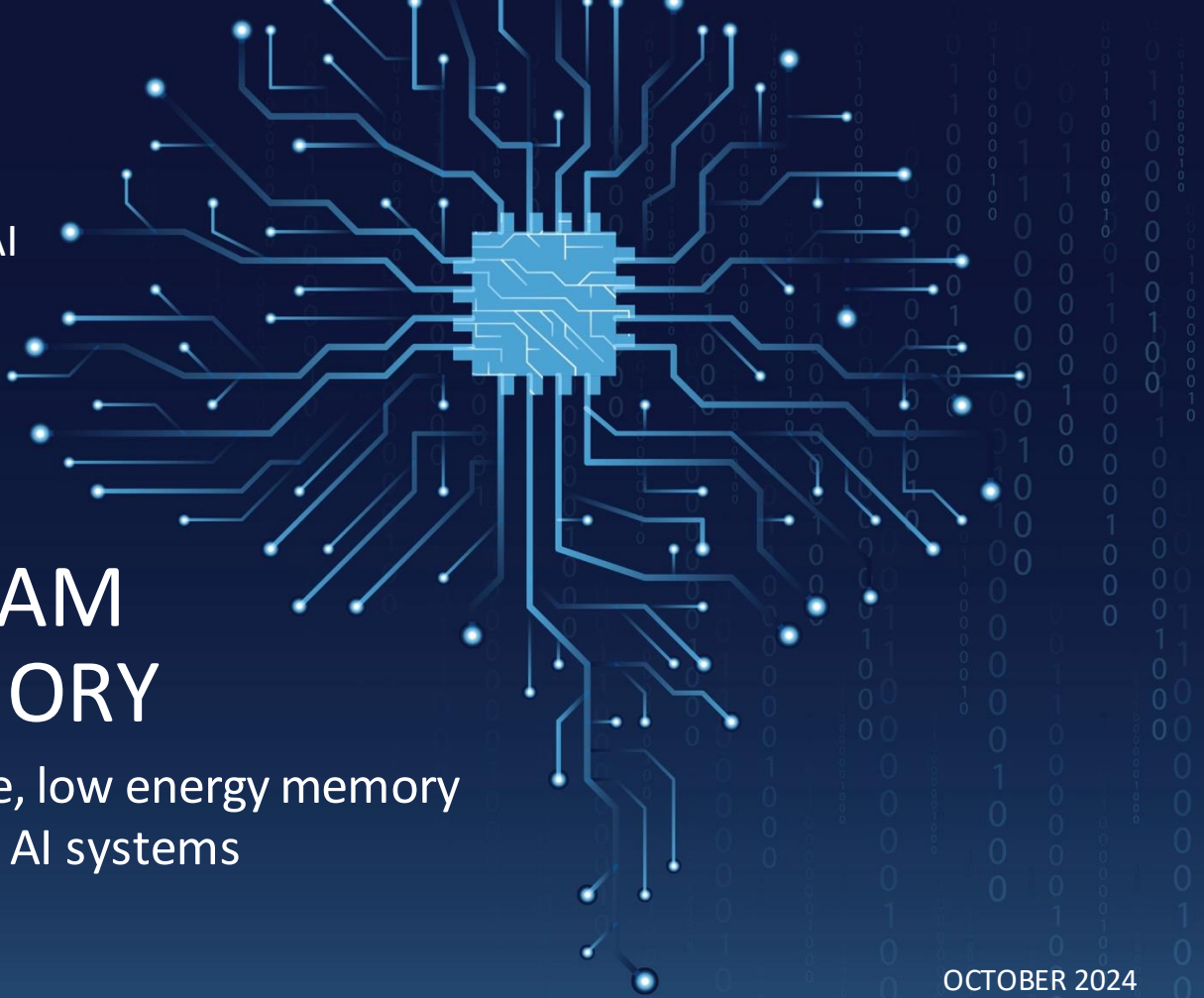
Beyond Barriers: Enabling Future AI

PERSISTENT RERAM FROM 4DS MEMORY

A high speed, high endurance, low energy memory
technology to enable Future AI systems

Peter Himes | Chief Strategic Officer

OCTOBER 2024



About 4DS Memory

Began groundbreaking work on PCMO ReRAM in 2007

Strategic relationship with HGST (now WD) in 2014

Public on ASX (Australia) in 2015

Started advanced process development with imec in 2017

Improved PCMO cell design efforts started in 2020

Latest generation Mb chip using 60nm cell fabricated in 2023

34th US patent issued 2023

20nm Mb chip (with 1.6B elements) to be run at imec in 2024

4DS is the only
company to
demonstrate
PCMO ReRAM
on an advanced
CMOS node

What are the challenges facing AI companies today?

SCALE

Big data compute needs are scaling exponentially

ENERGY

The power needed to run increasingly large models constrains use cases

SPEED

As computational needs scale, everything must work at higher speeds to maintain responsiveness

LATENCY

As performance demands greater scale the tolerance for system latencies due to memory bandwidths evaporates

OPTIMISATION

Reducing model size without compromising performance and reliability is a key differentiator across players

ADAPTATION

The ability of models to adapt based on changing resources and conditions

FAULT TOLERANCE

Increasing cluster sizes of big data systems brings higher system fault risks. Instantaneous recovery is vital

COST

Balancing the cost of AI systems with real world economic constraints

What are today's approaches to solve?

MORE SRAM

The most advanced AI processor chips have up to 280MB of SRAM on board

MORE DRAM

The need to hold larger and larger datasets in memory drives the need for more DRAM banks

FASTER DRAM

Compute latency due to data transfer from DRAM – CPU or GPU

MORE INTEGRATION

Compute In Memory to address data transfer cost

BIGGER CLUSTERS

More clusters for larger datasets and faster processing

HYBRID MEMORIES

NV SRAM, PMEM, CXL – all are approaches to address some of the challenges by combining different technologies

How should an advanced memory help these challenges?

ZERO LATENCY

but most NV technologies are slow

HIGH ENDURANCE

but NV technologies suffer from low lifetime

HIGH SCALE

but embedded memory options are few

LOW ENERGY

but DRAM requires constant refresh even for static data

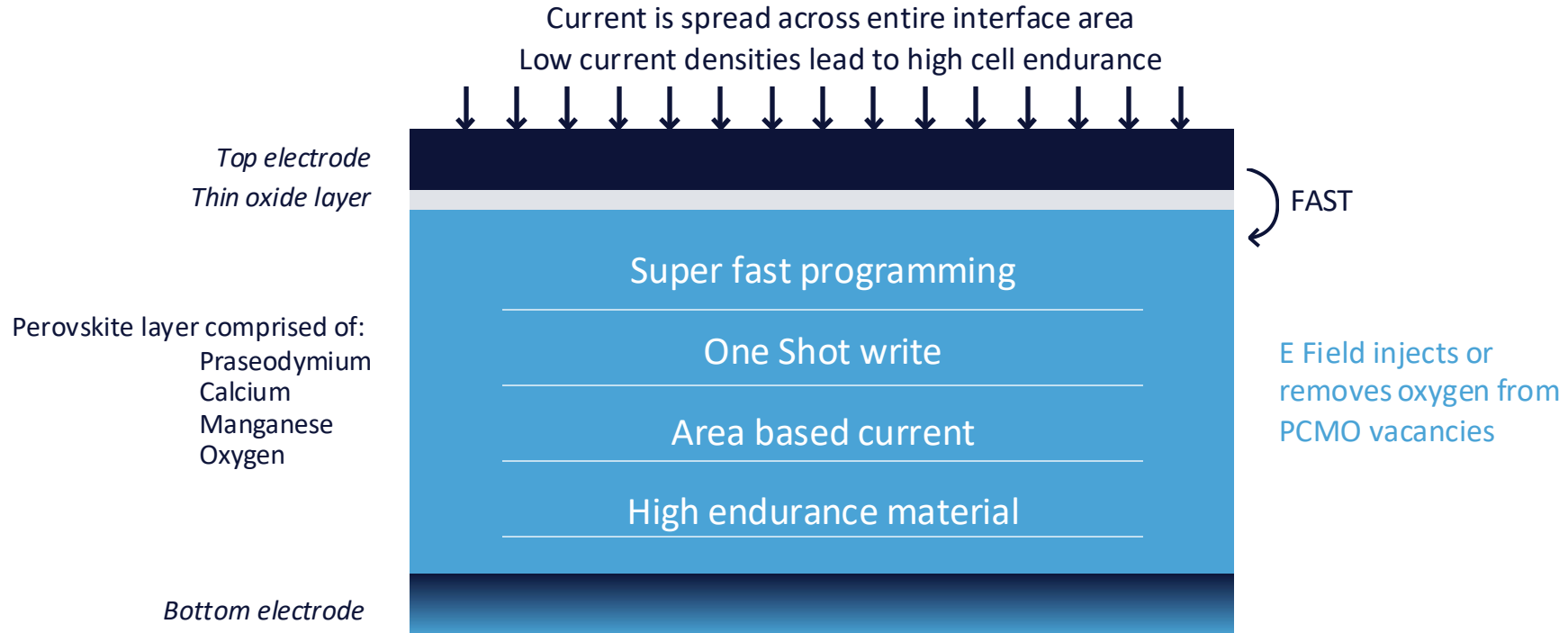
LOW COST

but some advanced memories require expensive ALD integration

HIGH RETENTION

but persistence, speed and endurance have long been trade offs

What is PCMO and why is it unique?



4DS: Persistent Memory at DRAM Speeds

Highly responsive PCMO with extremely fast single-shot write* times of 4.7ns to deliver low energy per bit writing at DRAM speeds

High bandwidth persistent memory for high performance data protection

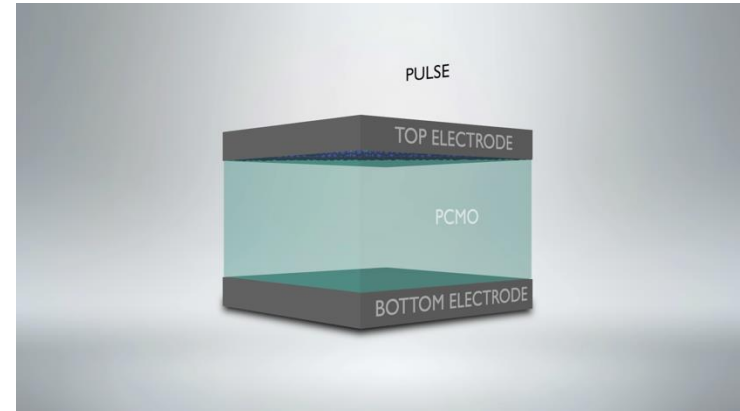
High endurance memory with up to 10^9 endurance demonstrated

High endurance and high retention sectors can be dynamically allocated with data retention from hours to months

High scale and density w 20 nm cell (to be demonstrated Q4 2024)

Area based programming, energy scales with size

Pulse programmable for Analog characteristics



4DS – The Memory that Breathes ©

* Switching in PCMO is thru Electric Pulse Induced Resistance switching, or EPIR

Why important? Warm Data Applications

Data at DRAM speeds that doesn't need constant updating

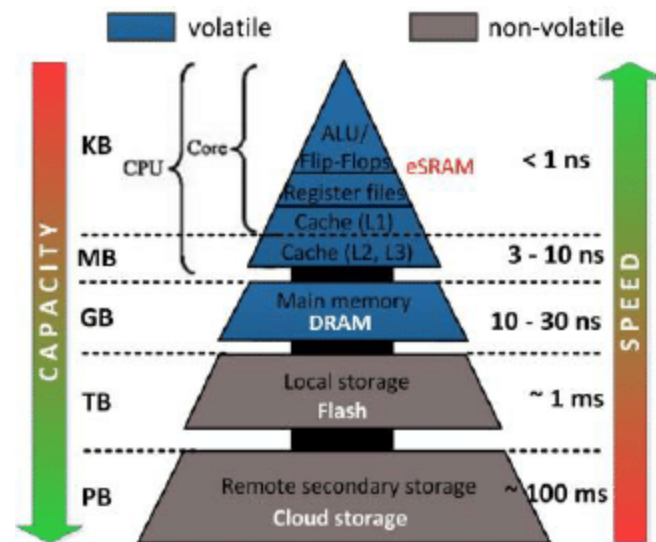
Prevalent in Inference (as opposed to Training) AI Engines

Lowers energy cost of memory for inference applications

Complement to CXL bus memory but at faster access, response times

Can be In Memory or Near Memory Compute

4DS believes that both CXL and Warm Data need a memory that responds at the speed of DRAM



Jovanovic, Bojan & Brum, Raphael & Torres, Lionel. (2015). MTJ-based hybrid storage cells for "normally-off and instant-on" computing. Facta universitatis - series: Electronics and Energetics. 28. 465-476. 10.2298/FUEE1503465J.

Why important? Persistent Memory for Big Data Applications

Combines the speed of DRAM with long term data retention

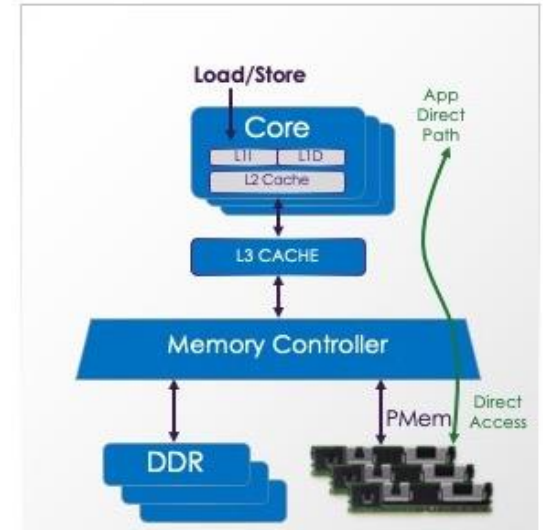
Enables faster data access and improved system reboot

Lowers energy cost of memory for inference applications

Integrates seamlessly into the memory hierarchy, residing between volatile memory and storage devices

Can provide extra memory capacity to DRAM for big data analytics, or can be ultrafast storage for in-memory databases

Persistent memory combines speed, resilience, and capacity with non-volatility, making it a great option for applications demanding rapid data access and retention



Intel PMEM structure

4DS believes there is still an unmet need for a high bandwidth persistent memory solution and that 4DS could potentially deliver that solution

Why important? High Bandwidth, Low Energy Memory for Edge AI Applications

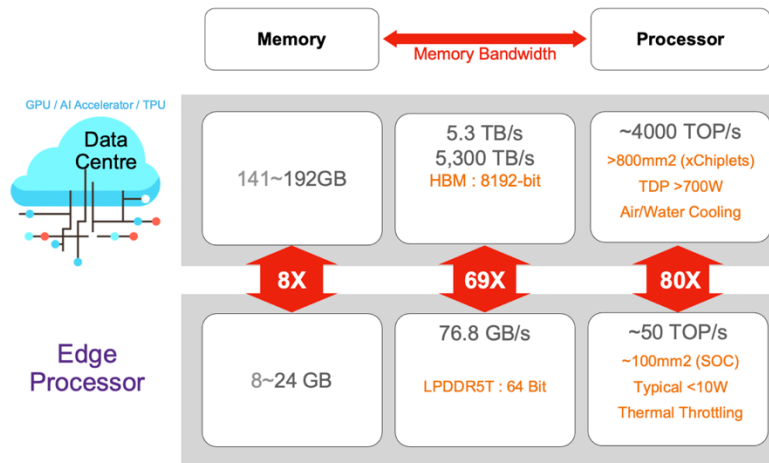
Edge AI needs to deliver the same AI performance within highly constrained resources

Many edge applications are battery powered meaning power consumption becomes a primary design constraint

Low cost and low pincount requirements add to the system design challenges for Edge AI applications

A memory technology needs to meet the speed requirements while contributing to power savings and efficiency

4DS believes that PCMO ReRAM can be an ideal candidate for this emerging memory need

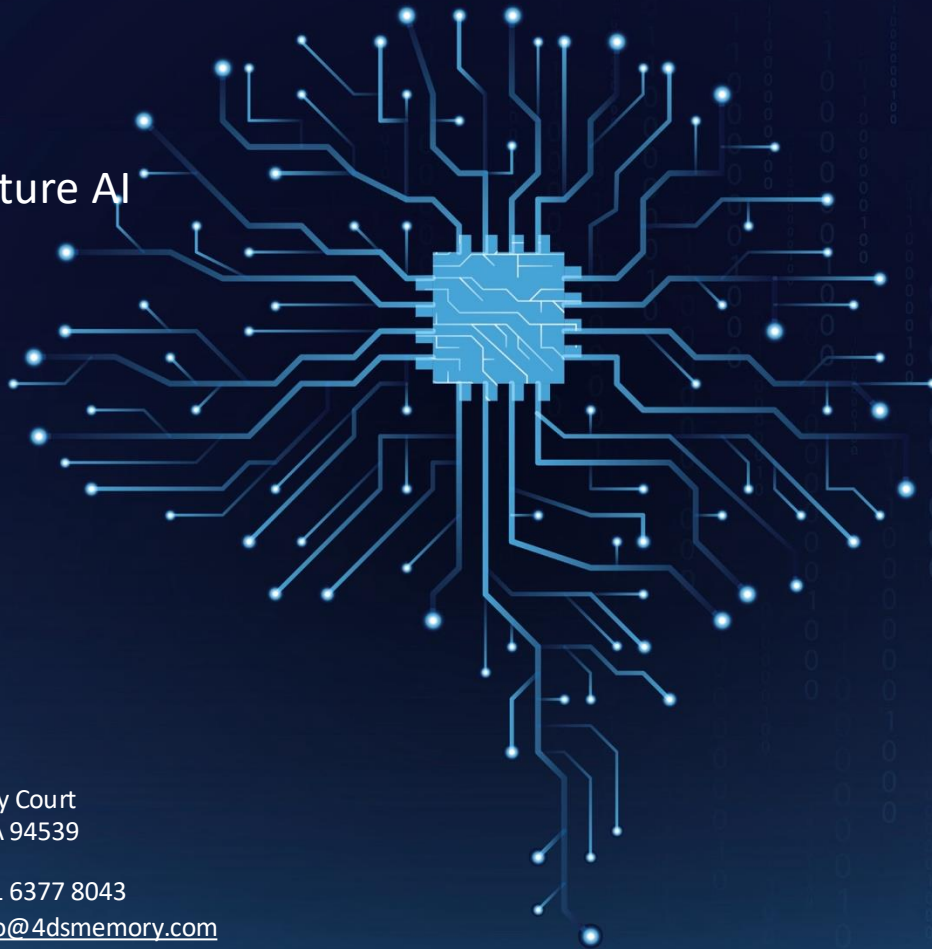


ISPD 2024, "Computing Architecture for Large Language Models (LLMs) and Large Multimodal Models (LMMs)," Bor-Sung Liang

Thank you for your time



Beyond Barriers: Enabling Future AI



FOR MORE INFORMATION

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Board and Management



David McAuliffe

Executive Chairman

Experienced company director

Involved in numerous capital raisings and in-licensing of technologies

Founder of several companies in Australia, France and the UK, many of which are now ASX listed. Non-Executive Chairman of Invex Therapeutics Ltd



Dr Guido Arnout

Non-Executive Director

30+ years in commercialising electronics technology

Successes include Power-Escape, CoWare, CrossCheck Technology and Silvar-Liso



Howard Digby

Non-Executive Director

Former senior roles at IBM, Adobem Gartner and the Economist Group

Director of Cirralto Ltd, Elsieight Ltd and Singular Health Ltd

Advisor to a number of technology companies



Ting Yen

Chief Technical Officer

30 years experience in commercialising memory technologies

Various roles at Integrated Memory, Netlogic, Integrated Device, Cypress, Paradigm and Philips Research



Peter Himes

Chief Strategic Officer

Experienced senior executive in high grown technology firms

Strong focus on innovation systems and strategic alliances