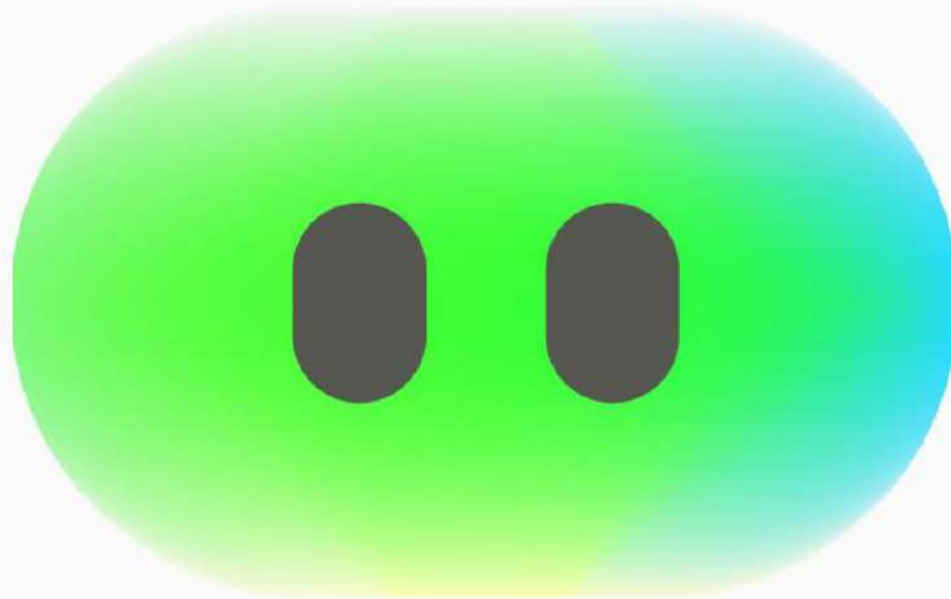


DURANCE



Pr. Benoit Miramond – [benoit@durance.ai](mailto:benoit@durance.ai)

Silicon brain for intelligent machines

DURANCE

# The founding team



Edgar  
**CEO**  
(Business, funding,  
strategy)

PhD in Brain-  
inspired Electronics  
Led the Durance AI  
project since 2023  
@ LEAT



Pierre-Louis  
**CTO**  
(Technology,  
product, operations)

Engineer (X2016) in  
Computer Vision  
Strong experience in  
tech startups



Benoît  
**Advisor**  
(Science)

Prof. in Brain-  
inspired Electron-  
ics @ LEAT



Ingolf  
**Advisor**  
(Marketing,  
strategy)

ex-CEO @ GrAI  
Matter Labs  
ex-Head of  
Strategy @ Intel  
Corp.

# Physical AI / Embodied AI

## Requirements

- **Low-Power**
  - Sparse activity
- **Real-time**
  - Hardware acceleration
- **Adaptivity**
  - On-chip learning
- **Sim-to-Real gap**
  - Sensory-motor loop

### Medical Delivery Drone



### Satellite in Orbit



### Person in Exoskeleton



### Robotic Quadruped Dog



*Can we rethink the way we compute?*



eBRAIN chair  
Embedded Bio-inspiRed Artificial Intelligence and  
Neuromorphic architectures



Neuromorphic  
Computing

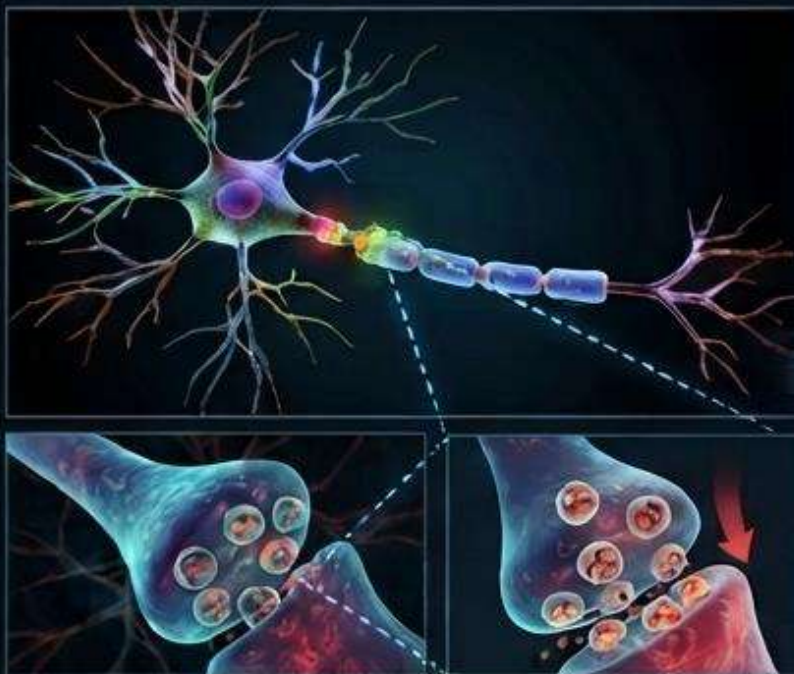
**Neuromorphic computing** proposes a paradigm-shift with a **brain-inspired computing** approach based on the co-development of **neuromorphic hardware (sensors and processors)** and **algorithms**



Spiking Neural Networks



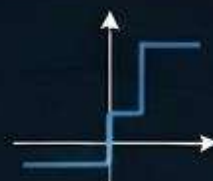
## Biological Neuron



Synapse

## Generations of Neural Networks (with Neuro-Inspiration)

First Gen.  
(Perceptrons)



Continuous Network  
(ANN)



Second Gen.  
(Deep ANNs)



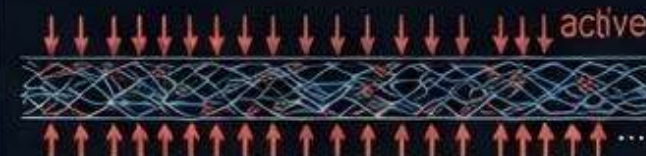
Third Gen.  
(SNNs)



Spiking Network  
(SNN)



## Energy Efficiency via Sparsity



Gen 2: Continuous Activation (High Power)



Gen 3: Sparse activation (low power)

## IV. Biological Inspiration & Functional Mapping



Functional Areas  
(Anatomical View)



Functional Connectome  
(Detailed View)

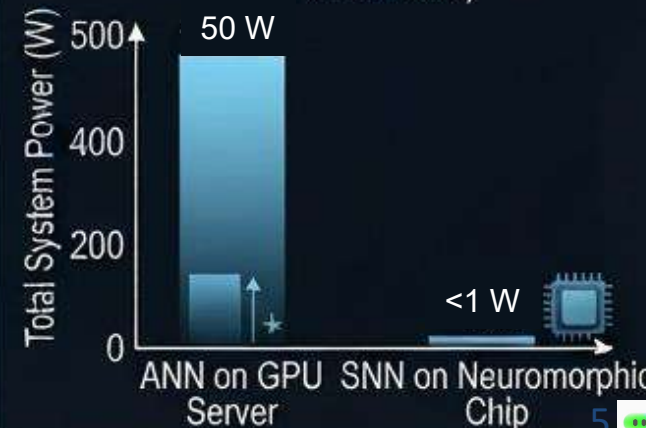


Spiking Network  
(SNN)



Continuous Network  
(ANNs)

## System-Level Power Comparison (Real-time Task)



# THE NEUROMORPHIC STACK

- **Spiking Neural Networks**

- Sparse internal activity

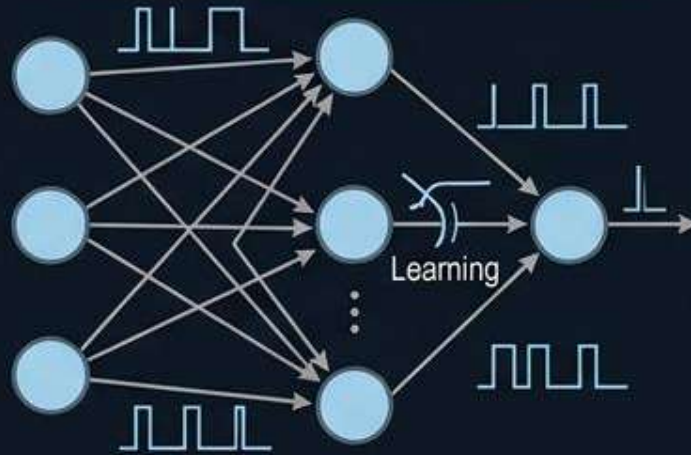
- **Event-based Cameras / Sensors**

- High-dynamic range

- **Neuromorphic Chip**

- Energy efficiency

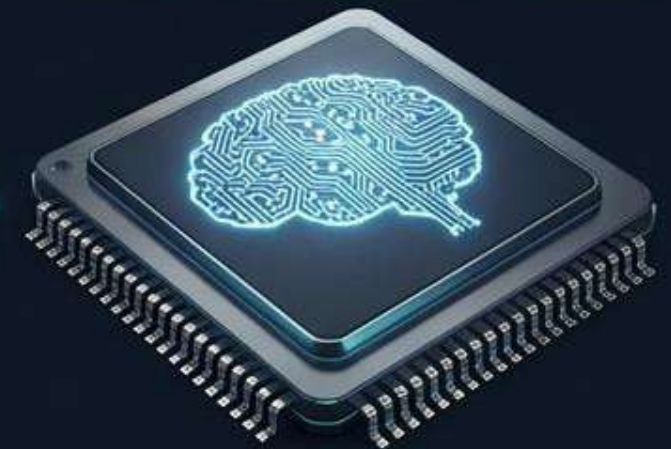
## Spiking Neural Networks



## Event-based Camera

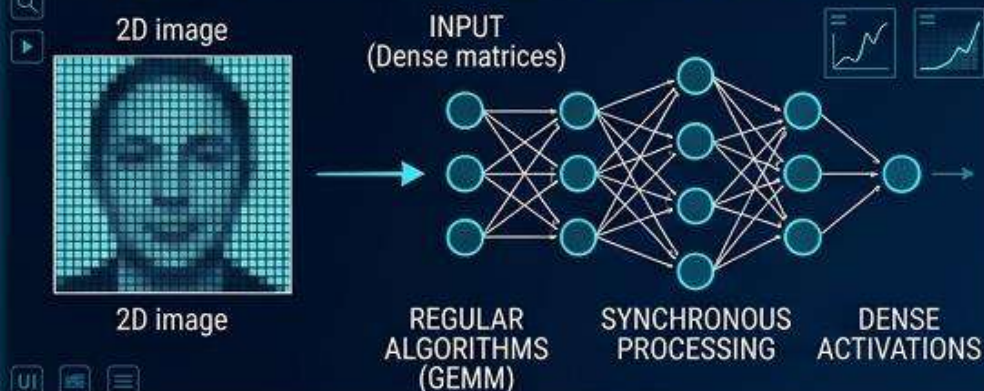


## Neuromorphic Microchip



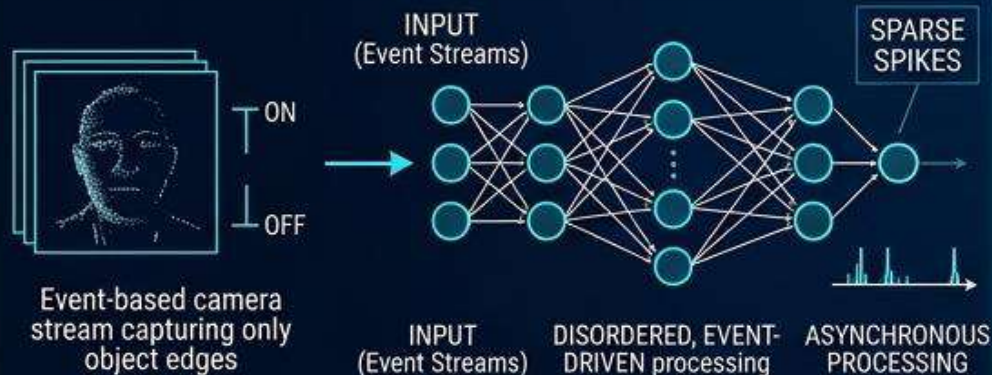
## STANDARD PARADIGM (ANNs/DNNs)

### DENSE MATRICES & REGULAR COMPUTING



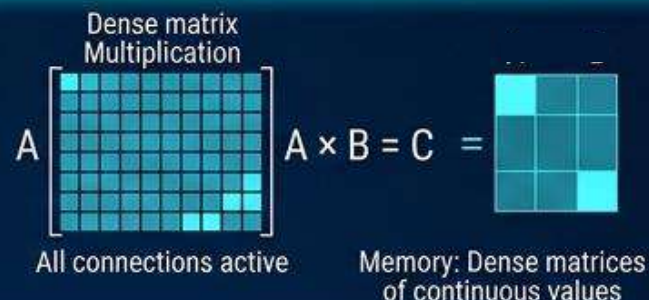
## SPIKING PARADIGM (SNNs)

### SPARSE EVENTS & EVENT-DRIVEN PROCESSING



## PARADIGM SHIFT IN SIGNAL & IMAGE PROCESSING

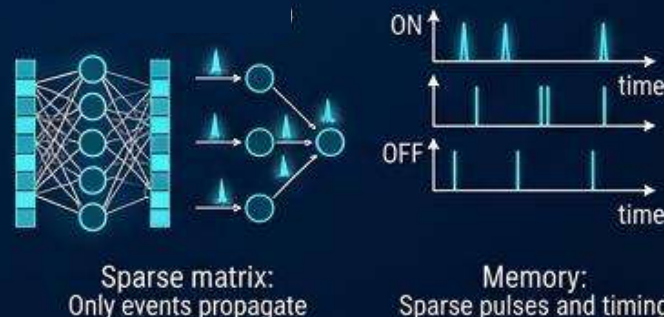
### NEUROMORPHIC SNNs VS. STANDARD ANNs



- REGULAR ALGORITHMS on Dense Matrices
- CONTINUOUS DATA (e.g., Pixel Grids)
- FULL COMPUTATION per step
- HIGH POWER CONSUMPTION

NEUROMORPHIC PARADIGM  
SHIFT  $\rightarrow$  SPARSE & EVEN-DRIVEN

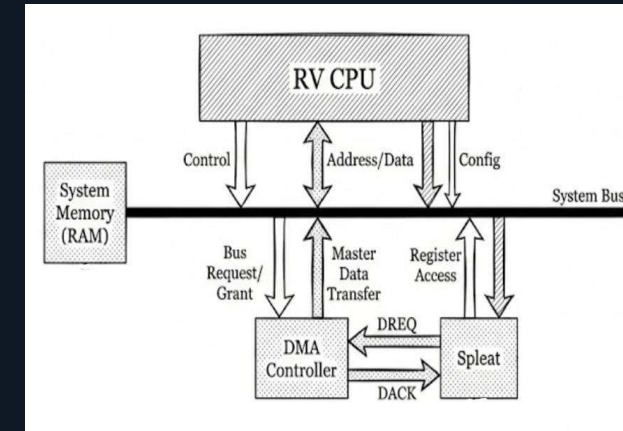
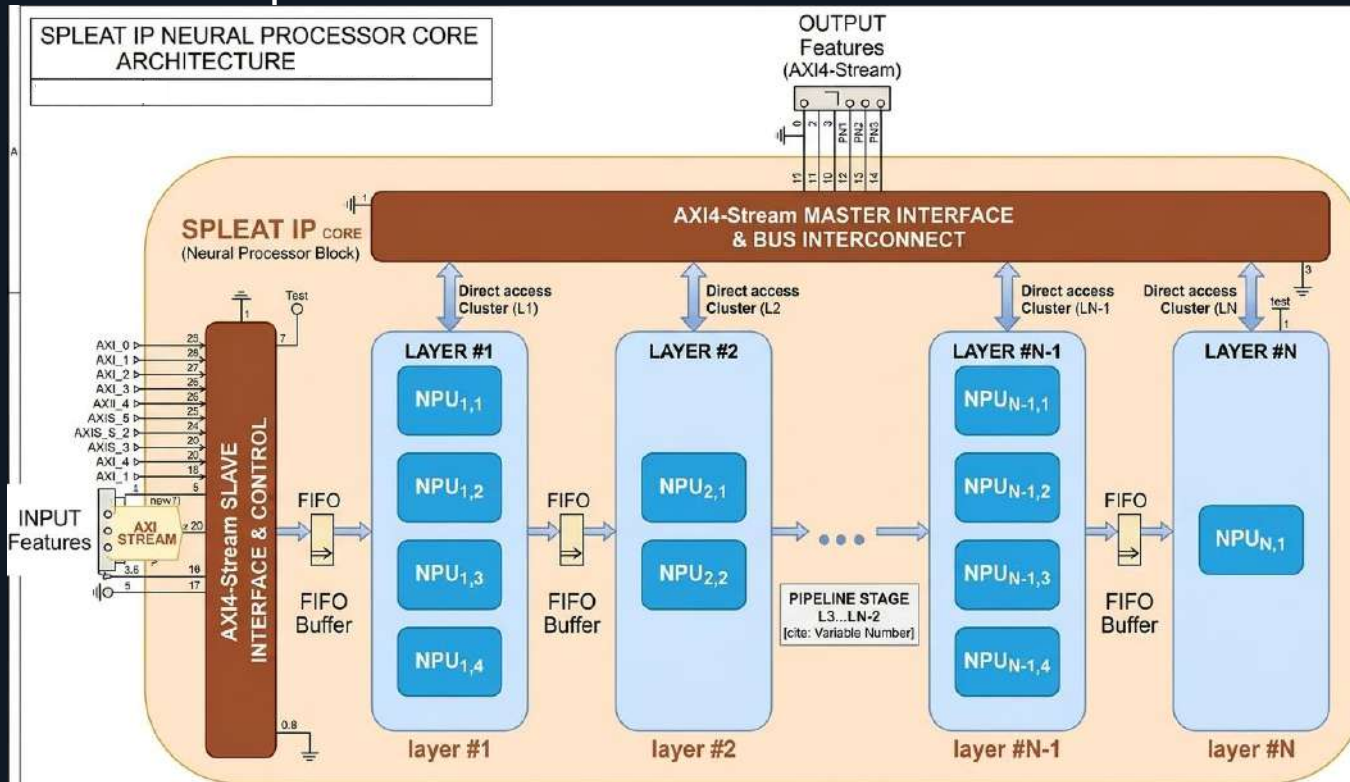
FROM DENSE & REGULAR  
TO SPARSE & EVEN-DRIVEN



- ASYNCHRONOUS PROCESSING on Sparse Events
- DISCRETE EVENTS (Spike Streams)
- SELECTIVE COMPUTATION upon spikes
- LOW POWER CONSUMPTION

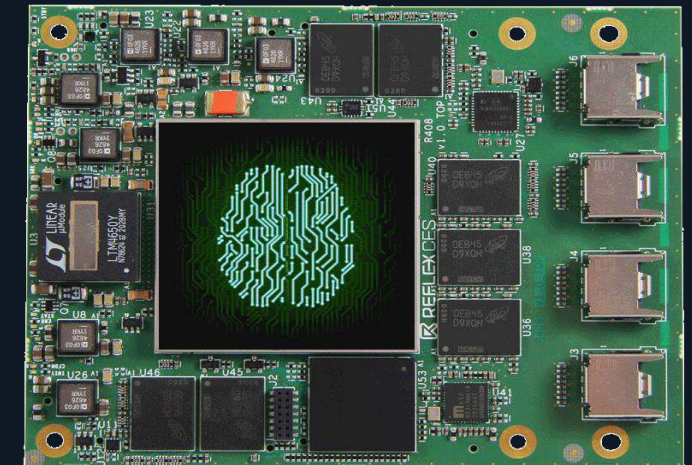
# SPLEAT – Neuromorphic hardware accelerator

- **SP**iking **L**ow-Power **E**vent-based **A**rchi**T**ecture (**SPLEAT**)
  - Patented Event-driven, scalable, pipelined architecture
  - Support of **convolutional** and **residual** spiking neural networks
  - Synthesizable both on **FPGA** and **ASIC**
  - Compatible with **RISC-V MCU**



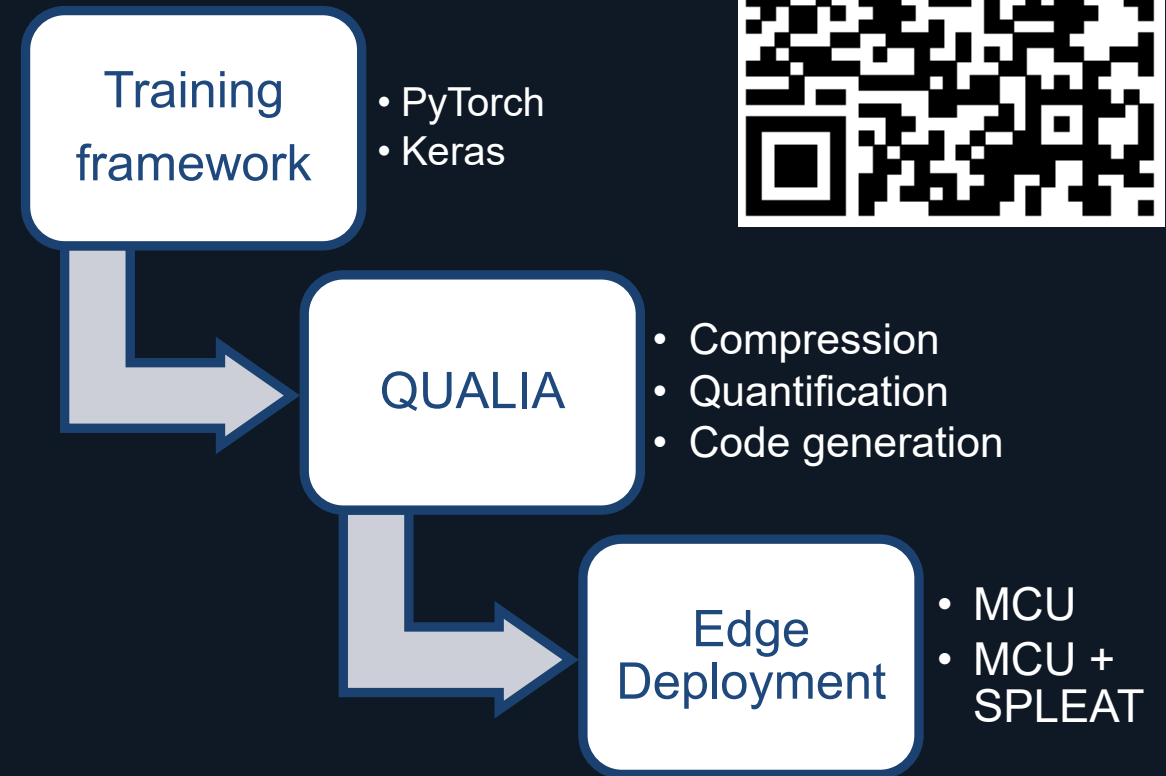
SPLEAT is **10x more efficient** in terms of

- Energy (ASIC)
- Resources (FPGA)
- Compared to existing NPU



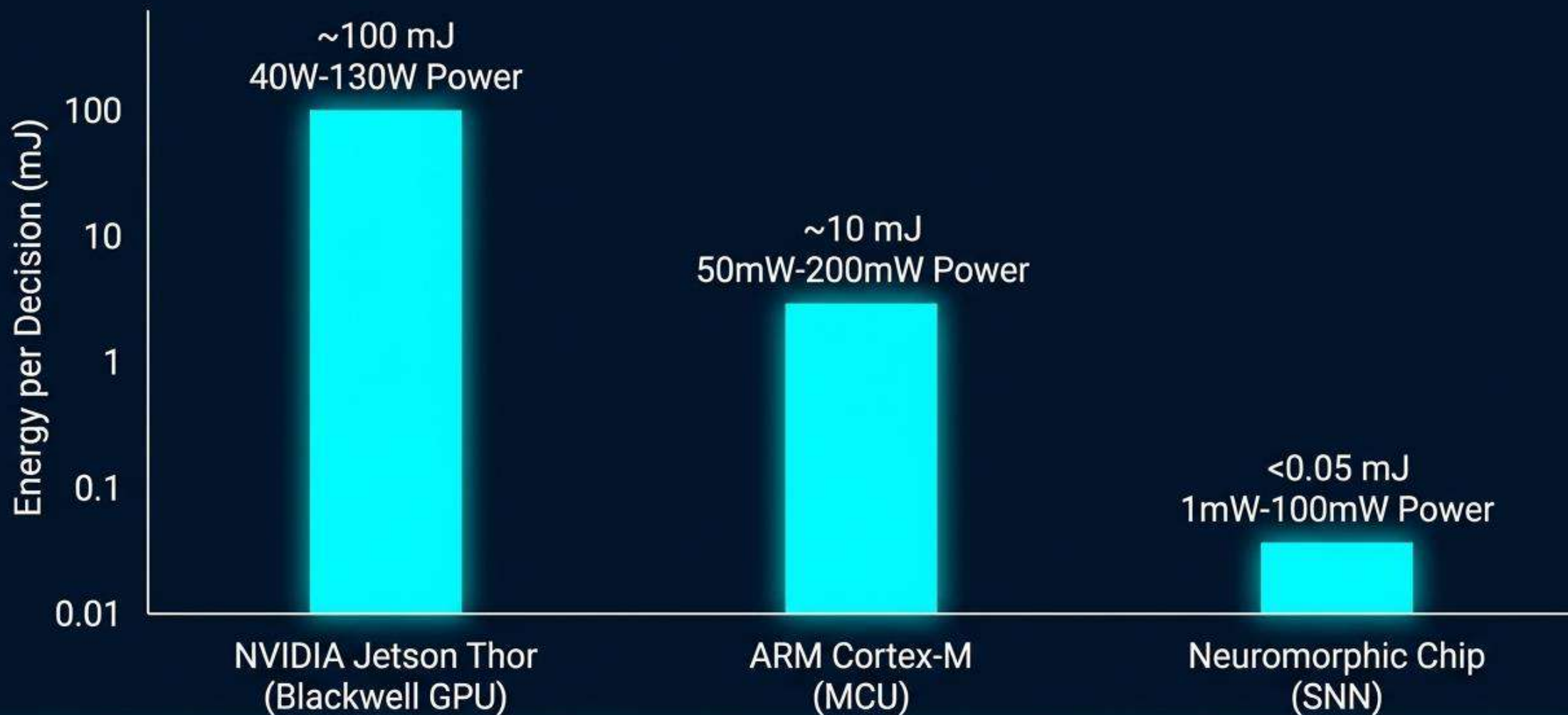
# QUALIA end-to-end flow

- **End-to-End Solution**
  - From Training to Edge deployment
- **Support both ANN and SNN**
  - Even hybrid networks (HNNs)
- **Training of networks (PyTorch, Keras)**
  - Surrogate Gradient & BPTT (SNN)
  - ANN to SNN Conversion
- **Deployment on embedded platforms**
  - CPU and MCU
  - Hardware accelerator
    - SPLEAT Neuromorphic Architecture



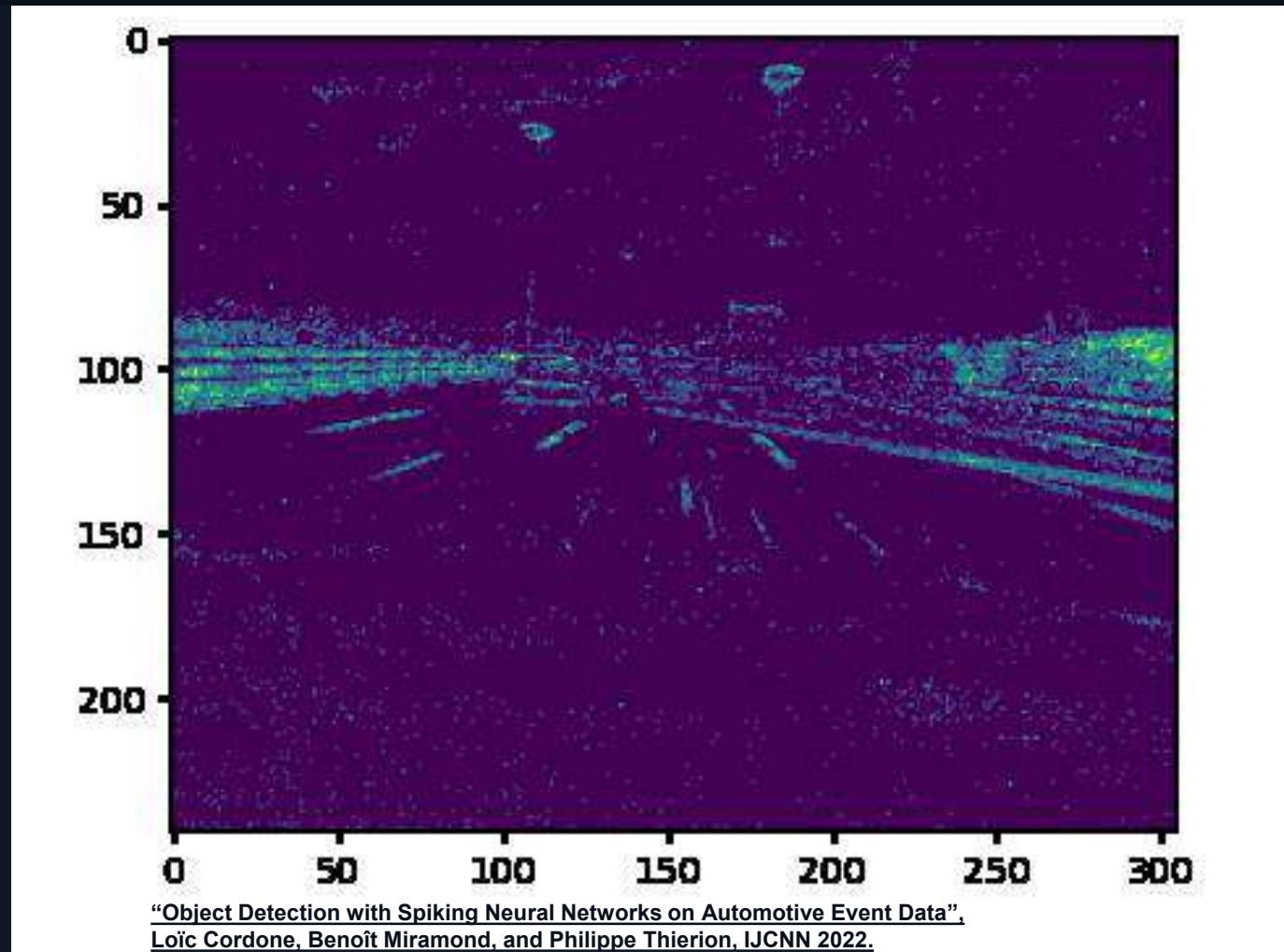
[Novac 2021] P.-E. Novac, G. Boukli Hacene, A. Pegatoquet, B. Miramond and V. Gripon, *Quantization and Deployment of Deep Neural Networks on Microcontrollers*, 2021

## Energy Per Decision on Sparse Event-Based Data (mJ/Inference)



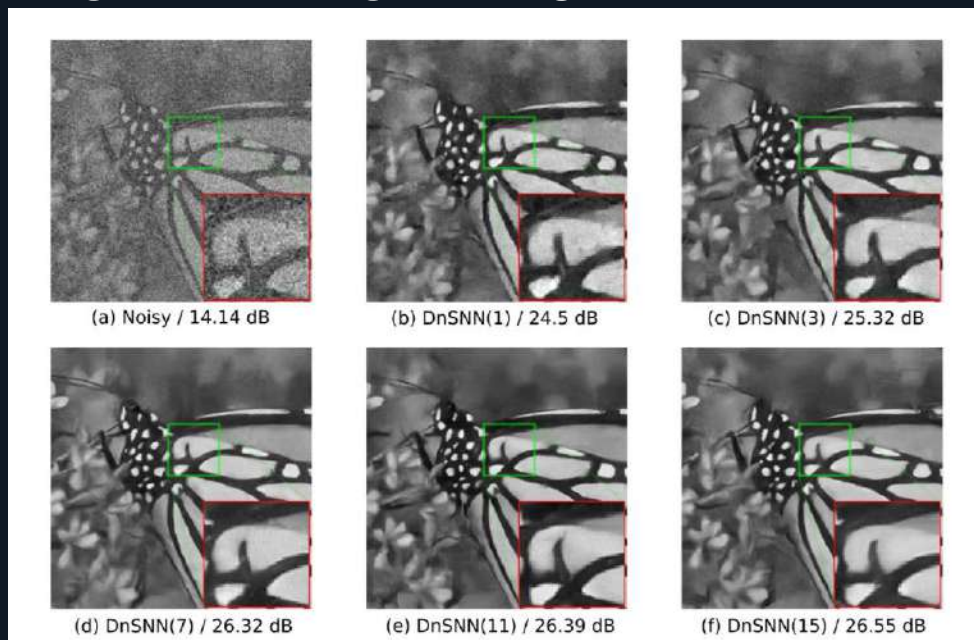
# SNN Use Cases

- **Event-based object detection: Prophesee Gen1 Automotive [Cordone 2022]**



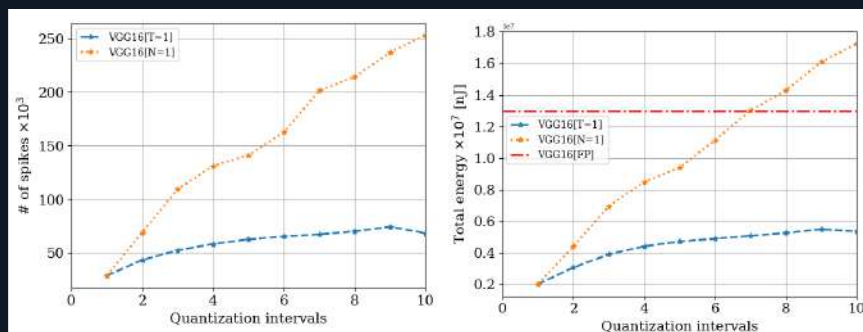
# SNN Use Cases

## ■ Image Denoising [Castagnetti 2023]

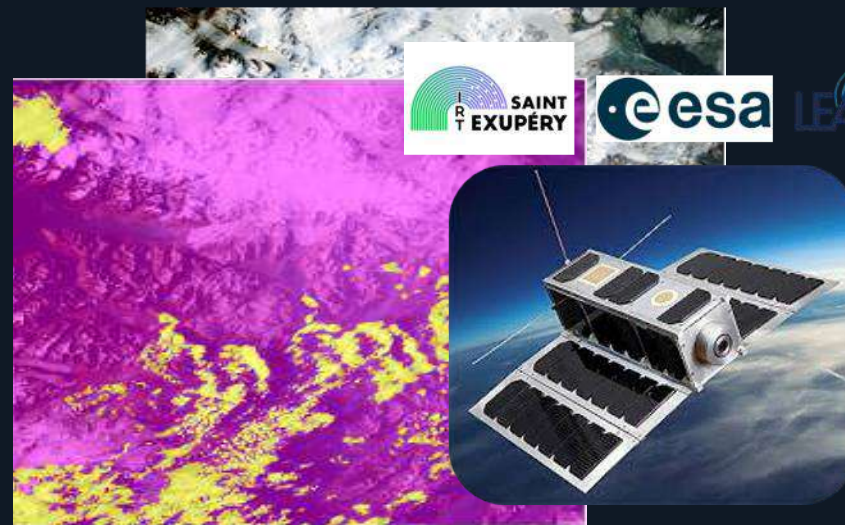


DnSNN Gaussian denoising results of the butterfly image with noise level 50 and for different number of timesteps

## ■ Face detection

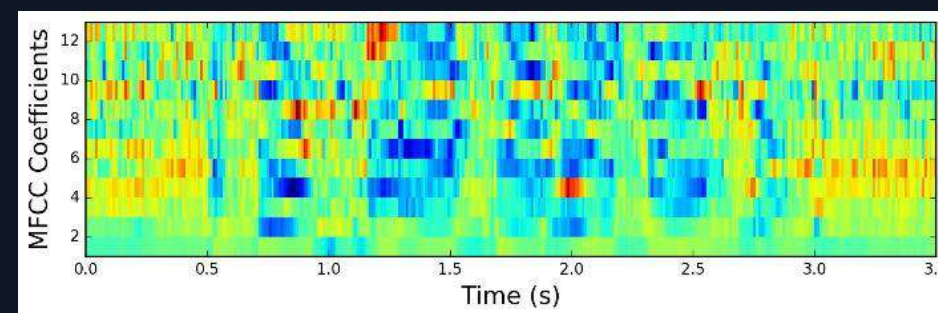


## ■ Image segmentation [Abderrahmane 2022]



*OPS-SAT ( Dec - 2019)  
SPLEAT for in-orbit  
processing of Earth  
observation images with  
SNN*

## ■ Keyword spotting [Lemaire 2022]





## Timeline Overview

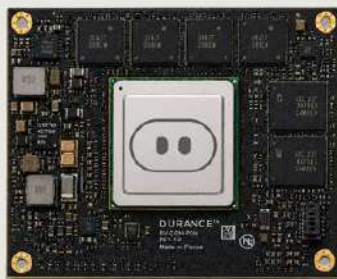
# DURANCE RIVER

## Brain-inspired AI hardware

Up to 100 TOPS

Below 10W

Shipping 2028



- **2020 — World First in Space AI**
  - First onboard execution of neuromorphic AI in an experimental satellite payload.
- **2021 — Core IP Protection**
  - Patent filing for the proprietary **SPLEAT** technology (*SPiking Low-Power Event-based ArChiTecture*).
- **2024 — Deeptech Recognition**
  - Awarded the prestigious **iPhD Grand Prix** by Bpifrance (BPI).
- **June 2025 — Official Startup Incorporation**
  - Spin-off LEAT Lab and creation of **DURANCE AI** (formerly *AICO Technology*).
- **September 2025 — Dual-Site Installation**
  - **Paris HQ**: 5 employees (Strategy & Business Development).
  - **Sophia Antipolis (Pôle Alpha)**: 3 employees (R&D & Hardware Design).
- **October 2025 — Commercial Traction (Automotive)**
  - Signed first Proof-of-Concept (PoC) contracts with Japanese and French automotive customers.
- **December 2025 — Pre-Seed Funding**
  - Successfully closed initial proximity fundraising (*Love Money*).
- **Spring 2027 — Series A Target**
  - Scheduled primary institutional fundraising round for international scaling and mass production.

To be continued...



Thanks for you attention  
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