neuro TUM

Future of Computing: RISC-V

23.04.2024

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neuroTUM's mission

EDUCATING YOUNG RESEARCHERS

by granting them hands-on experience at neuroengineering.

ADVANCING NEUROTECHNOLOGY

by combining state-of-the-art algorithms with cutting edge neuroscience insights.

BUILDING COMMUNITY

by establishing a environment for students to engage and support each other.

BOARD MEMBERS

Iusti

Operations

BCI

Brain Computer Interface

Isabel

Agustin

BIC

Brain Inspired Computing

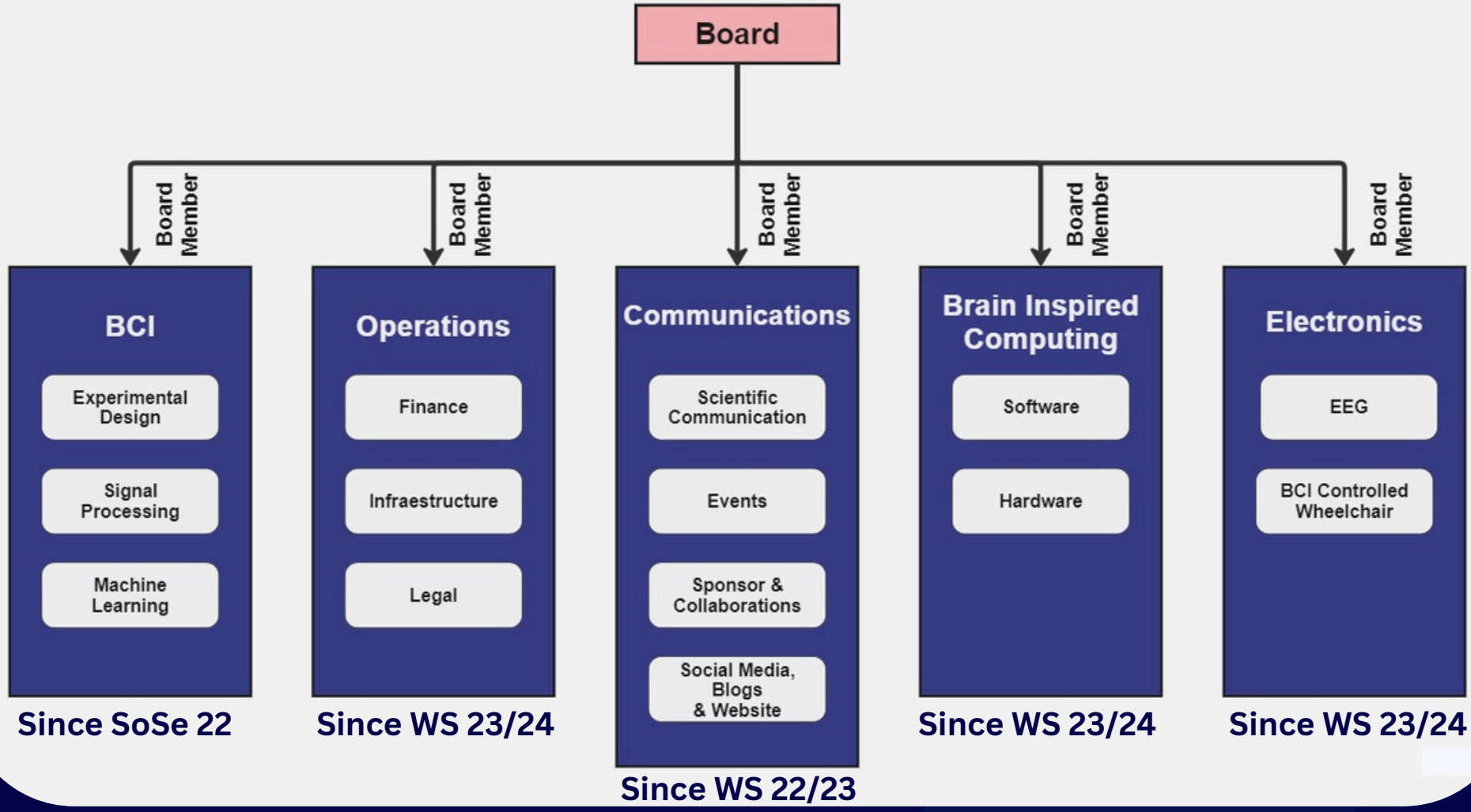
Leona

Electronics

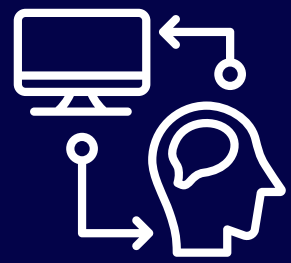
Communication

Enrico

neuroTUM


Board
Board Member
Board Member
Board Member
Board Member
Board Member
BCI
Experimental Design
Signal Processing
Machine Learning
Since SoSe 22
Operations
Finance
Infraestructure
Legal
Since WS 23/24
Communications
Scientific Communication
Events
Sponsor & Collaborations
Social Media, Blogs & Website
Since WS 22/23
Brain Inspired Computing
Software
Hardware
Since WS 23/24
Electronics
EEG
BCI Controlled Wheelchair
Since WS 23/24

CYBATHLON



Stay tuned for October 2024!

BIC

Brain-Inspired-Computing

neuro TUM

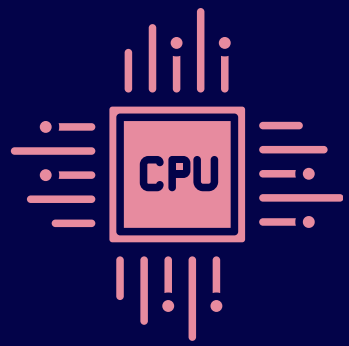
HW Design

Chair of
AI Processor Design
Prof. Amrouch

We are currently working on:

- Developing SNN in C for enabling portability to HW
- Developing Custom instructions for RISC-V for acceleration
- Customization of a RISC-V for SNNs on the Edge with
  low power
  less area
  less cycle/instruction count
- Use Case for Event Based Cameras and Image Detection for autonomous systems

SYNOPSYS®



BIC

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ASIP Hackathon

21.05-24.05

- 4-Day hackathon with 25 participants
- Collaboration with Chair of AI Processor Design & Synopsys
- Challenge: Accelerated RISC-V for brain-inspired algorithms

Chair of AI Processor Design
Prof. Amrouch

SYNOPSYS®

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Brain-Inspired-Computing

Hardware

Focus on:

- RISC-V customization for SNNs
- AI acceleration
- C code for Open Source Neuromorphic frameworks

Prof. Amrouch

Chair of AI Processor Design

Co-Design

Software

Focus on:

- Neuromorphic Computing algorithms
- Develop SNN (like Spiking Visual Transformers)
- Deploying work on Neuromorphic Chips
- Continual Learning

fortiss

BIC

Brain-Inspired-Computing

SW Design

neuro TUM

tortiss

We are working on:

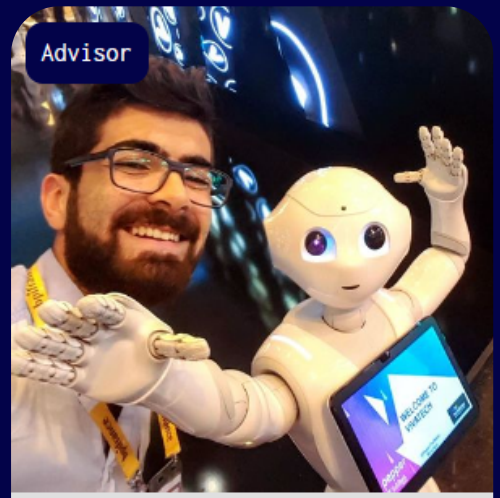
Implementation of...

- Fast and Slow learning
- New learing rules
- Hyperdimensional Computing(HDC)
- Neuromodulation in NN
- Spiking Visual Transformers

Michael Neumeier

Neuromorphic Computing

Researcher at Fortiss



Elvin Hajizada

Neuromorphic & Continual AI

Researcher at Intel Labs

Final goal? Papers publication, real-life applications for life-long learning

BIC

Brain-Inspired-Computing

Neuromorphic Hackathon

neuroTUM Hackathon: Pioneering Neuromorphic Technology

From November 6th to 9th, we at neuroTUM, in collaboration with Fortiss Neuromorphic Labs and Intel, hosted a neuromorphic hackathon. Here, we delved deep into the exciting world of neuromorphic computing, using the teachings of our own complex neural system to solve problems, that require energy efficiency, continual learning, and pattern recognition. In this article we take a closer look at the projects that emerged.

ARTICLE BY AGUSTIN, LOÏC, THOMAS AND LEONA

Stay tuned for the 2024 iteration in November!

This year we will feature:

- More Neuromorphic companies
- Lecture Series (1 Day)
- Hackathon (4 Days)

More information will follow next month

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Future Deliverables

Enriching our knowledge as a team by gaining more experience

Continuing to organize events to expand the BIC Community

Working towards the goal:

- Contribution to **Open Source**
- **Publications** with research partners

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Reach out to us for further questions:

neurotum.com

Thank you for listening!