

Consortium



5
partners



4
countries



3
universities



1
R&D center



1
company



Heterogeneously Integrated Multi-
material Photonic Chiplets for
Neuromorphic Photonic Transfer
Learning AI Engines

Factsheet

Grant agreement: 101194393

Programme: Horizon-JU-Chips-2024-3-RIA

Duration: 01/10/24 - 31/09/2027 (36 months)

Total budget: 2,899,956.00

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Consortium:

Aristotle University of Thessaloniki (GR)

Interuniv. Microelectronics Center IMEC (BE)

Akhetonics (GER)

Daegu Gyeongbuk Inst. Sci. & Tech. (ROK)

Korea Advanced Inst. Sci. & Tech. (ROK)

www.haetae.eu

Horizon-JU-Chips-2024-3-RIA

(Research and Innovation Actions Joint Call with Korea)



HAETAETAE

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material Photonic Chiplets for
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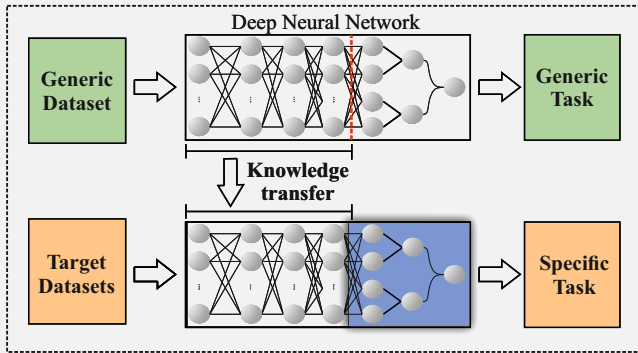
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Concept & Vision

HAETAE aims to establish a novel computing paradigm by developing a multi-material PIC technology platform and aligning it with photonic neural network architectures capable of operating based on the principles of transfer learning methods

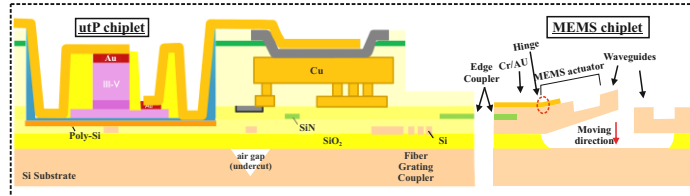


Heterogeneously Integrated Multi-material Photonic Chipllets for Neuromorphic Photonic Transfer Learning AI Engines

Computing Hardware

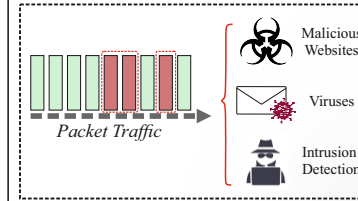
HAETAE invests in a co-integrated PIC platform that brings together the best-in-class material platforms through micro-transfer-printing and hybrid multi-chiplet bonding. It combines:

- (a) Si/SiN/SiGe photonics for high-speed fan-in, weighting and fan-out computational stages
- (b) InP actives for on-chip amplification, all-optical non-linearities and SNR-enhancement
- (c) Si/SiN non-volatile MEMS structures for zero-power weighting



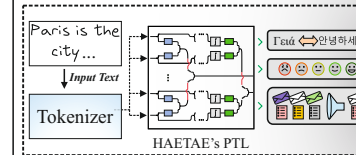
- HAETAE intends to deliver record-high:
- (a) Computational power of **>4 PMAC/s**
 - (b) Energy efficiency of **<20 fJ/MAC**

Inter-DC cyber Security



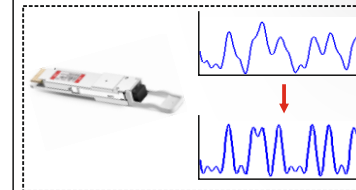
- All-optical converged accelerator operating at 50 GHz
- Real-time inspection

Large Language Models



- Photonic Multi-head attention
- Real-time translation
- Content filtering

Digital Signal Processing



- Photonic AI-enhanced DSP for IM/DD
- Low-power equalization

