電機系 DEPARTMENT OF ELECTRICAL ENGINEERING

VLSI Design Lab

Lab Feature

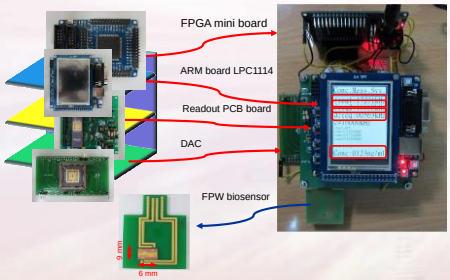
- Train students into IC/System design engineers and researchers
- Develop demanded and advanced IC/system technology for the society
- Physical chips and systems are fabricated
- Strong connection with industry

Main Research

- Biomedical IC and electronics
- Power IC and electronics
- AI chips and systems
- Manned and unmanned submersible

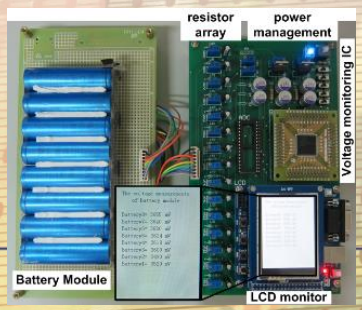
BioTech IC/System

- Rapid Tumor Marker Readout System
- Cost-effective and high precision solution



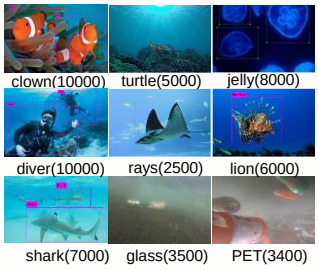
High-power Battery Monitoring IC/System

- Voltage monitoring IC for > 60V BMS
- Bidirectional larger current detection



AI in Water

- Underwater object recognition
- Object following and avoidance
- AI DLA on silicon
- Open water testing



	TPU (Google)[1]	DLA (ours)	Estimate
Technology (nm)	28	180	40
Year	2017	2021	2022
Voltage(V)	0.9	1.8	0.9
Chip size (mm)	≈18.1 x 18.1	7.328 x 7.325	1.5 x 1.5
Frequency (MHz)	700	100	200~500
On-Chip Buffer (KB)	28672	150	150
Number of MACs	256	256	256
Bit-width precision (bits)	8	16	16
TOPS	92	0.0446	1.3406
TOPS/W	2.3	0.17334	5.2

Underwater Vehicles

- Unmanned (AUV with AI)
- Manned (MUV)

- AUV is an unmanned drone in water
- AI (CNN, DNN) to assist AUV in object recognition, following, and avoidance
- Applications : aquaculture, rescue, exploration, etc.

First made-in-Taiwan manned underwater vehicle cruising in the sea

Website of our lab :
http://vlsi.ee.nsysu.edu.tw/index_en.html