

Low-cost open-source wireless random-access opto-stimulation

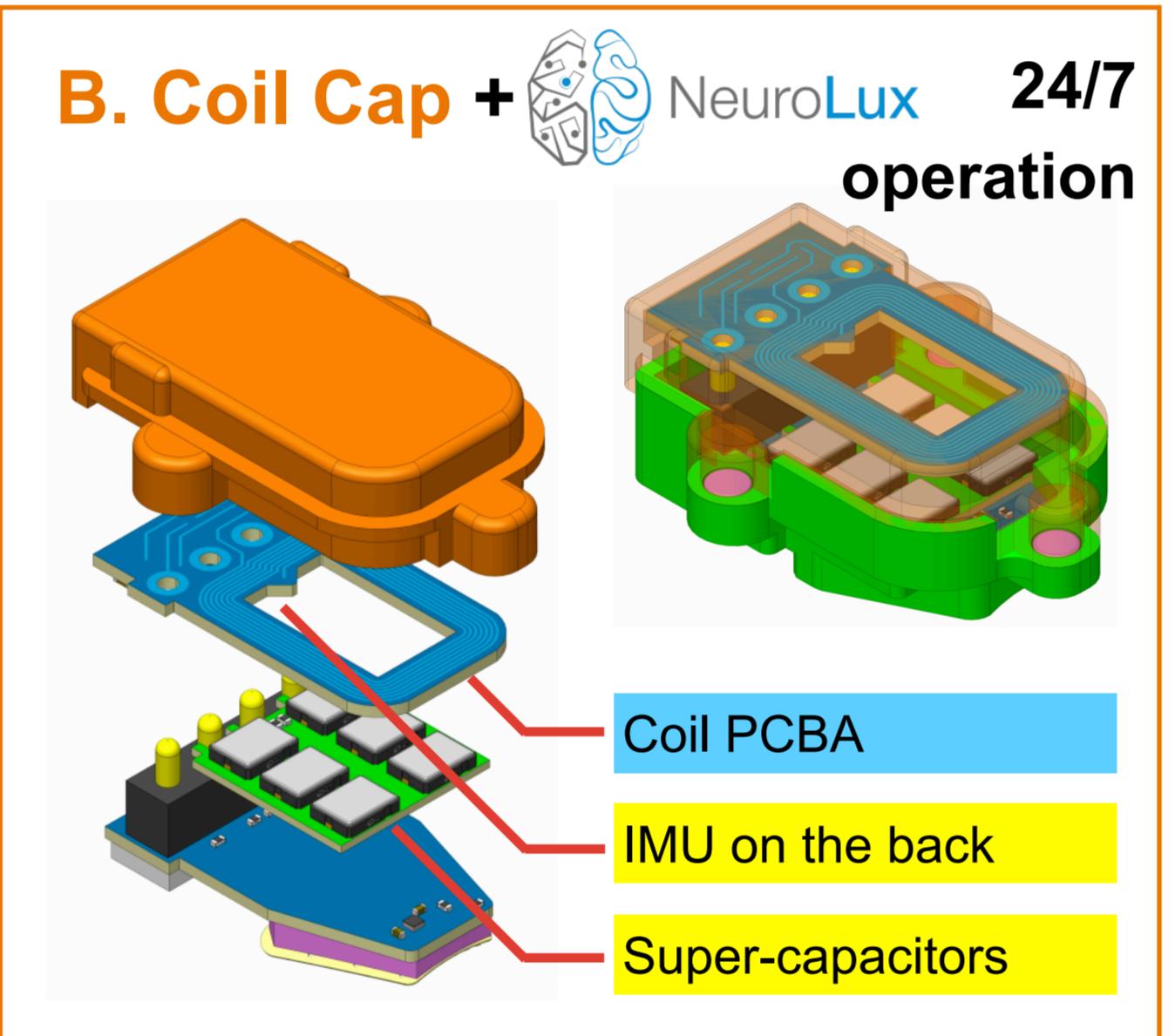
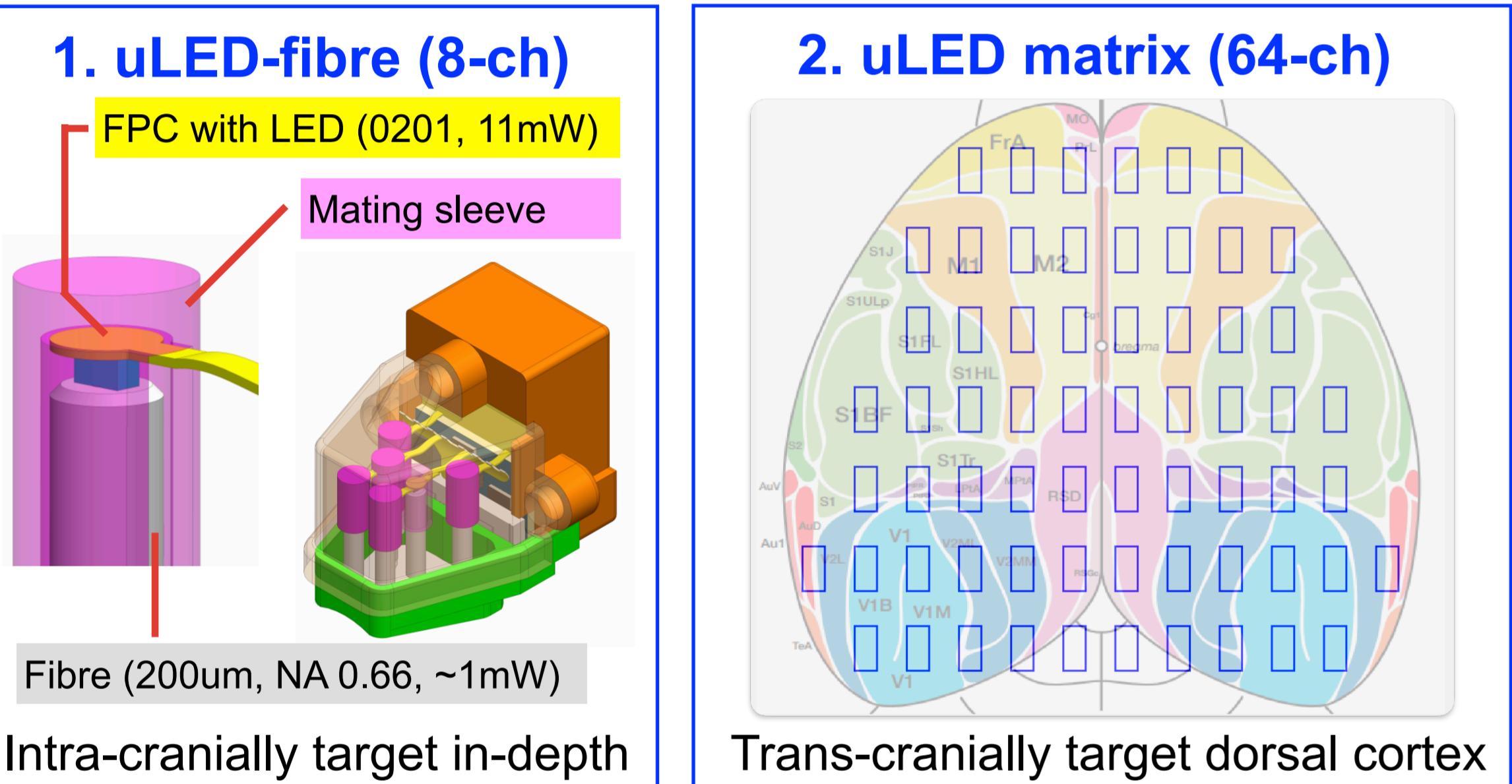
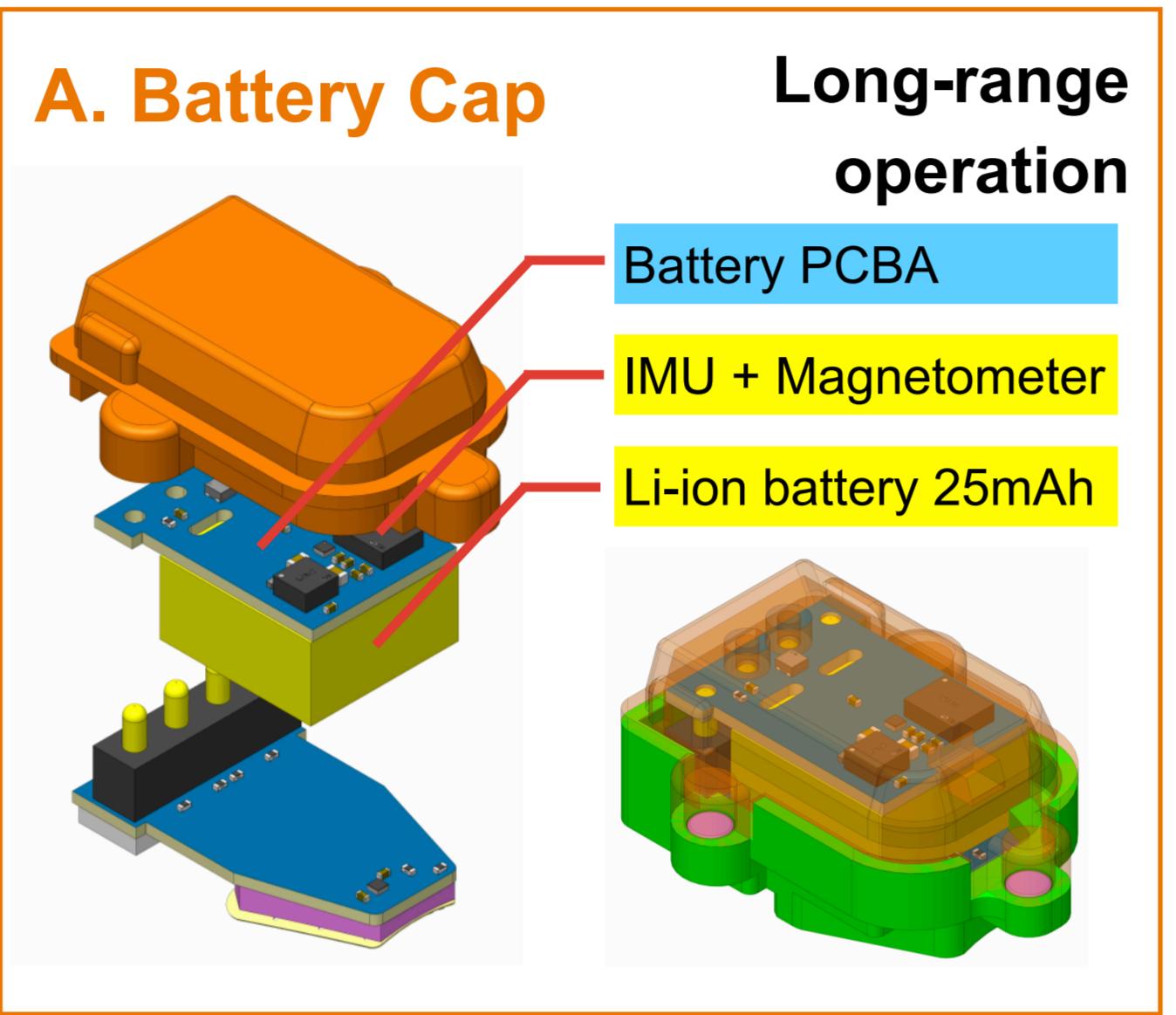
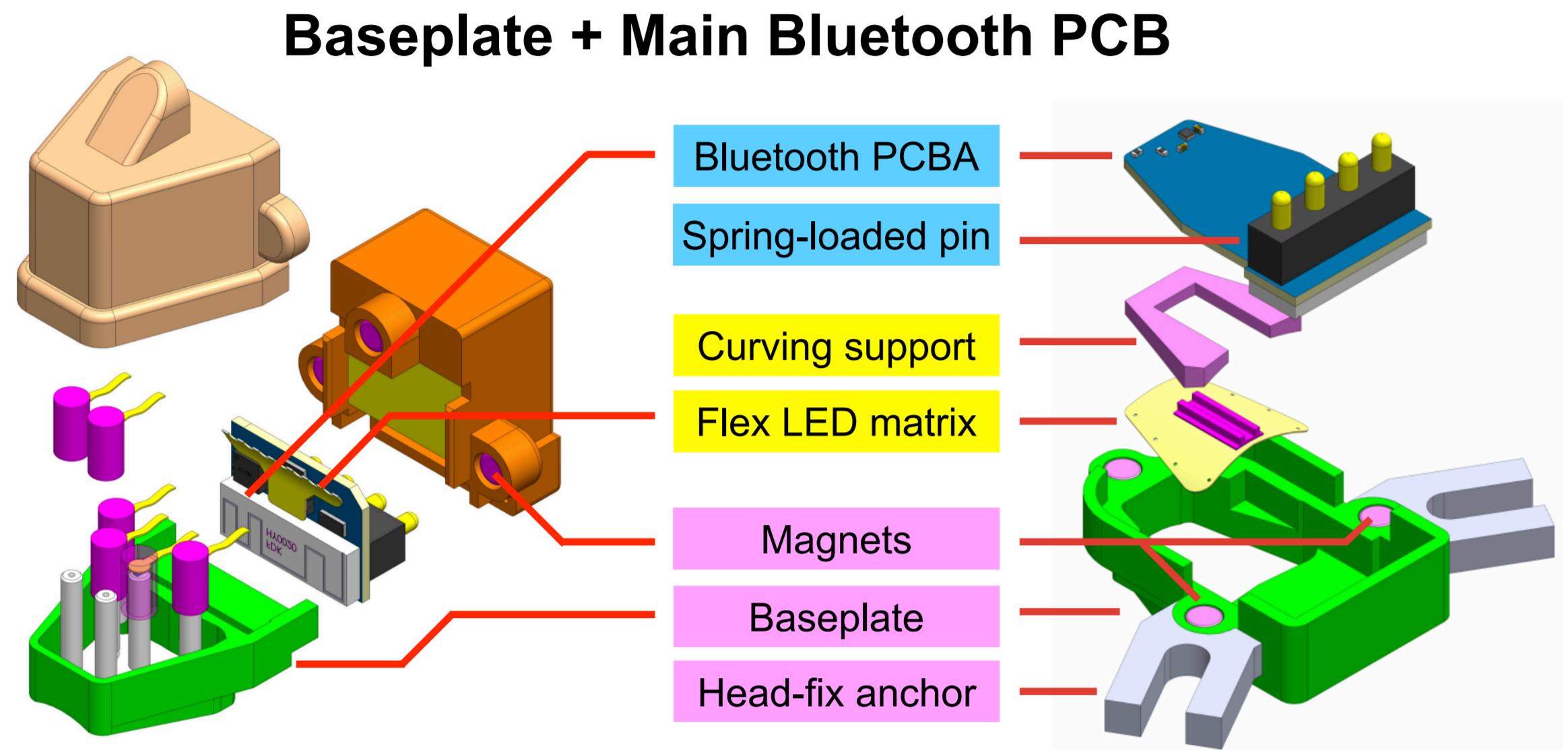
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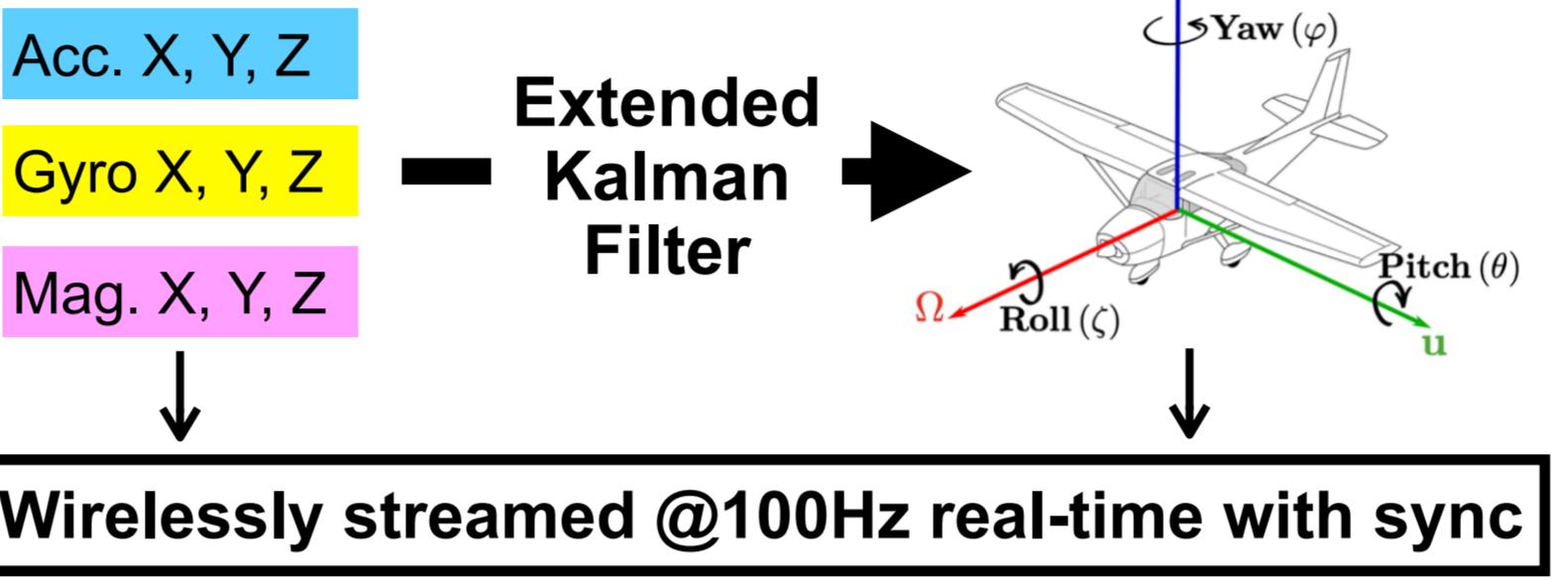
Sainsbury Wellcome Centre, UCL, London UK



1. Device Overview



2. Head movement tracking (9-axis)

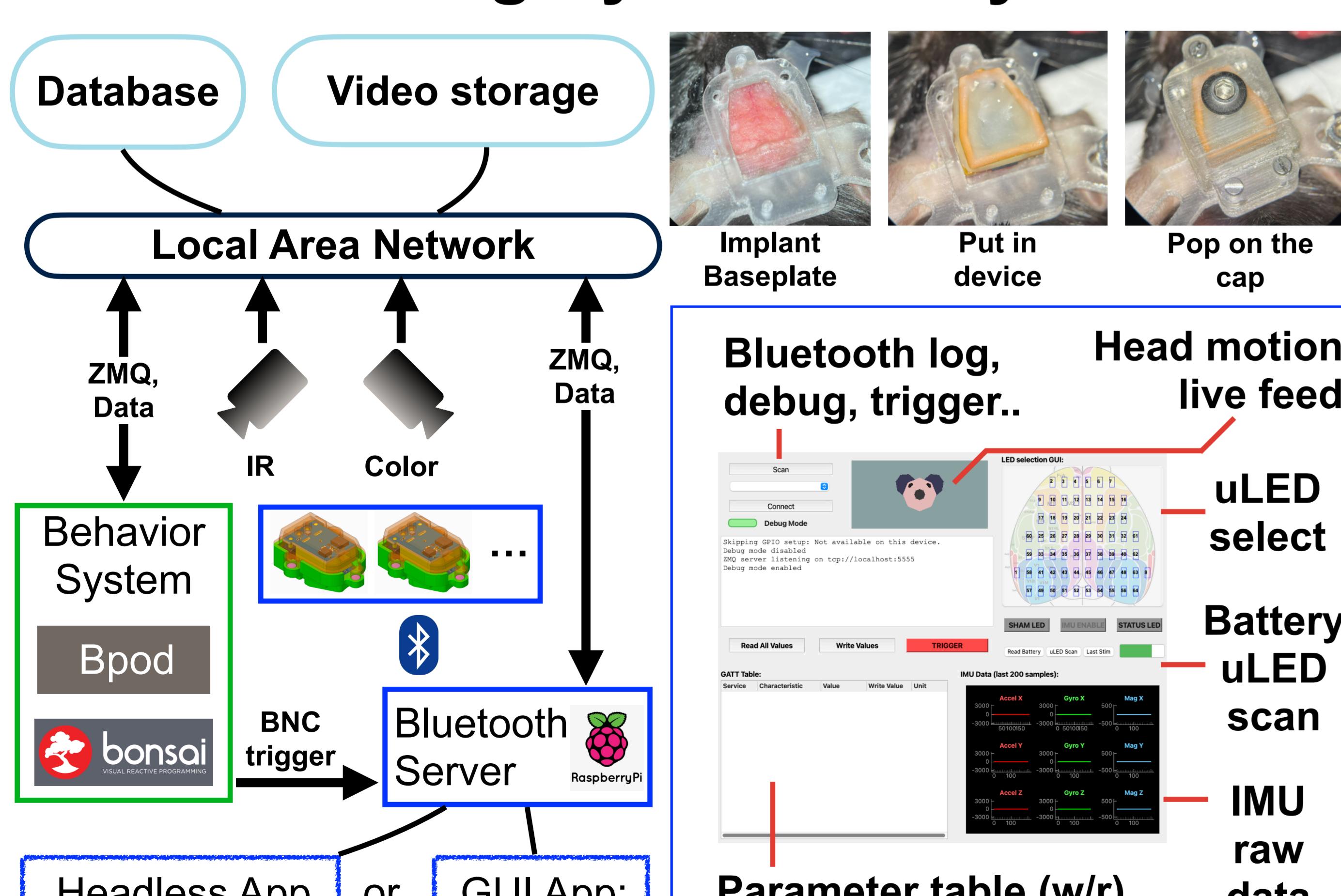


3. Device Specification

Specification	Value	Programmable
Latency	~10ms	Param.
Optical Power	3.3mW	Range
ML/AP Res.	1.2mm	LED select
Battery log	✓	0-100%
Stim. log	✓	Period
uLED scan log	✓	Pulsewidth
Assembly Weight Cost*		Duration
2A	2.4 g	0 - 2 ¹⁶ ms
2B	2.0 g	Ramp up
		Ramp down
		PWM freq. 0 - 2 ³² Hz

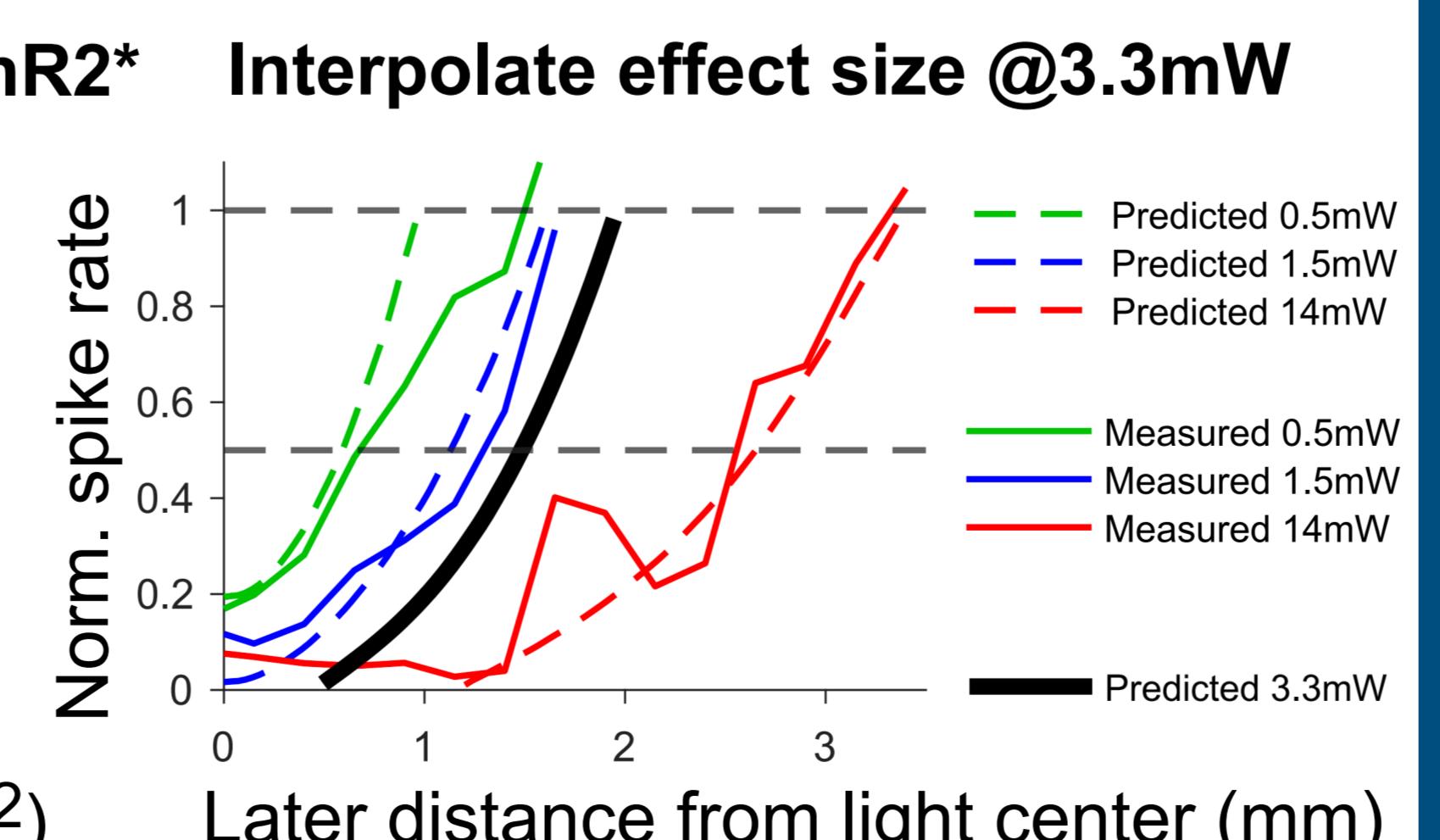
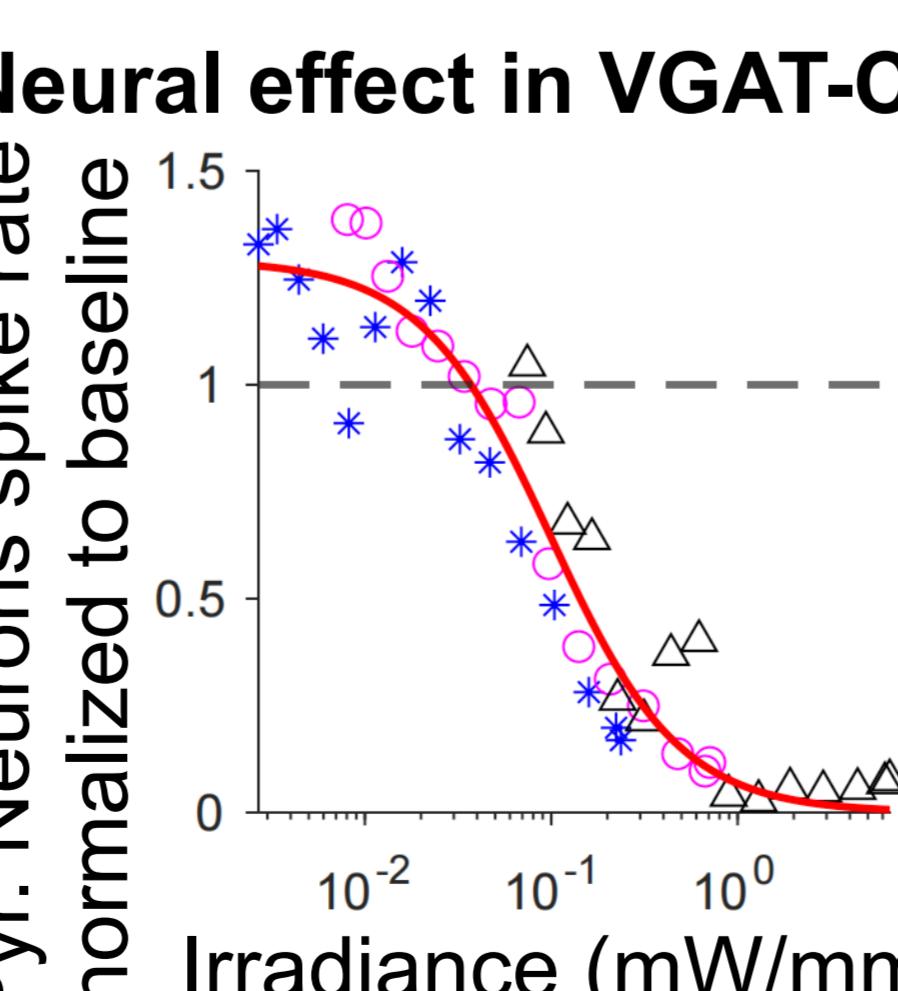
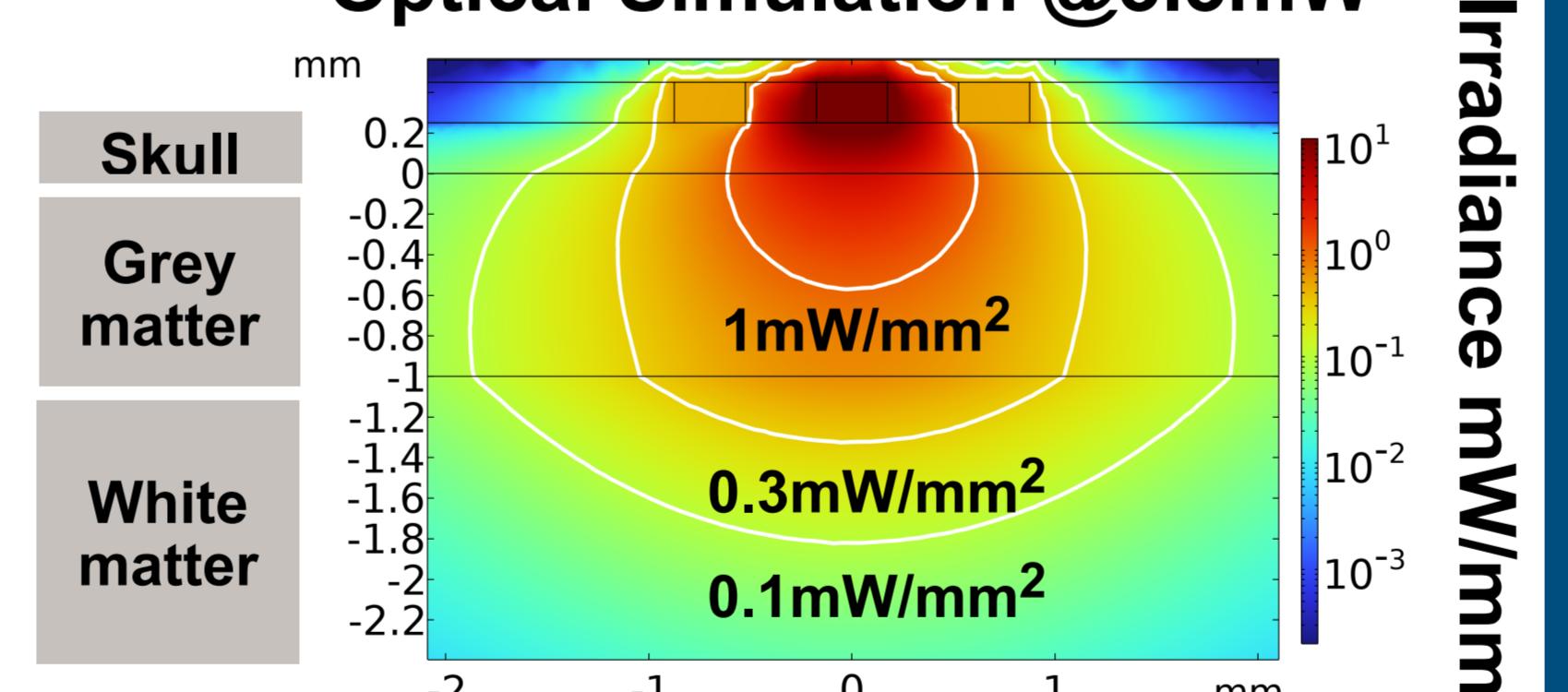
*Batch of 20 SET, exclude labor cost

4. Surgery & usability

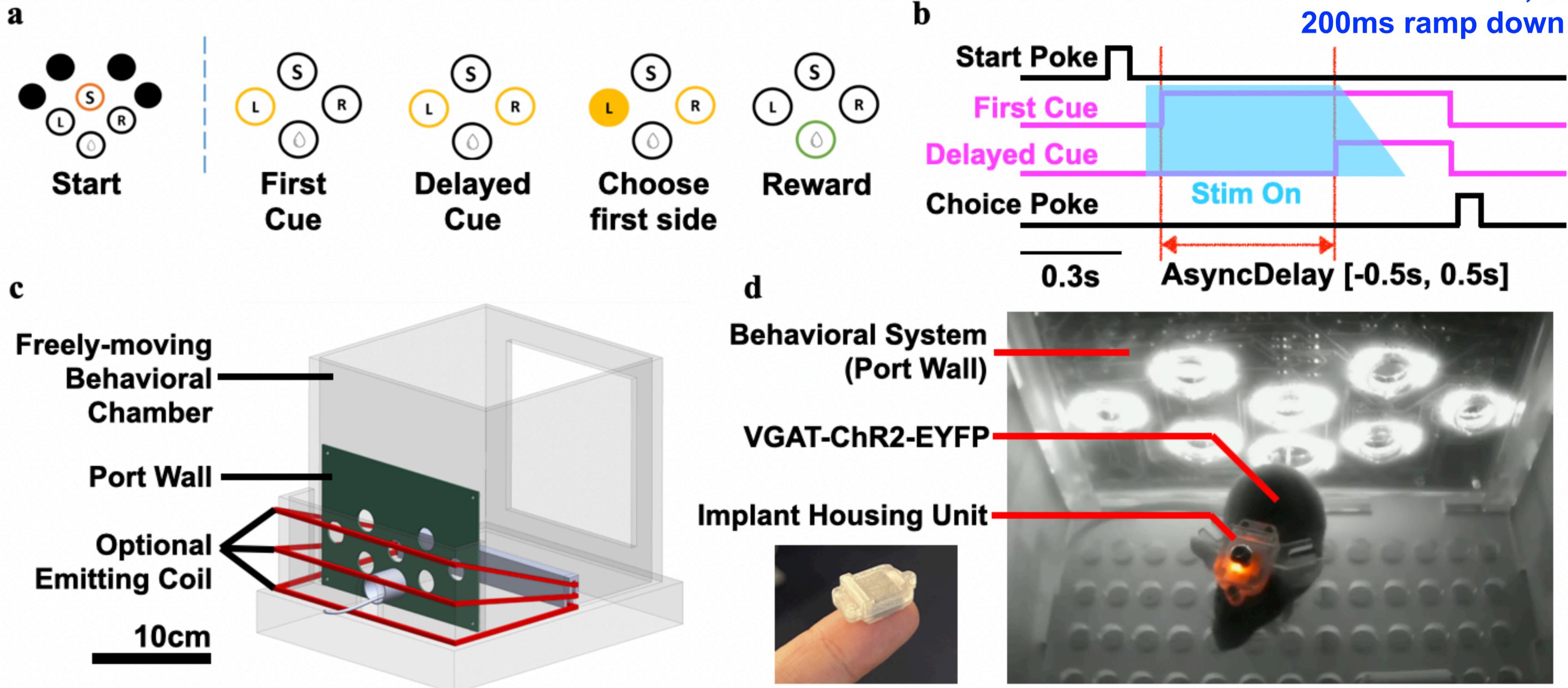


5. Device Characterization

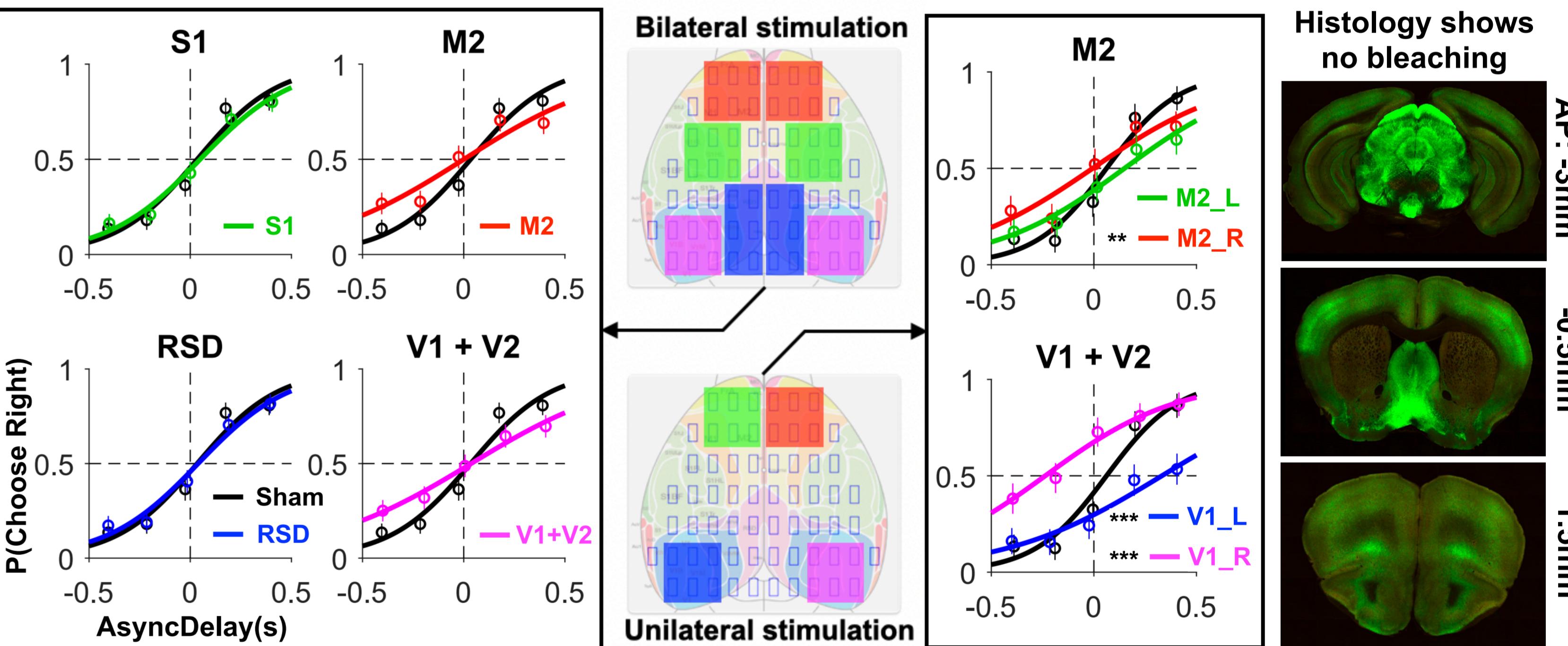
*Electro-physiology data from Nuo Li et. al. elife 2019



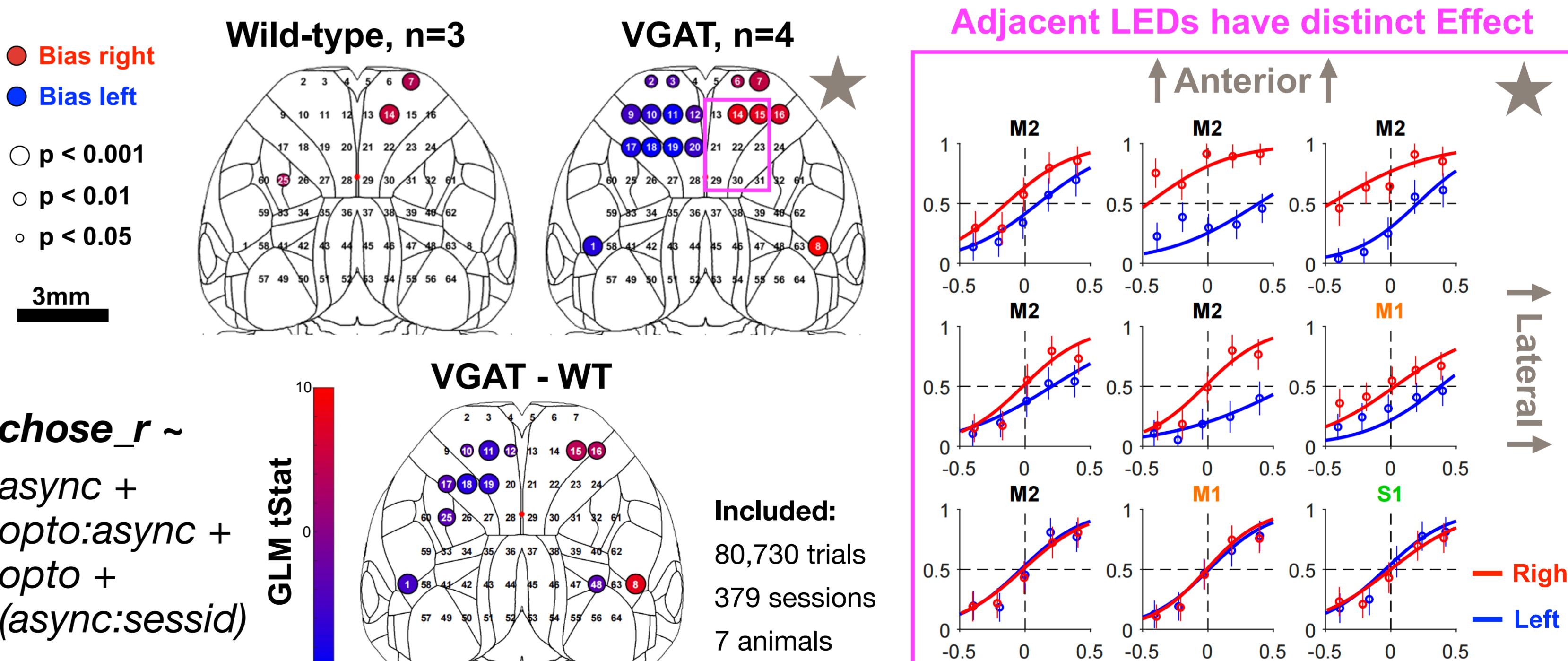
6. Behavioral Validation



Regional silencing shows both significant slope and main effects to choice



Single LED screening reveals task-critical areas on cortex



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Mouse opto-trial demo:
zenodo.org/records/14982327



Amplitude ramp demo:
zenodo.org/records/17567003



Design files available:
github.com/erlichlab/optogrid



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