



## CAPE Grand Challenge: Photonics and Electronics

### Call for Expressions of Interest

The CAPE Grand Challenge: Photonics and Electronics is a competition for project outlines aligned with the strategic research theme proposed by CAPE partners. The winning submissions will be developed into full CAPE project proposals in collaboration with BIACD (and may also involve other CAPE Partners).

The competition is open to researchers and academics in the University of Cambridge.

### Research Topics (Round 2)

#### 1. *High reliable signal transmission requirements*

In continuous rotational structures, usual method of signal transmission is a metal slip ring, which have disadvantages of larger size for multi-signal transmission, mechanical wear and tear, and contamination during long term use, that results in isolation and decreased transmission.

A goal of this project is to develop a novel transmission form with reduced size, that supports circuit and improves stability in a long-term run.

The requirement of transmission:

- a) two-way transmission  
one-way Bit rate: 100Mbit/s
- b) The size of transmission connector:  $\leq \text{Ø}30 \text{ mm} \times 30 \text{ mm}$
- c) Signal processing of requirement for circuit:
  - i. Size:  $\leq 40 \text{ mm} \times 60 \text{ mm} \times 15 \text{ mm}$
  - ii. Electric power: +5V  
Consumption: not larger than 1W  
input signal: Multiple RS-485 series input
- d) Application environment: metal sealed space ( $\text{Ø}500 \text{ mm} \times 500 \text{ mm}$ ), relative rotation of internal components.
- e) MTBF: 100000h

#### 2. *MEMS Technology*

To address MEMS resonator noise and non-linear vibration issues and design of high-accuracy Silicon-based resonant accelerometer.

### Award

**£1,000** bonus will be awarded to the submitter of a Grand Challenge proposal that is developed into a project with a CAPE Partner. CAPE reserves the right not to issue an award if the criteria for the project are not fulfilled and there is no guarantee that the project proposal will be funded.

All research project proposals resulting from the CAPE Grand Challenge between the winner and partner/s will follow standard CAPE project approval procedures and will operate under the terms of the CAPE Partnership Agreement.



## Eligibility

The competition is open to researchers and academics in the University of Cambridge. Each submission must include one applicant (i.e. the submitter or a co-investigator) who is eligible for PI status within the University.

## Criteria

Proposals will initially be evaluated by BIACD to identify which proposal(s) have the potential to form the basis of a full CAPE project proposal which they would support. Selection of shortlisted submissions to be taken through to full proposal stage will be made by the CAPE Steering Committee.

## Timeline

06/10/21	Round 1 Call for Proposals announced
10/12/21	Deadline for Expression of Interest round 1
December 2021	CAPE Partner consideration of submissions, which may include exploration with PIs to clarify/shape the project ideas
	Development of full project proposal by PI(s) with Partner(s)
Mid- January 22	Submission of full project proposals for approval to CAPE Steering Committee
	Announcement of Awards

## How to apply

Please complete an Expression of Interest Form ([download](#)) and return to [cape-office@eng.cam.ac.uk](mailto:cape-office@eng.cam.ac.uk) by 10 December 2021.

## Further Information

More details are available on the CAPE website, [www.cape.eng.cam.ac.uk/grand-challenge](http://www.cape.eng.cam.ac.uk/grand-challenge)

If you have any queries, please contact Ms Denisa Demko (CAPE Coordinator, CAPE Office, 9 JJ Thomson Avenue, Cambridge, CB3 0FA

Tel: +44 (0)1223 748343

Email: [cape-office@eng.cam.ac.uk](mailto:cape-office@eng.cam.ac.uk)