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# Standard PROPOSAL

Document Status: With Council

EPSRC Reference: EP/X039137/1

## EPSRC Large Research Infrastructure Call

### Organisation where the Grant would be held

Organisation	University of Bristol	Research Organisation Reference:	1864644
Division or Department	Computer Science		

### Project Title [up to 150 chars]

The GW4 Isambard Tier-2 service for advanced computer architectures

### Start Date and Duration

a. Proposed start date

01 April 2023

b. Duration of the grant (months)

### Applicants

Role	Name	Organisation	Division or Department	How many hours a week will the investigator work on the project?
Principal Investigator	Professor Simon McIntosh-Smith	University of Bristol	Computer Science	<input type="text"/>
Co-Investigator	Professor Adrian Mulholland	University of Bristol	Chemistry	<input type="text"/>
Co-Investigator	Professor Gavin Tabor	University of Exeter	Engineering	<input type="text"/>
Co-Investigator	Professor Martyn Guest	Cardiff University	Chemistry	<input type="text"/>
Co-Investigator	Professor James Davenport	University of Bath	Computer Science	<input type="text"/>

### Objectives

List the main objectives of the proposed research in order of priority [up to 4000 chars]

## Summary

Describe the proposed research in simple terms in a way that could be publicised to a general audience [up to 4000 chars].  
Note that this summary will be automatically published on EPSRC's website in the event that a grant is awarded.

This proposal is to fund the Isambard 3 Tier-2 national HPC service from the GW4 Alliance universities of Bristol, Bath, Cardiff and Exeter.

Isambard 3 will follow on from the successful Isambard 1 & 2 projects, delivering a supercomputer service based on the increasingly important Arm architecture. Isambard 3 will employ NVIDIA's new 'Grace' Arm-based processors, due out in early 2023, to build a fast yet highly energy efficient service. Isambard 3 will be moving into its own dedicated facility, hosted by the University of Bristol. This new facility, homed within a new modular data centre, will for the first time employ direct liquid cooling to the processors, reducing the total amount of energy used for cooling the system, and creating the opportunity to extract and use the waste heat.

We expect to procure a system of at least 6 racks, 55,000 cores, which should be large enough to rank in the Top500 list of supercomputers at SC in Nov 2023.

Isambard 3 will also continue to provide a Multi Architecture Comparison System, or MACS, which will includes 2-4 nodes of every important new CPU and GPU architecture to be released during the 4 year lifetime of the Isambard 3 service. This will enable scientifically rigorous architectural comparisons between Arm and the latest CPUs and GPUs from Intel, AMD, NVIDIA, and other emerging providers.

The Isambard 3 service will feature an expanded support team compared to previous services, including 6 RSEs and 2 systems administrators on the technical support side, as well as 0.5 FTE of project manager, and a business development manager on the user community engagement and development side.

In summary, the successful Isambard Arm-based Tier-2 service will be expanding to support a much wider user community across all of UKRI, with the first Arm-based server CPUs optimised specifically for HPC from a top-tier silicon vendor. It will be one of the first such systems anywhere in the world, and deliver one of the most energy efficient, low carbon, general purpose CPU services available. The Grace processors should be amongst the fastest available for Isambard's user community, which we expect to expand into weather and climate applications, as well as life sciences and beyond.

## Academic Beneficiaries

Describe who will benefit from the research [up to 4000 chars].


## Summary of Resources Required for Project

### Financial resources

Summary fund heading	Fund heading	Full economic Cost	EPSRC contribution	% EPSRC contribution
Directly Incurred	Staff			
	Travel & Subsistence			
	Equipment			
	Other Costs			
	<b>Sub-total</b>			
Directly Allocated	Investigators			
	Estates Costs			
	Other Directly Allocated			
	<b>Sub-total</b>			
Indirect Costs	Indirect Costs			
Exceptions	Staff			
	Other Costs			
	<b>Sub-total</b>			
	<b>Total</b>			

### Summary of staff effort requested

	Months
Investigator	
Researcher	
Technician	
Other	
Visiting Researcher	
Student	
<b>Total</b>	

## Other Support

Details of support sought or received from any other source for this or other research in the same field.

Awarding Organisation	Awarding Organisation's Reference	Title of project	Decision Made (Y/N)	Award Made (Y/N)	Start Date	End Date	Amount Sought / Awarded (£)
EPSRC	EP/T022078/1	GW4 Tier-2 HPC Centre for Advanced Architectures	Y	Y	01/02/2020	31/01/2023	4108144

## Staff

### Applicants

Role	Name	Post will outlast project (Y/N)	Contracted working week as a % of full time work	Total number of hours to be <b>charged</b> to the grant over the duration of the grant	Average number of hours per week <b>charged</b> to the grant	Rate of Salary pool/banding	Cost estimate
Principal Investigator	Professor Simon McIntosh-Smith	■	■	■	■	■	■
Co- Investigator	Professor Adrian Mulholland	■	■	■	■	■	■
Co- Investigator	Professor Gavin Tabor	■	■	■	■	■	■
Co- Investigator	Professor Martyn Guest	■	■	■	■	■	■
Co- Investigator	Professor James Davenport	■	■	■	■	■	■

Description	Country of Manufacture	Delivery Date	Basic price £	Import duty £	VAT £	Total £	Amount Sought £
[REDACTED]							
[REDACTED]							
[REDACTED]							
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]						
[REDACTED]							
[REDACTED]							
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]						
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]						
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]						
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]							
					Total £	[REDACTED]	[REDACTED]

[illegible]

Description	Total £
Total £	

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**Left Chart: AMA and ACS Membership**

Organization	Percentage of Respondents
AMA	~10%
ACS	~15%
Other	~35%
None	~40%

**Right Chart: ASPS and ASHS Membership**

Organization	Percentage of Respondents
ASPS	~10%
ASHS	~15%
Other	~35%
None	~40%

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[illegible]

Have the following necessary approvals been given by:				
	The Regional Multicentre Research Ethics Committee (MREC) or Local Research Ethics Committee (LREC)?	Yes	No	Not required✓
	The Human Fertilisation and Embryology Authority?	Yes	No	Not required✓
	The Home Office (in relation to personal and project licences, and certificates of designation)?	Yes	No	Not required✓
	The Gene Therapy Advisory Committee?	Yes	No	Not required✓
	The UK Xenotransplantation Interim Regulatory Authority?	Yes	No	Not required✓
	Administration of Radioactive Substances Advisory Committee (ARSAC)?	Yes	No	Not required✓
Other bodies as appropriate? Please specify.				

Are there any other issues of which the Council should be aware?

\_\_\_\_\_

cash			use of facilities/ equipment		
equipment/ materials			staff time		
secondment of staff			other		
other			Sub-Total		
Sub-Total				Total Contribution	

2	Name of partner organisation	Division or Department	Name of contact		
nVIDIA		Headquarters			
Direct contribution to project			Indirect contribution to project		
	Description	Value £		Description	Value £
cash			use of facilities/ equipment		
equipment/ materials			staff time		
secondment of staff			other		
other			Sub-Total		
Sub-Total				Total Contribution	

Total Contribution from all Project partners