Examiners' Joint Report and Recommendation Form: Doctoral Programmes

All postgraduate research awards at the University of Southampton are governed by the Regulations for Research Degrees and Higher Doctorates and the Code of Practice for Research Degree Candidature and Supervision. The Guidance for Examiners of Postgraduate Research Awards supplements the information from these sources and should be consulted to aid the completion of this form, but the Regulations and the Code must be consulted where clarification is required or where dispute arises during the examination process.

This form sets out the criteria for assessing the research student and the recommendations that are available to the examiners. It is used to record the examiners' agreed views in relation to the core outcomes of the research degree and to confirm their agreed recommendation. The form must provide a sufficiently detailed statement to justify the examiners' recommendation. A research student must satisfy the examiners in both the thesis and the *viva voce* and they may fail the examination either because of the thesis, the *viva voce,* or both. The examiners may therefore recommend re-examination only in that part in which the research student has failed and this report must therefore address both aspects of the examination.

The form should be completed and signed by all members of the examining team, before being submitted by the chair to the Faculty Graduate School Office – **Faculty of Engineering and Physical Sciences, University of Southampton, Room 2043, Building 13, Highfield Campus** – feps-gradschool@soton.ac.uk. This should be done within **one working week** of the *viva voce*.

Name of research student	Jie Zhan - 29563755		
Date of *viva voce*			
Title of thesis	Energy Budgeting for Intermittently-Powered Systems		
This report refers to the submission of a revised thesis or an additional *viva voce*		Yes ☐	No ☐

Part A **All UK doctorates, regardless of their form, require the main focus of the work of the research student to demonstrate an original contribution to knowledge in their subject, field or profession.**

Are you satisfied that the work of the research student demonstrates an original contribution to knowledge in their subject, field or profession?	Yes x	No ☐

If YES, please select at least one of the two options below. If NO, the research student cannot be awarded a doctoral degree

1. The contribution has been made through original research	☐x
2. The contribution has been made through original application of existing knowledge or understanding	☐x

Part B **Are you satisfied that the research student has demonstrated the following?**

If the answer to any of these statements is **NO**, the research student cannot be awarded the degree without further work/amendments and, if appropriate, an additional *viva voce*. The examiners may not recommend (a), (b) or (c) in Part D.

If the answer to any of these statements is **YES (SUBJECT TO SPECIFIC AMENDMENT)**, the extent to which amendment is required should be discussed further in the report, with reference to remedial actions and required amendments. The examiners may not recommend (a) in Part D.

If the answer to all of these statements is **YES**, a recommendation of (a), (b), or (c) in Part D should be selected.

	Yes	Yes (subject to specific amendment)	No
The creation and interpretation of new knowledge through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline and merit publication	**x**		
Comment here on the extent to which the criteria have not been met			

	Yes	Yes (subject to specific amendment)	No
A systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or an area of professional practice	**x**		
Comment here on the extent to which the criteria have not been met			

	Yes	Yes (subject to specific amendment)	No
The general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems	**x**		
Comment here on the extent to which the criteria have not been met			

	Yes	Yes (subject to specific amendment)	No
A detailed understanding of applicable techniques for research and advanced academic enquiry	**x**		
Comment here on the extent to which the criteria have not been met			

Part C Commentary

This section should comment on the research student's thesis and on their performance in the *viva voce*. The examining team may wish to comment on the organisation, structure, presentation, authenticity, content, publishable quality and critical awareness of the subject demonstrated throughout the examination process. The commentary can also be used to reference the statements made in Part B. If the examiners' individual reports expressed significantly different views as to the quality of the work, this should also be addressed. Any required amendments must be clearly specified here so as to ensure that the research student has a clear understanding of what is expected of them. The commentary may include a reference to correction of typographical errors noted in a marked-up copy of the student's thesis but more substantial amendments must be clearly specified below.

Report on the thesis
The thesis is well written and structured. It includes a detailed description of the motivation of this work, the experimental analysis, and the results obtained. Both examiners are happy with the quality of this research and its scientific contributions, we have recommended a few amendments below to refine the text and clarify a few points we found ambiguous, concerning the techniques implemented and the metrics used for evaluation e.g, forward progress. Overall the thesis is of very good quality.
Report on the performance of the research student in the *viva voce*
The candidate responded to all questions during the viva and addressed our concerns satisfactorily. We both felt the thesis requires the following minor amendments. 1) Add a table for acronym **2)** In chapter 2, make sure you have permission to include the figures taken from other references **3)** In chapter 3: add a section to describe the experimental methodology in detail, including figures of the setup if possible Include a method section to show how you obtained the data and a picture of the experiment. **4)** Chapter 3: Elaborate more in the meaning of the normalized forward progress i.e. explain how this metric was measured in your experiments, in particular for the results corresponding to Figure 3.3. **5)** In the conclusion, explain how you have addressed the research questions in the thesis and highlight the impact of this work on the field. 6) Please also clarify/correct the issues listed below:

Notes for page 23

- none of applications → no applications

Notes for page 24

- what is "nail-sized"?

Notes for page 43

- the each

  → each

- as well as their works
  not sure what is meant here. Do you mean as well as the associated research works? Or perhaps "as well as how they work"?

- system copy → system copies the
- system restore its state
- the system restores its state … and hence, continues its …

of lacing checkpoints → for placing checkpoints It is a
- concern in Mementos that how

- Rephrase. Perhaps something like “A concern in Mementos is how to set the voltage threshold so that snapshots can be saved successfully while avoiding too many redundant snapshots.”

Notes for page 45

- obtain permission for any image reproductions such as fig 2.5 This is usually just a matter of applying to the publisher. See https://www.acm.org/publications/policies/copyright-policy (https://www.acm.org/publications/policies/copyright-policy)

Notes for page 84

- profiles the maximum voltage drop—this seems like it might be subject to noise in the measurement of supply voltage. What is the noise in the reading (e.g., supply voltage varies with temperature) and how does Optic cope with this noise?

Notes for page 85

- Why is this related work not presented in chapter 2?
- proacitive → proactive

Notes for page 89

- for natural log—use log, for exp, use exp
- can 5.1 be simplified? i.e., exp(log(a).b) = a.exp(b)
- eq 5.1 should be expressed in A rather than μ A and update the constants to be consistent with that. I am sure that I_{sc} also should be in A?
- majorly is awkward—try “mostly”

Notes for page 114

- what is TRX in the figure?

Notes for page 115

- please end the work with a paragraph or two on the impact of the work

Notes for page 123

- reference 65 and 66 incomplete
  carefully check all references,
  please

Part D Recommendation

The examiners for the research student shall recommend one of the following outcomes. For research students studying for a research degree with a substantial taught component, recommendations (a) to (f) will also be subject to the satisfactory completion of the taught element of the programme. Note that if this form refers to the submission of a revised thesis or an additional *viva voce*, the examiners may not recommend (d) or (e) as an outcome.

		Recommendation		
(a)	□	That the degree for which the research student has submitted is awarded.		
(b)	□ x	That the degree for which the research student has submitted is awarded subject to minor amendments to the thesis[1] being made by a date specified. Such amendments include: minor errors/omissions of substance, typographical errors, occasional stylistic or grammatical flaws, corrections to references, minor changes to figures, and minor changes to layout, and require no new research. The date specified for the submission of the minor amendments should normally be no later than three months after the formal notification to the research student.		
(c)	□	That the degree for which the research student has submitted is awarded subject to the correction of modest amendments to the thesis[1] being made by a date specified. Such amendments include: modest errors/omissions of substance and may require limited further analysis but only to an extent which will not affect the originality of the central thesis. The date specified for the submission of the modest amendments should normally be no later than six months after the formal notification to the research student. Should the examiners wish to request a longer time period (of nine months), an academic rationale should be provided below.		
		Timeframe		Academic Rationale
		Six months	□	Not required
		Nine months	□	
(d)	□	That the research student is required to attend a further *viva voce* within three months of the date of the original examination.		
(e)	□	That the research student is required to submit, by a date specified a revised thesis[1] for the same degree for re-examination (including attendance at an additional *viva voce*) on one subsequent occasion. The date specified for submission of the revised thesis should normally be no later than twelve months after the formal notification to the research student;		
(f)		That in the case of a research student who has failed to satisfy the examiners, and where a Master of Philosophy is an exit award, they are invited to apply, by a date specified, for that award in accordance with one of the following recommendations:		
(i)	□	that the degree of Master of Philosophy is awarded (as per (a) above).		
(ii)	□	that the degree of Master of Philosophy is awarded subject to minor amendments to the thesis being made (as per (b) above).		
(iii)	□	that the degree of Master of Philosophy is awarded subject to modest amendments to the thesis being made (as per (c) above).		
		Timeframe		Academic Rationale
		Six months	□	Not required
		Nine months	□	
(g)	□	That the degree for which the research student has submitted is not awarded, resubmission is not permitted and the research degree is terminated.		

We, the examining team, have completed the examination of this research student according to the Regulations for Research Degrees and Higher Doctorates and the Code of Practice for Research Degree

[1] For staff candidates submitting for the award of Doctor of Philosophy by published works, references to the thesis should be taken as referring to the accompanying commentary.

Candidature and Supervision and recommend the outcome as specified above to the Faculty Director of the Graduate School.

External Examiner name	Prof James Brusey	Institution/Department	**Uinversity of Coventry**	Date	07/03/2022
Internal Examiner name	Dr Basel Halak	School/Faculty	**FEPS/ECS**	Date	07/03/200
Additional Examiner name		Institution/Department		Date	

As the Faculty Director of the Graduate School, I have scrutinised the examiners' independent reports and this form in my capacity as Chair of the Faculty Graduate School Committee, and approve their recommendation.

Name	Dr Alan McAlpine	Date	10/3/2022