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This statement should be read alongside the statement for Main Panel F and the generic statement.

Absences of chair and declaration of interests

1. Sub-panel members will not take responsibility for assessing any part of a submission from an institution in which they have declared a major interest, and they will leave the room when the submission is discussed.

2. Members will declare any minor interests in advance, and the chair may decide that they should not take lead or other responsibility for assessing the submission, or should leave the room.

3. A deputy chair has been appointed who will be responsible for chairing the meeting when the chair is absent. If both the chair and deputy chair are required to leave the room for discussion of a particular submission, a temporary chair will be appointed.

UOA descriptor

4. The UOA includes the study of methods for acquiring, storing, processing, communicating and reasoning about information, and the role of interactivity in natural and artificial systems, through the implementation, organisation and use of computer hardware, software and other resources. The subjects are characterised by the rigorous application of analysis, experimentation and design.

UOA boundaries

5. The sub-panel expects to receive submissions from all areas of computer science and informatics, as defined above, and expects that the majority of the research activity submitted will have made a direct contribution to the UOA as characterised in the UOA descriptor. It recognises and welcomes, however, the increasingly interdisciplinary nature of research in this area, and expects that submissions may contain outputs that make contributions to computer science and informatics and other disciplines. Such outputs, together with other information from the submission, may be referred to the relevant sub-panel, for advice on the contribution they should make to the quality profile for that submission. The sub-panel anticipates that it may make referrals to, and receive referrals from, any other sub-panel.

6. The sub-panel may take specialist advice in the following circumstances:

a. For submissions in any areas for which the sub-panel does not have the required expertise.

b. In other cases where, in the professional judgement of the sub-panel, it would be of assistance in reaching a decision.

7. Such advice will be used to inform the sub-panel's assessment and recommended quality profile for submissions.

Research staff

8. The sub-panel will treat staff in Categories C and D in the same ways as staff in Categories A and B, respectively, provided it is satisfied that such staff have (or, in the case of staff in Category D, have had) a genuine close relationship with the department. Evidence of the contribution of Category C staff to the research environment, and the extent of their relationship with the department, should be provided in RA5c. Such evidence might include the use of a department's address on publications, supervision or co-supervision of research students, membership of a research group, or acting as principal or co-investigator on a research project.

9. The contribution of staff in Categories B and D will be used only in the assessment of research environment and esteem indicators.

10. In the assessment of newly recruited staff, the sub-panel will consider their research output in the same way as for others. However, departments should be aware that these individuals' contribution to the research environment can only be assessed from the date of their appointment.

11. The sub-panel encourages departments to submit early career researchers even if their volume of output is limited.

Research outputs

12. All forms of research output will be treated equally. The sub-panel acknowledges the breadth of technology transfer and dissemination practice in computer science and informatics. Consequently it will accept outputs in any form including, but not

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necessarily limited to: books, chapters in books, articles in journals, conference contributions; creative media and multimedia; standards documents; patents, product or process specifications; items of software, software manuals; and technical reports, including consultancy reports or independent evaluations. All forms will be given equal consideration.

13. In the normal course of events research outputs within a submission may have a thematic relationship. They may address common research questions, be based on a common technical platform or focus on a common application domain. They may share small amounts of framing or introductory material. Such research outputs will, where the additional scientific contribution can be identified, be regarded as independent and judged as such. In other cases outputs may have overlapping content, such as where a preliminary version of research results appears in a conference and a fuller version subsequently in an archival journal. In such a situation the comments associated with the output should indicate that this is the case, and should further indicate which output can be regarded as an authoritative or final version. In assigning quality levels to these outputs the authoritative output will be assessed in its entirety and related outputs will be assessed only on the basis of additional scientific contributions made by the outputs.

14. Departments should list a maximum of four outputs per individual submitted for assessment. The sub-panel expects that each individual submitted will normally list four outputs. If fewer than four outputs are listed by an individual an explanation should be provided in RA5b. Reasons for listing fewer than four outputs will be dealt with on a case by case basis. Where there is no reasonable justification, in the sub-panel's view, for listing fewer than four outputs the sub-panel will allocate an Unclassified quality level to the 'missing' outputs.

15. The sub-panel may make allowances for the listing of fewer than four outputs in cases where individual staff circumstances such as those listed at paragraph 39 of the generic statement are cited.

16. The sub-panel recognises that special circumstances may occur in combination and will be responsive to a reasoned case in RA5b based on the following principles:

- each individual submitted for assessment must submit at least one output

- one item of output is expected for each 21 months of full-time equivalent work during the publication period in a Category A post (or similar post outside the UK HE sector).

17. As far as possible, the sub-panel will examine all research outputs, and expects to examine in detail at least 25% of the outputs in each submission. The sub-panel will use its professional judgement to select a subset of outputs to examine in detail, in order to increase confidence in the overall quality profile; it may, for example, examine in detail outputs that are published in outlets with which it is unfamiliar, and those which contain interdisciplinary research.

18. In assessing the quality of outputs the sub-panel will look for originality, rigour and significance to the discipline and wider research community and, where appropriate, to users. The assessment will be based on the content of the output and additional evidence provided in RA2 (see paragraph 22). Evidence that outputs have already been reviewed or refereed by experts and judged to embody work of high quality may be used as one measure of quality. However the absence of such review will not, in itself, be taken to imply lower quality.

19. In arriving at an overall assessment of research quality the sub-panel will use its professional judgement rather than applying a rigid or formulaic method of assessing research quality. It will not use a formal ranked list of outlets, nor impact factors, nor will it use citation indices in a formulaic way.

20. The sub-panel may use specialist advisers to assist with the assessment of research in the pedagogy of computer science and informatics. Any teaching materials listed that incorporate research outcomes will be evaluated in the same way as other research outputs.

21. The sub-panel recognises that collaborative research is a standard way of working in the UOA

and encourages the submission of such work. It is expected that the author who declares a piece of co-authored work will have made a substantial contribution to it. Co-authored outputs will carry full weight in the assessment of the submission's research quality, but the repeated listing of the same co-authored output by more than one individual in a department should be avoided. Where repeated listing occurs the repeated output will count only once in the calculation of the quality profile.

22. To help in the assessment of research quality the sub-panel expects departments to provide additional information (in no more than 100 words, or up to 300 words in exceptional cases) in the 'Other relevant details' field for each output listed in RA2. This should address the three assessment criteria of originality, rigour and significance and should include:

- a statement summarising the research contribution of the output

- evidence of academic or other impact.

23. The sub-panel does not expect the 'Other relevant details' field to be used for any other purpose except in exceptional circumstances.

24. The sub-panel recognises that, in addition to the applied research defined in paragraph 47 and in the main panel statement, there is practice-based research in the field. The sub-panel welcomes the submission of outputs that relate to practice-based research.

25. Practice-based research in this UOA is research that involves direct engagement with users through situated studies, technical deployments, installations and performances in order to gain new scientific knowledge and/or the use of research results to shape practice. Characteristics of excellence in practice-based research include original methodology, new understandings gained from practice, impact on existing practice and evidence of a strong connection between practice and research.

Research environment

26. When the quality, organisation and conduct of research in the UOA is organised in terms of

groups, staff included in RA1, RA2 and RA3 should be listed in groups. Otherwise staff should be listed in alphabetical order.

27. Departments should provide information about the following aspects of the research environment relevant to them:

a. Infrastructure, facilities and administrative support for research.

b. Arrangements for developing and supporting staff in their research.

c. Cumulative impact of research.

d. Industrial collaboration, relationship with research users, contribution to public awareness and understanding.

e. Academic collaboration, national and international, within discipline and interdisciplinary.

f. Research degrees awarded.

g. Research income: funding strategy, amount received and sustainability.

h. Credibility, vitality and sustainability of research organisation.

28. In assessing the research environment overall, the sub-panel will consider strategic vision and planning, organisational agility, operational effectiveness, leadership in establishing best practice, and, if applicable, the role played by interdisciplinary research.

29. Where staff are listed in groups, the contribution of each group to the research environment should be described separately.

30. When submitting information about infrastructure and facilities and administrative support, departments should emphasise new institutional investments made during the assessment period.

31. Information should be given on how the department supports early career researchers and how it monitors research students and encourages completion.

32. Cumulative research impact should be reported in terms of an assessment of academic impact, impact on wealth creation and the quality

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of life, including knowledge transfer activities such as spin outs, licences, consultancy and regional development initiatives.

33. The sub-panel does not expect departments to provide information on the detailed organisation and management structure of the department.

34. Departments should ensure that they provide clear evidence for the claims that they make about their research environment.

Research students and research studentships

35. The sub-panel will consider research students and research studentships as contributing to the profile for the research environment.

36. In addition to the standard analyses provided, the sub-panel will consider research masters and doctoral research degrees awarded per research-active staff member.

37. The sub-panel will place emphasis on the number of degrees awarded rather than on the number of students, with doctorates being rated more highly than research masters.

38. The source of studentships will not carry weight.

Research income

39. The sub-panel will consider research income as contributing to the profile for research environment, and will use the standard analyses provided in making its assessment. The sub-panel recognises that some types of research in computer science and informatics do not require external support.

40. The sub-panel is interested in research income from all sources. Departments should describe their needs for research income, the strategies by which they seek income and the sustainability of their sources of income.

Research strategy

41. Departments should provide a statement on their plans and mechanisms to sustain and develop the credibility and vitality of their research organisation over the next five years.

42. Departments should report how any changes of staff leading up to the census date have impacted on their strength, coherence and research culture.

Esteem indicators

43. Departments should list indicators of peer esteem and national and international recognition that relate to the staff submitted and were gained in the assessment period. The sub-panel will expect to see a range of esteem indicators, distributed across the department's staff, appropriate to the size and staffing profile of the department. Indicators should be listed by individual (with early career researchers clearly identified) and, where relevant, ordered by research group. They may include:

- awards, fellowships of learned societies, prizes, honours and named lectures

- personal research awards and fellowships

- keynote and plenary addresses at conferences

- significant professional service

- positions in national and international strategic advisory bodies

- industrial advisory roles

- editorial roles

- research co-ordination

- conference organisation (eg, programme chairs and programme committee memberships, including continued membership of a programme committee over several years).

44. Esteem indicators that relate to the whole department or research groups may also be provided where appropriate.

45. The maximum number of esteem indicators that may be listed is twice the number (ie, headcount) of Category A and C staff submitted for assessment, plus the number (ie, headcount) of Category B and D staff. Leaving aside indicators attributable to the department or research groups no more than four esteem indicators may be listed by each member of

Category A and C staff and no more than two by each member of Category B and D staff.

46. The sub-panel recognises that indicators of esteem may vary according to experience and seniority of staff included in the submission. In assessing the quality of esteem indicators the sub-panel will take into account the career stage of the individual.

Applied and interdisciplinary research

47. Applied research is research that makes a substantive contribution to another domain, based on the knowledge, methods and research of the core discipline. The outputs of applied research include software, patents and/or licences, experimental instrumentation and devices, other artefacts, and publications in any discipline or professional journal. Characteristics of excellence in applied research include original methodology, innovative application, impact in the applied field, uptake in the applied field, feedback to the core discipline and evidence of synergy between the applied field and the core discipline. The sub-panel recognises that there can be outstanding innovation and originality in solving practical problems, including applied research which is relevant to the needs of commerce, industry and public bodies.

48. Interdisciplinary research is research that brings together methods and perspectives from a number of disciplines. This may involve working with experts from other disciplinary backgrounds, the use of methods and techniques drawn from a number of disciplines or the development of new interdisciplinary approaches. The outputs of interdisciplinary research include publications, software, patents and/or licences, experimental instrumentation and devices, and other artefacts. Excellence in interdisciplinary research is characterised by originality of the contribution, the rigour of the interdisciplinary approach and techniques used, and the significance of the work to the constituent disciplines involved.

Individual staff circumstances

49. In assessing submissions, the sub-panel will take account of individual staff circumstances disclosed by departments in relation to the categories listed at paragraph 39 of the generic statement.

50. Departments should use RA5b to provide information on individual staff circumstances and their impact on the individual's research.

51. Early career researchers are individuals of any age who first entered the academic profession on employment terms that qualified them for submission to RAE2008 as Category A staff on or after 1 August 2003. The sub-panel encourages departments to submit early career researchers, even if their volume of output is limited. The sub-panel expects to see a clear statement on how such staff contribute to and are supported by the research environment. Early career researchers may submit up to four outputs.

52. Where individuals who are new to academic research but who have an established research portfolio from an earlier career as post-doctoral researchers or in industry or overseas are included, the sub-panel would normally expect four outputs to be submitted.

Working methods

53. The assessment will be one of peer review based on professional and scholarly judgement.

54. The overall process for reaching decisions will be iterative; each submission will be considered more than once during that process.

55. At the first meeting the sub-panel will identify submissions or outputs for which specialist advice or cross-referral are required.

56. Cross-referrals received from other sub-panels will be considered by the most appropriate member(s) of the sub-panel, who will provide comments to assist the referring UOA in making its assessment.

57. External advice (from specialist advisers or other sub-panels) may be used to inform the sub-panel's assessment of interdisciplinary work.

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58. Joint submissions will be assessed in the same way as submissions from single departments.

59. Before the first meeting in the assessment phase the chair, together with a small group of sub-panel members, will review the submissions and assign each submission to at least three sub-panel members to lead the assessment. Topic expertise and potential conflicts of interest will be taken into account when making this allocation.

60. The assigned assessors will each draft a quality profile for each component of the submission in advance of the meeting of the sub-panel. They will highlight any differences of opinion, which may require more detailed examination and discussion. The whole sub-panel will then discuss these drafts before the quality profile for each component is agreed.

61. It is anticipated that the final quality profile recommended for each submission will be agreed by consensus after full discussion, with recourse to voting only as a last resort.

Research outputs

62. This component will be weighted as 70% of the overall quality profile.

63. Each assessor assigned to a given submission will examine each output included in the submission for originality, rigour and significance. Originality will be judged by the extent to which the output introduces a new way of thinking about a subject. Rigour will be judged by the extent to which the purpose of the work is clearly articulated, appropriate methodology adopted, and compelling evidence presented to show that the purpose has been achieved. Significance will be judged by the extent to which the work has exerted, or is likely to exert, a significant impact on the academic field or its practical applications. In reaching these judgements the assessor may consider:

- the scope and content of the output

- evidence of rigorous third-party peer review

- the standing of the outlet, relative to others in the same field

- citations of the output, relative to others of similar age in the same field

- evidence that the work has established a new area of study

- evidence of significant practical applications of the work

- other evidence provided in the 'Other relevant details' field in RA2.

64. Taking all the evidence into account, the assessor will use their professional judgement to assign an overall score to the output, on a ten point scale.

65. The sub-panel will compare, selectively, scores assigned to the same outputs by different assessors, over the whole UOA, in order to calibrate the scores of individual sub-panel members. The score needed for an output to be deemed of world-leading quality, and awarded a quality level of 4*, will be established by the whole sub-panel, by sampling papers close to the proposed borderline. This decision will also be influenced by the initial exercise involving all the sub-panels of Main Panel F.

66. In assessing research outputs the sub-panel will interpret the quality levels within the profile as follows:

a. To be awarded a 4* quality level a research output must exhibit high levels of originality, innovation and depth, and must have had, or in the view of the sub-panel be likely to have, a significant impact on the development of its field.

b. To be awarded a 3* quality level a research output must exhibit high levels of originality, and must have had, or in the view of the sub-panel be likely to have, a clear impact on the development of its field.

c. To be awarded a 2* quality level a research output must exhibit clear originality, and must have had, or in the view of the sub-panel be likely to have, an impact on the development of its field.

d. To be awarded a 1* quality level a research output must make an original and useful contribution to its field but is unlikely to have more than a minor impact.

67. In the descriptions of quality levels above, the term 'field' includes theoretical, methodological, applied, practical and interdisciplinary work.

68. The assessors for each submission will together agree where allowance should be made for the listing of fewer than four outputs by an individual. In calculating the quality profile the total number of outputs (on which the proportion of outputs in each quality level will be based) will comprise the number of outputs listed in the submission, plus any missing outputs awarded an Unclassified quality level.

Research environment

69. This component will be weighted as 20% of the overall quality profile.

70. The quality profile for research environment will be calculated by awarding a quality level to each of the eight categories in paragraph 27.

Esteem indicators

71. This component will be weighted as 10% of the overall quality profile.

72. The quality profile for esteem will be calculated in a similar way to that for research outputs. Each of the three assessors will award a quality level to each indicator listed in their assigned submissions. If the number of indicators listed is less than the maximum permitted, the missing indicators will be assigned an Unclassified quality level.

73. Examples of esteem indicators that the sub-panel might consider to be 4* include (the list is not exhaustive):

* election to fellowship of The Royal Society, Royal Academy of Engineering, Association for Computing Machinery, Institute of Electrical and Electronics Engineers

* best paper award at a major conference

* programme chair of a major international conference in a relevant research area

* funded senior research fellowship by a national organisation

* invited keynote speaker at an international or national conference in another country.

74. The three proposed profiles for outputs, environment and esteem will be developed independently. Using the agreed weightings and rounding method, the sub-panel will then combine the three profiles to develop the overall quality profile for the submission. The sub-panel will finally confirm that, in its collective expert judgement, the overall profile recommended to the main panel is a fair reflection of the research activity in that submission, and that the assessment has taken account of all the different components of the submission.

Additional information requested

75. Departments may wish to provide information (in RA5) on any difficulties of fit between their departmental structure and UOA boundaries, and other UOAs to which related work has been submitted.

76. Departments may comment on any ongoing research that has not yet produced visible outcomes.