

REPORT OF THE VISITING GROUP TO THE JOHN INNES CENTRE

16-19 MAY 2005

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WHOLE INSTITUTE ASSESSMENT

SUMMARY ASSESSMENT

1. The unanimous view of the VG was that there was a continued need for a research institute in the UK that covered plant science, microbial science and the interactions between them, and that spanned basic and strategic translational research which underpinned the agricultural and biotechnology industries. The JIC was carrying out work of the highest international standard, which was improving the fundamental understanding of plant development, metabolism and chemistry.
2. The JIC carried out a very broad range of high quality and fundamental plant and microbial science of high strategic relevance, in many areas providing leadership internationally. Although there was a need to retain a broad range of plant and microbial sciences, in the view of the VG there was also a need to focus within that range and define more explicitly the strategic role of the institute.

Recommendation 1

The VG endorsed the need for a research institute in the UK covering plant and microbial sciences and the interactions between them, and acknowledged that the JIC carried out a broad range of high quality plant and microbial science, in some areas providing leadership internationally. However, the VG recommended that the institute focus within that range and defines more explicitly the strategic role of the institute.

3. In the view of the VG, research in comparative genomics that utilised model organisms and agronomically-relevant crops was world-leading and JIC was uniquely placed in the UK for delivering effective transition of trait identification and exploitation between model plant species and crops. The concept of model-to-crops translation had been integrated in some areas and needed to be embraced by the institute as a whole. It held significant promise for the future, underpinned by crop genomic approaches as well as appropriate deployment of molecular technologies and, increasingly, genomic technologies.
4. JIC must maintain crop genetics as the lynchpin of the institute's remit. The science was in part potentially threatened, however, by the vulnerability of the subject worldwide following the decline of the plant biotech sector. The VG was pleased to see the more central role of crop science across the whole range of the institute's research programmes and supported the management's actions that had led to this emphasis.

Recommendation 2

Crop science spanned the range of the institute's programmes and there was evidence of a clear commitment to model-to-crop translation. The VG strongly recommended that JIC maintains crop genetics as the lynchpin and focus of the institute's remit and that work on model-to-crop translation be further embedded and enhanced.

5. The institute was carrying out work of the highest international standard, which was improving the fundamental understanding of plant development, metabolism and biochemistry. Furthermore the study of plants in a non-sterile environment was identified by the VG as a real strength of the institute's activities and the potential for a systems biology approach on plant-microbe interactions was evident.
6. The VG was particularly impressed with the work in molecular microbiology at the institute which was of high international standard. This had already demonstrated enormous potential for the exploitation of natural products with the development of a spin-out company based on the *Streptomyces* antibiotic research. The VG felt that JIC should demonstrate a long-term commitment, developing a clear direction and role for microbiology within JIC, in order to retain the unique features of the institute.

Recommendation 3

The VG was particularly impressed with the JIC's high international standard work in molecular microbiology. The VG recommended that the institute demonstrate its long-term commitment to this area, by developing a clear strategy with a clear direction and role for microbiology within JIC.

7. The long-term multidisciplinary approach proposed by the director, linking fundamental research to strategic targets, together with key resources (eg germplasm collections, platform technologies) demonstrated, in the view of the VG, the clear added value obtained from carrying out the work in an institute environment. The VG applauded the cross-programme approach to big, scientific challenges, such as abiotic stress, which was well suited to an institute environment, and must be appropriately resourced. The VG also supported the development of a Cross-Institute Programme (CIP) and encouraged further such collaborations (see paragraph 13).
8. The scientific role of computational biology beyond a service function, across all the institute's programmes, needed to be recognised. Realising its full potential and achieving complete fitness for purpose across the range of science carried out at the JIC would require the full integration, improved status and development of the role of computational biology across the whole institute.

Recommendation 4

To realise the full potential of the institute's research programme and achieve full fitness for purpose, JIC must improve the status of computational biology and fully integrate these skills across the whole institute. The scientific role of computational biology beyond a service function must be recognised.

9. The VG believed that scientific input at a chemical level would also be essential for the future sustainability of the institute's scientific strategy, but the VG noted that the mechanism for achieving this needed to be fully developed and implemented. This was a fundamental point because the VG felt that JIC needed to determine whether it wished to be competitive in structural biology and maintain core biological chemistry expertise in

mechanistic enzymology and protein function and/or enhance its capabilities in chemical biology. The latter would require more resources in analytical chemistry and also in synthetic chemistry expertise.

Recommendation 5

As scientific input at a chemical level would be essential for the future sustainability of the institute's science strategy, the VG recommended that JIC consider carefully how best to deliver critically important chemistry inputs across research programmes.

10. The following were also recognised as core requirements, essential for future plans, and which needed to be developed sustainably to meet future demand:
 - key platform technologies (eg genomics, metabolomics, proteomics and bio-imaging)
 - key resources (eg germplasm collections)
 - key facilities (eg controlled environments)

Expertise to support these requirements would need to be managed in a sustainable way.

Recommendation 6

Key technologies, resources and facilities were recognised by the VG as core requirements for the institute to fulfil its potential. The VG recommended that these be developed in a sustainable way to meet future demand. Furthermore, expertise to support these must also be managed in a sustainable way.

COLLABORATION

11. JIC had numerous and effective links with universities and other organisations across the range of its science. These included many collaborations which had been developed with researchers originally trained and based at the institute in areas where JIC was recognised as world-leading (eg microbiology and crop genetics research). The institute was contributing to the global plant and microbial science skills base.
12. Most collaborations were productive, appropriate and beneficial to the institute's science programmes. For example, the Crop Genetics programme was making a significant contribution to crop improvement programmes at national, European and wider international levels and was playing an active role in the Cross-Institute Programme at the institute (see paragraph 13). However, the VG was concerned that in some cases collaborations were addressing a lack of expertise that should be part of the core skills of the institute, and that this might sometimes be acting as a barrier to interactions between JIC programmes (eg quantitative trait loci (QTLs) identified in the Crop Genetics programme were being linked to their underlying physiology although this was primarily dependent on external collaboration).

Recommendation 7

Although most collaborations with external organisations were appropriate and productive, the VG expressed concern that in some cases these were covering for a lack of expertise that should be part of the core skills of the institute. The VG recommended that the director ensure that a balance of core expertise was maintained across the institute.

13. The value of links with other BBSRC-sponsored institutes was recognised within JIC and, where described, appeared to be effective. The VG supported the development of a new, Cross Institute Programme (CIP) on crop genetics with the Institute of Grassland and Environmental Research and Rothamsted Research [RRes] (and also involving the Scottish Crop Research Institute [SCRI]). This had the potential to maximise the outputs from almost £3M of BBSRC funding across the institutes involved. The VG also encouraged the institute to consider other cross-institute alliances where appropriate, eg closer links with the Roslin ARK-Genomics for bioinformatics. In addition closer integration with complementary work at RRes on plant-insect interactions would strengthen programmes at both institutes.

Recommendation 8

The VG supported the development of a Cross-Institute Programme (CIP) in crop genomics, and recommended that the institute consider new cross-institute alliances, including with Roslin ARK-Genomics for bioinformatics and RRes for complementary work on plant-insect interactions.

14. The VG also endorsed the forging of closer and appropriate alliances within the Norwich Research Park (NRP: including the Institute of Food Research [IFR], the University of East Anglia [UEA], the Sainsbury Laboratory [SL] and the Norwich and Norfolk University Hospital [NNUH]). These represented sensible and appropriate pooling of resources for key platform technologies. In particular the VG felt that forging closer alliances in food science with IFR would prove beneficial and productive.
15. While recognising that UEA faculty contributed to JIC research, plans for a new facility on Integrative Systems Biology (the D'Arcy Thompson Centre) within the University, although a welcome development, was viewed by the VG as being too focused in its remit: it felt that the new centre as envisaged would not fully address the core needs of the institute for support in systems biology.

Recommendation 9

The VG welcomed the sensible and cost-effective alliances that the institute had made within the NRP, particularly for shared platform technologies, and felt that there were further opportunities to forge closer links in food science with IFR. It recommended that JIC ensure that where possible such alliances also address the Centre's own long-term strategic requirements.

16. The VG agreed that JIC was recognised internationally as one of the most important centres for plant and microbial science and the VG noted that some students and fellows were attracted to study and work at the institute by JIC's

international reputation for a high quality research environment. It was also noted that a significant proportion of students at JIC were from overseas, which supported this conclusion. The VG considered that the JIC should aim to export talent trained in-house at studentship, postdoctoral and fellowship levels to positions at UK and overseas universities and institutes.

STRATEGIC RELEVANCE

17. JIC's research was, in the opinion of the VG, strongly relevant to a number of BBSRC Strategic Plan 2003-2008 priorities although the VG was at times doubtful about whether the JIC was developing a clear strategic position or merely fitting programmes to areas pre-determined by the BBSRC. All programmes were relevant to the Integrative Biology priority; most work was also a major contributor to the Sustainable Agriculture priority. The VG agreed with the director's assessment that Metabolic Biology, Molecular Microbiology and Biological Chemistry programmes contributed significantly to the Bioscience for Industry priority, and had high potential relevance to the Healthy Organism priority through effective knowledge transfer routes such as the development of a drug discovery spin-out company.
18. Evidence for the institute's relevance to industry came from previous major achievements in attracting significant investment to the site (eg Syngenta). The retrenchment of the plant biotech sector worldwide did not, in the opinion of the VG, reduce the long-term relevance of JIC work. Indeed it could be argued that JIC was contributing effectively to public good work in well-established areas such as crop improvement. Furthermore, developing areas such as adaptation to abiotic stress in relation to climate change, were likely to play a more critical role in the future.
19. Much of the current connection with industry came from involvement in Defra-funded LINK programmes for crop improvement networks. There was also substantial evidence that JIC had influenced the development of the EU Framework Programme research areas including the development of EU-funded plant science programmes.
20. The VG endorsed the view, as set out in the institute's well-articulated business development plan, that the institute should continue to widen and diversify industrial links beyond the traditional areas related to crop improvement. The VG approved of the approach the institute had taken, as part of a phased development programme, in appointing consultants to review new industrial opportunities including in the wider biotech sector.
21. JIC research contributed to wider strategic relevance and public good (eg through its contribution to the crop improvement networks). Long-term storage of genetic resources had benefits for agriculture beyond the UK which were particularly relevant in the context of adaptation to climate change. JIC had and should continue to embrace a strategy that included GM and non-GM routes to crop improvement, recognising that market conditions and public perception might change. As the leading plant-microbial science institute in

the UK, JIC should consider placing greater emphasis on wider crop targets including abiotic and biotic stress, sustainable agriculture, health and healthy foods. The VG emphasised strongly that, in exploring new areas, JIC should take care not to jeopardise the implementation and success of existing core strategies.

Recommendation 10

The VG applauded the institute's contribution to the wider public good through its research, and felt there were additional opportunities to widen and diversify the strategic relevance of much of the research at the institute into non-traditional areas and, where these did not compromise the implementation and success of existing core strategies, they should be considered by the institute.

SCIENCE AND SOCIETY

22. The VG viewed the JIC as developing an impressive programme of science and society activities, showing both breadth and diversity of reach, and depth of engagement with different audiences.
23. The VG applauded the committed approach, which was led and championed by leading scientists at the institute; the VG particularly commended the pioneering approach and individual endeavours of individual JIC staff.
24. Particular credit should be given to the Teacher-Scientist Network, through which they were reaching a wide range and number of pupils in secondary and primary schools. The demand for the Network by teachers far exceeded the supply of scientists. It was evident that this Network also provided a valuable experience for the participating scientists, who were provided with training and support. In addition, the institute had excellent relations with the media, through the Science Media Centre and particular journalists, and could be relied upon to put forward spokespeople as required. These were just two of a wide range of excellent initiatives described by the institute staff during the presentation. Good practice in these and other areas should be shared with other BBSRC-sponsored institutes.
25. Scientists at all levels were involved in various ways and there were good opportunities for training those who wished to be involved. There was commitment to communication and engagement from the top of the institute, which provided an excellent role model for staff. Individual decisions about whether to be involved were made locally between staff and their line managers; the VG felt that care should be taken to ensure that this did not result in the exclusion of some who would like and would benefit from involvement, but felt that they could not, owing to other pressures.
26. The institute defined four target audiences: policy makers, the media, educators, and the local community. It was evident that these groups were not always wholly sympathetic to the aims of the institute. The JIC saw its role in relation to public engagement in increasing the understanding and appreciation of its aims amongst these groups. Progress had been made with some groups,

such as the Soil Association, whose chairman was a frequent attendee of the Friends of John Innes Centre meetings. A proactive strategy that built on this existing understanding of the need for dialogue and mutual understanding would be useful to ensure all activities were fully attuned to the concerns and aspirations of the target audience.

27. The wide range of activities that the institute was involved in had evolved both through demand and from the enthusiasm of individual scientists. Now would be an excellent opportunity for the institute to take stock of the existing, wide-ranging programme, to clarify the aims and measure performance of the programme as a whole, as well as individual activities. This would help inform the development of a strategy, which would bring together existing activities and ensure that new and future programmes would be targeted at the institute's overall aims in this area. It would also help if this strategy development coincided with a revision of the wording of high-level strategy documents to reflect the culture of dialogue that was evident in the existing programme. Development of a strategy might result in greater integration of activities, to maximise individual impact. It was recognised that evaluation of public engagement activities was both difficult and resource-heavy. However, 'light-touch' measures could be useful to develop new activities and reflect upon existing ones.
28. The institute had excellent links with some organisations. The VG felt that the institute should build on those links, both with other BBSRC-sponsored institutes and with other bodies. This could help share best practice and maximise impact with limited resources. Other organisations it might be helpful to work with included Science and Plants in Schools (SAPS) and the National Centre for Biotechnology Education (NCBE).

Recommendation 11

As an excellent level of activity had now been achieved, it would be a good time for the institute to clarify its aims in this area and develop a strategy for science and society for the future, drawing the current activities together. Evaluation of the success of the programme against its objectives should be considered to help develop the strategy and targeting of activities, although the VG fully accepted that this represented a significant resource. JIC should build on its existing relationships with other bodies. Good practice in certain areas should be presented as an example to other institutes.

29. The VG and science and society experts felt that above all the institute should be commended for its activities, many of which could be seen to be exemplary. The imaginative use of limited resources, and the commitment of high-level scientists within the institute, made for a wide-ranging and diverse programme backed with enthusiasm from all those involved.

KNOWLEDGE TRANSFER (KT)

30. The Knowledge Transfer (KT) report echoed observations from the VG about the impact that the decline of the industrial plant biotech sector had had on the

institute. The VG agreed with points in the KT report about the need to establish mechanisms whereby the needs of industry could be more effectively heard. The institute had responded positively with a new business development plan which was less reliant on single large sponsors.

31. The VG noted that the decline in license income was a reaction to a depressed market but commended the JIC for responding effectively to changed conditions and placing greater emphasis on spin-out activity. However, the VG wished to add that a clearer focus on decision-making procedures for protecting IP and its licensing potential would be useful.
32. Although many effective links across the NRP had already been established, the VG was concerned that in the view of the KT panel the institute was not fully committed to the development of the NRP. In the KT panel's view there was a lack of overview of the potential of the site and engagement with other residents. This was reflected in part in the VG's recommendation that there were more opportunities to foster closer links within the NRP and that such alliances should carefully address the long-term needs of the institute.

Recommendation 12

The VG endorsed the positive comments in the KT report. The institute was responding positively and appropriately to the decline in the plant biotech sector. The VG welcomed the development of spin-out activity but felt that a clearer focus on decision-making procedures for protecting IP and its licensing potential would help address the decline in income in these areas. Furthermore the VG, whilst recognising that much effort had been made by the institute, endorsed the comments in the KT report that JIC should enhance and improve its alliances within the NRP.

STUDENTSHIPS AND FELLOWSHIPS TRAINING (SFT)

33. The Studentships and Fellowships Training (SFT) report appeared to offer an accurate and informed picture of studentship and fellowship training at JIC. The VG met informally with students and fellows and was satisfied that the main findings in the SFT report were fully reflected in the VG's discussions. The full report is at Annex 2.

BUSINESS PLANNING AND ORGANISATION

34. There was generally good integration of science across programmes, as seen in the emerging institute-wide commitment to model-to-crop translation. The VG welcomed the proposals for increased cross-programme collaborations in future plans. It would be important for the institute to deliver on the promise of such alliances. The VG also applauded the cross-programme approach to tackling bigger questions (eg abiotic stress). However, it was important that these were appropriately and adequately resourced, seeking external collaborations only where appropriate.

Recommendation 13

The VG applauded the cross-programme approach to tackling bigger questions. There was evidence that this was beginning to work effectively. However, much depended on proposed future collaborations. The VG recommended that these be appropriately and adequately resourced, seeking external collaborations only where appropriate.

35. The VG was satisfied that the Centre Management Board (CMB) was a cohesive and well functioning group, which had been effective in change management. Together with the Appointments Committee (APCOM) it was working effectively to implement institute policy and strategy. The VG endorsed mechanisms that were in place for staff opinions to be heard. All programmes had developed science strategy 'roadmaps' which had involved staff at all levels to varying degrees. However, the VG was less convinced about the impact such mechanisms had on influencing strategy or how many staff understood how strategic objectives were to be realised.
36. The VG expressed some concern that the current constitution of the CMB might be reducing the real impact that staff could have in influencing the development of science strategy within the institute. The use of fixed term appointments to CMB would encourage more rotation of responsibilities among senior staff from all programmes and research areas, and give more staff the opportunity to gain experience of senior scientific management.

Recommendation 14

The VG felt that the CMB was a cohesive and well-functioning group for the implementation of strategy. However, it was not perceived to be fully effective across the institute. Wider participation of staff should be encouraged by changing the appointment and tenure procedures for CMB membership.

37. The JIC's stringent appointments procedure was securing very high quality staff. However, the VG was concerned that the opportunistic nature of the system might inhibit a targeted approach to recruitment of key skills, where gaps had been identified (eg in computational biology and cell biology). In addition, although applying the tenure stringency to existing staff was appropriate, it was felt that this approach should not be extended to senior independent fellows, who might be expected to leave after the duration of the award. Appropriate turnover would, in the view of the VG, encourage new talent and fresh ideas into the institute. The VG felt that the institute might gain from looking at best practice elsewhere in the BBSRC system where there did not appear to be a problem in attracting senior fellows. The institute should also explore with BBSRC Human Resources Group (HRG) ways in which to resolve this issue.

Recommendation 15

The VG applauded the stringency of the current recruitment procedures, but was concerned that the opportunistic nature of the system might impede recruitment to key strategic posts, and that the procedures might be deterring the recruitment of senior independent fellows. The director should review the procedures to allow for increased flexibility in making strategic appointments, and to encourage senior

independent fellows to the institute. The VG also recommended that the institute follow best practice from elsewhere in BBSRC, and explores with BBSRC HRG ways in which to resolve this issue.

RESEARCH FOOTPRINT

Research footprint assessment summary					
	Number of programme themes in each assessment category*				
BBSRC-funded	High international	Inter-national	High national	National	Unsatisfactory
	6	4		2	
Mixed programmes	High international	Inter-national	High national	National	Unsatisfactory
	2	6		2	
	Outstanding	Good	Satisfactory	Unsatisfactory	
	2	6	2		

* owing to the size of the 6 JIC programmes separate assessment ratings were given for research themes in each programme.

Programme 1: Crop genetics (Mixed funded) (7 themes)
 BBSRC ratings: High international: 2; International: 3; National: 2
 External ratings: Outstanding: 2; Good: 3; Satisfactory: 2

Programme 2: Biological chemistry (BBSRC funded) (3 themes)
 BBSRC ratings: International: 1; National: 1; No rating: 1**

Programme 3: Cell and developmental biology (BBSRC funded) (4 themes)
 BBSRC ratings: High international: 3; International: 1

Programme 4: Metabolic biology (BBSRC funded) (3 themes)
 BBSRC ratings: International: 2; National: 1

Programme 5: Molecular microbiology (BBSRC funded) (3 themes)
 BBSRC ratings: High international: 3

Programme 6: Disease and stress biology (Mixed funded) (4 themes)
 BBSRC ratings: International: 3; No rating: 1**
 External ratings: Good: 3; No rating: 1**

**No assessment undertaken (some themes were yet to be fully established at the time of the visit)

ANNEX 1: VISITING GROUP MEMBERSHIP AND ACKNOWLEDGEMENTS

MEMBERSHIP

- i. The John Innes Centre (JIC) was reviewed by a Visiting Group (VG) between 16 and 19 May 2005. The Group comprised:

Professor K Gull CBE FRS (chair)	University of Oxford
Professor M Akam FRS	University of Cambridge
Professor C Anthony	University of Southampton
Dr S R Barnes	Advanta, Belgium
Professor A Brass	University of Manchester
Professor J Coggins	University of Glasgow
Professor L Dijkhuizen	University of Groningen, The Netherlands
Dr S Donadio	Formerly of Vicuron Pharmaceuticals, Italy
Professor M J Kearsey	University of Birmingham
Dr J Langdale	University of Oxford
Professor H Nimmo	University of Glasgow
Professor S E V Phillips	University of Leeds
Professor I Roberts	University of Manchester
Professor U Sonnewald	Institute for Plant Genetics and Crop Plant Research, Gatersleben, Germany
Professor W J Stiekema	Centre for BioSystems Genomics, Wageningen, The Netherlands
Professor N J Talbot	University of Exeter

- ii. The Group was joined by additional experts to review the institute's contributions to the Science and Society agenda:

Dr G Cardew	The Royal Institution of Great Britain
Dr P Finegold	The Wellcome Trust

- iii. The following people attended from BBSRC Office: Professor Julia Goodfellow; Professor Nigel Brown; Dr Doug Yarrow; Dr Bill Eason; Dr Clare Rushowski; Dr Maggie Leggett; Miss Caroline Dow.

ACKNOWLEDGEMENTS

- iv. The VG was most grateful for the welcome and hospitality extended by the director and staff of the institute, which had done much to contribute to the smooth-running of the visit. The Group also appreciated the considerable amount of background work that had been undertaken by the institute in preparation for the visit.

ANNEX 2: REPORT ON STUDENTSHIPS AND FELLOWSHIPS TRAINING ASSESSMENT

BIOTECHNOLOGY AND BIOLOGICAL SCIENCES RESEARCH COUNCIL

2005 INSTITUTE ASSESSMENT EXERCISE

STUDENTSHIPS AND FELLOWSHIPS TRAINING (SFT) ASSESSMENT

VISIT TO THE JOHN INNES CENTRE: 15 SEPTEMBER 2004

INTRODUCTION

1. The John Innes Centre (JIC) was visited by a BBSRC Studentships and Fellowships Training (SFT) assessment panel on 15 September 2004. The SFT assessment forms part of the Institute Assessment Exercise (IAE). The SFT panel at JIC comprised two members of the Committee on Studentships and Fellowships (CSF): Professor Ian Roberts (University of Manchester; chair) and Professor David Rice (University of Sheffield). The panel was accompanied by staff from BBSRC Swindon Office: Dr Ian Lyne (Head of Postgraduate Training and Fellowships), Dr Tom Loeffler (Postgraduate Training and Fellowships Branch) and Dr Bill Eason (Evaluation and Policy Unit).
2. The visit was informed by a background paper prepared by the institute, which provided the basis for a meeting with senior institute staff with designated responsibilities for postgraduate and postdoctoral training. The panel subsequently met with groups of postgraduate students and postdoctoral fellows from JIC for informal, free-ranging and confidential discussions about their experiences and expectations of the training provided by the institute. In addition, the panel viewed examples of laboratory and office accommodation used by students and fellows at JIC, together with some of the site's specialised facilities.
3. In assessing its provision of postgraduate training, the panel had regard to JIC's effectiveness in meeting the needs of the Joint Statement of the Research Councils Skills Training Requirements for Research Students (http://www.bbsrc.ac.uk/funding/training/skill_train_req.html) including:
 - Research skills and techniques
 - Research environment
 - Research management
 - Personal effectiveness
 - Communication skills
 - Networking and team working
 - Career management

In making their assessments the panel considered a range of factors which contributed to the delivery of the requirements set out above, including the environment and facilities; links with universities; supervisory practice; generic training and pastoral care and the student community.

4. The panel provided an overall assessment in three key areas:
 - provision of research based training
 - provision of generic, non research-based training
 - the quality of the training environment

5. Each aspect was assigned to one of three broad categories
 - good
 - adequate
 - unsatisfactory

PROVISION OF RESEARCH-BASED TRAINING

Overall rating: Good

6. The panel noted that the John Innes Centre was widely recognised as one of the leading research organisations for plant and microbial sciences. At the time of the visit there were approximately 50 faculty members (project leaders) at JIC. This critical mass in terms of scientific expertise was complemented by excellent infrastructure and access to key platform technologies, creating conditions for a high-quality multidisciplinary research and training environment for students and fellows. In particular, the postdoctoral fellows that the panel met cited the high international reputation of JIC as the principal reason for their choice of JIC as the host organisation for their fellowship. The Centre's commitment to high quality doctoral and postdoctoral research training was also clearly signalled in its Mission Statement.

7. It was reported by JIC senior management that JIC was closely associated with the University of East Anglia (UEA), where most of the large student community (80-90) at the institute were registered. It was reported that JIC and UEA were part of the Norwich Research Park (NRP), which also included the Institute of Food Research and the Sainsbury Laboratory. A single Graduate Studies Office (situated at JIC) served the NRP students. The UEA Code of Practice on research degrees was integrated into JIC student policy. UEA ran a number of training courses that JIC students attended. Students at JIC had access to the range of facilities, both academic and social, at UEA.

8. JIC had its own Graduate Studies Committee (GSC), which was a University Committee to which key academic responsibilities had been devolved to the institute. The chair of the JIC GSC also sat on the equivalent committee at UEA. Student issues were raised by the presence on the GSC of student representatives nominated by the Student Voice Committee, a committee representing all students at JIC. It was noted with approval that this was

proving to be an effective route for the students to express a communal voice on key issues. Students highlighted improvements in computing facilities in the library, improved security lighting between JIC and UEA and changes to the statistical training course as examples of positive changes arising from their involvement in the GSC.

9. JIC offered three types of PhD programme, two of which had a duration of four years, including an oversubscribed four-year rotational programme, now in its second year, where students spent a period in at least three different labs in their first year. The higher stipend of the rotational studentship and the opportunity for students to benefit from a wider range of experimental approaches and research environments was proving to be an attractive proposition for students. In the year of the visit there had been over 80 applicants for the seven places available. Four-year PhD programmes were now regarded as the norm at JIC, with three-year “fast track” programmes only being offered when the student had considerable previous research training or experience.
10. Although the flagship rotational PhD programme was indirectly assisting in recruiting students to other programmes on offer at JIC, recruitment to some placements was still proving to be problematic, particularly where these were restricted to UK applicants. The panel felt that JIC would benefit from greater effort to raise awareness of the institute amongst UK final year science undergraduates as a place for postgraduate research training, matching or exceeding in quality the best UK universities. This might for example include the development of new promotional material and targeted visits/seminars by JIC staff. A cost-effective way of raising the profile of JIC amongst the UEA student community, and as a consequence improving recruitment of the best UEA graduates, would be to offer a limited number of attractive third year undergraduate research project placements each year.
11. Students and postdoctoral fellows were obviously motivated by the excellent research environment at JIC. All were clearly well integrated into and contributing to their own departments and the Centre, with, for example, most students reporting involvement in numerous seminars. Procedures in place for the supervision, monitoring and assessment of students appeared to be working well. The Supervisory Committee appointed for each student included, in addition to the main supervisor, an adviser who could provide a detached view both of student progress and, if necessary, of supervisor performance. All new supervisors, which included some postdoctoral fellows, were assigned a mentor as co-supervisor and training courses run by UEA were available, although these were only mandatory for new supervisors. The Graduate Studies Committee would not support the proposed appointment of a supervisor if they believe that the Code of Practice would not be followed, or where there was evidence of poor supervision in the past.
12. JIC’s comprehensive training catalogue listed an impressive selection of optional, discipline-specific courses and the panel commended the institute for providing such a document. The panel examined a sample of student progress reports. These provided good records of training with evidence of the

supervisor's role in the process. Training needs assessment appeared to rely heavily on student self-assessment. The panel welcomed new proposals to introduce a Personal Development Plan (PDP) for students and fellows. This would set out the requirements for continued progression. For fellows this included a checklist of key targets (e.g. grant applications; papers) to prepare them for their first permanent position. However the panel felt that careful consideration should be given to the current proposal that this should be a private reflective document, intended to encourage the take-up of appropriate training options by the individual. It was felt that the PDP could be used advantageously in a formal way to monitor the training undertaken and to provide a basis for discussion between the student and the supervisory team about individual training needs. Although the panel accepted that the selection and take up of courses had ultimately to be driven by students/postdoctoral fellows themselves, some element of formalised structure to the research-based training courses taken would promote interdisciplinarity and help ensure that acceptable levels in key research skills were consistently developed.

PROVISION OF GENERIC NON RESEARCH-BASED TRAINING

Overall Rating: Adequate

13. The Transitions programme, run by the UEA, set out a comprehensive programme of generic professional skills for postgraduate students. The chair of the JIC GSC had contributed to the development of this UEA programme through his participation in the UEA committee set up to oversee its development. Aspects of this training were also available to postdoctoral fellows. Parts of this programme, such as induction training, were mandatory, but the panel was concerned that it was not clear what subsequent training a student would undertake with no formal structures to guide students along the best path to develop their skills. Whilst it is accepted that the Transitions programme was still in development, there was, in the opinion of the panel, an unsatisfactory level of confusion about what was expected of the students. The training programme needed to reflect generic skills in a more structured way, integrated into more formalised multi-disciplinary research training.
14. Feedback from students suggested that the generic skills training provided by UEA was not sufficiently aligned to JIC student requirements. The panel felt that JIC should explore more closely student requirements for this type of training and either consider alternative options for provision of such training or apply pressure as a major user of the UEA generic skills training programme to press for improvements in existing provision from UEA or both. It was reported that statistical training, which had previously been provided by UEA, was now provided by JIC, following complaints from students. The panel felt that numbers of students at JIC were sufficient to consider development of similar in-house training provision in other areas, if what was provided by UEA did not meet JIC's requirements.
15. Laboratory demonstrating opportunities at UEA appeared to be communicated to students in an ad hoc manner that disadvantaged JIC students, and further

consideration should be given to ensuring that such opportunities were open to all students.

16. Some aspects of generic training were coordinated with the Institute of Food Research (IFR). The panel, whilst recognising the need for JIC to maintain ownership of its training programme, felt that more should be done to coordinate further aspects of both generic and research-based training with IFR.
17. The panel commended the Centre for hosting a careers symposium at which non-academic career options were explored by inviting ex-students to JIC. There was also strong positive feedback about the quality of careers advice provided by the Careers Centre at UEA. JIC students were clearly also active participants in the BBSRC Biotechnology YES competition, which in the year of the visit included three teams from JIC including a joint entry with IFR. The alumni database held by JIC, would help in tracking careers of former students and fellows and in consequence lead to improvements in the quality of careers guidance for future students.
18. Students who had attended a UK GRAD School national course recommended it to others; however, the panel was disappointed by the poor overall attendance with less than a quarter of BBSRC-funded students participating. The panel recognised the significant time commitment of attending such residential courses, but felt that a more formalised approach to the student training programme should be used to encourage increased attendance. The move to four-year PhD programmes as standard should also serve to facilitate attendance by students.

THE QUALITY OF THE TRAINING ENVIRONMENT

Overall Rating: Good

19. Students and fellows had access to designated laboratory and office space. Access to computing facilities was good with additional quiet working areas in the well-equipped library.
20. Students and fellows reported no problems with access to equipment or consumables. Students and fellows benefited from access to a range of facilities at JIC not frequently found together in a university, including extensive controlled environment facilities and field plots, statistical support through the Computational Biology department, and key platform technologies in the JIC Genome Laboratory.

GENERAL COMMENTS

21. The quality of the research training and environment provided at JIC for both students and postdoctoral fellows was of the highest standard. The

comprehensive research training on offer enabled the development of multidisciplinary research skills and this, together with the academically stimulating environment and the well-resourced laboratories at JIC, was clearly contributing significantly to the training of the next generation of plant and microbial scientists.

22. JIC had made a serious effort to provide generic skills training, through the development of UEA-based courses. Whilst it was recognised that such courses remained in development, it was clear that in the form seen by the panel they were not meeting student requirements. JIC was in a strong position to drive changes in current provision or to develop alternative in-house training.
23. The panel strongly recommended that all training at JIC should be more formalised. There should be less reliance on self-assessment of training needs, and more mandatory elements of both generic and research training, combined with incentives to ensure compliance. Although the panel accepted that ultimately the student must be self-motivated, formalised structures, with an increased element of mandatory training, would ensure required standards were maintained and transparent. The new Personal Development Plan should be used to stimulate discussion about training requirements between students and postdoctoral fellows and their supervisors/mentors and provide a mechanism for a training audit.

SUMMARY OF RECOMMENDATIONS

Recommendation 1

The panel felt that JIC would benefit from greater effort to raise awareness of the institute amongst UK final year science undergraduates as a place for postgraduate research training matching or exceeding in quality the best UK universities. This might for example include the development of new promotional material and targeted visits/seminars by JIC staff. A cost-effective way of raising the profile of JIC amongst the UEA student community, and as a consequence improving recruitment of the best UEA graduates, would be to offer a limited number of attractive third year undergraduate research project placements each year.

Recommendation 2

The panel welcomed new proposals to introduce a Personal Development Plan (PDP) for students and fellows. This would set out the requirements for continued progression. For fellows this included a checklist of key targets (e.g. grant applications; papers) to prepare them for their first permanent position. However the panel felt that careful consideration should be given to the proposal that this should be a private reflective document, intended to encourage the take-up of appropriate training options by the individual. It was felt that the PDP could be used advantageously in a formal way to monitor the training undertaken and to provide a basis for discussion between the student and the supervisory team about individual training needs. Although it was accepted by the panel that the selection and take-up of courses had ultimately to be driven by students/postdoctoral fellows themselves, some

element of formalised structure to the research-based training courses taken would promote interdisciplinarity and help ensure that acceptable levels in key research skills were consistently developed.

Recommendation 3

Whilst it was accepted that the Transitions programme was still in development, there was, in the opinion of the panel, an unsatisfactory level of confusion about what was expected of the students. The training programme needed to reflect generic skills in a more structured way, integrated into more formalised multi-disciplinary research training.

Recommendation 4

The panel felt that JIC should explore more closely, student requirements for generic skills training and either consider alternative options for provision of such training or apply pressure as a major user of the UEA generic skills training programme to press for improvements in existing provision from UEA or both. The panel felt that numbers of students at JIC were sufficient to consider development of more in-house training provision, if what was provided by UEA did not meet JIC's requirements.

Recommendation 5

Laboratory demonstrating opportunities at UEA appeared to be communicated to students in an ad hoc manner that disadvantaged JIC students, and further consideration should be given to ensuring that such opportunities were open to all students.

Recommendation 6

The panel, whilst recognising the need for JIC to maintain ownership of its training programme, felt that more should be done to coordinate further aspects of both generic and research-based training with IFR.

Recommendation 7

The panel was disappointed by the poor overall attendance at UK GRAD Schools. The panel recognised the significant time commitment of attending such residential courses, but felt that a more formalised approach to the student training programme should be used to encourage increased attendance. The move to four-year PhD programmes as standard should also serve to facilitate attendance by students.

The following documents were tabled at the meeting:

Personal Development Plan for Postgraduate and Postdoctoral Training
Postdoctoral Training Mentoring
Outline Programme for Certificate of Postdoctoral Training at JIC
BBSRC Postdoctoral Training and Career Development Scheme
Notes for JIC Student Induction Programme
UEA Code of Practice: Assuring the quality of research degrees
UEA Handbook for Research Students in Science Group

General Policy on Postgraduate Training at JIC/SL
Prospectus for Rotation Students PhD Programme
Policy on Supervisors and Examiners
Training for Research Students
Monitoring Student Progress
Marie Curie Programmes
Full List of Policy Documents from Graduate Studies Committee
UEA Statement on University-Institute Relations
UEA Training Catalogue for Students in Schools of Faculty of Science and the
Institutes of the Norwich Research Park

