



NUI MAYNOOTH

Bliacail na hÉireann Mhí Nuad

**Quality Review of the
National Centre for Geocomputation
April 2009**

Peer Review Report

Peer Review Group

**External reviewer: Professor Michael Batty, Centre for Advanced
Spatial Analysis, University College London**

**Internal reviewer: Professor Ray O'Neill, Vice President for
Research, NUIM**

Preamble

The external assessor Professor Michael Batty of UCL visited the university and undertook this Quality Review on April 30th and May 1st 2009. The programme was laid out by the Quality Review Office and consisted of the following:

30th April 2009 Meetings and Presentations

1-00pm	Outline of the Review with Richard Watson & Marguerite Lohan
1-45pm	Peer Group Review with Ray O'Neill, internal assessor
2-30pm	Meeting with Bernard Mahon, Dean of Science
3-00pm	Meeting with Registrar, David Redmond
3-45pm	Meeting with Stewart Fotheringham, Director NCG
4-00pm	Meeting with PhD Students
4-45pm	Meeting with PostDoc Researchers
5-30pm	Meeting with IT technical Staff
7-00pm Dinner	Dinner

1st May 2009

9-30am	Meeting with entire NCG Staff; presentation of the StratAG project by the Director
10-15am	Meeting with Administrative Staff
10-45am	Meeting with Research Assistants
11-00am	Meeting with Director
11-30am	Meeting with Core Academic Staff
noon	Preparation of 'First Impressions' report
12-45pm	Lunch
2-00pm	Peer Group Review with Ray O'Neill, internal assessor
2-30pm	Exit presentation of First Impressions report
4-00pm	Conclusion and Departure

Prior to the visit, the assessors were informed by copies of the

- Guidelines for the Review Exercise
- Guidelines for External Assessors of Academic Departments, and
- A Departmental Self Assessment Report prepared by the Director of NCG which included 15 appendices dealing with Personnel, Visiting Researchers, Grants, the 2005, 2006 and 2007 SFI Annual Reports, the SFI Mid Term Report, Equipment MSc in Geocomputation Outline, Publications, Conferences /Seminar Presentations, Conferences Hosted, Seminar Speakers, SFI STAR Awards, and GWR workshops.

Summary

The NCG has been in existence for almost 5 years. It was set up with a Science Foundation of Ireland (SFI) grant to Professor Stewart Fotheringham for a fixed term of 5 years to build a presence in geocomputation, GIS (geographical information systems) and spatial analysis (which collectively are sometimes referred to as GIScience) at NUI Maynooth. Originally the focus was closely aligned to that of NIRSA (National Institute for Regional and Spatial Analysis) but it quickly established its own focus. In the third year, the centre, under the auspices of the Director Professor Stewart Fotheringham, developed a bid for a Strategic Research Cluster (SRC) in Advanced Geotechnologies centred on NCG but involving other departments of the University and Departments at Trinity College, UCD, and Dublin Institute of Technology.

As part of the growth of NCG during this period, the University has guaranteed certain positions that now make up most but not all of the core staff, and has helped with infrastructure in terms of IT and buildings. This has been supplemented by judicious use of the SFI grants to leverage many new smaller grants and to bring a succession of visitors to NCG for short visits and for longer term sabbatical leave. There is little doubt that this has been extremely successful and the NCG has raised its profile to become, in its short life, one of the best known centres for geocomputation world-wide. There is little doubt that it has filled an enormous vacuum in Ireland and now has all the potential to consolidate this through reaching out from Maynooth to other groups. The success of the NCG is largely due, in our view, to the success that the initiators and the Director have had with SFI, the excellent links it has made to other university, commercial and government agencies, to the relatively light touch that the university has exercised in letting the NCG prosper and develop, to the fact that NCG is a semi-autonomous unit within the university and is not embedded in a single department, and to the use of SFI and other resources in bringing new people to Ireland to build capacity in these technologies.

In the future, there needs to be a degree of further consolidation, building on the four established core posts (Fotheringham, Charlton, Demsar, Rigby) along with the Stokes post held by Pozdnoukhov. At the same time, there needs to be a recognition by the NCG (which there is) that they cannot rest on their laurels and that new sources of external funding are always required and that, where possible, a contribution to salary costs for the core staff should be sought. The problems that the centre faces are those of success with the administrative staff under severe pressure. The ratio of such staff to total

personnel is low and monies should be sought to improve this. Plans for the immediate and medium term future appear to recognise these challenges, and the appointment of Dr Rigby to a 50% administrative role from May 2009 should ease this problem to some extent.

We will organise this report by first looking at a little more background to this review, noting specifically the other reviews that are and have been done in the last five years. We will then focus in turn on research quality, organisation of the centre, administration, style of research management and culture NCG's international profile, its teaching, courses and the disciplines it relates to, and we will conclude by examining questions of sustainability in the long term

Background and Related Reviews

Because NCG grew out of and to an extent is synonymous with SFI funding, it has been reviewed extensively during its first five years with annual reporting consistent with all such initiatives and a mid term report conducted in late 2006 which led to the highest accolade being awarded to NCG as 'outstanding'. The mid term review was extremely complimentary as to what had been accomplished but it did identify differences between the publication rates of different areas that NCG is pulling together, particularly with respect to the different culture of publications and dissemination between for example, 'geography' and 'computer science'. In some respects, the annual reporting and mid term review have drawn together much of the material that has been produced in the self assessment that the Director has completed, and it is very clear that developments from the mid term review in late 2006 to early 2009 have changed the critique of 2 years ago quite substantially. Since then the StratAG grant has been awarded by SFI and this makes the diversity of styles even wider. Moreover the internationalism that NCG has engendered is now much more evident than it was 2 or more years ago and it is against this background that this quality review will be set.

Accordingly, this particular review is a relatively 'light touch' because the various plaudits that have come to NCG are echoed of course in this evaluation, particularly since the external advisor knows NCG and its research portfolio quite well.

Research Quality

NCG looks out to distinct areas of the university that are dealing with geo spatial technologies and GIScience, specifically Geography (and NIRSA) which might be regarded as its 'home department'. This is now highly debatable for Computer Science is increasingly central, and other units such as Electrical Engineering and to a lesser extent Mathematics are beginning to play a part. Equally important are Computer Science groups in other

academic institutions in Greater Dublin and of course external government and commercial agencies which are collaborating with the research programme.

Publications which are the stock in trade of NCG are generally of high quality but diverse and the productivity becomes more uneven outside of the core staff of NCG. We suspect that interdisciplinary work also attracts less citations, normalised by numbers, in the field than mainstream disciplinary work and we think that in terms of the SFI research programme, that NCG should work on this to make sure the various component parts perform in terms of publications as well as in commercialisation, dissemination, and outreach more generally. One key issue is that the research has deepened into much more technical GIScience activities since NCG started and the centre is now being mandated to respond on a much wider remit of objectives. Publications to date are excellent but commercialisation is a clear goal that many of the new projects must relate to. Inter-disciplinary links which NCG has been good at cultivating, are central. Teaching in terms of the new MSc in Geocomputation is now firmly on the agenda and some of the core staff are now working hard with the Departments of Geography and Computer Science in teaching courses. This is a sign that consolidation is already taking place but with this comes less time for publication and other activities. Managing this increase in size, its consolidation, and the tensions imposed will be major issues in the next 5 years. NCG should not underestimate the pressures created by moves into more formal teaching.

One last issue is the disciplinary focus of the NCG which we have implied is between Computer Science and Geography. It is clearly somewhat difficult to link to other mainstream social sciences, such as urban planning, which are not represented within NUIM. However NCG has made good links outside as we will note later but in the next 5 years, these links need to be strengthened. We argue later that NCG represents a core focus for GIScience in Ireland and beyond and some of this focus might come from building a formal 'star' network out from NUIM to all other existing and potential centres in Ireland.

Organisation of the Centre

One of the strengths of the centre is its separateness from a department. This has the advantage of enabling it to stress interdisciplinarity, and to remain unencumbered with departmental bureaucracies. The down side is that it sometimes makes the unit look aloof and as in all new developments, there is tension and a fine line between separateness and integration. Computer

Science and Geography tend to be its two core departments but the focus now on geotechnologies pushes NCG strongly towards engineering. This appears to be working well but it is harder to make links to the social sciences given the current focus. Arguably the centre should pay more attention to the social sciences in the medium term without deflecting resources from its current mission and this probably means a quest for more resources.

There is a view that in modern universities, research centres are the proper way to do serious research and thus represent the cutting edge. This is the ethos, to an extent, in the NCG and its co-location with NIRSA clearly impresses this organisation as the appropriate way to resource research. The link to NIRSA appears very low key but nevertheless is synergistic in the best sense of the word. In our visit, the actual work of NIRSA and that of NCG did not appear to link or overlap very much for NIRSA is not strongly technological in the way of NCG. There is the obvious sharing of resources and some mapping work in common and the arrangement appears to work well, especially in terms of sharing technical and administrative staff. It appears that this is an arrangement that will continue when the new building that is promised next year (2010) comes on stream. This would appear appropriate and sustainable.

There did not appear to be a top-down management structure for NCG although there is a large amount of such organisation associated with the SFI grant money – such as board for StratAG and other forums for bringing researchers together. The fact there is not a steering committee or management advisory board that meets on regular basis for NCG is probably a wholly good thing in that it is not clear that this is needed. It would be reasonable to use the StratAG management board to cover both StratAg and NCG given the very close identity between the two. Links to the rest of the university appear strong and the fact that the university is of modest size, means that the Director and his staff have direct links to the top, so to speak, and it is easy to make this work

The programme of work involves many academic meetings to the point that these tend to dominate the work of the administrative staff and they raise the profile of the centre enormously. The NCG has been exceptionally lucky in gaining monies to be able to do this for many, if not most, grant funding of the more conventional type would not allow this. It has raised profile and really positioned the centre in Ireland and in the world. In some sense, there are almost too many meetings but these are bound to settle down. In fact the vibrancy and diversity of the NCG depends on this and as long as they are able to handle the load, we consider this to be a wholly good thing.

Lastly links outside NUIM to academic, government and industry have been cultivated and it is clear that the centre has made great progress here too. There is still the prospect of NCG becoming the keystone to a network across all Ireland – in de facto terms it already is – but it could become more so as it begins to consolidate in an era when large scale resources are bound to be less. This is another challenge for the future.

Style of Research Management and Culture

Management at all levels seems low key and thus effective. But this is not to say that it is hands-off; the productivity of the researchers is such that this cannot be the case. The fact that the group is centrally located and although links to other units on campus in terms of the research programmes do divide effort, the core effort is spatially integrated. The layout of space facilitates this with enough space for researchers to be private but plenty of open space in which researchers can talk with one another. In this sense, the feel to NCG is one of being fairly decentralised. This, it appears, will continue when the group moves to the new building in 2010.

The style of management is one in which productivity is encouraged on all dimensions, particularly publications and grant getting. Commercialisation is a current concern and the SFI grant is very focussed on generating a spin-off. This may require a slight change in culture and a different style once it starts but what it will require is some diversion of resources – administrative as well as management – to make it happen. It may be useful to recognise that various team members should not be expected to do all things across the range of activities; some will be academically and publication focused, while some may be more commercially focussed. The team should play according to its strengths. These are all pressures that need to be accommodated as NCG diversifies, consolidates and grows and there needs to be recognition at all levels of the tensions involved in changing the centre towards these new goals that need to be met in an environment which is quite different from the one in which the operation was spawned.

International Profile

There have been a remarkable number of visitors of many types during the short life of the centre. As noted above, the ability to finance this through the SFI grant has provided a great opportunity from the word go to generate a strong profile internationally and nationally. What is impressive is not only

the ability to finance visitors but also to attract visitors for their sabbatical years. This may be because the university and centre can offer resources like offices and access to good people but it must also be supported by a place that has buzz. Again without inquiring in too much detail, one imagines that the university does not throw obstacles in the way of visitors such as insisting on bench fees that happen in some universities. The regime, in short, is a liberal one that fosters good collegiality.

There has also been remarkable number of academic meetings, some financed by the research programme but several which have locked NCG into the world conference circuit in GIScience. Again this is a triumph of raising the profile of the centre. The recent meetings that are associated with the four steams of StratAG are like the initiative meetings organised though the NCGIA which was a consortium of three centres in the US in the late 1980s and 1990s which propelled GIScience to the forefront. The great thing about these meetings is the fact that they produce material for the research programme which is generated by outsiders and this strengthens the network internationally. These are very important mechanisms for sustaining the centre and the model has been so successful that it is important to continue it in a way that keeps the profile of NCG high without consuming more and more resources that divert the centre from its true research mission.

Other comparable ventures in other parts of the world divide into networks and centres and none of them are the same. Some centres such as CASA in UCL in the UK are more focussed on disciplinary or professional interests, in this case on urban applications in planning; others such as the NCGIA and its successor CSISS tend to be more focussed on the discipline of geography and on education. The GEOIDE network is more like the UKs Regional Research Laboratory in the 1980s and 190s but is focussed more on geomatics. CSIS at the University of Tokyo is not unlike NCG but it has a more explicit network role in Japan. There are more centres in fact which lie as nodes of networks and in Europe, the GISData network of the 1990s was an example that brought researchers from many countries together to share their research. In fact one can see features of all these centres and networks in NCG and no one is the same as any other. Much depends on the local context but it is clear that NCG has been able to position itself in a really effective way in Ireland and the world. The fact that it draws its staff from all over the world must be an important element in its success.

Teaching, Courses and Disciplines

The PhD programme is becoming established and there is considerable scope for this to grow. It is important to attract really good students internationally and probably the way forward here is to build this kind of capacity or supply from explicit research grant funding. This is in fact being done. It is an area that could grow quite a lot without imposing massive strain on the core researchers as the balance currently is very favourable towards research students in terms of supervision.

The MSc in Geocomputation which is about to be implemented and which will take its first students in September 2009 is an important initiative and this in time might provide a steady stream for the PhD programme. There also need to be links to the GIS programme in Geography with the possibility of some sharing of courses. In fact now that NCG is strong and independent, it can afford to develop links back to the departments – to its core in Geography and Computer Science as well as making links with other units on Campus, particularly in the social sciences if possible.

A key issue is that the resources already established combined with its reputation mean that other universities in the Dublin region could support NCG directly in terms of student provision as well as research. To an extent this is happening but there is no reason why the MSc in Geocomputation might not be wider than NUIM and certainly the PhD programme could be. These are difficult issues to broach as they tend to fracture institutional loyalties but NCG is amongst the best positioned of any such research centres to begin explore such possibilities due to the fact that it is the only focus in Ireland.

Finally we know little about the capability in remote sensing in Ireland although the focus of NCG is very strongly now in sensing technologies. Elsewhere in the world, remote sensing often goes hand in hand with GIS and there may well be an all-Ireland focus to be developed in this domain. NCG would be well placed to pursue this.

Sustainability in the Long Term

After a period of dramatic growth, establishing a more secure base through a period of consolidation is clearly the way forward. Many of the structural instruments to build a much bigger centre have been put in place and the reputation secured already makes this entirely feasible. Commercialisation is

an important short to medium term initiative to be developed for the SFI mandate but this should not overwhelm the wider mission of the centre. Pressures to publish are substantial and there needs to be control over this process to ensure that the diversity of the operation is appropriately reflected in the various outputs that the centre will continue to be judged by. It is worth listing a number of possible future directions which might be explored in the new economic environment that we are facing and to conclude we will list these. To maintain and extend its excellent reputation and its outstanding research programme in the next five years, the NCG should:

- Seek to secure a stronger administrative staff that can continue to support an expanding work programme and this must mean additional resources
- Build a network of GIScience in its widest sense in all Ireland as befits its role as the National Centre, and specifically consider how resources from other universities in the Dublin metro region might support such a network
- Extend the interuniversity interagency research initiatives such as the StratAG programme
- Explore major international funding such as that available through the EU and possibly world agencies
- Consider reflecting substantive themes of research in the research portfolio such as the spatial aspects of climate change, energy, etc.
- Continue the high profile meetings and perhaps reflect the organisation of administration of the centre with respect to these successful initiatives
- Focus on exploring the extent to which other geotechnologies such as remote sensing might become an explicit part of NCG in an all-Ireland context
- Build back links to departments through modest teaching that reflects the importance of GI technologies and their applications
- Convince departments to buy into NCG through associating new appointments with these technologies, that is to associate new academic staff in departments with NCG

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