

# **Aalto Science Institute**

## **Review by Scientific Advisory Board**

**September 2013**

### **Executive Summary**

- AScI is still in its launch phase; nonetheless the SAB was impressed by what had been achieved so far
- Depth is important as well as breadth in AScI's activities, and the School may wish to consider a model for appointing Fellows that targets a particular topic area each year so as to provide a cohort of Fellows who can collaborate more effectively over an extended period (3 years)
- Topics should reflect new developing areas that are not currently well represented in the School/University with a view to enabling Departments to attract top of the range staff in these areas
- The Visiting Scientists scheme (and perhaps the Visiting Professors scheme) should be targeted to Fellows' research interests
- Bringing the Departments into AScI is important both for departmental commitment to AScI and for the Fellows (who will benefit from mentoring and collaboration); allowing Departments to propose topics for a cohort's focus would be one way of facilitating this
- Inter-disciplinary collaboration can never be engineered – the best that can be done is to provide the environment that allows it to happen; allowing projects/topics to develop critical mass and enabling regular AScI seminars and other activities will play a key role
- AScI has the potential to be the glittering crown of Aalto's external presence; the School and the University will need to look to enhancing funding to make this possible

### **Introduction**

The Aalto Science Institute (AScI) was established by the Aalto University School of Science in 2012 to provide an inter-disciplinary forum for developing high calibre, international-level, blue skies research. Its mission is “to provide a forum for researchers from different fields of science, and at different career stages, to come together and collaborate on challenging problems at the forefront of science.” AScI is housed in its own accommodation in the University's Open Innovation House.

The Institute was officially launched in early 2012, but did not become formally active (in terms of having Junior Research Fellows in post) until September 2012. It did not move into its own dedicated accommodation until earlier this year.

ASci has an Executive Committee of Aalto Professors who are responsible for overseeing the running of the Institute, and a Scientific Advisory Board of five international members.

ASci runs six main programmes: Junior Research Fellowships, Visiting Professorships (on behalf of the School), a Visiting Scientist programme, incoming and outgoing undergraduate internship schemes (on behalf of the School), a Science Factory (workshop) scheme, and an exploratory project (small grants) scheme. The visiting professorship and intern schemes are funded directly from central funds, independently of the Institute core funding.

The Scientific Advisory Board (SAB) met at Aalto University on 19-20<sup>th</sup> September 2013 to review the activities of the Institute over its first year and a half. We met with the Executive Committee, the Institute administrator (Dr Minna Lind) and with the Junior Research Fellows.

### **Review**

The SAB was impressed both with the quality of the Junior Research Fellows and with the diversity of their projects. The SAB enthusiastically supports the aims and objectives of ASci, both in terms of its potential contribution to Aalto University but also in terms of the potential it has to become a Finnish national facility. The Institute is still very much in its launch phase (most of the fellows have been in residence for less than 6 months), and our comments reflect the fact that it is difficult at this stage to evaluate the success of most of the programmes. Nonetheless, it is clear that the Institute has achieved a lot in a relatively short period of time.

#### *Fellowship Scheme*

The Junior Research Fellowships form the core of ASci's activities, and will always be its central feature and its future. Seven Fellows have been appointed, with one withdrawing soon after starting to take up a prestigious post elsewhere (but still retaining an association with ASci for the time being). A further round of applications will be in process for 2014, with an expectation that a further 3 fellows will be appointed. At present, Fellows are appointed via an Open Call on the basis of the best candidates, irrespective of discipline.

The SAB was concerned about the modestly small number of Fellows relative to the diversity of disciplines they represent. An effective research institute needs depth as well as breadth: critical mass is important in generating intellectual excitement and interaction. With the current diversity of topics, it will not be easy for Fellows to collaborate with each other or develop an intellectual critical mass. If they are left to plough their own lonely furrows, the Fellows will achieve less and are more likely to be seduced away by job offers from elsewhere. It is important that ASci develops a reputation for being *the* place to come to, both nationally within Finland and internationally. For the same reasons, the SAB was also concerned about the level of mentoring for the Fellows. Not all young researchers need mentoring, but it is important that Fellows feel a sense of being part of the wider Aalto community and having support for discussion and advice within their own fields. We offer a

specific suggestion for an alternative approach that the School might wish to consider at the end of this Report.

The SAB had some concerns about research funding for Fellows' projects, since there seemed to be no budget allocation for expenses other than travel. Mathematical projects may require little in the way of project funding, but experimental projects may well need both kit and funding for running experiments. The Exploratory Projects scheme provides a possible mechanism for this (Fellows could apply for funds just as other staff do). Alternatively, each Fellow could be given a modest allocation for which he/she could bid for specific purposes.

The current Fellows seem to be mainly working in isolation. They should probably be encouraged to think in terms of building up their own small research groups. These might include their own research assistants and junior postdocs, but also graduate students. Since graduate students would need to be based in a Department for administrative reasons, this would help build links to individual Departments.

### *Visiting Professorships*

Since these are centrally funded and are only administered by AScI, we will not comment on this scheme in detail. However, the School may wish to consider aligning these with individual projects in AScI so as to increase the level of interaction between AScI and individual Departments.

### *Visiting Scientists*

This is a potentially valuable mechanism for the AScI Fellows to enlarge their international collaborations while at the same time gaining useful input into their own projects. The scheme is currently run as a service to Departments, and hitherto most of the visitors seem to have been based in their host departments. The SAB feels that this scheme in particular should be more directly focussed on the projects in AScI. While visitors should also be seen as a potential bridge to the Departments, our view is that they should largely come from recommendations made by the Fellows as a mechanism for attracting in mid-career or senior scientists who could help Fellows with their projects. Visiting scientists should be provided with accommodation in the AScI premises and encouraged to see this as their natural base, even if they are also collaborating with departmental staff.

The SAB noted that NSF-supported institutes in the USA use this mechanism to provide on-going collaboration with institute members. Thus, part of the visiting scientists scheme could be used to fund regular visits (a few weeks each year for several years) for key external collaborators on Fellows' projects as a form of 'rolling workshop'. Fellows could bid for 'rolling workshop' funds so as to target specific senior scientists from abroad who would be especially helpful to their projects. (Invitations to former graduate supervisors should probably be discouraged, as Fellows actively need to widen their scientific networks rather than merely do 'more of the same'.)

### *Internships*

These, again, are centrally funded, and outside the remit of this review. However, the SAB was of the view that this scheme could be extended to include graduate (in particular, PhD) students so as to allow students from abroad working on topics related to AScI Fellows' research to come and spend a period of time (one semester, or even a whole year) working at the Institute. These interns should come during semesters rather than the summer in order to take part in the Institute's activities. This would be very valuable experience for the incoming interns, as well as making a valuable contribution to the Fellows' projects.

### *Science Factories*

Three of these workshops have been held so far. In future, they should be held in the AScI premises if possible (both to reduce costs and to encourage attendance by Fellows and other Aalto-based staff). Fellows should be encouraged to propose topics and see these as a valuable basis for bringing in outside expertise. This instrument would also provide a mechanism for funding 'rolling workshops' (see above) consisting of a group of participating visitors.

### *Other Issues*

The success of AScI will ultimately depend on how well it becomes embedded in the wider Aalto academic community. Developing a reputation as being the place to go for intellectual stimulation should be a key objective for the Institute in the years ahead. One well tried way of doing this is to provide a regular seminar series with invited speakers from outside the University (i.e. national and international speakers), preferably associated with some kind of social event at which students and staff can engage with the speaker and develop contacts. We understand that a fortnightly seminar series will be launched in the coming academic year, and we welcome this as an important development. Funding should be allocated for this in the budget. The Fellows should be responsible for organising and hosting such events.

It is important that individual departments within the School of Science have a sense of ownership of the Institute (i.e. that they feel they have some role to play in it, rather than merely paying for it). The SAB notes that some Fellows have already developed collaborations with staff in other Aalto University units. Collaborations of this kind should be encouraged, since they provide a potentially important mechanism for embedding the Institute into the Departments. *However*, it is vitally important that the Fellows and AScI remain independent of the Departments so as to be able to develop novel research programmes independent of departmental interests and politics.

### *Budget*

The SAB considered the budget adequate for present needs. However, if the AScI is to achieve its potential, the University and School needs to accept that the budget will have to increase with time. The Visiting Professorship and/or Visiting Scientists schemes could be

increased to allow some special rolling appointments associated with AScI Fellows' projects (see above). This will clearly be a challenge, but we urge the School and University to view AScI as a worthwhile venture that has the potential to become a national and even international facility that will rank with many of the best Institutes of Advanced Study in Europe and the USA.

One potential source of funding would obviously be to extend AScI's remit to include other Schools within Aalto University. It will be for the various Deans and the senior University administrators to negotiate this, but they will probably wish to wait until AScI has had time to bed in and develop a successful presence before widening its scope. Nothing is better than success in persuading others to join in on a venture. So making AScI the glittering crown of the University is essential both for its own success and for persuading other Schools to want to join in.

External funding from national and international granting agencies is also a potentially important way of enhancing a budget, and Fellows should be encouraged to apply for funding of this kind to help build their individual research groups and fund their individual projects. This is, however, less likely to contribute to core funding, and for this the University may need to seek support from private donors on the US model.

The SAB were of the opinion that the University should encourage contacts between AScI and industry, both to enhance the quality of projects (research groups in industry are often working on topics of academic interest) and their economic impact, but also to attract external funding. However, it is vital that any such funding be on a 'no strings attached' basis. A blue skies research institute can only achieve its full potential to develop novel ideas and discoveries if it is free to choose its own research agenda.

#### *Appointment of AScI Fellows: a suggestion*

The SAB has some serious concerns about the disciplinary spread of the current Fellows under the current selection process and the risk that there may not be sufficient critical mass to generate top flight, innovative research. The School may wish to consider alternative models for appointing Fellows.

One model would be to choose a core topic area for each year, allowing three fellows to form a collaborative group that works together for three years. Topics could be selected by the Executive Committee from proposals submitted by the staff in the School's departments, who would be invited to make submissions each year (and perhaps be involved in the interview process). Submissions should identify upcoming novel fields/problems or topic areas not currently well represented in the School/University so as to allow investment in the development of new fields. It is important that such projects are novel and maintain a turnover of topics over time – and do not merely provide extra researchers for existing projects within departments. External review of proposals might be encouraged.

This would have the merit of creating some kind of critical mass for each year cohort, built around a particular project. This critical mass would be enhanced by giving the Fellows

concerned the responsibility for creating ‘rolling workshops’ of one or more Visiting Professors and/or Visiting Scientists, plus incoming graduate interns/visitors.

Giving departments (or individual staff within departments) direct involvement in the AScI projects through allowing them to nominate projects will also naturally enable mentoring for the Fellows as well as active collaborations, thereby enhancing Fellows’ sense of being members of the wider Aalto community. This may also help promote novel research directions for the departmental staff involved. The Fellowship scheme should be seen as a natural vehicle for enhancing the future professoriate in the School, as well as a vehicle for developing novel up-coming areas that are currently not well represented in the University.

2<sup>nd</sup> October 2013

*Scientific Advisory Board*

Professor R.I.M. Dunbar, Oxford University (Panel Chair)

Professor Lance Fortnow, Georgia Institute of Technology, USA

Professor Ilkka Hanski, University of Helsinki

Professor Ari Laptev, Imperial College London and Institut Mittag- Leffler