AusBiotech
BIOINFORMATICS AUSTRALIA
AUSTRALIA'S BIOTECHNOLOGY ORGANISATION

THE EXECUTIVE SUMMARY TO THE FINAL REPORT OF THE AUSTRALIAN BIOINFORMATICS NETWORK PROJECT

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Bioinformatics has been named as an area of emerging sciences where Australia has strength and that are important to Australia in the Australia's Science and Technology Priorities for Global Engagement, by the PMSEIC working group. It has been considered an important enabling technology to discoveries in life- and medical-sciences, such as the various genome projects, identification of genes pertaining to diseases and prediction of protein structures and functions.

Bioinformatics activities started in Australia in early to mid nineties. Relative to the counterparts in places such as Europe and the USA, the community is relatively young, small and fragmented. The National Bioinformatics Strategy recognised this situation and potential of Australia's role in international bioinformatics arena, and recommended that efforts of coordination be made, in the form of the establishment of the Australian Bioinformatics Network, encompassing six key areas: Infrastructure, Research and Development, Education and Training, Commercialisation, Data Management and Coordination.

This document reports the conclusion of the Australian Bioinformatics Network project, which is the beginning of the development of the Australian bioinformatics community. In the duration of this project, the community has been consulted. The following are the findings resulting from the discussions amongst the community.

Key Findings

1. The greatest need in infrastructure is in human infrastructure, namingly skilled people who are able to understand the life- or medical-science questions, take the available data and wield or develop tools to analyse them.
2. This need in human infrastructure is expected to rise with the drop of the cost of generating data, hence the increase of data size.
3. The capacity of hard-infrastructure facilities are not exhausted. In some cases, they are in fact under-utilised by the bioinformatics community, possibly because many members of the community are not sufficiently skilled to take advantage of high-performance computing capabilities.
4. High-performance computing facilities used by the bioinformatics community are typically staffed by skilled support personnel.

Recommendation 1
Each hard infrastructure provider dedicated to support the bioinformatics community must be equipped with expert/trained support staff and develop strategies of optimal utilisation.

Recommendation 2
Each institution whose activities include management and analysis of large sizes of biological data should have in-house informatics support staff.

5. Key-stakeholders of the research community expressed that the success rate of funding for bioinformatics research is poor, particularly for the groups embedded within medical research institutes, rendering them largely dependent on NH & MRC as a funding source.
6. Key-stakeholders of the research community expressed that the allowance for informatics support in life-science/medical-science research is not sufficient. In many cases, only a fraction of the proposed amount is granted and bioinformatics support to that piece of research is often the component which suffers, which opens possibilties of inaccurate or inappropriate data-handling or –analysis.

Recommendation 3
A review should be conducted of the level of activities in bioinformatics research, as well as use or need of bioinformatics, in medical research, in comparison to the level of funding.

7. The bioinformatics community is by-and-large academic and research.
8. Career structure in bioinformatics in unclear and recruitment level has historically been relatively low, evidenced by the small numbers of job advertisement and exit of bioinformaticians to other work sectors. A sharp rise in vacancies in late 2007 suggests a beginning of bioinformatics uptake in related areas.

Recommendation 4
Efforts should be made in provision of intermediary services, to survey the health and biotechnology industries of their possible needs of bioinformatics and explore how bioinformatics can improve their performance, and to leverage the observed uptake of bioinformatics in bioscience research.

Recommendation 5.
Internship programmes should be explored, for placements of bioinformatics students in industries enabled by bioinformatics. This is expected to create the demand in employment as well as enriching the learning experience and broadening the students' professional networks.

9. There is a need in professional development courses in bioinformatics skills for life- or medical-scientists.
10. ANGIS (now Sydney Bioinformatics) seems to be the only successful organisation in the provision of bioinformatics training courses. Its capacity has not been able to meet the demand in professional development in bioinformatics skills.

Recommendation 6
The role of ANGIS as a provider of professional development in bioinformatics skills should be further explored, including the possibility of expanding its operation to meet the demand.

11. Dedicated undergraduate degree-course in bioinformatics is not enouraged, given the low employment uptake in bioinformatics.
12. Master degree qualitification is much preferred, with a bachelor degree in one of the core-disciplines. A good master degree course should be tailored to the student's background.

Recommendation 7
Bioinformatics should be offered at the undergraduate level as a stream of one of the core disciplines. Such a course should offer all the abovenamed components (IT, statistics and life-sciences) with a flexibility to vary its proportion within the course, with a component which involves teamwork (such as a group-project).

At the master degree level, bioinformatics courses should be further customised to the background of the students.

13. There is currently only a low level of engagement between the mostly academic bioinformatics community and the commercial sector.
14. Industry related to bioinformatics in Australia (biotechnology and ICT) are typically small-to-medium enterprises (SME). The available incentive for interaction (such as ARC linkage grants) are more feasible to very large companies and are not attractive to industry of this size.
15. There is a strong open-source culture in the bioinformatics community, that poses as a hurdle to commercialisation.
16. Freely available bioinfomatics tools are not always easy to use. Commercial packages with embedded work-flows and pipelines are prohibitively expensive. There may be a market in small commercial packages for small-scale needs.

Recommendation 8
More potential and opportunities for the research community to engage with the private sector should be explored. For example:
(a) funding should become available in the form of seed-funding to develop a product required or developed by the bioinformatics community,
(b) collaboration should be encouraged between the tool-developing research community and commercial organisations to develop more custom software, with smaller number of components and which would cost less than the currently available commercial products.

Business models should be developed with consideration of the open-source culture of the research community, e.g., in packaging free software to render them easier to use.

17. Data management issues are of concern to health-care research, where bioinformatics may play a part therein, for example, in genetic epidemiology.

Recommendation 9
Efforts should be coordinated in education of medical (and life-science) researchers on the existing data standards and the importance of adhering to these standards. The education efforts should be done in conjuction with organisations currently pursuing these endeavours, such as the Western Australian Institute of Medical Research.

18. The Australian bioinformatics community has enjoyed and profited from opportunities to meet and conduct discussions, of scientific and community-building issues. Two Bioinformatics Australia conferences held in conjunction with AusBiotech 2006 and 2007, have been very well received. The community strongly indicated the desire for an ongoing annual conference.
19. Australian bioinformatics profile has been noticed and acknowledged in the region (Asia and New Zealand). There is clear potential to play an active part in the Asia-Pacific region.

Recommendation 10
The potential for Australia's leading role in the Asia-Pacific bioinformatics arena should be further explored. This would include:
(a) continuation of the annual bioinformatics conferences, encouraging the participation of other countries.
(b) taking the opportunities to host international conferences, such as the proposed Genome Informatics Workshop 2008.

Proposals

The efforts in the Australian Bioinformatics Network project constitutes the beginnings of the establishment of the bioinformatics community. There clearly are ongoing and new activities to be followed, the need of which was identified in during of the project.

The young Australian bioinformatics community is starting to show its potential in the world arena. The recommendations following the findings should be considered, to further foster and nurture this community to its maturity.

BIOINFORMATICS AUSTRALIA COMMITTEE

Bioinformatics Australia Management Committee, term 2007-2008 at the face-to-face committee meeting in August 2007. L-R: Dr Anna Lavelle (AusBiotech CEO), Prof Shoba Ranganathan, Dr Bruno Gaëta, Dr Tim Littlejohn (president), Dr Rohan Teasdale, Dr Annette McGrath, Prof Mark Ragan (vice-president), A/Prof Phoebe Chen, Dr Lucia Santoso (ABN EO), Dr Michael Poidinger. Not present: Dr Catherine Abbott.

Bioinformatics Australia inaugural Management Committee, at the face-to-face meeting in August 2006. L-R: Dr Catherine Abbott (vice-president), Dr Dominique Gorse, Dr Anna Lavelle (AusBiotech CEO), Dr Mark Crowe, A/Prof Phoebe Chen, Dr Rohan Teasdale, Dr Jonathan Arthur (president), Dr Bruno Gaëta.