



The 4th AIST Advisory Board meeting

The AIST Advisory Board consists of leading domestic and overseas experts in various fields. At every meeting, members of the Advisory Board comprehensively examine various aspects of AIST's operations, including overall research activities, methods of resource allocation and evaluation of systems, and consider the future direction of AIST from an external viewpoint, with an eye to offering advice to AIST. A total of three meetings were held over a four-year period during the first term. For the second term, biannual meetings are scheduled for the first, third and fifth year. The first meeting of the second term, the 4th Advisory Board Meeting, was held on 6 and 7 February 2006, at the AIST Tsukuba Headquarters.

The agenda of the 4th meeting was the “second term strategy for AIST as an innovation engine”. The discussions focused on the President's presentation, entitled “Vision for AIST's Second Mid-term Period”, and on the presentation given by Masanori Yoshikai, Director of Planning Headquarters, entitled “Establishing the innovation Hub at AIST”. The Advisory Board members and AIST executives held active discussions about the Innovation hub strategy, and other issues. They divided into three groups to visit laboratories and exchange opinions with researchers. The following text provides an outline of the meeting and the main comments from each member of the Advisory Board.

Table 1 List of AIST Advisory Board Members

Masuo Aizawa (Chaired)	President, Tokyo Institute of Technology
Wataru Aso	Governor, Fukuoka Prefecture
Takeshi Isayama	Vice Chairman, Nissan Motor Co., Ltd.
Hiroshi Komiyama	President, The University of Tokyo
Tomoko M. Nakanishi	Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo
Tomoyo Nonaka	Chairman, SANYO Electric Co., Ltd.
Isao Uchigasaki	Chairman of the Board, Hitachi Chemical Co., Ltd.
Katsuhiko Utada	Senior Corporate Adviser, Ajinomoto Co., Inc.
Lord Broers	President, Royal Academy of Engineering, UK
Hans-Jörg Bullinger	President, Fraunhofer-Gesellschaft, Germany
Geoff Garrett	Chief Executive, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia
Binglin Gu	President, Tsinghua University, China
Richard K. Lester	Professor, Nuclear Science and Engineering, Massachusetts Institute of Technology (MIT) and Founding Director, MIT Industrial Performance Center, USA
Sakarindr Bhumiratana	President, National Science and Technology Development Agency (NSTDA), Thailand
Hratch G. Semerjian	Deputy Director, National Institute of Standards and Technology (NIST), USA

Structure of Advisory Board Meeting

AIST reshuffled the Advisory Board as it entered the second term. For the 4th Advisory Board meeting, a total of fifteen people were selected as members; eight were from universities, industry and local governments in Japan, the others were from universities and public research organizations outside Japan (Table 1). The meeting took one and a half days and followed the program as shown in Table 2. In the morning of the first day, AIST President Hiroyuki Yoshikawa made a presentation entitled “Vision for AIST's Second Mid-term Period ” to give an outline of AIST, focusing particularly on the way research activities should be conducted in the second term, which was followed by a question and answer session. In the afternoon, members visited laboratories implementing an “innovation hub strategy”. These strategies include collaboration between industry and academia, human resource development and venture creation. The laboratory tours were followed by a presentation by Masanori Yoshikai, Director of Planning Headquarters, entitled “Establishing the

Table2 Schedule

Feb 06 (Mon)

Opening / Welcome address (H. Yoshikawa, President, AIST)
Introducing AIST Advisory Board Members
“Vision for AIST's Second Mid-term Period” (H. Yoshikawa, President, AIST)
Exchanging views with President
Lunch
Laboratory Tour: Meeting with AIST research scientists
“Establishing the Innovation Hub at AIST” (M. Yoshikai, Vice President, AIST)
Discussion on “AIST Innovation Hub Strategy”
General discussion
Banquet

Feb 07 (Tue)

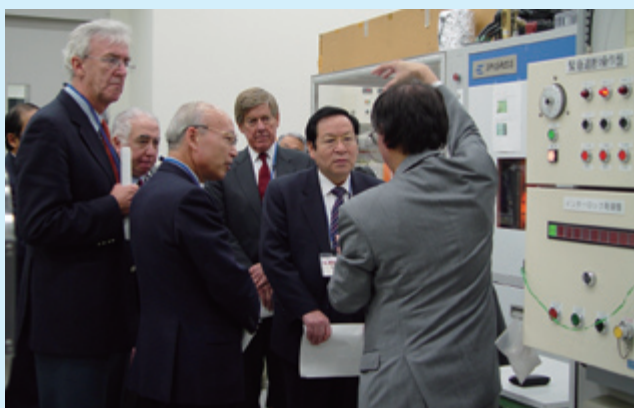
Discussion with AIST executives based on day-old discussion
Summary discussion for wrap-up
Adjourned / Luncheon

Innovation Hub at AIST”; this set out the innovation hub strategy AIST should implement in the second term. On the second day of the meeting, the Advisory Board members and AIST executives engaged in active discussions on various issues surrounding the operation of AIST, including research management, collaboration between industry and

academia, intellectual property, human resource development, safety management, security management and public relations. At the end of the meeting, each member was asked to give a comment and advice on future AIST research activities and operations.

Laboratory Tours by Advisory Board Members in Three Groups

As an innovation hub, AIST uses various systems to promote transfer of research outputs. Members of the Advisory Board were invited to inspect the conditions of various laboratories and to exchange opinions with researchers. The laboratories and research programs that were inspected included Power Electronics Research Center and its joint research program focusing on SiC semiconductor research; Institute for Human Science and Biomedical Engineering and its research program on surgical-assist



technology, jointly conducted by a U.S. medical institution; Advanced Manufacturing Research Institute and its innovative ceramics compaction technology that uses nano-fracture of fine particles at room temperature and is based on IP integration; Research Institute of Instrumentation Frontier and its research program on defect characterization using positron beams, a program promoted as an AIST consortium; Nanotechnology Research Institute and its human resource development program; and IQUANTUM, a high-tech startup company formed by Nanoelectronics Research Institute.

Members' Comments and Advice for AIST in the second term

Ms. Tomoyo Nonaka

I was very pleased to know that AIST has reached the stage where you have raised the question, "Is the direction of AIST's innovation and outcomes appropriate?" The question clearly reflects your vision for the future, which is to act in concert to move into the direction of sustainability. No other word can describe your vision for the future.

You introduced research units and shifted the focus of evaluation of research outcomes



to strengthen your competitiveness in the market and to change the awareness of researchers. By stressing the importance of autonomy of research, you sent a clear message: research institutes will not survive unless they produce research outcomes that are valued by the market. I think it's time that you considered how to contribute to the economy and society. I believe it's important to formulate and implement concrete measures to address the needs of the future.

A network of excellence, as well as sharing of information and research themes, and personnel exchanges with the industry, will be one of the pillars of Japan as a country that is built on intellectual property.

A methodology of intellectual property hasn't been firmly established in Japan. Therefore, I think it is very important for AIST to strengthen its intelligence and analytical capabilities. It is also important for AIST to promote financial literacy and recruit financial management experts in intellectual property management. You have to distinguish between public and private funds. That will help you adhere to the openness principle of public funds and the non-disclosure agreement concerning private funds. I expect that AIST will strive to accumulate the know-how required for establishing a completely new way of managing intellectual property.

Mr. Wataru Aso

AIST's seven regional centers are very important for local industries because they play a role in the world-class research efforts at AIST. Over a long period of time, regional centers have played an enormous role in giving guidance to local industries in research and development through technical guidance, commissioned research, joint research and seminars.

Regional centers conduct a very high level of research activities. Their research objectives and methods are closely linked to those adopted by AIST Headquarters, thereby providing much insight (stimulation)

to local research institutes and universities. I therefore hope that AIST will foster further development of its regional centers to establish them as a very important arm of AIST research activities. I also hope that regional centers will play a key role in the creation of industry clusters in their respective regions.

The kind of research activities conducted at AIST matter so much to local industries. I know that local industries need to learn more about various assistance measures such as the nanotechnology human resource development program and other human resource development programs, research and development projects, and assistance to

small and medium enterprises. I urge you to ensure that such assistance measures are communicated to all those in need of them.

Local research institutes often face the difficulty of pursuing a research theme, due to the lack of researchers with relevant expertise. There isn't sufficient mobility of human resources in Japan. Efficient mobility of human resources is indispensable to the stimulation of research activities in local regions. I sincerely hope that AIST will increase mobility of human resources, including researchers, in local regions.



Dr. Geoff Garrett



It is necessary to clearly position AIST in the national innovation system and define its respective advantages in regard to other research organizations in order to differentiate AIST, for example its focus on 'full research'. It is important to clarify and state AIST's uniqueness in particular areas and how it can make a special contribution.

Second, I would like to emphasize the importance of networking in the innovation process, and mobility in facilitating effective technology transfer. This personal networking, and good communication skills, is often more important than scientific papers in transmitting our science outcomes:

the roles that individuals play through this networking is very important in ensuring effective application of quality research.

Third, and relatedly, it is important to nurture leaders who can stimulate 'porosity', and move across fields of science and technology, for example those of the nano and the bio. As technologies increasingly converge, it is important to nurture a generation of individuals who can readily transcend traditional disciplinary boundaries, collaborate effectively and move beyond the framework of usual organization hierarchy.

Fourth, it is very important that we clearly understand what the measures of success are, that we communicate these and that we cascade these measures throughout the organization. It is also important to reflect on possible unintended consequences: for example, if externally generated funding is a particular measure, this might drive some

shorter – term focus than we might have intended. Therefore, we have to be very careful about how we measure performance in the context of the behaviours and outcomes we seek to achieve.

Finally, there are two meanings of the words "look out". The first is "danger, or beware". As this implies, we need to be vigilant around the increasingly competitive environment in which a publicly-funded research organization is operating, locally and internationally. Another meaning implies that our existence is only really justified by others, ie those outside our organization who are the effective recipients of our work and the difference our science makes in helping society advance. We have to watch an over-emphasis on matters internal, with our priority on our external contributions, commercially and socially.

Mr. Katsuhiro Utada

AIST is a large and complex organization and it is difficult for an outsider to understand what AIST does. AIST is departmentalized and there are more than ten research units specializing in biotechnology alone. From a standpoint of industry-academia collaboration, AIST needs to develop a community-based industry cluster. AIST's regional centers are important as they help to foster new industries.

As a research organization, AIST needs to have autonomy. I think that you need

to achieve harmony between individual researchers and the organization. That will be a big challenge for AIST. You also need to consider individual research programs carefully, or your leadership will be called into question. Corporate governance, information transmission and transparency (mutual information exchange with the outside world) are important for companies. The same is true in the case of AIST. I think that the ability of AIST's management to address the issue of "selection and concentration" is in question.

Your ability to respond to various issues

such as compliance and personal information, in addition to antisocial problems such as unethical activities, is also in question. President Yoshikawa said, "A director of a unit must be a philosopher". That is a sublime idea. I know that it's not easy to realize that idea, but I strongly hope that you will strive to realize that.



Dr. Hratch G. Semerjian

I think the strength of AIST has been its emphasis on interactions with business and industry. I advise you to make these interactions even more efficient. If the industry speaks up for AIST and communicates the positive impacts of your work on industry and society, you will

secure the understanding of the public and help them to recognize the importance of your work.

I understand that autonomous research is encouraged in the context of the strategic plan. However, most of the cutting-edge research is in fact happening in the interdisciplinary research areas, for example between nano and bio. I feel that you

should step up efforts to coordinate research activities conducted at the 54 organizations (which have different research objectives), particularly those in the interface area.



Prof. Hiroshi Komiyama



Subsidy reductions at the rate of 1.5% per annum and the employment of aging staff provide an important perspective on formulating advice

regarding the issue of "how to evaluate what is an appropriate for AIST". There is a larger proportion of administrative staff to researchers in research settings, including universities. Although there have been discussions at this meeting as to how elderly

researchers can improve their careers, I believe it's more important to consider how to develop younger researchers.

In the meantime, it is important to collaborate with society in order to justify the work conducted by 2,500 researchers. To increase the impact of collaboration with society, AIST needs human resources that can play the role of catalyst. It means that AIST needs to secure funds and use these funds efficiently. It is therefore necessary to promote efficiency of funds procurement and to increase the amount of external funds and donations that you currently receive.

What matters most is not the appropriate

size of AIST, but how capable AIST is. I don't think that universities and research institutes should reduce the number of researchers they have. In an extreme case, it could mean that it's best to stop doing research. The number of researchers reflects the amount of research work that the organization can do. In that sense, I believe that AIST should maximize the number of researchers as far as possible.

Prof. Sakarindr Bhumiratana

I think that you might be able to do a little more innovation in terms of linkage with the private sector.

As for mobility, it seems that you have no problem bringing in visitors into AIST. I think that the number of people who are going out is a little small. I would like to know how you manage human resources to keep them full of vigor and keep them happy to produce results. I would also like to know

how you manage young people who come from universities so that they can produce many results.

I hope that AIST will continue to demonstrate unsurpassed leadership in fostering development of science and technology in developing countries in Asia, and do more to help small developing countries to survive further globalization. By doing so, AIST will find more innovative ways of engaging people from developing countries in development of science and

technology. With the emergence of China and India as major industrial countries, I think that AIST's role in this area should be strengthened further.



Lord Broers

Metrics are clearly important if they're the right metrics. If you look at the development of the high technologies in the world over the last two or three decades, we have seen some marked changes. The fashionable way to do research in the 60s, 70s and 80s was in large industrial laboratories. However, the large industrial laboratories that have indulged in pure research, fundamental research, have diminished in importance and mostly stopped that work. This was because technology became too broad, too interrelated, and no single company was really large enough to cover the entire research base. The trend has been to move it into universities. In general, intermediate laboratories and organizations,

such as AIST, have not been the favored route. If you look at these trends over the years, there are some advantages and disadvantages. I think that the judgment has been made.

With regard to porosity, it's not untypical for the average age of employees of a research lab in industry to advance by almost one year every year. If that's happening, you have to look into it. You have noted that the people entering research are older than they used to be. This is an issue that you really must look at.

There is also an issue of communication. The moment you sit yourself between, if you like, universities and industry, you've introduced two interfaces where there used to be one, or perhaps three, depending on how you want to think about all of this. It means that you need many different types of

communication.

I would urge you to have a more specific financial policy. You have to decide on overhead charging rates and what sort of agreements you will have with an industrial collaborator, who owns the intellectual property, whether you have to pay for it or you don't have to pay for it, and individual rights with intellectual property. In the creative world, there used to be a feeling that individuals found it difficult to gain recognition in your society. However, the situation has changed significantly. The research we saw was outstanding. I hope that you will keep up the good work.



Prof. Binglin Gu

I think it's wonderful that AIST has adopted a strategy of innovation for the future. The meritorious knowledge originated from AIST and its sustained contribution to industry and economy are important.



It is good to hear that AIST has been pursuing comprehensive researches. I believe that the research on SiC and positron spectroscopy will be beneficial to industry.

I would like to make a few suggestions. Japanese and Chinese students go to universities in the US because their favorable environment for overseas students. In view of the present situation, Japan and China need to make universities and research organizations globalized and more open to overseas talents.

It is good to conduct comprehensive researches. While the focus of research can vary, depending on scientists and researchers. There are three areas: basic research 1, basic research 2, and production. I am sure that AIST has the capabilities to conduct comprehensive research in all these areas. However, there may be an area in which you are more competent than in other areas. Perhaps you should concentrate more on one area rather than distributing your resources to all three areas.

Prof. Richard K. Lester

AIST is clearly a very high quality organization with very strong leadership. Like all good organizations it's evolving in parallel with, and in response to, changes in its environment.



Innovation is the "realization of new

knowledge on a large scale and for the benefit of humanity". It has become increasingly cross-disciplinary and cross-industry. It cuts across countries and institutions. The challenge for AIST is to find its place in this increasingly complicated context.

It makes sense to extend the concept of full research to one of full innovation. What full research has done for AIST is to raise the sights of its people and make them think about research activities that they weren't

necessarily themselves actually engaged in.

Maybe we have to raise the sights even a little further, to think about other aspects of innovation. That includes the educational aspect, the human resources aspect and the capacity of industry to take up the results of research. Individual researchers may not be necessarily involved in these activities themselves. However, they need to know about things that are going on beyond the research activity itself in order to implement effective innovation.

Mr. Isao Uchigasaki

AIST has to raise its awareness of the role it plays to "serve industry with information and technology". I hope that AIST will position itself between industry and academia and broaden further research to cover life science, standardization and metrology.

It is very important to have a broad

and deep technology platform. Individual optimization can be achieved by universities and research institutes. However, general optimization can't be achieved without a diversified technology platform. That is where AIST can prove its merits.

Specifically, AIST needs to collect research results from various fields, select and concentrate on research themes and bring research results to the market within a

short time, for their evaluation. I hope that AIST will actively participate in international meetings for reading research papers, either for the special field or for general interest, to make itself better known.



Mr. Takeshi Isayama

Diversity is one of the unique qualities of AIST, when compared with other research organizations and universities in Japan. There has been increased diversification of the AIST staff, which now includes women



and foreigners. Out of all the directors of the research centers, thirteen were appointed from outside AIST. These people could

have been recruited by any other research organization. That is quite exceptional.

I think that AIST needs to recognize and highlight its traditional strengths in a positive way. It is important to set a global standard in the field of metrology. However, it is also particularly important to step up standardization efforts in those areas other than metrology.

AIST's research programs have more complementary effects than those conducted by companies and you should put greater emphasis on that. We would like excellent people to engage in research, so that we

can take advantage of their know-how and knowledge. We make a conscious effort to create a star researcher, because that will have a significant impact on the company as a whole.

AIST is in an advantageous position because of its network base, as typified by the advisory board.

It is very important to visualize research results. You don't have to publicize research results, once their visualization is incorporated routinely. I think that is what you should do in a strategic way.

Prof. Tomoko M. Nakanishi



AIST takes the top-down approach to strategy formation and bases its strategy on national and societal strategies. I think you should take more of a bottom-up approach, to strike a balance. I believe that talented researchers will lead research projects at AIST. Perhaps you should do something to help researchers pay

attention to areas other than those in which they are working. I think that you need to create an environment in which individual researchers can fully capitalize on their abilities and uniqueness, because advanced technologies belong to the interface area.

As a national research organization, AIST should look ahead to the future, predict social structures and demands for future technologies in 10 to 20 years' time, and present us with a vision for future technology. I think that only AIST can take the lead, as to conducting good research in

Japan.

I have an impression that AIST has been concentrating on secondary industry. Please conduct more research in energy and food because they are indispensable for survival of human beings. Agricultural research lacks a kind of innovation implemented in production process in other industries. I strongly hope that AIST will initiate technological innovation in the area of agriculture.

Prof. Masuo Aizawa (Chairman)

I would like to give full credit to AIST because it has adopted a challenging strategy for the second term, made an effort to survive structural reform, and reduce public funding and labor costs in order to keep going in the right direction.

During the first term, AIST was unable to fully capitalize its scale merit. It was pointed out back then that AIST was more of a departmentalized sort of institution and it was not doing "what it was supposed to do". Therefore, I highly appreciate the management policy presented by AIST at this meeting.

During the first term, there were also discussions on what AIST should do to contribute to industrial technology. To answer this question, AIST has come up with the strategy of establishing an innovation

hub and taking an industry reform initiative, and I do appreciate your efforts. I think that you should clearly demonstrate your strength and unique selling position, not simply for publicity, but from a strategic point of view.

I highly commend your objective for the second term: realization of research outcomes. However, I feel that you should change your research strategy if you aim to realize research outcomes. The AIST President said that AIST would strive to achieve autonomy of research units and the separation of three powers. In my view, what he said contradicts the objective of realizing research outcomes. I think that a strong emphasis on autonomy of research units will most certainly lead to discipline-oriented research. That's all right when you place an emphasis on outputs. But to achieve outcomes, you should not set up research units with a very limited horizon. Therein

lies the problem. Discipline-oriented research alone will not produce the outcomes that you aim to achieve.

At the meeting, promotion and planning of research were mentioned, in connection with separation of the three powers. I fear that your research strategy may not function if there is a strong emphasis on independence and autonomy of promotion and planning of research.

I feel AIST needs to establish a new structure for the main body that moves ahead on proposals for the implementation of management policies suggested at the meeting.

