An Overview of Projects Planned for 2009

The BEANS Laboratory will be implementing the following R&D projects in 2009.

R&D Project 1: Development of processes for integrating biomaterials and organic matter

1) Process technologies for nano-interface fusion
2) Process technologies for the formation of higher order bio/organic structures

R&D Project 2: Development of processes for the formation of 3D nanostructures

1) Technologies for forming ultra-low damage/high-density 3D nanostructures
2) Technologies for forming hetero-functional integrated 3D nanostructures
3) Technologies for forming 3D nanostructures for space applications

R&D Project 3: Development of micro/nanostructure large-area continuous manufacturing processes

1) Process technologies for large-area formation of high-grade nanofunction membranes in a non-vacuum environment
2) Process technologies for continuous micromachining and integration of fibrous substrates

R&D Project 4: Development of a knowledge database for next-generation device fabrication technologies integrating dissimilar fields

We are also collecting information from dissimilar fields on tangible requirements for producing innovative devices that may lead to new lifestyle improvements.

Entering the 2nd Year of the BEANS Project

Atsushi Yusa, BEANS Project Leader

The initial year of the BEANS Project spanned a shorter-than-usual nine-month term, which seemed to be over before it began. Our work during this period could be described succinctly as start-up activities for launching the project. For example, we provided facilities at the University of Tokyo's Komaba Research Campus, the Kyushu University Center for Future Chemistry, and the Tsukuba East Office of the National Institute of Advanced Industrial Science and Technology with clean rooms, private sitting rooms, and labs for the exclusive use of the BEANS Project. We also worked on equipping the labs and enhancing the environment of the facilities by installing large machinery and lab equipment during the early stage of the project. At the same time, we naturally focused our efforts on research tasks scheduled for the first year by taking advantage of the university-owned research facilities. This quickly resulted in some ingenious research results, that could only have been made possible by the BEANS Project. Our research findings were covered in academic publications and other media under the subject of MEMS and transducer research, raising the profile of the BEANS Project.

By working to coordinate research centers and integrate research tasks, which is a goal of the BEANS Project, we are beginning to develop integration among research topics. Of course, not all research projects go according to plan, and progress can be erratic depending on the nature and degree of difficulty of the topic. However, I believe the project as a whole is proceeding in the right direction.

After reviewing the results from the initial year, as well as the problems or difficulties that were encountered, we have set a primary objective for the second year to achieving smooth and efficient project implementation. From the first year, we have learned the importance of establishing expected results and clear target values at the time of drafting the plan. Even when a plan is drafted, however, there are always unforeseen circumstances that prevent research from proceeding as anticipated. This is also the enjoyment and thrill of research. Consequently, even though researchers go through the motions of drafting a plan initially, they tend to feel that such a plan is pointless and neglect to conduct mid-year reviews of the plan and to monitor progress. In other words, at times researchers can become mired in research conducted for their own interests or research that produces immediate results, losing sight of the original goals. Of course, one cannot completely negate such digressions because they occasionally lead to important discoveries and inventions. However, within the BEANS Project research we cannot allow researchers to stray from the end goal or expected achievements. We also cannot simply assume that results will necessarily be produced thorough research management. Therefore, all the managers of this project the research directors and the project leader, must attempt to achieve balance in their management so as to anticipate a degree of uncertainty in the original plan and respect the researchers' independence and spontaneity, while guiding the researchers in a direction that does not veer from the basic plan. In this case, the implementation plan serves as the fulcrum of the balance and helps the managers determine the correct approach when research does not proceed as hoped. Based on such determinations, the managers may revise or modify the initial plan within the scope of the basic plan. More important is that all researchers fully understand their goals and share their results with other researchers and centers. Cooperative relationships among research topics and members of the BEANS Project will come about naturally as a result. I realize that this approach was not adequately achieved in the first year of the project and feel strongly that these ideas can be better incorporated in our project management this year.

The next goal for the second year is to strengthen collaboration among research centers, as mentioned earlier. This year we will begin a new topic of integrated research between the 3D BEANS Center and Life BEANS Center Kyushu, which was suggested and planned based on preliminary experimental results produced in the first year. By applying low-damage etching technology, the core technology at the 3D BEANS Center, to organic thin film formation technology at Life BEANS Center Kyushu, we have begun to see some potential for forming 3D structures of organic matter that do not occur in the natural world. This is a research topic appropriate for the BEANS Project, and I am confident that it will be received as creative and revolutionary throughout the world. We are also planning similar topics of integrated research between the Macro BEANS Center and the Life BEANS Center and between the 3D BEANS Center and the Life BEANS Center. Hence, the second year of the project will be shifting from the preparation stage to serious topics of integrated research, and I anticipate that we will produce results worthy of the BEANS Project that will attract much attention.

If we liken the first year of the BEANS Project to a period of preparing for takeoff, then the second year will see us spread our wings to lift off of the runway. With diligence and hard work, we can skillfully catch an updraft and ride it to great heights where the flying is smoother. In this I ask for your continued support and cooperation.