

RIMS, an Institute for Japan and the World

Allyn Jackson

In 2003 one of the world's major mathematics institutes, the Research Institute for Mathematical Sciences (RIMS) at Kyoto University, passed a milestone, its fortieth year of operation. As Japan's only mathematics institute, RIMS takes on a wider variety of activities than one typically finds at institutes, serving as a focal point for meetings of Japanese mathematicians, maintaining a permanent faculty, hosting international activities, and even running its own graduate program. Despite its long history and strong track record, as well as major new funding to expand its international program, the future is somewhat uncertain for RIMS, as it sails into the uncharted waters of a sweeping reform of universities that has been mandated by the Japanese government.

The Establishment of RIMS

Japan entered the modern era of mathematics in the early part of the twentieth century. One of the key figures of that time was Teiji Takagi, who studied with David Hilbert and others in Göttingen and worked in class field theory. On returning to Japan in 1903, Takagi took a position at what was then called the Imperial University Tokyo and is now the University of Tokyo, where he developed a strong school in algebra and number theory. His students included Shokichi Iyanaga, who after spending time in France and Germany also became a professor at Tokyo and had several outstanding doctoral students during the 1930s and 1940s, among them Kenkichi Iwasawa, Mikio Sato, Michio Suzuki, and

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Tsuneo Tamagawa. Another prominent figure from this era was Kiyoshi Oka, who in 1929 went to Paris and attended the seminar of Élie Cartan. This was at the time of the early development of the theory of several complex variables, and after his return to Japan in 1932, Oka solved many of the outstanding problems in

this new field. Oka's development of cohomology in the context of several complex variables led some years later to the insight that cohomology could be used in algebraic geometry.

World War II hindered mathematics research in Japan but did not stop it completely. After the postwar years, Japanese mathematicians were rather isolated but continued to do research. Kyoji Saito, a professor at RIMS, recalled that when he was an undergraduate student at the University of Tokyo in the 1960s, he found some notes that had been made by Yutaka Taniyama in the preceding decade, when Taniyama had been a staff member in the mathematics department. Taniyama, one of the most promising Japanese mathematicians of his generation, committed suicide in 1958 at the age of thirty-one. Saito's impression from reading these notes is that young Japanese mathematicians of Taniyama's time were working very hard but were cut off from the international arena of mathematics. "I was impressed that at the time people of the young generation were so interested and enthusiastic and were working without much information," Saito noted.

The International Symposium on Algebraic Number Theory, held in Tokyo and Nikko in 1955, was a crucial postwar event for Japanese mathematics. The symposium was sponsored by

the Science Council of Japan, which was established after the war to provide advice to the Japanese government. The council is part of the government but operates independently and consists of scientists who work on a voluntary basis (its role is similar to that of the National Research Council of the National Academies in the United States). Iyanaga, who was a member of the Science Council for ten years starting in 1948, was one of the main organizers of the Tokyo-Nikko symposium. Nine foreign mathematicians attended: Emil Artin, Richard Brauer, Claude Chevalley, Max Deuring, André Néron, Jean-Pierre Serre, André Weil, K. G. Ramanathan, and Daniel Zelinsky. Kenkichi Iwasawa, who was at the Massachusetts Institute of Technology at the time, also attended. Among the Japanese attendees were Goro Shimura and Taniyama, fellow students at Tokyo at the time. It was during this symposium that Taniyama formulated a number of problems, one of which, in a more refined form, became known as the Taniyama-Shimura Conjecture (or the Taniyama-Shimura-Weil Conjecture). Forty years later, this conjecture, which posited a deep and surprising connection between elliptic curves and modular forms, played a central role in Andrew Wiles's proof of Fermat's Last Theorem.

The development of mathematics in postwar Japan owes much to Toyosaburo Taniguchi, a Japanese industrialist who had made a fortune in textiles. Taniguchi, who originally wanted to become a mathematician but had to take over his family's business, counted several prominent Japanese mathematicians among his friends, including Oka and Yasuo Akizuki of Kyoto University. Taniguchi provided support for domestic meetings for Japanese mathematicians starting in the 1950s; occasionally international visitors also took part. Beginning in 1974, Taniguchi provided funding for international meetings, which came to be known worldwide as the "Taniguchi Symposia". According to the current director of RIMS, Yoichiro Takahashi, Taniguchi's motivation in supporting international exchanges of mathematicians grew out of his desire to prevent a repetition of World War II, which he believed was caused by a lack of understanding between world cultures. Takahashi also noted that, although Taniguchi did not take part in the founding of RIMS, his support of mathematics helped to create a climate receptive to the idea of a mathematics research institute in Japan.

"In the 1950s, science was attractive in Japan," recalled Saito, who was a youngster at that time. "Right after the war, we were poor. We had no ice cream, no chocolate! But there was hope, and science was attractive." The popularity of science had gotten a big boost in 1949, when Hideki Yukawa, a professor of theoretical physics at Kyoto University, received the Nobel Prize in Physics for his

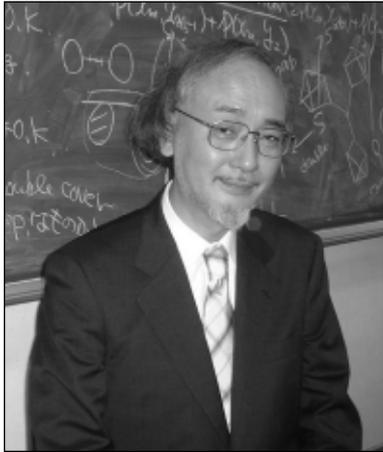


Exterior of RIMS building, Kyoto, Japan.

theoretical prediction of the existence of the meson. In 1953 the Yukawa Institute for Theoretical Physics was established at Kyoto University with funding from the Japanese government. This institute came about through a recommendation of the Science Council of Japan. After the establishment of the Yukawa Institute, the council recommended increasing government investment in all areas of science and in particular establishing more research institutes. In 1958, at the urging of Japanese mathematicians, the council recommended that the government fund a research institute in mathematics.

Over the following five years several committees of mathematicians—under the Science Council, under the Mathematical Society of Japan, and within universities—discussed the establishment of the institute. In addition to Iyanaga and Akizuki, the prominent figures on these committees included Kenjiro Shoda of Osaka University, who was the uncle of Princess Michiko, now the empress of Japan; Masuo Hukuhara, who became the first director when RIMS began in 1963; and Kiyosi Ito, who later served as a director of RIMS in the 1970s. The idea that RIMS should cover both pure and applied mathematics was present from the beginning, and the support of the Faculty of Engineering at Kyoto University was key to the establishment of RIMS. Combining pure and applied mathematics is somewhat unusual in Japan, where most mathematics departments have only pure mathematicians, while applied mathematicians are usually in engineering, computer science, or physics departments.

The way the faculty at RIMS was built up looks a bit strange to Western eyes, but it is entirely in keeping with the rather rigid Japanese academic bureaucracy. When RIMS was founded, a typical "unit" in a Japanese university consisted of one professor, one associate professor, and two assistants. RIMS started off with two units, and a building was



RIMS director Yoichiro Takahashi.



RIMS professor Kyoji Saito.

built to fit this number of people. Over the next four years the faculty was expanded in installments of two units, and finally a single unit was added, to make a total of nine units. The building, which was expanded in stages as the units were added, was completed six years after the launching of RIMS. At the time it was traditional in Japanese universities for academic units to be centered around the research of the professor heading the unit. RIMS broke with this tradition from the outset and tried simply to appoint the best mathematicians available; today this remains the guiding principle for RIMS appointments.

Research institutes are common in Japanese universities; Kyoto University alone has over twenty-five. But RIMS is the only one in all of Japan devoted to the mathematical sciences. RIMS is part of Kyoto University but operates independently and has its own budget from the Ministry of Education, Culture, Science, Sports and Technology, of about 300 million yen (about US\$2.7 million) per year. RIMS was not always

so independent; indeed, in its early years it functioned more as an auxiliary to the Kyoto University mathematics department. This changed during the 1970s with the appointments of Heisuke Hironaka, a 1970 Fields Medalist, and Mikio Sato, a 2003 Wolf Prize recipient. Hironaka retained his position at Harvard University and spent half of his time at RIMS; Sato moved from Tokyo University to RIMS full time. “Sato and Hironaka were big leaders, very original, with very independent personalities,” remarked Saito, who was recruited to RIMS by Hironaka in 1979. “They led RIMS in their own way, which made RIMS an independent institute by developing their own research programs.” In particular, RIMS became the center for Sato’s thriving school of algebraic analysis, which had a deep influence on mathematics research in Japan.

RIMS Operations

What does RIMS do? In a word, everything. It may have the most diverse collection of activities of any of the major international mathematics institutes. According to its charter, the main purpose of RIMS is to promote cooperative research of

Japanese mathematicians. So first and foremost, RIMS is a center for domestic meetings. In this respect it plays a role similar to that of the Mathematisches Forschungsinstitut in Oberwolfach, Germany—but RIMS is even busier. It hosts fifty to sixty meetings per year; in 2002–2003 there were sixty-three. Most of these last less than a week, and sometimes two or three meetings are running in parallel. Over the course of a year the number of participants in RIMS meetings totals between three and four thousand.

It is easy for Japanese mathematicians to apply to organize such meetings at RIMS, and the success rate for applications is high. Decisions are made each January by the RIMS Scientific Advisory Board, half of the members of which are RIMS faculty and half are mathematicians outside of RIMS who are appointed by the Science Council of Japan. RIMS can offer meetings organizers only modest financial support, perhaps the equivalent of a few thousand dollars. But because there is plentiful travel support through individual grants from the Japanese government, most participants do not need travel expenses paid by RIMS. Sometimes the meetings consist of a number of mathematicians—anywhere from a few people up to twenty or thirty—who simply want to spend a few days working together and discussing ideas; in such cases there are usually no scheduled lectures. And generally the format, size, and character of the meetings are up to the organizers. This flexibility makes for a bit of chaos, but as RIMS professor Shigefumi Mori put it, “Running a system allowing some chaos is often more fruitful” than having set rules.

In addition to serving as a focal point for domestic mathematics, RIMS supports international activities. From the beginning RIMS has had international visitors and has held meetings attended by mathematicians from outside Japan. But the 1990 International Congress of Mathematicians, which was held in Kyoto, proved to be a turning point in efforts to raise the institute’s international profile. The ICM was held at a conference center in Kyoto, but RIMS was in some ways the nerve center for the congress, for all of the local organizing was carried out at RIMS by Huzihiro Araki, who was a professor there from 1964 until his retirement in 1997. Araki served as executive secretary of ICM-1990, overseeing all the practical arrangements, from the scheduling of lecture halls to the choice of fabric for the complimentary bags for participants to publicity for the Fields Medals, which made big news in Japan: that year Mori, who had just joined the RIMS faculty, was awarded a Fields Medal.

The experience of ICM-1990 paved the way for RIMS to expand its international activities. Also, the RIMS faculty knew that the Taniguchi Symposia, which had provided a rich source of international

contacts, would not continue forever; indeed, the symposia stopped a few years after the death of Taniguchi in 1994. So in 1991 RIMS launched International Project Research, a year-long program of meetings, workshops, and weekly seminars centered on a particular theme. Over the past few years the themes have included geometry and string theory, reaction-diffusion systems, low-dimensional topology, and complex dynamics. Short- and long-term visitors from inside and outside Japan are brought in, and around one hundred to three hundred people take part over the course of the year. The RIMS faculty collectively discusses and proposes themes, and the Scientific Advisory Board makes the final decisions. So far, about half of the themes have been proposed by the faculty and half by outside mathematicians. As with the other RIMS meetings, there is a lot of flexibility in the program's format, which is set by the organizers. "At first we couldn't fix a certain style," explained Takahashi, because it was not clear what would work best. "But now my feeling is the flexibility is very good for the scientific activities."

Takahashi headed the 2002 international project, which was on stochastic analysis and related topics. With about three hundred fifty participants, this project broke RIMS records. There were four workshops and a major symposium with about two hundred fifty participants. One part of the symposium was devoted to the work of Kiyosi Ito, who is a professor emeritus at Kyoto University and served as director of RIMS from 1976 to 1979. A 1987 Wolf Prize winner and the inventor of stochastic differential equations, Ito was honored for his eighty-eighth birthday, which in Japanese is called *beiju* and has a special significance related to the resemblance of the numeral 88 to the Japanese character for rice. The age of eighty-eight is reckoned according to the traditional Japanese way of counting age, *kazodoshi*, whereby a person has an age of one at the time of birth and is considered one year older with the start of the New Year on January 1. Takahashi confessed, with a laugh, that at the time Ito was a mere eighty-seven.

The Permanent Staff

"This is the best place in Japan to do research," declared Kazuo Murota, who was on the RIMS faculty from 1992 until 2002 and is now at the University of Tokyo. His area of research is mathematical engineering, particularly discrete optimization. Although the balance of fields covered by RIMS faculty tilts toward the pure end of the mathematical spectrum, Murota said he felt very much at home as an applied mathematician there. Another mathematician who works in a similar area, Satoru Fujishige, was recently appointed as a professor at RIMS; Fujishige was one of the winners of the 2003 Fulkerson Prize, sponsored by the AMS

and the Mathematical Programming Society. There are others among the RIMS professors who work in applied areas, such as Reiji Nakajima, who specializes in the theory of computing, and Hisashi Okamoto, who works in numerical analysis.

The Sato school established RIMS as a center for algebraic analysis. Two current professors, Masaki Kashiwara and Takahiro Kawai, were students of Sato and were appointed to RIMS in the early 1970s. Hironaka's legacy in geometry can be seen today at RIMS, which has outstanding figures in algebraic and analytic geometry, including Mori, Shigeru Mukai, and Saito. Number theory is strongly represented at RIMS by Shinichi Mochizuki and Akio Tamagawa, who at age thirty-four and thirty-six, respectively, are the youngest RIMS professors. Rumors have circulated that Mochizuki, who received a Prize Fellowship from the Clay Mathematics Institute in 2002, may be on the way to solving the ABC conjecture, which can be thought of as the ultimate generalization of Fermat's Last Theorem. Two recent appointments to RIMS professorships are Toshiyuki Kobayashi, who works in Lie groups and representation theory, and Michio Yamada, who works in fluid mechanics and wavelet analysis. The present RIMS director, Yoichiro Takahashi, works in stochastic processes and dynamical systems.

When hiring new professors, RIMS focuses on getting the best people possible. "Each time we start the hiring process, we agree that we just want people suitable for RIMS," Mori remarked. "That is the only official requirement of RIMS. It's rather vague, but that way we can be flexible." The balance across different branches of mathematics is taken into account, but mostly as a secondary consideration. All RIMS professors take part in hiring decisions, regardless of the field of the candidates. And, according to Mori, the faculty has a good sense of unity in making these and other decisions, despite the diversity of their fields of interest. "We have managed to be one," he said.

In having a permanent faculty, RIMS resembles the School of Mathematics at the Institute for Advanced Study (IAS) in Princeton and the Institut des



RIMS professor Shigefumi Mori.



Huzihiro Araki.

Hautes Études Scientifiques (IHÉS) near Paris. As at those two institutes, the RIMS faculty members have no teaching duties (though some choose to teach occasionally at Kyoto University). But RIMS differs from IAS and IHÉS in having three levels of permanent positions—professor, associate professor, and research associate—and in having many more positions, a total of forty.

That all of the full professors are Japanese is partly a vestige of now-obsolete laws that made it difficult to hire foreigners in such positions. But there is also a practical reason: RIMS professors have considerable administrative duties in running the institute, applying for funding from the government, handling matters related to Kyoto University, and the like—tasks that would be impossible for someone who did not speak, read, and write Japanese fluently. There are a few foreigners on the permanent faculty, such as Anatol Kirillov, who is an associate professor and works in algebraic analysis, representation theory, and mathematical physics.

Most of the RIMS research associates are young mathematicians who stay for a few years and then move up to higher-ranking positions elsewhere. (Promotions within RIMS are rare.) But because RIMS positions are permanent, it is possible for people to stay longer as research associates, and a few have, particularly in recent years, when the number of academic positions in Japan has been decreasing. RIMS faculty members acknowledge that having long-term research associates is not ideal. Occasionally there have been suggestions within the Japanese mathematical community that

RIMS should shift toward having more visiting positions and fewer permanent ones, so that it could operate more like, for example, the Max-Planck-Institut für Mathematik in Bonn, which has a small permanent faculty and a large number of visitors. However, such a drastic change in operation would probably be impossible for RIMS.

Postdocs and Visitors

RIMS also has some postdoctoral positions, which are temporary. A new program of postdoctoral fellowships, called the Twenty-First Century COE Kyoto Mathematics Fellowships, began in October 2003. The funding comes from a “Center of Excellence” grant from the Japanese government that was awarded jointly to RIMS and the mathematics department at Kyoto

University. The purpose of the grant, which will bring 60 million yen per year to RIMS for the next five years, is to promote research on the international level and to develop future generations of mathematicians. The three-year COE postdocs are open to mathematicians from all over the world. Masaki Kashiwara, who is the head of the COE effort, said that a few years ago RIMS had four or five postdoctoral positions each year, but nowadays the government provides funding for only two. The COE grant will permit RIMS to continue its postdoctoral program at the same level as before. While the COE funding is welcome, RIMS professors note that it comes at a time when other programs that used to support RIMS international activities are being phased out. It is not yet clear whether RIMS is better off with the shift in funding mechanisms.

RIMS has an active visitor program, with eight to twelve visitors in residence at any one time; the Center of Excellence funding will allow RIMS to increase this number in the future. The duration of the stays ranges from a few days up to a year, and many of the visitors are associated with the yearly theme of the International Project Research. Most visitors are reimbursed for their local expenses but are not paid a salary. Some of the funding for visitors comes from RIMS itself and some from individual research grants of the faculty. In addition, RIMS has three visiting professor positions per year, which do pay a salary, the maximum of which is about 700,000 yen per month. RIMS does not have its own housing for visitors, so if one is not lucky enough to obtain the inexpensive—and scarce—housing available through Kyoto University, the funds are likely to be stretched tight, as rents in Kyoto are high. The rules for the salary are somewhat rigid; like RIMS faculty salaries, visiting professor salaries follow the academic pay scale, which is based almost entirely on seniority. If a visiting professor is young and has not had a faculty position for very long, then RIMS might have to make special justifications—such as noting that the person has won a prize or has held an administrative post—so that the full amount can be paid.

On top of holding meetings, running a visitor program, and maintaining a permanent faculty, RIMS also has its own graduate program. In this respect it is probably unique among the major mathematics institutes (the IAS in Princeton has the necessary credentials to award the doctoral degree but has never done so). Since it began twenty-five years ago, the RIMS graduate program, which is separate from the one in the Kyoto University mathematics department, has awarded about one hundred D.Sc. degrees. According to Araki the program was begun in order to offer students a different kind of graduate education from what is commonly found at universities. There is no



RIMS professor Masaki Kashiwara.

required coursework in the traditional sense. Rather, students participate in seminars in which they lecture to each other; sometimes RIMS faculty members present lectures on current topics. The emphasis is on interacting with RIMS faculty, who try to get students involved in research right away. Students are expected to learn the background they need as they go along. “The effect of having a graduate school is quite significant” for RIMS, Mori noted. “Although the size is small, we have produced excellent Ph.D.’s and excellent researchers.”

In Japan students who go on to graduate school tend to remain at their undergraduate institutions, and this tendency increased with a recent expansion of many graduate programs. As a result, RIMS has been getting fewer graduate students in recent years. And in general, interest in doing mathematics is down among Japanese students, reflecting what may be a worldwide trend. Although mathematics education in Japan is often looked upon with envy by Americans, Japanese mathematicians say that standards have slipped in their country. The word *yutori*, which translates as “ease”, is often used to characterize mathematics education in Japan today. Japanese mathematicians joke, rather ruefully, about teachers being told to make things easier for students by telling them that π equals 3. “In our generation, undergraduate students already had some advanced knowledge in mathematics,” Kashiwara recalled. “But not anymore.” RIMS is using some of the funding from the Center of Excellence grant to try to stimulate student interest in mathematics. Recently, for example, it held a three-day seminar for undergraduate students, with lectures by RIMS faculty.

RIMS Facilities

The prefabricated origins of the RIMS building can be seen today in its bland, anonymous facade and its dreary, dilapidated corridors. Looking from the outside, one is hard pressed to believe that this medium-sized, four-story building holds offices for forty permanent faculty, up to a dozen visitors, about twenty secretaries and other staff, and a topnotch library. Homes, offices, and public spaces are smaller in the crowded island nation of Japan than they are in, say, the United States, where the population is much less densely packed. But even accounting for this cultural difference, the RIMS building is clearly too small. A refrigerator and microwave standing in the hallway on the third floor testify to the fact that this building is bursting at the seams. Some years ago professors’ offices were literally cut in half and new walls installed because space was so tight. A visitor usually must share an office with one or two others. Teatime, a common afternoon tradition at mathematics institutes, cannot be held at RIMS because of the lack of space. There is a modest-sized common room on the

first floor and another smaller and more cramped one on the third floor that does double duty as a photocopy room. Apart from the obvious space problems, the design of the RIMS building—long corridors with rows of offices—is not well suited to holding meetings, which is one of the institute’s main activities.

Araki, who joined the RIMS faculty in 1964, said that the RIMS building has been too small for a long time. According to official Japanese building regulations, which specify the needed floor area based on the number of personnel and the building’s functions, the RIMS building should be twice the size it is, Araki said. Over the years there have been continual efforts to get a new building, all of which failed for one reason or another. At one point RIMS hoped to share a new building with the Yukawa Institute of Theoretical Physics; that plan fell through, but the physics institute managed to get its own new building. When Saito was director five years ago, RIMS very nearly succeeded in getting a new building, but hopes were dashed when big government deficits led to cutbacks. Today there is yet another effort to get a new building; RIMS faculty members seem cautiously optimistic.

Another part of the RIMS facilities that seems in need of upgrading is the computer system, which, as one faculty member bluntly put it, is “very bad.” There are new workstations in many offices, but the central computer system is antiquated, and the Internet connection is very slow. One visitor said that it took an hour’s time and a lot of help from the staff to set up a laptop to collect email; printing a document was a major hurdle. In the common room on the first floor there are two ancient terminals for general use, with a sign warning against typing any command except “telnet”.

Although the physical and computer facilities leave a lot to be desired, the human factor shines at RIMS. Indeed, for visitors much of the character of the institute is established by the courtesy and helpfulness of the staff. Visitors get to know the five secretaries in the Scientific Exchange Program Office, who help with reimbursements, housing, and the like. Another five in the main Secretariat attend to the needs of the permanent staff; this group also oversees the RIMS website and prepares for publication the RIMS journal, its preprint series, and conference proceedings. The five-person library staff



Painting hanging in Kyoji Saito's RIMS office.

oversees an impressive collection of 70,000 books and over 1,000 journals in mathematics and related subjects. Because the library has bought back issues of many journals, its holdings are better than what one might expect from a library just forty years old.

Reform of National Universities

RIMS faculty members expressed a great deal of uncertainty, if not outright apprehension, about how RIMS will be affected by the reform of national universities that has been mandated by the Japanese government and that will begin in spring 2004. (National universities are those funded by the government; Japan also has many private universities.) The Japanese term used to describe the reform process translates literally as “making national universities into independent administrative bodies”. This is part of a general trend toward privatizing government entities that has already been implemented in the Japanese postal service and government-run train system. According to Araki one of the biggest changes is that faculty and staff at national universities will no longer be government employees. In theory the purpose is to give universities greater control over hiring, firing, and setting salaries. In practice, Araki said, it will remain difficult to fire university employees and to change the rigid salary system based on seniority. There is pressure for universities to do their own fundraising, even though donations to universities are not a part of the Japanese culture. A gradual climb in tuition of national universities seems intended to shift their funding base away from the government and onto students.

The reform calls for the national universities to be evaluated every six years by a committee of citizens appointed by the government. Universities must set achievement targets, and the evaluation will examine whether the targets have been met. Araki said it is not clear whether RIMS will be lumped in with the evaluation of Kyoto University or whether it will be evaluated as an independent entity; he believes the latter would be better for RIMS. Nevertheless, mathematics research does not proceed by setting targets and meeting them, so this kind of evaluation does not fit RIMS well. Some of the targets, such as number of papers written per year, seem especially unsuited to evaluating mathematics research. Indeed, Takahashi points out that the reform’s emphasis on short-term goals is an argument for RIMS keeping its permanent positions rather than converting them into visiting positions, because the permanent positions support the development of research over the long-term. The RIMS faculty has developed targets, such as numbers of students and numbers of meetings held, that are appropriate to the institute’s operations. One target is to improve the research

environment, which essentially means getting a new building.

One likely effect of the reform of national universities is to force them to compete against each other for funds from the government. How mathematics and other basic sciences will fare in the more competitive, results-oriented environment is unclear. In many ways RIMS seems to be in a strong position as the only mathematics research institute in Japan and as one of the world’s major mathematics institutes. The recent success in obtaining the Center of Excellence grant is also a positive sign. On the other hand, like mathematicians everywhere, RIMS professors are not especially good at politics and administration, and many of them expressed bewilderment at the changes taking place around them. RIMS is run by the permanent professors, with the position of director rotating among them every few years. Kashiwara noted that it might help to appoint an administratively savvy director from the outside but that such a move would be very difficult.

Kashiwara is uncertain what eventual effect the reform might have on RIMS. “I think in the near future there is no problem,” he said, “but in the long run we need a constant effort to reinforce this institute. Otherwise, it will disappear.” Mori agrees that there are likely to be greater pressures on RIMS in the future. “RIMS is the only institute in pure mathematics” in Japan, he said. “I think we should try to keep and develop this institute....It should be cherished.”