Sadahiro Saeki: Harmonically Inclined

by Bob Burckel

It's a pleasure to introduce to readers of our Newsletter Professor Sadahiro Saeki, a personal friend and admired colleague. Sadahiro got his B.S. at Waseda University in 1965 and his Ph.D. from Tokyo Metropolitan University in 1970. Already in 1968 his first publication appeared, a short but beautiful note in the Proceedings of the American Mathematical Society. I had read and appreciated this paper and several others when in the summer of 1972, shortly after coming to K-State myself, I received a phone call from Professor Edwin Hewitt in Seattle. Sadahiro had been invited (people of stature in our field, like Professor Hewitt, had read these early papers, too) to spend a year at the University of Washington; but at the last moment the funds became unavailable and there was considerable embarrassment.

Well, the kind of mathematics that Sadahiro and Ed Hewitt do (harmonic analysis) was also represented here at K-State, principally by an active young researcher named Louis Pigno and an older, well established analyst, one of Ed Hewitt's several famous students, Karl Stromberg. Could we perhaps find a visiting position for Saeki? This was the period when John Maxfield was energizing the nascent research component of our department, and when told of what a remarkable opportunity had serendipitously fallen into our lap, he secured the necessary funding and visiting position for Sadahiro.

I well remember being in the welcoming group that met Sadahiro, his wife Chie, and small son and daughter at the Manhattan airport. Of course there were a few communication problems because, while he wrote excellent English, Sadahiro hadn't had much opportunity to speak it. Now we all like to use the exponential function to illustrate a function with extremely rapid growth (it beats every power of x!). Some time ago, however, my favorite example became Sadahiro's English fluency curve.

In deference to this initial limitation, John Maxfield arranged that Sadahiro teach small graduate classes and seminars. Louis, Karl, Bill Parker, and I avidly attended these (and many others since). The record of such a course is a set of notes in meticulous calligraphy which Sadahiro takes considerable pains to prepare himself. They could be published as books but alas, only a fortunate few of us have them. Here we see another aspect of the perfectionist in Sadahiro. One recalls Gauss' famous motto, "paucis sed matura" ("few but mature" [publications]). Though far from few, Sadahiro's published works could easily be more numerous; many of the gems which we colleagues and the students see in his seminars could be published as papers, but for the high standards of depth and breadth which Sadahiro sets for himself.

During these first two years many strong personal and professional bonds were formed and when Sadahiro and his family returned to Tokyo in 1974 all agreed that a high priority of our department would be to secure a permanent position for Sadahiro. It is a tribute to the professionalism of the department that this support was unanimous, across the various subdisciplines represented here. Sadahiro's mathematical stature was undisputed and he was liked by all.

But of course translating this support into a tenure-track position was not a simple task. Much credit goes to John Maxfield, who regarded the realization of this goal in 1981 as the cornerstone of his building efforts at K-State. But the final drive to success has to be credited to Louis Pigno. Late in 1980 with two colleagues (one a former visiting professor at K-State), Louis solved a famous problem in harmonic analysis (a conjecture of the great J. E. Littlewood that resisted resolution for 33 years). The fame of this achievement was the right currency with which to persuade administrators.

Over the years, Sadahiro has also become one of the department's most conscientious and dedicated teachers, popular among undergraduates in spite of his high standards and expectations. He has had several Ph.D. students here (others while in Japan) and has done joint research with several of us.

Many times I've discussed over lunch with him some attractive new result I'd seen in the research literature, often with a difficult proof. Several days later, Sadahiro comes across the hall to my office and suggests he may have a new proof for the theorem. The two or three neatly written pages he gives me are invariably a significant improvement and simplification of the published research article. Everything mathematical he touches he improves.
Friends of Math problem:
If the sum of the volumes of two cubes is 50 in³ and the sum of their areas is 90 in² then what is the sum of their widths?

A Historical Perspective

William Stamey retired as dean of the College of Arts and Sciences in 1987, after 24 years as a University administrator, and 10 years before that as a faculty member in the Department of Mathematics. In an interview conducted late last year, Dean Stamey was asked to talk about his career, with special regard to the history of the mathematics department.

Stamey recalls that in 1952, when he received his Ph.D., academic job hunting was extremely difficult. It was the last year of the Korean conflict, which everyone expected would soon end. It was feared, however, that student deferments from military service had artificially inflated student enrollments, and consequently, the demand for new Ph.D.'s in academic positions was very low. Stamey received only one job offer, from a junior college in Georgia, but after a year in Atlanta, more offers began to come in as rising university enrollments contradicted expectations. One such offer came from Ralph G. Sanger, then the chairman of the mathematics department at KSU. Stamey recalls two reasons that led him to take this offer: the desire to raise his children in a small-town environment, and the professional desire to work in a department that offered courses in mathematics at both the advanced undergraduate and graduate level.

Then, as now, the Department of Mathematics devoted most of its teaching resources to students who were not majoring in mathematics, especially those in the sciences and engineering. Stamey estimates that of the math majors themselves, at this time about 75% were women, and he conjectures that men with an interest in mathematics were encouraged to become engineers or scientists, while women were probably discouraged from pursuing such careers—a situation which did not really begin to change until well into the 1960s.

Stamey also recalls some differences in student attitudes between then and now. For example, he tells of one semester when he was forced to cancel a week of classes due to illness, and of being faced, on his return, with a group of engineering students in a tensor-analysis course who demanded that he schedule extra classes in order to make up the lost sessions. Whether such an attitude on the part of students to their studies was typical of the time is hard to say, but such an episode would be unheard of today.

The 1950s and '60s were, as everyone knows, a period of social changes throughout the country. In 1960 there had never been a black faculty member at KSU, other than in non-teaching positions involving athletics. It was in this year that an undergraduate engineering major named Daniel Craig Jones became interested in mathematics, and enrolled in the master's degree program. As now, graduate students were employed as teaching assistants in lower-division courses, and it says something about the reality of the prevailing racial attitudes that there was some hesitation (for fear of student complaints, at least) about how to place Craig Jones in such a position. Sanger dealt with this potentially delicate issue by making sure that whenever Jones was scheduled to teach a class, there would always be another section of the class available at the same hour. As it happened, there never were any complaints, and the precautionary measures were dropped after one semester. Jones, incidentally, went on to get his master's degree in 1963 and then on to a job at Sandia Laboratories in New Mexico, where he is now manager of Computer Services and Office Systems.

Stamey recalls that Chairman Sanger himself in some ways represented the passing away of a certain academic style. He was a well known figure on campus, in part because of such obvious and disturbing idiosyncrasies as wearing a moustache (well trimmed, of course, but still . . .), wearing a flower in his jacket lapel, and being identifiable as a member of a suspect Keillor-esque minority group—the Midwestern Bachelor Professors. He was, as Stamey tells it, dedicated to maintaining a standard of high quality teaching of mathematics, and he took this as a personal responsibility. In keeping with the times, he ran his department in a more authoritarian manner than is common now, and his formal consultations with his faculty concerned only minor affairs.

Important decisions were carried out either alone or with the device of what Stamey calls "watercooler consultations." These consisted of waylaying a faculty member in the hallway and asking for an opinion on some issue of tenure, reappointment, hiring, and so forth. In 1965, the University as a whole began an expansion which led to a reorganization and expansion of the mathematics department in particular. By this time, Stamey had become associate dean, and Sanger retired. The result of the ongoing expansion has been the creation of a larger department, with a solid nationwide reputation in certain areas of mathematical research. Most importantly, the graduate program expanded to include a highly respectable Ph.D. program.

We hope that Bill Stamey feels proud of the development of the Department of Mathematics and of the College of Arts and Sciences, and we thank him for sharing his unique perspective with us.
Summer Science at KSU

Every summer about 15 to 20 high school juniors and seniors come to Manhattan to spend five weeks studying mathematics and physics at KSU's Summer Science Institute. This program, unique in Kansas, gives bright high school students the opportunity to live as college students and earn college credit while getting a rare view of advanced mathematics and physics.

The institute was founded in 1981 by Chuck Hathaway of the Department of Physics at KSU with funding from the National Science Foundation. Unfortunately, the NSF no longer funds such programs, but the Summer Science Institute has been able to continue through support from the College of Arts and Sciences and the Department of Continuing Education at KSU and through participants' fees.

At the institute the students attend classes in mathematics and physics five days a week. Dr. Larry Weaver of the KSU physics department teaches the physics class. There is no rigid curriculum at the institute but he likes to teach the theory of special relativity and topics in astronomy. Dr. Weaver begins his course with the fundamentals of motion and geometry before tackling special relativity. They get far enough into the subject to discuss the equivalence of gravity and acceleration. The students get a chance to do some laboratory work in astronomy. By studying photographs of stars they learn how astronomers classify stars by their spectra and the way they infer the distance to the stars.

The mathematics part of the institute is taught by Dr. David Surowski of the KSU math department. Dr. Surowski eschews the mundane and chooses to teach a variety of appealing topics from pure mathematics few people outside the profession see. One of the subjects is the classification of the compact two-dimensional manifolds, a subject that most certainly expands the students' view of the nature of mathematics. Other topics include probability and logic. The theory of groups is often introduced by way of the fundamental group of a manifold. The students get a chance to use the mainframe computer at KSU with the sophisticated CAYLEY program which solves group theory problems. As in the physics class, the emphasis is on learning by problem solving. Dr. Surowski encourages collaboration among the students to solve the problems he assigns. He was impressed when two students last summer were able to find the number of j-dimensional faces on an n-dimensional cube rather quickly by working together.

The math curriculum at the institute is not designed to teach the students how to get better at calculus or other traditional undergraduate courses; Dr. Surowski says that already "too much of what the students learn is in the area of analysis." His goal is to show how interesting mathematics is and he hopes his students will go back to high school having "set their sights a little higher."

Some participants from past Summer Science Institutes have returned to KSU as undergraduate math or physics majors but the purpose of the institute is, according to Dr. Weaver, "just educational" rather than recruitment. His goal is to provide "excitement and challenge in science."

Dr. Weaver's enthusiasm for science is shared by the students at the institute. I talked to a group of students at the close of the institute last July. Jerry Pierson said the institute gave him "a lot of good ideas to chew on." The students liked almost every topic covered but many agreed with participant Jason Willford who said he "liked topology the best." The students unanimously said they would recommend the institute to their friends.

In the summer of 1988 the Summer Science Institute will be combined with the Kansas Regents Academy. Founded in 1987, the Regents Academy is a summer program for high school students that rotates among the Regents' universities. Interested students are encouraged to apply. Details about the Summer Science Institute can be obtained by writing to:

David Surowski  
Department of Mathematics  
136 Cardwell Hall  
Kansas State University  
Manhattan, Kansas 66506

Establishing an Endowed Gift to the Department of Mathematics

It can cost as little as $5,000 to establish a named lecture series, departmental fund, scholarship, etc. The minimum endowment for a distinguished professorship is $150,000, and the minimum endowment for a distinguished faculty chair is $250,000. Endowed lecture series, scholarships, chairs, etc., are funded from the interest on the donor's gift. Please consider your personal situation and see if you can assist us in our efforts to enhance the programming of the Department of Mathematics. The following steps offer a guideline to how you can give.

1. Notify the KSU Foundation or Department of Mathematics

Contact the Foundation or Department of Mathematics regarding your interest in establishing a scholarship, distinguished chair, or lecture series. Once you have made that contact, via phone or mail, a Foundation staff member and a mathematics faculty member will work with you. All contact is confidential, and new scholarships or distinguished chairs are publicized only with donor approval.

2. Determination of Eligibility and Award Amounts

Donors can tailor a scholarship, chair, colloquium series, etc., to match their wishes. Recipients are determined by the Department of Mathematics. Donors can establish chairs or lecture series in applied mathematics, algebra, analysis, number theory, etc. Donors can establish departmental funds for the development of specific programs such as scientific computation, microcomputer laboratories, faculty travel to scientific meetings, etc.

3. Develop a Memo of Understanding

A Foundation staff member, in close consultation with the donor, develops an administrative document known as the Memo of Understanding. The amount of the gift, name, donors, and other considerations are included. The document is approved by the donor, the mathematics department, and the Foundation.

4. Provide the Funds

After the Memo of Understanding is completed, the donor makes a contribution to initiate the scholarship, chair, or supporting program. Endowed scholarships, chairs, etc., are usually begun the following year after sufficient interest income has accumulated. When the scholarship, chair, or lecture series is initiated, the Foundation staff will prepare appropriate news coverage if the donor approves.

For more information about any of the programs mentioned in this newsletter, contact either of the following:

Louis Pigno, Head  
Department of Mathematics  
136 Cardwell Hall  
Kansas State University  
Manhattan, Kansas 66506  
(913) 532-6750

Mark More, Department of Planned Giving  
Kansas State University Foundation  
1408 Denison  
Manhattan, Kansas 66506  
(913) 532-6266

All inquiries will be kept strictly confidential.
Conferences and Guests, 1987–88

In the last year the Department of Mathematics has been privileged to host an exceptional number of internationally recognized mathematicians, through our new endowed colloquia, and through various other sources of support.

The first annual Harry E. Valentine lecture was given in April 1987 by Professor Mary-Ellen Rudin of the University of Wisconsin. Professor Rudin is a renowned topologist who, in 1963, was awarded the prize for New Research in Science by the Mathematical Society of the Netherlands. Her talk here consisted, first of all, of a discussion of the types of difficulties that mathematicians face when called upon to explain (and to justify) their research, presenting an imaginary dialogue between a government official and an ideal mathematician. She went on to say that, apart from its specific applications, the role of mathematics in society is to explore and uncover new ways of thinking, and that the changes that develop, whether over the course of decades or centuries, in the ways in which people create mathematics, reflect and expand on changes in society as a whole.

The speaker for the first annual Liddore and Hilda Dressler colloquium was Professor Daniel Gorenstein of Rutgers University. Professor Gorenstein spoke on the classification of the finite simple groups, an "enormous theorem" which involved the combined work of several dozen mathematicians from 1960 to 1980, and in which Gorenstein played a guiding role. An unexpected highlight of Professor Gorenstein's visit here was the announcement (from Washington) of his election to the National Academy of Sciences. Readers who are interested in finding out about the enormous theorem can consult Gorenstein's article in the December 1985 issue of Scientific American.

In October 1987, a mini-conference in algebra and geometry was held here under the sponsorship of Distinguished Regents Professor Ernie Shult. Participants included Professors William Kantor (University of Oregon), Daniel Hughes (Queens College, London), and Jaap Seidel (Aarhus University, Netherlands), as well as Professors Chemak, Delgado, Shult, and Surowski of KSU. This conference focused on combinatorial geometrical structures such as graphs, chamber systems, buildings, and generalized polygons, and their relationships with associated algebraic structures.

Also in October, there were two colloquiums at KSU supported by the Mid-America State Universities Association (MASUA), an organization involving universities in five states, and designed to foster interaction among faculty and students in the graduate schools of these universities. The speakers for these colloquia were Professors Nigel Kalton (University of Missouri) and Darryl J. McCullough (University of Oklahoma). In 1988, our first guest will be Professor Thomas W. Koerner of Cambridge University, who will be at KSU from March 12 to 26. Professor Koerner's main research contributions are in the fields of Fourier series and harmonic analysis, for which he was awarded the French Mathematical Society's Salem Prize in 1971.

The second annual Dressler colloquium will be given by Professor Hugh Montgomery of the University of Michigan. For his work on analytic number theory he was awarded the Salem Prize in 1974. His talk is entitled "Irregularities of Point Distributions." Finally, and not least, the second annual Valentine Lecture will be given by William P. Thurston of Princeton University. Professor Thurston was awarded a Fields Medal in 1982 by the International Congress of Mathematicians. The Fields Medal is awarded once every five years. It is the highest award that exists in the world of mathematics, and is comparable to the Nobel Prize (which has no mathematics category). Thurston received this award for "revolutionizing the study of topology in two and three dimensions." (See the article by Thurston and Jeffrey Weeks in Scientific American, July 1984.)

Friends of Mathematics Lecture, 1987–88

Each year, the KSU Friends of Mathematics Society sponsors an afternoon lecture, given by a mathematician of special distinction, followed by a banquet at the K-State Union, with after-dinner speeches given by the guest lecturer and by a distinguished alumnus.

The fifth annual Friends of Mathematics Lecture and Awards Banquet, in April 1987, featured Professor Lynn Arthur Steen of St. Olaf's College. His lecture on "Mathematics in the Year 2000," addressed primarily to our mathematics majors and graduate students, outlined various important trends in mathematics as areas for future research. In his after-dinner speech, Professor Steen turned to the dangers posed by an "smokestack classrooms," offering warnings and suggestions concerning public school education in the United States. The Distinguished Alumni talk was given by Gary Dickson, class of '76, and was entitled "An Actuary, A Mathematician."

This year, the sixth Friends of Mathematics lecture will be Professor Raoul Bott of Harvard University. Professor Bott was awarded a National Medal of Science by President Reagan in 1987 in recognition of Bott's profound studies over the course of several decades in the topology of Lie groups and in differential geometry, and in particular for his periodicity theorem. This theorem and related work now form a cornerstone in diverse areas of mathematics ranging from algebraic topology to the theory of elliptic operators.

Our Distinguished Alumni Lecture this year will be given by Daniel Craig Jones, M.A., class of '63. Jones is the manager of Computer Services and Office Systems at Sandia Laboratories in Albuquerque, New Mexico. (See "A Historical Perspective")
Added in press: Sadahiro Saeki has just solved a 25-year old problem about integration on topological groups. His resolution of this famous “L^q-conjecture” has led to a significant sharpening of a classical result, Young’s Inequality.

Alumni and Contributor News

Tony Blake, B.S. 1983, and Susan Arnoldy Blake, B.S. 1984, live in Littleton, Colorado, and both work for Martin Marietta Astronautics in Denver. Tony Blake is involved in the modeling and simulation of space flight and Susan Blake does statistical reliability analysis.

Vicki Logan Cramer, B.S. 1985, is living in Manhattan and is teaching mathematics at Blue Valley High School in Randolph, Kansas. Some of her students there recently placed second at the Washburn Math Contest. Vicki was married to Carl Cramer last December.

Alan Cunningham, B.S. 1983, is a high school math teacher and basketball coach in Topeka, Kansas. He is married to Kim Feight, who is a KSU alumna. They have a daughter, Abigail.

Mary Conrad Gentry, B.S. 1985, has been a designer engineer for Southwestern Bell for two years in Lawrence, Kansas. She has recently developed and taught a course on electrical drawing. She was married in April 1986.

Garry Hart, Ph.D. 1970, has been a professor of mathematics at California State University at Dominguez Hills since 1970. He was chairman of the math department there last year.

Robert Kirkpatrick, B.S. 1957, has been a project statistician for the Allied Corporation in Kansas City for 30 years. He was recently honored by the American Society for Quality Control for his contributions to the development of statistical computer programs.

Gordon Huggins, B.S. 1949, retired in 1987 after 37 years as a teacher and elementary school principal in Parsons, Kansas. The board of education there honored his long service by naming a room in Outhridge School after him.

Robert Mai, M.S. 1969, lives in Yuma, Arizona, where he has been working as a civil service mathematician for 15 years. He has been married for 19 years and has three children. Recently, he has worked on new algorithms for use in real-time testing of various instruments.

Donald Myers, B.S. 1953, M.S. 1955, is a professor of mathematics at the University of Arizona where he has been for 27 years. During the past two years he has had visiting appointments at the Université Paris and the Centre de Géomatistique, Fontainbleau, France, as well as a five-month sabbatical at Stanford University.

John Neff, M.S. 1951, has been professor of mathematics at the Georgia Institute of Technology since 1961. A few years ago Professor Neff was honored by the Mathematical Association of America with an Award for Meritorious Service.

Marilyn McCard Nelson, B.S. 1961, has been working the past seven years for Texas Instruments in Dallas. Presently, her position there is instructor in artificial intelligence.

Neil Norman, B.S. 1970, M.S. 1978, is living in Scott City, Kansas, where he is director of operations for the Wheatland Electric Cooperative. He is also the chairman of the MathCounts program of the Kansas Engineering Society.

Jeanne Sebaugh, M.S. 1965, is living in Columbia, Missouri, where she has her own business. Sebaugh's Information Service provides statistical consulting for researchers.

Gaylene Shank, M.S. 1978, is running the computers at the junior and senior high schools in Goodland, Kansas. She says that her job is system manager, coordinator, operator, and general brainstormer. She also keeps busy with substitute teaching and raising her children.

Paul Stallsworth, B.S. 1972, graduated from the Duke University Divinity School in 1976 and is a minister in the United Methodist Church. He and his wife, Marsha Lemke Stallsworth, who is a KSU alumna, live in Edison, New Jersey, with their two children. For the past two years, he has been the assistant director of The Center on Religion and Society in New York City.

Ferbert Tillinghast, B.S. 1971, has worked for TransWorld Airlines in Kansas City for 11 years. He is the technical manager for TWA's Artificial Intelligence Group. He says that his family had a nice visit with Dr. and Mrs. Leonard Fuller in 1986 while on vacation in New Mexico.

John Waterman, B.S. 1976, has been with Raytheon Corporation for eight years where he designs and builds vacuum tubes. He and his wife Pam are rebuilding a Victorian house near Boston, Massachusetts.

Lawrence Wilson, B.S. 1975, is a captain in the U.S. Air Force. His current assignment is as mathematics instructor at the United States Air Force Academy. Until recently, he was at Lowry AFB where he was named Training Manager of the Year for 1985.

Scholarship Winners

These undergraduate students at KSU were awarded scholarships by the Department of Mathematics for 1987–88:

Curtis Hiller is a Friends of Mathematics Scholar.

David Burnett has a Friends of Mathematics Matching Scholarship Award.

Nancy Berry, Loren Helmuth, James Hu, and Scott Sowers are Capitol Federal Scholarship winners.

Heather Hahn has the Rector Scholarship for 1985-89.
FRIENDS OF
MATHEMATICS

Information Wanted

As you probably know, we issue a departmental newsletter once a year. We like to include some notes about our alumni whenever possible. If you would like us to include some news about you in a future issue, please fill out our alumni survey form and send it back to:

Louis Pigno, Head
Department of Mathematics
136 Cardwell Hall
Kansas State University
Manhattan, Kansas 66506

Alumni Survey

Name ____________________________

Class and Degree ____________________________

Address ____________________________

Occupation ____________________________

Title ____________________________

Time in current job ____________________________

Recent promotions, awards, special achievements in your work ____________________________

Personal happenings you would like to share ____________________________

News of other classmates or other remarks ____________________________

Notice of Nondiscrimination
Kansas State University is committed to a policy of nondiscrimination on the basis of race, sex, national origin, handicap, or other nonmerit reasons, in admissions, educational programs or activities, and employment, all as required by applicable laws and regulations. Responsibility for documentation of compliance efforts and receipt of inquiries, including those concerning Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973, has been delegated to Jane D. Bowles, Ph.D., Director, Affirmative Action Office, 214 Anderson Hall, Kansas State University, Manhattan, Kansas 66506, (913) 532-3220.