

**Yahiko Kambayashi**  
**February 15, 1943 – February 6, 2004**

**A tribute and personal memoirs**

**Yoshifumi Masunaga\* and Katsumi Tanaka\*\***

**\* Department of Information Science, Faculty of Science, Ochanomizu University, Tokyo,  
Japan**

**\*\* Graduate School of Informatics, Kyoto University, Kyoto, Japan**

### **1. A Sudden and Untimely Death**

On February 6th, 2004, the tragic news of the sudden and untimely death of Professor Yahiko Kambayashi of Kyoto University, Japan was broadcast throughout the world. Even today, it will still be fresh in the memory of many SIGMOD Record readers who read: “Dr. Kambayashi was hospitalized after suffering a cerebral hemorrhage at work on February 4th , and, in spite of all the treatment he received, he passed away at 4:42 a.m. JST on February 6th”. He was only 60 years old.



The Late Dr. Yahiko Kambayashi

Dr. Masunaga, as the current Database Society of Japan (DBSJ) president and one of the co-authors of this tribute, had the sad duty to announce the sudden death of Dr. Kambayashi to all of the Japanese database researchers on “dbjapan”, the e-mail list of DBSJ. Although he prepared an e-mail, he couldn’t press the “send” button for some

time because of all the thoughts that rushed through his mind such as, ‘perhaps it is only a horrible dream’, or ‘perhaps Dr. Kambayashi’s passing was a lie, or ‘a hospital name error’. In fact, he was terrified of committing the irrevocable act of announcing Dr. Kambayashi’s death when he had so many doubts as to the reality of the situation, and was unable to accept the news himself.

The funeral ceremony took place in an old Buddhist temple in Kyoto on February 7. The temple is located in a historic area of ancient Kyoto, where Dr. Kambayashi liked to take his dog for a walk. Several hundred people attended the funeral.

## **2. Dr. Kambayashi as a Leader of Men and an International Facilitator**

Although Dr. Kambayashi lived a relatively short life of only 60 years, he achieved things that average people could not achieve, even if they were able to live for several hundred years. We can admire Dr. Kambayashi’s “genius” because he had an amazing ability to successfully achieve every new and pioneering project that he put his mind to. We can admire him as a giant among men because of his strong dedication to achieving his goals. And we can admire him for his unassuming strength of character, because of the way he always displayed more energy and courage than anyone else. Although the death of Dr. Kambayashi was an irretrievable loss to all who knew him, and even to those who knew him only through his work, we all feel very fortunate and proud that such a great man was born in Japan. In the following section, we will introduce his academic background and career, social contributions, and his amazing ability to arrange and organize international conferences.

### **(a) Academic Background and Career**

Dr. Kambayashi received a Bachelor of Engineering, a Master of Engineering, and a Doctor of Engineering degree in Electronic Science and Engineering from Kyoto University, in 1965, 1967, and 1970, respectively. He became a research associate at the Kyoto University Data Processing Center in 1970. After holding positions as a visiting research associate at the University of Illinois at Urbana Champaign from February 1971, a research associate in the Division of Information Science, Faculty of Engineering, Kyoto University from March 1973, a lecturer in the same Department from December 1973, and an associate professor from October 1976, he was appointed as professor in the Department of Computer Science and Communication Engineering, at Kyushu University, in April 1984. Since that time, Dr. Kambayashi has held professorships at the Integrated Media Environment Experimental Laboratory, Faculty of Engineering, Kyoto University from July 1990, the Faculty of Engineering, Kyoto University from August 1995, the Department of Information Science, Graduate School of Engineering, Kyoto University (from April 1996), and the Department of Social Informatics, Graduate School of Informatics, Kyoto University from April 1998. He became a Regent of Kyoto University from April 2002. He was a program leader for Kyoto University’s 21st Century Center of Excellence (COE) Program called the “Informatics Research Center for Development of Knowledge Society Infrastructure,” supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), from 2002, and a Dean of the Graduate School of Informatics, Kyoto University from April 2003.

### **(b) Dr. Kambayashi as the Genuine Leader of Japan's Database Society**

Dr. Kambayashi was a genuine leader of the Japanese database society as most of the database activities held in Japan were organized under his supervision. For example, over a three-year period, beginning in 1996, Dr. Kambayashi acted as the representative for more than 60 Japanese database researchers in priority areas through the "Research and Development of Advanced Database Systems for Integration of Media and User Environments" project, supported by MEXT.

Dr. Kambayashi held key positions in many major academic societies in Japan. Some of his more noteworthy positions included:

- President and Director of the Institute of Electronics, Information and Communication Engineers of Japan (IEICE)
- First President of the DBSJ, and,
- Director of the Information Processing Society of Japan (IPSJ).

In recognition of his outstanding achievements, Dr. Kambayashi was selected as a Fellow in the IEEE, the IPSJ, and the IEICE.

Dr. Kambayashi was active in many Japanese government organizations. Some of his many positions include:

- Member of the MEXT Committee on Informatics Technologies and Sciences;
- Chair of the MEXT Steering Committee for the Implementation of Ultra High-speed Network Infrastructures for Technological Research;
- Member of the MEXT Council for Cultural Affairs SIG on Copyrights;
- Member of the Cultural Affairs Agency Cultural Council SIG on Copyrights;
- Member of the MEXT Council for Science and Technology; etc.

### **(c) Dr. Kambayashi as an International Conference Facilitator, Presenter, and Goodwill Ambassador for Japan**

During his short lifetime, Dr. Kambayashi promoted database activities not only in Japan, but also in Asia and throughout the world. Among his most notable achievements were his efforts to establish some of the most prominent international conferences in the database field, including the International Conference on Database Systems for Advanced Applications (DASFAA), Research Issues on Data Engineering (RIDE), Foundations of Data Organization (FODO), International Conference on Web Information Systems Engineering (WISE), CODAS, and CoopIs.

In particular, Dr. Kambayashi, in cooperation with Dr. Won Kim and members of SIGDB of the Korea Information Science Society (KISS), worked together to create an international conference for Asia, called DASFAA. The first DASFAA conference was held in Seoul, S. Korea in 1989 to promote database research activities in Korea as well as in Japan. The second DASFAA conference was held in Tokyo in 1991, and this year (2004) the ninth DASFAA was again held in S. Korea. The DASFAA conferences have evolved into annual conferences; the tenth,

eleventh and twelfth DASFAA conference will be held in Beijing, China in 2005, Thailand in 2006, and India in 2007, respectively.

He developed close friendships with many researchers from around the world, and frequently invited renowned researchers to Japan in order to promote international academic exchanges. Dr. Kambayashi's warmhearted hospitality was appreciated by many of the foreign database researchers. He never forgot to give foreign visitors presents traditional to Kyoto. He often personally drove them sightseeing around the Kyoto area and usually took them out for Japanese food. He preferred to organize international conferences at the Heian Shrine, one of the most famous and historical shrines in Kyoto.

Dr. Kambayashi played an essential role in establishing the ACM Japan Chapter and the ACM SIGMOD Japan chapter. Concerning international journals, Dr. Kambayashi served as an associate editor for ACM Transactions on Database Systems, Co-Editor-in-Chief of the World-Wide-Web Journal, and others.

**In 1995 Dr. Kambayashi became the only Asian recipient of the ACM SIGMOD Contribution Award for his distinguished achievements in the database field.**

### **3. Honorable Achievement in Database Research**

Although Dr. Kambayashi received his Doctor of Engineering degree in 1970 for his research in logic circuit design, he switched his research direction to databases in the mid-1970s. In 1975 Professor Shuzo Yajima, Dr. Kambayashi's supervisor, asked him to participate in a three-year program in Scientific Research on Priority Areas through the "Research and Development of High Level Processing of Widely Distributed Large Information Resources," under the auspices of MEXT. Dr. Kambayashi told me that Prof. Yajima appreciated the importance of database research and ordered him to engage in it.

Anyway, he became one of the first to become aware of the importance of relational databases – an unexplored field where new ideas were just beginning to emerge at the time – and to initiate research in this field. He achieved a substantial number of discoveries that won high international recognition in this field:

#### **(a) Design Theory of Relational Databases**

Dr. Kambayashi's first research paper was presented at the proceedings of the Third VLDB International Conference held at Tokyo in 1977. The paper was written by himself and two co-authors; Katsumi Tanaka, (one of the co-authors of this tribute), and Shuzo Yajima. In the early stages of his database research, he showed an interest in the theory of recursive queries, which became important in deductive databases, as well as in the dependency theory of relations. The following are some of the main results that have emerged from this research field:

Y. Kambayashi, K.Tanaka, and S.Yajima: "A Relational Data Language with Simplified Binary Relation Handling Capability," *Proc. 3rd Int. Conf. on Very Large Data Bases*, Tokyo, Japan, pp.338-350, Oct.1977.

K.Tanaka, Y.Kambayashi, and S.Yajima: "Properties of Embedded Multivalued Dependencies in Relational Databases," *Trans. of IECE Japan*, Vol. E 62, No.8, pp.536-543, Aug. 1979.

K.Tanaka and Y.Kambayashi: "Logical Integration of Locally Independent Relational Databases into a

Distributed Database,” *Proc. 7th Int. Conf. on Very Large Data Bases*, Cannes, France, pp.131-141, Sept. 1981.

Y. Kambayashi, K. Tanaka, K. Takeda: “Synthesis of Unnormalized Relations Incorporating More Meaning,” *Information Sciences*, Vol. 29, pp. 201-247, 1983.

### **(b) Query Processing**

The problem of cyclic query processing was known as one of the more difficult problems in the query-processing field. Dr. Kambayashi invented an algorithm to process cyclic queries efficiently by introducing the query transformation method. The results were presented at ACM SIGMOD International Conferences in 1982 and 1984 as well as at VLDB Conference in 1984. These results are included in the following book:

Y. Kambayashi: “Processing Cyclic Queries”, in *Query Processing in Database Systems*, Springer-Verlag, 1985, pp. 62-78.

### **(c) Groupware and databases**

From the 1990s, Dr. Kambayashi began research into computer-based collaborative work support, otherwise known as groupware. With the popularization of the Internet, an infrastructure was being put into place to support collaborative work in offices and other locations on a day-to-day basis, and there was an increasing demand for collaborative work support that could easily integrate the existing frameworks of office tasks. Dr. Kambayashi was among the first to recognize the common elements of groupware and databases, and undertook research into collaborative work support methods based on the foundations of the database functions. He developed a system called VIEW Media, which was reported in the following:

Y. Kambayashi and Z. Peng: “An Object Deputy Model for Realization of Flexible and Powerful Objectbases”, *Journal of System Integration*, Vol.6, No.4, Kluwer Academic Publishers, Vol.6, No.4, pp.329-363, Oct. 1996.

In addition Dr. Kambayashi launched pioneering research in the field of Geographic Information Systems (GIS) in the mid-1980s. He interpreted map data as a collection of geographic objects on the earth’s surface, rather than two-dimensional drawings, and proposed a new concept that maps are simply one view of geographic databases that store these geographic objects, or, in other words, a visualized result of multiple query responses retrieved from that database.

Dr. Kambayashi was a strong supporter of computer education in elementary schools, junior high schools, and high schools in Kyoto. In 2002, in cooperation with Dr. Alan Kay (Senior Fellow, Hewlett Packard), he initiated the Advanced Learning Network in Kyoto (ALAN-K) project, in which even elementary school students could enjoy computer programming using graphics, sounds, and other elements in an object-oriented environment.

During his career, Dr. Kambayashi published countless original and pioneering research papers, focusing mainly on the fields of computer science and information science. He was extremely devoted to providing guidance to students and younger professors, and many of the outstanding individuals that he fostered are currently active in a broad range of fields, from key positions at universities and research institutes to private sector companies. As many as 40 students received their doctoral degrees under the supervision of Dr. Kambayashi.

### 3. Personal Memoirs

The reason why we prepared this tribute is because of our long and happy association with Dr. Kambayashi. Dr. Masunaga and Dr. Kambayashi were the same age, and worked together in the Japanese database society for nearly thirty years. Dr. Tanaka was the first doctoral student under Dr. Kambayashi's supervision. Together, we have many fond memories, experiences and episodes to share.

Dr. Kambayashi and Dr. Masunaga met each other in the late 1960s as doctoral students at Kyoto University and Tohoku University, respectively. Although Dr. Kambayashi's major was switching theory and Dr. Masunaga's was automata theory, because of the nature of their research, they frequently met at the same sessions of the annual IPSJ or IEICE conferences. Because both were known to be young scientists who asked sharp and probing questions of anyone who made dubious presentations, they began to take notice of each other. From 1975 to 1977 Dr. Masunaga was a scientist at the Computer Science Department of the International Institute for Applied Systems Analysis, Laxenburg, Austria (IIASA), where he first became aware of Dr. Ted Codd's famous paper on Communications of the ACM. He was so impressed with the paper that it didn't take long to decide that relational databases would be his life's work. In 1977, when Dr. Masunaga attended the third VLDB conference at Tokyo, he was both surprised and pleased that Dr. Kambayashi had come to present a paper on relational database query languages with Dr. Tanaka, one of the co-authors of this tribute. After that time their paths often crossed, as they were all were immersed in database research. In May 2002, in order to intensively promote the visibility of Japanese database activities, they established the Database Society of Japan (DBSJ). Dr. Kambayashi was nominated as the first president of the DBSJ, while Dr. Masunaga was honored by being the first official member of the society.

Dr. Kambayashi was Doctor Tanaka's greatest mentor. Dr. Kambayashi led Dr. Tanaka into the new database research area at Kyoto University in the late 1970s. Under Dr. Kambayashi's supervision, Dr. Tanaka finished his master's thesis on quasi-consecutive retrieval file research, and his Ph.D thesis on relational query languages with the expressive power of recursive queries (VLDB77), and the logical design of relational databases (embedded multi-valued dependencies properties) (VLDB81). Dr. Kambayashi always emphasized the importance of originality in research. Indeed, he truly loved new ideas in research as well as in items commonly used in our daily lives. He loved to demonstrate new things to people and to see people having fun. He often confessed that the research on automata theory had no real world applications, and that was the real reason he changed his research area to database research. Dr. Kambayashi was a person with a warm heart and a wonderful sense of humor. The alumni of the Kambayashi Laboratory donated a laboratory flag called "Challenge", dedicated to Professor Kambayashi's life long belief that research should always be a challenge, as a gift commemorating the 10<sup>th</sup> anniversary of his lab. Whenever they discussed their next research project Dr. Tanaka suggested that they should "attack it". Dr. Kambayashi often showed deep displeasure with this proposal, and would say: "Hey, is this topic really exciting to you? Is it fun?" Even after Dr. Tanaka obtained his PhD from Kyoto University, Dr Kambayashi continued to guide and support him. From 1983-1984, Dr. Tanaka was affiliated with University of Southern California as a visiting

researcher and lecturer. During his stay in California, Dr. Kambayashi once visited Dr. Tanaka's apartment. As soon as Dr. Kambayashi arrived at his apartment, he sat down the dinner table and said; "Hey, let's start to write a paper". Dr. Tanaka returned to Kyoto University three years ago, and joined the same department as Dr. Kambayashi. In the spring of 2003, Dr. Kambayashi was invited to speak at a domestic database conference to an audience of young researchers about future database research. He left his young audience with these words: "Hey, why do you believe your supervising professor's words? DO NOT believe everything your mentor says to you. Research is a challenge for you to explore by yourself."

#### **4. Concluding Remarks**

Dr. Kambayashi was a person who believed in Confucius's teachings that the young should respect their elders. He always respected his seniors and superiors. Although he was an outstanding man, he never looked down on people or acted in an arrogant or pompous manner. However, sometimes he gave penetrating glances to those who spoke or acted irresponsibly. Everyone listened when he spoke and admired his intellect and wisdom. He was a broad-minded man who was always ready with a big laugh and a sincere smile. He is irreplaceable, and it will be a very long time before we see another person like Dr. Kambayashi.

Dr. Kambayashi is survived by his wife, Noriko, and two sons. He also leaves many other family members, friends, and colleagues from all around the world. He is deeply mourned and sorely missed by all. While a great man has left us, his amazing achievements and humanity will live forever.