Professor Susumu Maeda our colleague, mentor, and friend

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The candle that burns brightest burns the fastest. The lives of all he touched were illuminated by the radiance of our colleague Susumu Maeda. His light brightened our lives with enthusiasm, quiet humor, and compassion. It set a high ethical standard. He brightened the lives of the family that he honored and adored. He illuminated new pathways in science for many to follow. He provided a beacon for a new generation of scientists to chart their way. Then he ignited a new flame of understanding in all those he touched as he followed his own quest for knowledge. This fundamental understanding of virology has contributed greatly to our joint pleasure of biological insight. His life work already has had a major impact on improving human and environmental health through medical and agricultural biotechnology. This impact grows larger by the day. Susumu Maeda, our friend and our colleague, we miss you. This is a brief remembrance and resume of Susumu Maeda

Professor Maeda's background

Professor Susumu Maeda was born on April 9, 1950, the second son of Dr. and Mrs. Tsuneo Maeda in Matsumoto, Japan. The kanji or Chinese character of his given name "Susumu" means "to advance or progress". Following his death he was given the Buddhist name Kenshininshakujyoshin which partly means "sincere seeker of knowledge". Susumu spent his childhood in Matsumoto which is located about two and a half hours (by train) northwest of Tokyo in the heart of the Japan Alps. As a youngster Susumu enjoyed hiking and climbing in the Japanese Alps where he would observe and collect butterflies and other insects. During his early years Susumu also learned to play the violin under the direction of Shinichi Suzuki the originator of the popular Suzuki Method of violin and piano instruction. His love for classical music was life-long, and he had a large collection of classical music CDs. After graduation from Matsumoto-Fukashi Senior High School, Susumu was accepted at the University of Tokyo where he received his bachelor of science in 1975, master of science in 1978, and doctor of philosophy in 1983 for a dissertation that is roughly translated as "Analysis of the densonucleosis virus of the domesticated silkworm, *Bombyx mori*". Susumu accepted a position as Assistant Professor in The Laboratory of Applied Entomology at Tottori University in 1978. In 1980, Susumu studied for one year at the University of California, Berkeley in Professor Yoshinori Tanada's insect pathology laboratory. In Berkeley, Susumu met another student from Japan, Hiroko Murai, who would later become his wife. After returning to Japan, Susumu commuted from Tottori to Tokyo in between his teaching responsibilities at Tottori University and research at the University of Tokyo. He served as a consultant to many agricultural, pharmaceutical and biotechnology companies. In 1987, Susumu joined the Zoecon Research Institute in Palo Alto, California as a Visiting Scientist and in 1988 joined the Department of Entomology at the University of California, Davis, as an Assistant Professor of Entomology. In 1996 Susumu accepted a concurrent position as Director of the Laboratory of Molecular Entomology and Baculovirology at RIKEN in Wako, Japan. The challenge of establishing a new laboratory in Japan while maintaining an active and expanding program in Davis would have terrified one of lesser ability than Susumu. However, he worked with enthusiasm to build a well equipped facility and an exciting interdisciplinary team at RIKEN.

At UC Davis his remarkable accomplishments led to his promotion to Professor Step II, in July 1997, after just eight short years on the campus. Normally when one is promoted from the Associate Professor rank to the rank of Professor, a faculty member goes to Professor, Step I. In Susumu's case, his file was so outstanding that he received an accelerated promotion to Professor, Step II. To say that this is unusual in our system is an understatement-it is very rarely done.

Susumu was very active in his profession. He presented numerous lectures nationally and internationally. He was an active member of the Entomological Society of America, The

Fig. 1. At a special reception by the Emperor Akihito of Japan, Dr. Maeda was among one of ten outstanding young scientists to be presented.

Society for Invertebrate Pathology, The American Society for Microbiology, The American Society for Virology, and the American Society for Biochemistry and Molecular Biology. Of the numerous honors and awards bestowed upon Dr. Maeda, perhaps his most cherished was in 1995. During a formal reception in honor of Dr. Edward Knipling, who received the Japan Prize for that year, Susumu as one of ten young scientists who were, along with their spouses, invited to a special audience with Emperor Akihito to discuss their research (Fig. 1).

Dr. Maeda's research

Dr. Maeda contributed to the Department of Entomology in all areas-teaching, research, public and university service and outreach. However, it is Susumu's research accomplishments that clearly rise above the rest. The following comments were extracted from the letter written by the Department of Entomology in support of Susumu's promotion to full Professor and we quote "Dr. Maeda's research program is nothing short of prodigious, brilliant, prolific, explosive and world class according to the unanimous sentiments of faculty in the Department of Entomology and the external reviewers. During the period of review, he has published 51 scientific articles (40 in refereed journals), many of which have broken new ground and essentially represent the best and most influential science in his field. His program is the epitome of achievement of the research goals and mission of the College of Agriculture and Environmental Science because of its purposeful and functional balance of basic and applied research and, furthermore, its intent at and apparent success in extending new technologies to innovatively solve long-standing problems in the control of pest insects.

His stature as one of the preeminent scientists in his field is attested to by his publication record in top flight journals including the Journal of Virology, Virology, Nature, Biochemistry, Gene, and Insect Biochemistry and Molecular Biology, by the diverse and considerable extramural funding from federal, foreign, and industrial sources, by the hosts of scientists that came to visit and work in his lab, by his numerous reviews of grants and scientific papers for federal agencies and prestigious journals, and by the numerous invitations to present seminars at universities and at major national and international symposia. Perhaps the most noteworthy index of the esteem with which Dr. Maeda is held internationally is his appointment as Laboratory Director for the Laboratory of Molecular Entomology and Baculovirology, The Institute of Physical and Chemical Research (RIKEN) in Tokyo, Japan. Dr. Maeda held a joint appointment between UC Davis and RIKEN. The appointment is among the highest honors in Japan and the fact that a faculty member from Davis holds such a position speaks eloquently of Dr. Maeda and for UCD's fortune in having Dr. Maeda as a faculty member.

Professor Maeda's evaluation by his colleagues

Stature in the eyes of one's colleagues and peers is possibly the best criterion of success for an academician. The faculty review of Susumu supporting his exceptional accelerated promotion to Professor in 1996 is illustrative of the esteem with which we held him at Davis.

With regard to his teaching in the areas of molecular biology, gene expression and structure, developmental biology and virology, the faculty concurred on the following. "The lectures are stimulating because they forced students to ponder the controversies and societal impact of molecular technology in that they elucidate the complexities of technology transfer to agriculture, medicine and the pharmaceutical industry, the current and future roles of universities in pure and applied research, and the sensitive issues of environmental safety and public perceptions. Dr. Maeda is a leader in his field; hence, his expertise and broad comprehension of his and related fields is clearly portrayed is his lectures by an effective balance of methodology, fact, concept, and ethics."

It is typical of Susumu in detailing his own accomplishments to be overly modest. The University of California requires external evaluation of a candidate's accomplishments by imminent scientists in a fashion anonymous to the candidate. "The external reviewers extol the sequencing of the complete genome of BmNPV as a technological feat that will revolutionize the study of insect-baculovirus interactions from a biological as well as molecular point of view. Elucidation of the sequence of BmNPV genome provides the real possibility of understanding the relationship between the viral and host genomes with regard to gene products and gene expression. Also, as a result of his sequencing and dove-tailing research on the evolution of baculoviral specificity, his baculovirus-lepidopteran system will in the future be an exemplar for fundamental studies in developmental biology and molecular elucidation of parasitism. The letters laud the recent studies of helicase and cysteine proteases (cathepsin) as major contributions to the current understanding of host-range/specificity of baculoviruses and programmed cell-death (apoptosis) as a result of baculoviral infection. Until Maeda's work, the mechanisms of determination of host-ranges/specificity were virtually unknown. Such work opens new windows in science for understanding the evolution of baculoviruses and the mechanisms by which they control their hosts, and will assuredly lead to innovative avenues for creating more effective viruses for insect-control. Such experimental leadership, that is, being the first to identify genes and/or gene products that are involved in determining the success of oral infection, establishment of infection, subsequent gene replication and eventual decomposition of the host to facilitate horizontal transmission are the types of foresightful and seminal accomplishment that one external reviewer classified as being typical of Dr. Maeda's meteoric career. The external letters again describe ground-breaking and technically brilliant work that established baculoviruses as elegant vector systems for the expression of foreign proteins. Such work led to (a) the innovative use of insect-baculovirus expression systems for the commercial production of drugs such as interferon and vaccines, and (b) the profoundly influential work on the transvecting of foreign genes for the expression of juvenile hormone esterase and scorpion toxin into baculoviruses as a means of effecting better control of noctuid pests through faster kill. The studies on enhancement of viral kill time epitomize, in particular, the imaginative use of forefront technology to solve current critical problems in agriculture.

In short, the external reviewers praise Dr. Maeda in the most glowing terms for his unusually influential, innovative

and prolific contributions in three areas of research related to insect molecular biology and virology. These praises lucidly and explicitly justify why Dr. Maeda is at the pinnacle of his field and, hence, more than justify his promotion."

Susumu's faculty colleagues were also ecstatic about the "quality, quantity, breadth, insight" and high "impact" of Dr. Maeda's research using phrases such as "absolutely astounding," "exciting," "exceedingly successful' and "almost explosive" to describe its "growth into a cutting-edge world-class program" of "extraordinary productivity" arising from a "remarkable level of funding." Faculty comments unanimously reiterated those made by the external reviewers and, in fact, many faculty were "overwhelmed by the tone of the" external "letters" because of their "universal positivism." Faculty comments also reinforced the idea that his research program is an ideal ferment for the training of graduate and postdoctoral students, as evidenced by co-authorship. Not only were the original research papers deemed on the highest intellectual quality and scientific impact, but also his review articles were admired for their perceptive and "highly synthetic nature." Faculty also praised the long-term focus and effective balance (theoretical, fundamental and applied) of Dr. Maeda's research because of its high potential to have a major impact not only on thought and methodology in basic science but also on agricultural practices of pest-control, as well as pharmacology and drug protection. Few research programs have such immediate, far-reaching and diverse impacts."

Interaction with Mike Parrella

As Chair of the Department, I interacted with Susumu on a regular basis. For me he was an absolutely delightful faculty member. He had an exceptionally strong international program that I used regularly when promoting the Department of Entomology, and Susumu never complained about anything. I remember on one occasion Susumu came to my office and indicated that he needed a larger laboratory. I then followed Susumu down to his lab, and I realized that he shared his office with a postdoctoral research scientist. This is probably the ultimate sacrifice by a college professor. I came to realize that there were so many people in his laboratory that they had to work in shifts. Nonetheless, I made it a priority to try and get Dr. Maeda more space. In negotiations with Mark McNamee, I was able to secure a much larger laboratory for Susumu and he would have moved into this space probably some time in 1999.

My own area of research is biological control of greenhouse pests, and I have benefited directly through my association with Dr. Maeda. At an international meeting on biological control held in Pacific Grove, California, I found myself talking to two participants who were from Japan. Just by chance I happened to ask them if they knew Dr. Susumu Maeda. I still remember the looks on their faces. Their eyes lit up, they became very excited and they told me that he was a famous Japanese scientist working in the area of baculoviruses. When I told them that he was in the Department of Entomology at Davis they were almost speechless. I did not deserve this, but it was clear to me that their opinion of me was heightened simply because I was the Chair of the Department in which Dr. Maeda was a faculty member. This spoke volumes to me concerning the true national and international reputation of Dr. Maeda.

Interaction with Bruce Hammock

Above all Susumu was a friend. We shared the rare triumphs and common disasters of faculty. Susumu communicated to me the tremendous pleasure in watching the scientists that he mentored mature. He seemed to be driven by a love of science much more than ego. When I appeared in his office with some iced beer to celebrate his receiving tenure, he seemed genuinely pleased. However, he added that it was not that big of an event.

As outlined in the next chapter in this book, Susumu and I shared an exciting time in a small arena of trying to develop the first recombinant viral insecticide. His value as a colleague extended far beyond this fruitful and entertaining collaboration. Susumu was a sounding board for ideas and was free with his suggestions. We had an entertaining week together wandering around Crete after a molecular biology meeting. We decided to spend the week trying to think of new fields in science that we could pursue together. Susumu wanted to find a field where there was no literature so that we could spend out time running experiments and inventing a new field rather than going to the library. In a remarkable fete of bad timing we concluded to develop recombinant antibodies. The project could be justified in the short term by improved immunoassays and in the longer term by innovative ways to treat disease and improve crops. Our timing was great in that there was almost no literature when we started the work, but poor in that several large laboratories noted the same void and soon over powered our efforts. Susumu found quite a bit of humor in joint this disaster.

He took his job as a mentor seriously both with the people in his own laboratory and with other scientists. He spent a great deal of time training scientists from my laboratory in molecular virology. He welcomed any serious scientist to his laboratory, and often had several rotation students and students from other biochemical laboratories on campus learning to do eucaryotic expression in his laboratory.

Possibly because of his apparent shyness and his prowess in molecular virology, many of his peers did not realize that Susumu was broadly trained in agriculture and entomology. As a student he had developed an interest as an insect collector. Susumu took the collegial nature of the department seriously. He wanted to do his full share of committee work, and probably had the best record of attendance of any faculty member at faculty meetings. Susumu felt a great loyalty to the University of California and worked hard on behalf of the University to expand research opportunities for students and faculty. Later in his career he desperately wanted to see a productive research interaction between UC and RIKEN.

We commonly talked of the mountains. Each year I invited him on a climb of Bear Creek Spire in the Southern Sierra Nevada Mountains. Each year he considered it carefully then concluded he was too busy and would go the next year. Thus there are a few regrets and missed opportunities in our years

together. However, over all one could not have hoped for a better colleague and friend than Susumu Maeda.

Interaction with George Kamita

I joined the Maeda Laboratory nearly ten years ago in October of 1988 (Fig. 2). At that time the Maeda Laboratory was three months old and only partially functional because the lab was still undergoing renovations. Back then, there were only three of us, Professor Maeda, Dr. Terry Hanzlik, and me. Since we were so small, Dr. Maeda had his own bench space and took an active role in research. He poured his own plates, picked bacterial colonies, and yes, he even did his own mini-preps usually 120 or more at a time. It was an amazing feat of timing. Dr. Maeda loved to do things in large numbers and quickly. Soon, however, more people joined the lab and Dr. Maeda's bench time became more and more infrequent.

Fig. 2. The Maeda laboratory under construction in 1988. Standing from left: Susumu Maeda, Toshihiko Ishiko, Yoshi Aira, George Kamita and kneeling Terry Hanzlik.

Since those early days, more than 50 scientists and students have been a part of the Maeda Laboratory at UC Davis. These scientists and students came not only from throughout the US and Dr. Maeda's native Japan, but also from England, from China, from France, from Egypt, from Taiwan, from India, from Israel, from all over the world people came to study with Dr. Maeda. With all of these scientists and students, Dr. Maeda was very free with his ideas and with his time. Perhaps because he was so free with his time, Dr. Maeda always seemed to be running out of it. For example, it was a given in our lab that the night before a major grant proposal was due no one made any plans. In fact, we even started to wear comfortable clothes so that we could work on the proposal long into night. In the end, however, we would always pull together and everything would work out. I think that Dr. Maeda enjoyed the excitement and challenge of accomplishing something in a short amount of time and at the very last minute.

Life in the Maeda Laboratory, however, was not only about research. We also got together for parties and other social events. My most favorite of these events were the barbecue parties that Dr. Maeda and his wife hosted during the summer time (Fig. 3). I can still vividly picture Dr. Maeda

Fig. 3. Dr. Maeda preparing steak and lobster for a summer barbecue party at his home in Davis.

running around in his shorts and T-shirt making sure that everyone had enough to eat, but then quickly running back to the grill to make sure that none of the food caught on fire. This, too, was an amazing feat of timing.

Professor Maeda was truly an extraordinary and wonderful person and with him at the helm, the Maeda Laboratory was truly a special place. We will all miss Professor Maeda's mentorship, his leadership, his kindness, and the joy that he brought to the lab.

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