

! "\$%&'()\*+,-. #+##(/' +/' ()

)

! 0)1' 2' \$"\*&' )&3' )4#5' )05)

)

)

63#+7\*)8+0%9)

)

)

: /&0\$' "); <=>; >?@)

)



**S an Gerbi**

I first met Shinya Inoué

***Nina Stromgren Allen***

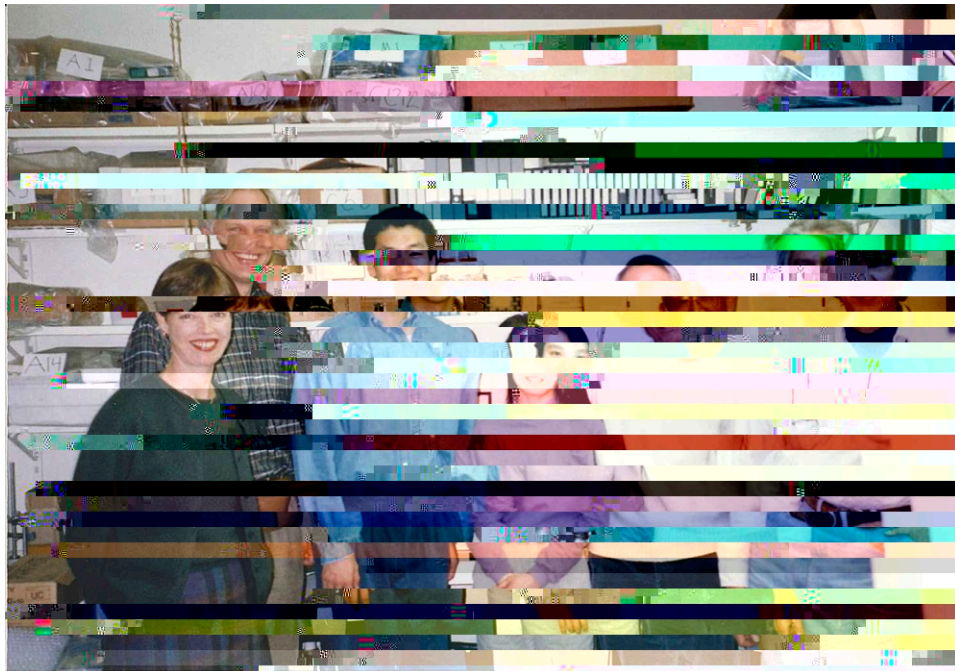
***Tim Michion***

Below are a couple of quotes I love from an essay co-written by Shinya Inoué and Ted Salmon (1995, *Mol. Biol. Cell*). These statements reflect the views of both co-authors, but somehow I hear Shinya's voice especially strongly. Listen to the living cell....

“...we should remember that nature sometimes reveals her most well-kept secrets through exaggerated displays found only in exotic cell types.”

“...we need, in addition to dissecting the molecules further, to listen ever more carefully to the living cell, and be prepared to be taught further unexpected paradigms.”

***Rieko Arimoto***



Shinya's research attracted people from diverse backgrounds; the lab was truly interdisciplinary, certainly steered my scientific interests into a new directions! From left, Jane MacNeil, Rudolf Oldenbourg, Keisuke Sukuzi, Rieko Arimoto, Shinya Inoue and Bob Knudson (1996), surrounded by piles of video tapes and neatly organized recording equipment.



### ***Ron Vale***

Shinya Inoué had a big influence on my life. I remember meeting Shinya when I was a graduate student at the MBL in Tom Reese's lab in 1983-1986. Working on microscopy myself, Shinya was a heroic figure who pioneered live-cell imaging, built magnificent microscopes and led the digital era of microscopy. Shinya was filled with a passion for science that burned strong throughout his life. However, I also remember him as a kind individual who always had a twinkle in his eye. We would have nice talks in the dead of winter in Woods Hole; he looked after me then and helped me in my career. At the close of my time in Woods Hole, Shinya suggested and effectively arranged for me to do a "Dan Fellowship" in Japan. Working in Kyoto, Japan at age 27 proved to be a very influential 3 months in my life, and Shinya's introduction seeded my long-term connection with many Japanese scientists.

My wife Karen Dell and I later wrote an article in the Journal of Cell Biology in 2004 in honor of Shinya's receiving the 2003 International Prize in Biology and a special meeting held in his honor in Japan. The article concluded by saying:







### ***Keigi F ji ara***

Although I was a graduate student in the Biophysical Cytology Program at Penn for 5 years and took 2 courses offered by Shinya, I do not remember having any personal or long conversations with him during that time except for on one occasion, which I will describe in a minute. This was partly because Shinya was not my direct thesis advisor, but the main reason was that for me, Dr. Inoué was so far above me that I didn't know how to approach him, let alone what to say. Throughout my Penn years, I could never call him by his first name; he was Dr. Inoué. Period.

So, the only time I did talk to him was when I wanted to take the Physiology Course at MBL. I went to his office and asked him if he had time to speak with me. He looked surprised, but pointed to an empty chair. I sat and clearly remember feeling very awkward, but I must have begun talking. He first listened and then asked me a few questions. I was so surprised that he was truly interested in what I had to say and responded to me with smiles, softness, and support. He then told me that the deadline for application had long passed. Hearing that, I was ready to thank him and leave, but he told me to stay then picked up the phone. I remember Shinya saying on the phone something about the uncertainty of the course being offered the following year. Before ending the call, they discussed matters that had nothing to do with me. After the call, Shinya said, "I think you're in." I thanked him of course, but I thought what a powerful person he was. I was of course very happy to hear this, but I remember thinking "I think you're in" is not a definitive statement. However, I now know that when Shinya says, "I think...", that means IT IS SO.

It was after I left Penn that Dr. Inoué became Shinya. Although no paper was published, we did many experiments together at MBL, mostly him microinjecting antibodies into fertilized sea urchin eggs. Through these experiments, I got to know Shinya well, his true fascination about biology, uncompromising technical perfection, and meticulous record-keeping. I remember that whenever I said something that he did not agree with, he would not say anything but would tilt his head sideways slightly and look at me with a smile. I have many fond memories of him: having a countless number of meals at Captain Kidd, dining at a restaurant in Kyoto with Shinya and Sylvia, taking long brisk walks together in Osaka, collecting sand dollars, catching grasshoppers, and chatting with him at the ASCB meetings. Like all of us, I will miss him and am better for having known him, a person who was a great teacher, incredibly creative scientist, and friend with warm smiles.

***Michael Shribak***

### ***Lo i Kerr***

I came to the MBL in 1980 and very quickly met Dr. Inoué through my duties of assisting in the MBL short courses, which included the AQLM course.

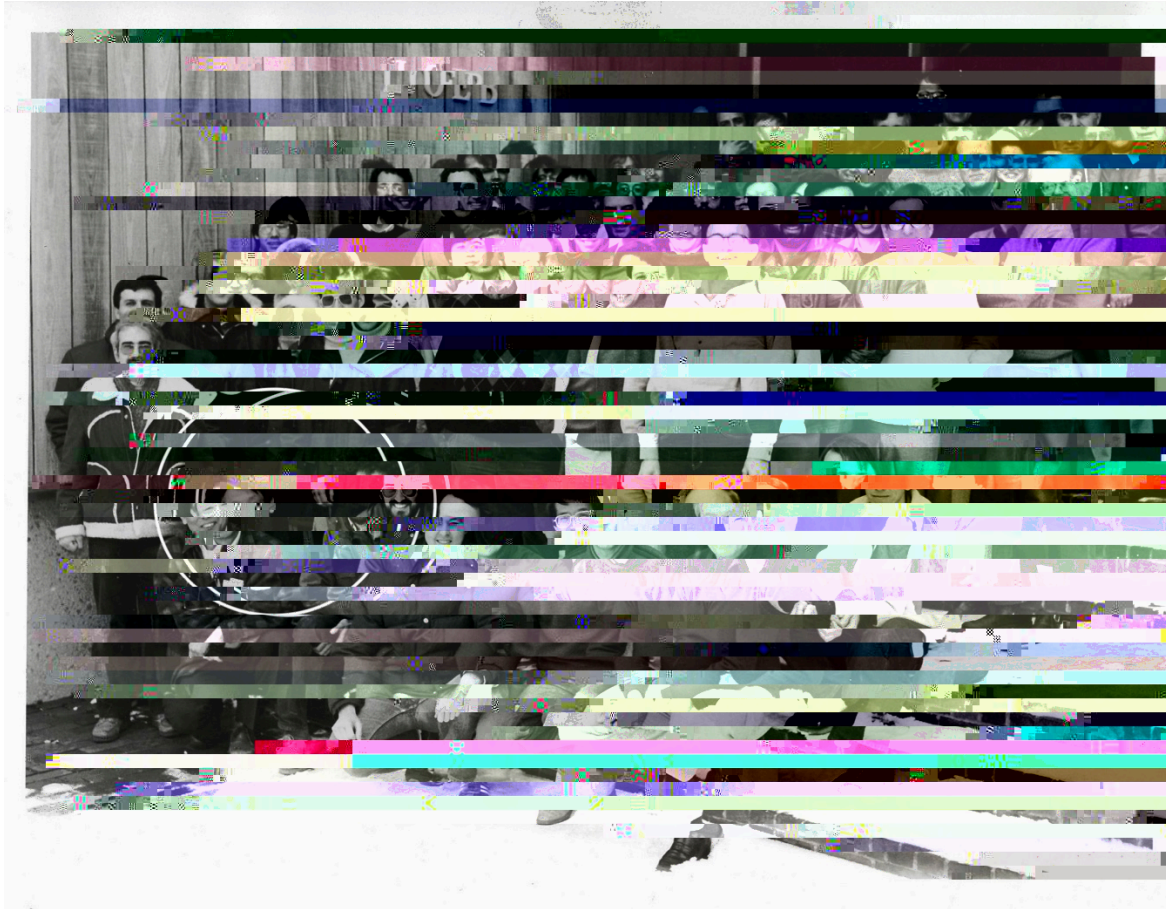
The other day while on the water I saw a sun dog and it reminded me of Shinya as he was the one who introduced me to these phenomena. The sun dog is caused by the refraction of sunlight by ice crystals in the atmosphere. Seeing the sun dog lead me to think about the time he told us that we humans can perceive polarization. An example he gave was Haidinger's brush and he said it could be seen as a bluish bow tie while looking at a clear blue sky early in the morning. A few days after his presentation I came to work and the sky was blue so I went outside the Lillie building and laid upon the concrete pad and looked up. After a few minutes I could see it! I told Shinya about it and I think he was surprised that I would try but impressed that I was able to see it.

On another occasion when his son Ted was in high school, he and Shinya asked me if I could coat a hand polished mirror with aluminum to use in a telescope they were building. They came to me because we had a vacuum coating device that could evaporate aluminum. I said sure thinking we would load some aluminum foil on a filament, put the mirror on the base of the instrument and do a vacuum evaporation run. Of course, I wound up getting a lesson about how the coating thickness is based on the amount of aluminum and the distance from the aluminum to the mirror. Shinya and Ted knew the thickness they wanted so we were able to calculate the other two variables. It worked out well!

I was impressed with Shinya's interest in civil engagement and trying to make a positive impact while acting with humility and also being prepared. Over the years on many occasions in meetings and lectures in the Lillie Auditorium I was witness to this effort. If you go into the Auditorium through the back doors Shinya liked to sit about halfway up in the left side section. I am sure he had a good reason to select this area, but I don't know why?! Regularly during MBL Society meetings, general institutional meetings and lectures Shinya would raise his hand to deliver a well thought out question, comment or suggestion. He presented these without exaggeration and was always well intentioned.

A comment about his ability as a teacher. I really enjoyed listening to Shinya lecture because his excitement and attention to detail was visible. He knew his subject and presented it in interesting ways. He liked to draw detailed diagrams on the board, use the overhead projector and use props, such as two pieces of the same type of wood cut in orthogonal directions and then using a tuning hammer he would demonstrate how they made different tones. This represented the two different fields of polarization. I was able to work with Shinya to produce the muscle-thin section slides that very eloquently show the utility of polarized light microscopy. Shinya left nothing to chance, the sample – striated frog leg muscle in the tensed state, fixation protocol, embedment, section thickness, orientation on the coverslip, mounting media, etc. All these things were thoroughly thought out. (

(Louis Kerr, cont.) In the end, Shinya was a great mentor to me without him even trying to be. He was humble, detail orientated, quietly humorous, respectful and wise.



Shinya and Louie Kerr in AQLM class photo, year unknown.

### ***Joseph and Jean Sanger***

On behalf of Jean and myself, I would like to say a few sentences about Shinya.

It was a different era in the 60's (Dartmouth Medical School, and then Penn) and 70's (Penn), so we do not have any photographs of Shinya.

The attached photo is of Jean and me on the first full day of our honeymoon in Bermuda, September 13, 1964. We were married in Falmouth on September 12, 1964, after the Physiology course was finished. Shinya and Andrew Szent-Gyorgyi attended our wedding reception.

Shinya arranged for us to be his two graduate assistants in the 1964 Physiology Course so that we could spend the summer of 1964 in Woods Hole. Jean grew up in Falmouth, and her family has had a long connection to WHOI.

Shinya was not only our scientific hero, but he looked out for students in his Department of Cytology at Dartmouth. My comments would relate to his kindness towards Jean and me at Dartmouth, but also at Penn. Jean and I were in the Anatomy Department at Penn, and Shinya was in the Biology Department at Penn, only a very short trip between the two Departments.

***Pa I Forman***

I learned one of my most important lessons in life from Shina Inoué when I was working as his research assistant. I assisted him with a polarizing microscope he was developing, and once complained about the awkwardness of the focus mechanism. Two days later he handed me a gadget that completely eliminated the cause of my complaints. It was a sophisticated, not-at-all-

***Brad Amo***

I first started communicating with Shinya in the 1970s, when I had completed my PhD



### ***Mai Tran***

I was a former PhD student and postdoc in Rudolf Oldenbourg's lab from 2012 to 2019. When I joined Rudolf's lab, Shinya had not visited the lab often. However, I was so lucky to use Shinya's office. Here, I can learn from how he organized his stuff, especially his books which are invaluable. Sometimes, I can see his helpful notes while reading the books. In addition, his old work was still valuable for my work on microscopy. Actually, I found the ideas based on his work.

I believe that Shinya's work on cell biology and microscopy will be immortal. I always consider him my indirect mentor. I don't know him much in person but from my respected colleagues and people in Woods Hole, I know Shinya is an amazing and great person. I really admire him and his love for science.

In summer 2012, our lab was suffering considerable financial difficulty. Shinya was very generous to use his own money to support us. We are really grateful for his support not only financially but also emotionally.

I remember when I was first at MBL, someone asked me "Do you know Shinya? Have you seen his microscope?". Now, it's my turn to ask a new MBL visitor if I have a chance. "Do you know Shinya Inoue? Have you seen his microscope?"

I would like to express my deep gratitude to him. Rest in peace. Shinya will be missed by us, forever.

### ***Hideo Hir ma***

Our relationship started when Shinya gave us some claim on our camera for microscope. The trouble was a simple one. It was fixed in five minutes. But it happened simultaneously that so called "real time subtraction on the image" which named later on as VEC (Video Enhanced Contrast) was invented. We continued collaboration with him to develop high sensitive laser scanning microscope. This technology is utilized in semiconductor failure analysis field effectively.

I remember many time of driving to the MBL from Boston and spend a wonderful time with Shinya and hope for a peaceful heaven for him.

### ***Hiro I hii***

When I first started to work at the MBL as a postdoc, Shinya-sensei kindly came to his lab and taught me how to use his microscope. It was the strict winter season of 2015. I was truly impressed with his passion and sincere attitude toward science. Shinya-sensei was my dream scientist who taught us how the living cell is beautiful and unique and the true worth to study the biophysical mechanisms deeply as a scientist. May he rest in peace.

***I ei Mab chi***

I first met Shinya-san when I went to the U. of Penn as a postdoc in Lew Tilney lab in 1977. I was lucky to collaborate with Shinya-san and his graduate student Dan Kiehart. In every summer of the past 15 years or so, I used to visit his office or house and enjoyed talking with him. His passion for science inspired me and his excellent memory

***Ka hiro O i a***

When I was an undergraduate student of the Department of Zoology, the Tokyo University, I spent a week in the Misaki Marin Biological Station (MMBS) and met Katsuma Dan. Although he had been already retired from the university, he spent many days in MMBS for his research. He kindly showed us the cleavage of the eggs of   
with an optical microscope At that time, I happened to hear the name of Shinya Inoué from Katsuma Dan.

When I became a graduate student, the book entitled “Video Microscopy”, which Shinya Inoué authored, was one of the most influential books on me. I have still consulted this book for my present research. As a postdoc, I received his kind words on our research achievement in 1990 on the centrifuge microscopy applied to   
actin cables and these words very much encouraged our group and me. I was thus inspired by his wisdom, his critical thinking, and scientific objectiveness.

The photo attached reminds me of the scene that Shinya Inoué had a lecture on the wood stage of the Noh theatre in Nara Kasugano International Forum, where the symposium was held honoring Inoué’s 2003 International Prize for Biology award and his pioneering spirit in light microscopy. It was a great honor and privilege for me to have a chance to give a talk in the symposium.

Shinya Inoué will be greatly missed by his family, his students, his colleagues, and his friends.

***Ka hiro***

### ***Mahito Kikumoto***

We, Prof. Oosawa, his wife and me arrived in WoodsHole at 1993. At that time, Shinya's group had the members of, Rudolf Oldenbourg the scientist and his assistant Guan May, Andreas Stemmer the Post-doc. from Swiss, who is constructing bio-AFM, Jane the secretary, Barbara the assistant of Shinya.

Here are epsodes related to Shinya during my stay and etc.

[Ep.1] Prof. Fumio Oosawa was invited to the summer courses in Woods Hole in 1993 and stayed first time there. He had lectures in Microscopy course directed by Shinya in May, and in Phisiology course by prof. Tom Pollard from July to August. He brought me





### ***Mi ho Shimi***

It is exactly 20 years since I first met Shinya at MBL, when Yokogawa sent me to demonstrate the CSU-10, spinning disk confocal scanner, at the AQLM course. I used to be an industrial microbial researcher before joining Yokogawa but my knowledge and skills in microscopy was quite poor. Shinya very kindly and patiently gave me personal elementary lessons how to clean lens and very basic Koehler illumination method, which I still remember vividly. Ted Inoue helped me all the time to run the Argon laser and a video camera to enable running the CSU-10 and successfully demonstrated direct viewing of live confocal image, which resulted in cheers all the time. Shinya, himself was the very first researcher to find the potential of the CSU-10 long before it had been commercialized, as Takashi Akiyama writes.

Especially, Shinya had discovered significantly reduced laser photo-damages with the microlens-enhanced spinning disk confocal method far ahead of any researchers. Shinya's positive endorsement was most important for the acknowledgment by notable biology researchers such as Ted Salmon and Ron Vale, who saw the live confocal images with the prototype CSU-10 at Shinya's MBL laboratory and became one of the earliest CSU-10 customers. Exactly, "seeing is better than hearing".

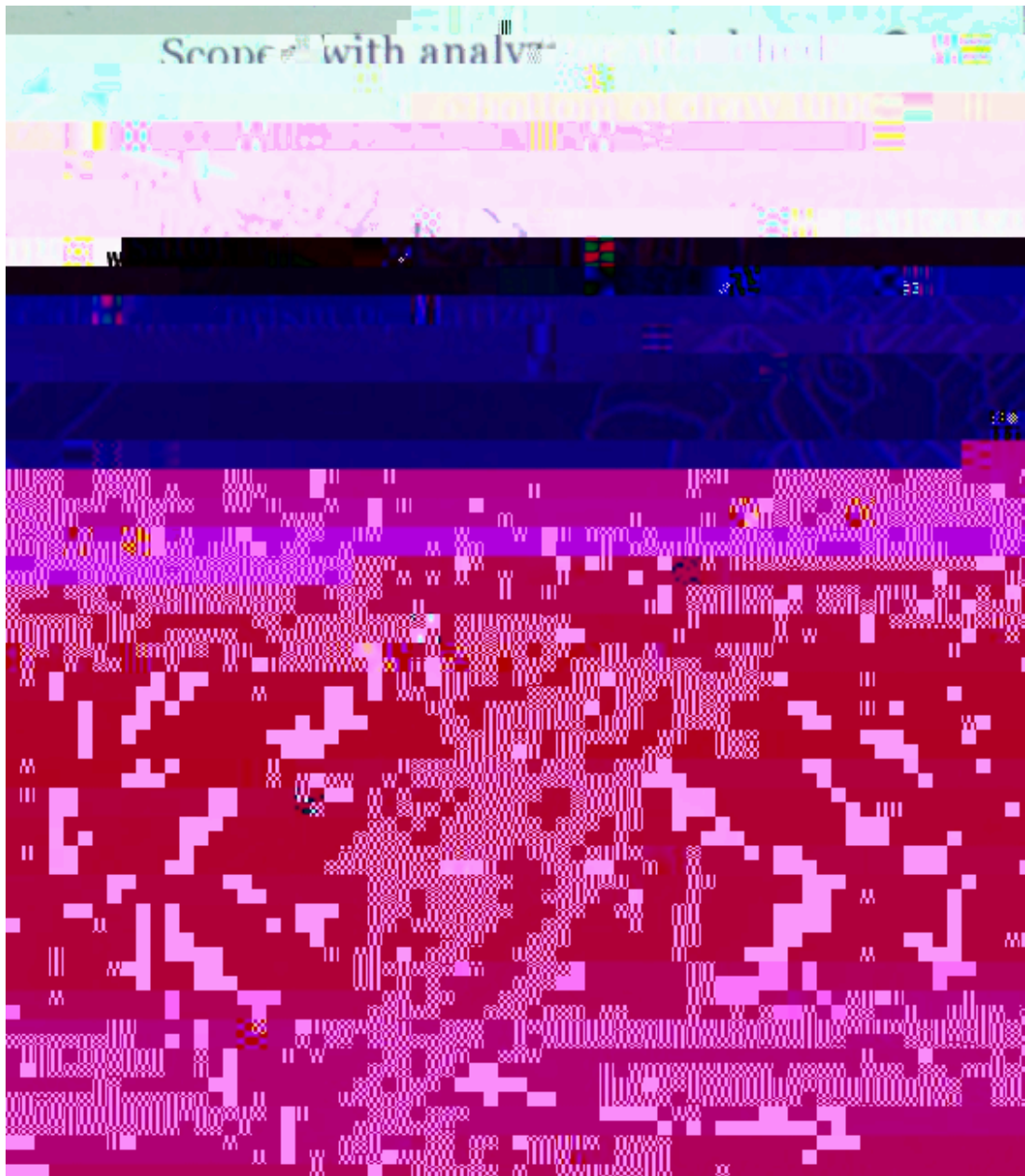
In addition, since the CSU-10 is just a scanner, it is necessary to set up a full system consisting of a microscope, laser light source and a camera, for which Shinya's kindest advises based on his profound knowledge were immeasurable benefit. ie

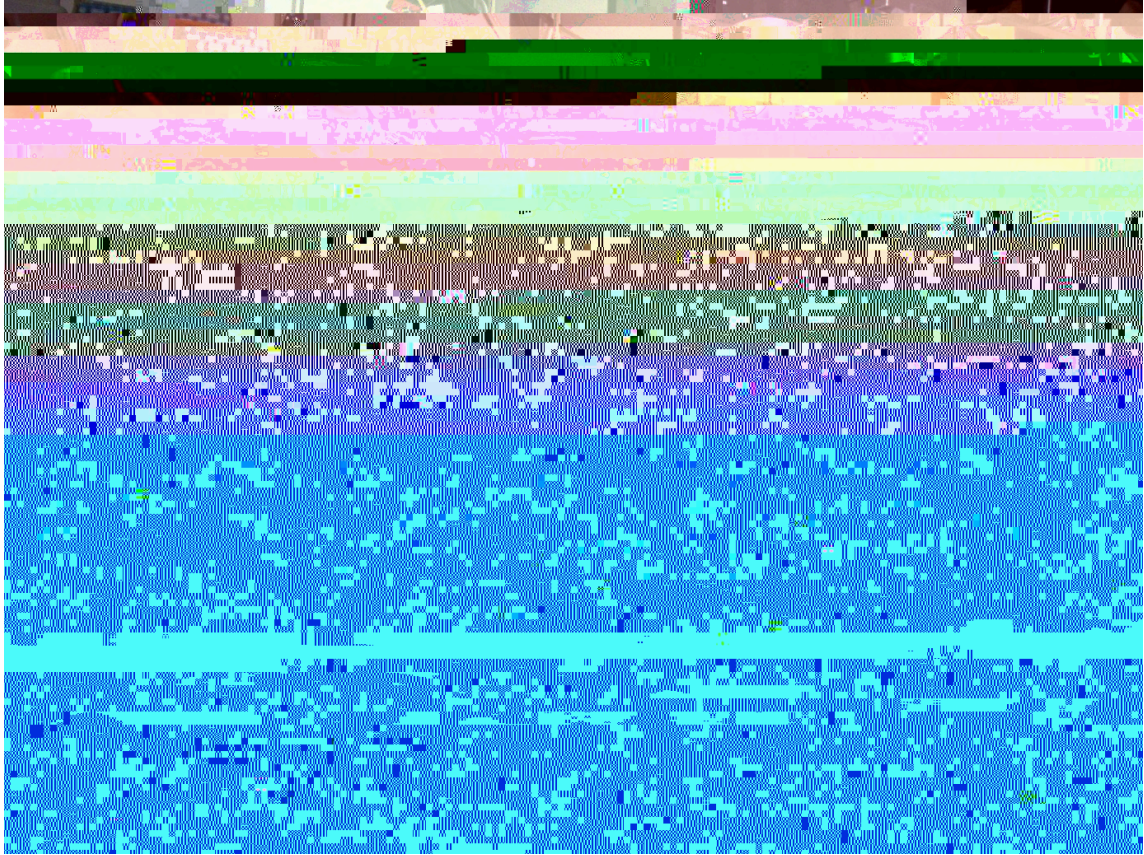
### ***Mo onori Ho hi***

Inoué-san always welcomed me and enthusiastically explained me his new findings whenever I visited him at MBL. His never-fading passion for biology always encouraged me. I saw him time to time at MBL, but did so only twice in Japan, namely at the Presentation Ceremony for the 2003 International Prize for Biology<sup>1</sup> and at a symposium in Tokyo.

The research field for “the 2003 International Prize for Biology” was Cell Biology, and the Prize was awarded to Dr. Shinya Inou







)

***Taka hi Aki ama***

All of us are grieved to hear of Dr. Shinya Inoue's passing and I would like to offer my heartfelt condolences to his family and friends. Please allow me to say a few words about Dr. Inoue's influence on Yokogawa.

Because of his inspiration and encouragement, we made the decision to begin the sale of the CSU through our international distribution system.

I am struck by the conjunction of events that changed the course of our company: if we had not known Dr. Ishikawa, if Yokogawa were not located in Mitaka, and if we had taken the Saturday off on that particular weekend in November, then Yokogawa would likely be quite a bit different today than what we have become. This combination of events and Dr. Inoue's guidance and encouragement have permitted us to become a leader in this field.

During our long relationship with him, we have benefitted greatly from his polite manners and kind attitude towards us, and we know that other companies in the Life Sciences industry share our high esteem.

Dr. Inoue's distinguished career in academia and his generous and kind personality have been recognized throughout the world. We at Yokogawa are deeply grateful for

### ***Take Nagai***

I would like to share a photograph taken at Friday Harbor in 2004 by my Sony camera. 2nd person from the left is Shinya-sensei. You can also find Roger Tsien, Martin Chalfie and Osamu Shimomura. A guy wearing striped shirt and sitting in the front-middle of this picture is me.

At this meeting, I asked to Shinya-sensei about how to compensate depolarization caused by light-passing through an objective lens with high numerical aperture. At that time, I wanted to use fluorescence polarization to detect homo-FRET because I found that a FRET-based calcium indicator, YC3.60 dramatically change the polarization angle of emitted fluorescence upon calcium binding when illuminated with a linearly polarized excitation light. Thus, I thought that I could make a homo-FRET-based calcium indicator whose signal change could be detected by the polarization angle change. Shinya-sensei taught me that rectifier could not be applicable but I might be able to detect the signal change by putting a certain mask in the back aperture of the objective. At that time, I could not understand how to make such mask. But later, you and I started the collaborative work for homo-FRET microscope, and then successfully constructed nice microscope that used a photonic crystal-based compensator.

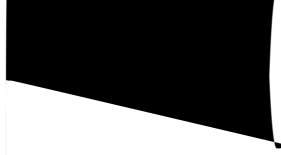
I only have this story regarding Shinya-sensei but this is very nostalgic memory for me.

***Shin'ichi I hi a/a***

The first time I met Shinya-san was in the mid-1970s when Shinya-

***Hajime Takaha hi***

Dear Shinya: It has been 20 years since I developed the Centrifuge Polarizing  
Microscope with you, but I still



Dear Shinya Inoué,

I am a very lucky person because I had a chance to learn your fantastic science.

Here, I would like to write about my memories with Shinya-sensei.

During my PhD course, I was studying the semi-open mitosis of embryos and I was interested in the variety of mitosis among eukaryotes. I found your works in which you clearly described the



