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## “Homework” from childhood

Naoki Yamamoto

When I was around nine years old, my father bought me the book entitled “A Data Book to Understand the Universe.” I was intensely fascinated by this book, which offered explanations of the universe, elementary particles, the life and death of stars, and the origins of life, via evocative photographs and illustrations. Two things remain with me most from the explanations found in this book. One is that, for whatever reason, of the elementary particles which are the basic components of matter known as quarks and leptons, the former do not today exist in space as singular entities. The other is that the universe may have been created from a vacuum-like nothingness which suddenly changed into a finite space somewhat like a bubble. However, at the time I was unable

to understand what this meant, or why it was necessary to think about this. I thought that this idea of “creation of the universe from nothing” was merely a theory proposed by the Soviet-born physicist Vilenkin, and wondered at the fact that there are people in the world thinking about such unimaginable things. It is extremely appealing to imagine it might be possible to inquire into and understand fundamental problems not just of the universe but of the natural world.

More than a quarter of a century later, in September 2018, I took part in a conference in Sweden. All of the participants were assigned an office at this conference, and who did I find myself sharing mine with but the very same Vilenkin! As he was returning home on the same day that I would be giving a talk, I cornered him to discuss my recent paper on supernova explosions at the office (naturally I also mentioned that I had read this book when I was a child.) I would never have dared to imagine that our paths would one day cross, and that a day would come when I would be able to directly discuss my own ideas with him.

From my childhood through to today, it would appear that the number of “useful” things has increased considerably in the world, and also

that various other fields have developed after gaining popularity. Nevertheless, even if many of the long-standing problems of the universe and matter remain unsolved, recent progress is also undeniable. We have established that the universe is around 13.8 billion years; confirmed the existence of the Higgs field which is the origin of the mass of elementary particles; and recently detected gravitational waves from the merger of black holes and neutron stars. Around one hundred years has elapsed between Einstein’s theoretical prediction of gravitational waves and their direct observation. I have a genuine sense of amazement for humanity because we can scientifically ascertain over a long time span such things which far exceed the scale of the human being.

I aspire to make a contribution, however small, to clarifying the universal mechanisms of nature which have thus far remained obscure to all, despite their undeniable existence. I also hope to inspire interest in younger generations unbound by transient fads. Finally, I wish for a society that understands the significance and urgency of tackling these sorts of fundamental problems from various directions.

## 理工学 Information

### Business Idea Contest

We hosted a business idea contest at the KEIO TECHNO-MALL 2019 (20th Annual Keio Science and Technology Exhibition).

#### Contest Overview

At the Keio Leading-edge Laboratory of Science and Technology (KLL) of Science and Technology, we actively create and invest in, offer technological support, and initiate tie-ups with business start-ups, to actualize and feed research outcomes by faculty members and students in the Faculty of Science and Technology through to the community at large. This contest involved introductions of the business ideas of students that will become “eggs” for the start-ups selected for KLL incubation and preparatory support initiatives in the current year, by way of a pitch contest consisting of short presentations of four minutes length.

Eight teams participated in the event, with one of these singled out for the Grand Prize and four other teams selected for Excellence Awards, following a screening of technical and business aspects of the various business ideas presented.

#### Participating teams and presenters, and screening results

Grand Prize “Zip Infrastructure,”  
Takamasa Suchi (third-year undergraduate)

Excellence Award “Development for the practical use of a simple, rapid DNA quantitative diagnosis technology using conjugate gold nanoparticles”  
Keiko Esashika (doctoral candidate)

Excellence Award “Toy Step”,  
Goki Yamamoto (master’s student)

Excellence Award “SC-Ring”,  
Takuya Suga (master’s student)

Excellence Award “LABLIC”,  
Tatsuho Nagatomo (doctoral candidate)

(Shown below in order of presentation )  
“Information Bank aggregating people’s searching behaviors,”  
Ryo Onodera (fourth-year undergraduate)  
“A proposal for the Live SNS,”  
Saishi Kurata (fourth-year undergraduate)  
“Smart Contract for Credit Assignment,”  
Kiichiro Toyoizumi (second-year undergraduate)



#### Editor’s postscript

The sight of Associate Professor Yamamoto’s eyes sparking as he declares that, “There are many problems I would like to solve,” was just one highlight of this deeply impressive interview. Indeed, he has had a professed love of “solving problems” since a young age. A sensation similar to what is felt when having solved a problem may be the driving force behind his willingness to try things he has never experienced or to take on something new upon entering university, whether it be through competitive dance, the martial arts, or by meeting a diverse array of people. (Izumi Hagiwara)

**Cover of current issue :** The cover was created using the “Supernova” that Associate Professor Yamamoto is currently studying as its background.

## 新版 窮理図解



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