

A stylized world map in shades of blue, green, and yellow, serving as a background for the top half of the page.

# STeLA

## Leadership Forum 2007 in Tokyo Conference Report

August 18 - 26, 2007  
National Olympics Memorial Youth Center

brought to you by:  
Science and Technology Leadership Association  
MIT-Japan Program

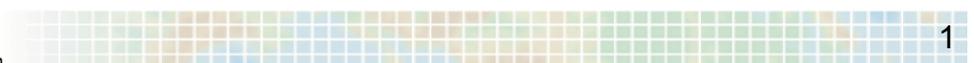
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STeLA





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This year's Forum was our first annual event to give a profound thought on leadership in science and technology. We are proud that our Forum drew participants from such a variety of backgrounds, both culturally and academically. We truly believe that the participants stumbled upon a great many discoveries both in the outer world and within themselves.

I would like to take this opportunity to express my gratitude towards the staff, our advisors, site visit organizers, speakers, our sponsors, and all other individuals and parties that gave us indispensable help to make the Forum happen. The whole idea started from a chat over dinner two years ago, and this timeframe was certainly not a short one, although it was not long at all either, given the scale of the event and all the preparations that had to be gone through.

It is our sincere hope that this first Forum will become the foundation for the future network of leaders in science and technology.

STeLA US President  
Masaru Tsuchiya

The STeLA Leadership Forum 2007 in Tokyo was the first memorable Leadership Forum for the young generation in science and technology. This Forum was a great challenge for all of our STeLA members. We had many difficulties while preparing the Forum. Because this Forum is our first trial, not many people believed in our vision at the beginning. So, I truly appreciate our sponsors for their understanding and sharing our vision.

And I would like to extend my appreciation to all those who worked to make the Forum possible: MIT-Japan program, the International Foundation for Information Technology, and all of our supporters who made contributions to our Forum. Without their donations of time, funds and other important contributions, this Forum could not have succeeded.

I really thank our STeLA members for their hard work and endurance to make it through the year and the participants of STeLA Leadership Forum 2007 in Tokyo, for their enthusiasm and various efforts to improve the Forum.

We hope to broaden our activities all over the world. And I am looking forward to seeing the impact of our activities after a few decades.

STeLA Japan President  
Jiyoung Choi



***“I am very excited about this initiative in bringing together students from various backgrounds, culture, and areas of study to Japan to think about, discuss, and take the first step towards their future leadership roles from a science and technology standpoint. I am certain that the Forum will bear fruit in a very profound way.”***

*Richard J. Samuels  
Ford International Professor of Political Science  
Director, MIT-Japan Program  
Massachusetts Institute of Technology*

***“I would like to express my gratitude to all participants, organizers, sponsors, collaborators, and other advisory people. I feel honored to have partaken in such a splendid event and view the real power of people’s passions. I believe that the passionate people, such as those involved in the Forum, will become highly valued engineers, scientists, entrepreneurs, and policymakers.”***

*Shigeki Saito  
Associate Professor  
Tokyo Institute of Technology*

***“The STeLA Leadership Forum is something I have dreamed to see happen because I have been concerned about the narrowness of the scope of typical science and technology education for many years. I am very much looking forward to seeing the impact of this initiative to create a new leadership in coming years.”***

*Hiroshi Ishii  
Professor of Media Arts and Sciences  
MIT Media Laboratory  
Massachusetts Institute of Technology*

***“ The MIT-Japan Program is delighted to support this emerging network of young technologists dedicated to taking a leadership role on science and technology issues that are critical for the future of this planet. It has been especially gratifying to be part of a student-initiated venture that brings deep understanding and entrepreneurial energy.”***

*Patricia Gercik  
Managing Director  
MIT-Japan Program*





Last year the Science and Technology Leadership Association (STeLA) was launched by graduate students studying science and technology at MIT, Harvard University, and Boston University. Through meetings and discussion with highly motivated students from different countries and various fields, the founders understood the need for a network of a younger generation of scientists and engineers who would exchange ideas on the critical role of science and technology in the global society. Shortly after its creation in the US, some founding members, upon completion of their study in the US, returned to Japan and established a branch of STeLA in Japan, composed of students from the University of Tokyo, Keio University, and Tokyo Institute of Technology.

The STeLA Leadership Forum 2007 was our first conference and organized by STeLA under the auspices of the MIT-Japan Program. Both the US and Japan branches actively contributed. The mandate of the Forum was to create an intellectual network and to develop leadership skills to prepare participants to cope with the overarching theme of global science and technology issues. University students in the United States visited Japan and interacted with students in Japan through a series of activities during the period of the 10-day conference.

The Forum was held at the National Institution for Youth Education in Tokyo, Japan, from August 18 through August 26, 2007. 20 students from Japan and 15 from the U.S. universities spent 9 days together, after selected from a pool of highly competitive candidates studying at universities such as Harvard, MIT, and Boston University from the United States and the University of Tokyo, Tokyo Institute of Technology, and Keio University from Japan. The Forum consisted of three components: (1) a leadership session modeled after the education materials at the MIT Leadership Center, (2) thematic sessions on two contemporary issues, “energy and climate change” and “globalization and manufacturing” (lectures, site visits, and discussions), and (3) an experiential group project to create a Rube Goldberg Machine. The final project products were exhibited at the National Museum of Emerging Science and Innovation. The program also featured keynote speeches by Mr. Koji Omi, Japan’s then Minister of Finance, and Dr. Toshio Yasui of e-Access.

Aug 18 (Sat)	Day 1	Orientation, Keynote Speech	
	Day 2	Leadership Lecture	
	Day 3	Thematic Sessions	
	Day 4	Globalization and Manufacturing	Climate change and Energy
	Day 5		
	Day 6	Group Project	
	Day 7		
	Day 8	Final Presentation	
Aug 26 (Mon)	Day 9		



**2006**

Spring	US	STeLA USA was launched
Summer	US	MIT-Japan Program became co-organizer
September	Japan	Some founding members, upon completion of their study in the US, returned to Japan
October	Japan	Formal kick-off of STeLA Japan
November	US	Staff took part in the Friday After Thanksgiving Chain Reaction event at MIT
December	Japan/US	Beginning of Forum content planning

**2007**

January	Japan/US	Official web site was launched
February	Japan/US	Preparation of advertisement / selection planning
March	US	Advertise the call for applications
early April	Japan	Advertise the call for applications
	US	Information sessions for applicants
mid-April	Japan	Information sessions for applicants
late April	US	Interview of applicants
May	Japan	Interview of applicants
June	Japan/US	Information sessions for participants
July	Japan	Pre-forum study session part 1
Early August	Japan	Pre-forum study session part 2, dinner with sponsors
	US	Dinner for staff members and participants



# Detailed Schedule



Leadership Education Session						
8/18 (Sat)	17:00 - 18:00	NIYE/NYC*	<b>Check in at NIYE/NYC</b>			
	18:00 - 20:00		<b>Welcome reception</b> - opening address - orientation			
	20:00 - 20:30		introduction of the facilities			
8/19 (Sun)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:00		Morning leadership short session			
	9:00 - 9:30		<b>Overview of the Forum</b> - sharing the purpose of the Forum - explanation of the Sensible Organizations research project			
	9:30 - 12:00		<b>Leadership Lecture</b> - Overview of distributed leadership and a role-play exercise "Carson Racing"			
	12:00 - 13:00		Lunch			
	13:00 - 17:00		<b>Leadership Lecture</b> - Beer distribution game and systems thinking			
	17:30 - 18:30		<b>Feedback session</b>			
	18:30 - 20:00		Dinner & bath			
20:00 - 21:00	<b>Socialize</b> - in-depth self-introduction					
Thematic Sessions						
<b>Globalization and manufacturing</b>			<b>Climate change and energy technology</b>			
8/20 (Mon)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:30	Ota City Industrial Promotion Organization	Move to Ota City (morning leadership session in bus)		8:30 - 9:00 9:00 - 9:30	Morning leadership session <b>Overview Lecture</b> - Prof. Matsushashi (U. Tokyo) "Climate change and mitigation" - Prof. Suzuki (U. Tokyo) "Sustainability and Technology Governance"
			Lecture - Prof. Hashimoto (GRIPS) "Globalization and Manufacturing: the Case for Ota City"		9:30 - 12:15	
	12:00 - 13:00	Ota City Industrial Promotion Organization	Lunch		12:15 - 13:00	Lunch <b>Case study and discussion</b> - negotiation game (Another COP) - Discussions on climate policy for the transportation sector
	13:00 - 17:30		<b>Factory tour and panel</b> - visiting factories in Ota City - Panel discussion among presidents of factory		13:00 - 17:40	
	17:30 - 19:00	NIYE/NYC*	Move back to NIYE/NYC (snack in bus)		17:45 - 18:30 18:30 - 19:00	<b>Feedback session</b> snack
	19:00 - 20:30		<b>Keynote speech</b> - Koji Omi (Minister of Finance, Member of the House of Representatives) "Leadership in Science and Technology Developments for the Future of Japan and Humankind"			
	20:30 - 21:30	Reception				
8/21 (Tue)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:00	NIYE/NYC*	Morning leadership session		8:30 - 10:00	Move to NSC (morning short session in bus) <b>Factory tour &amp; panel discussion</b> - Nippon Steel Corporation (NSC) Lunch
	9:00 - 12:00		<b>Trading game</b>		10:00 - 12:00	
	12:00 - 13:00	NIYE/NYC*	Lunch		12:00 - 13:00	<b>Factory tour &amp; panel discussion</b> Move back to NYC
	13:00 - 16:00		<b>Lecture &amp; discussion</b> - Ms. Sakuma (JACSES)		13:00 - 14:30 14:30 - 16:00	
	16:00 - 18:00	NIYE/NYC*	<b>Leadership Lecture</b> - exercise (3)			
	18:00 - 19:00		<b>Feedback session</b>			
19:00 -	Free time					

8/22 (Wed)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 10:00		Move to Nissan factory (morning leadership session in bus)			
	10:30 - 10:40		Welcome address and introduction of the factory			
	10:50 - 12:00	Oppama factory of Nissan Corp.	<b>Lecture</b> - Globalization in the workplace	10:50 - 12:00	Oppama factory of Nissan Corp.	<b>Lecture</b> - introduction of NGP2010 - R&D of FCV
	12:00 - 13:00		Lunch	12:00 - 13:00		Lunch
	13:00 - 16:00		<b>Factory tour &amp; panel discussion</b>	13:00 - 16:00		<b>Factory tour &amp; panel discussion</b>
	16:00 - 17:30		Move back to NIYE/NYC			
	17:30 - 19:00		Dinner			
19:00 - 21:00	NIYE/NYC*	<b>Feedback session</b> - preparation for presentation				
8/23 (Thu)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:00		Morning leadership short session			
	9:00 - 12:00		<b>Presentation on Thematic Sessions</b>			
	12:00 - 13:00		Social hour			
<b>Group Project</b>						
8/23 (Thu)	13:00 - 15:00	NIYE/NYC*	<b>Leadership Lecture</b> - introduction of teaching assistants - exercise (4)			
	15:00 - 18:00		<b>Preparation for the Group Project</b> - overview of this project - designing the machines			
	18:00 - 19:00		Dinner			
	19:00 - 20:00		<b>Feedback session</b>			
8/24 (Fri)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:00		Morning leadership short session			
	9:00 - 10:00		Move to Tokyo Tech.			
	10:00 - 20:00		Tokyo Tech.	<b>Fabrication of machines</b> - feedback session		
20:00 - 21:00		Move back to NIYE/NYC				
8/25 (Sat)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:00		Morning leadership short session			
	9:00 - 10:00		Move to Tokyo Tech.			
	10:00 - 23:00		Tokyo Tech.	<b>Fabrication of machines</b> - videotape the machine - feedback session		
23:00 - 24:00		Move back to NIYE/NYC				
8/26 (Sun)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast			
	8:30 - 9:00		Morning leadership short session			
	9:00 - 10:00		Move to Miraikan			
	10:00 - 12:00		National Museum of Emerging Science and Innovation	<b>Preparation for the Final Presentation</b> (includes lunch)		
	12:00 - 14:00			<b>Final Presentation (Open to the public)</b> - demonstration & contest		
	14:00 - 14:30			Snack		
	14:30 - 16:30			<b>Feedback session</b> - feedback of the forum / discussion on leadership		
	17:00 - 18:30			Move back to NIYE/NYC		
18:30 - 20:00	NIYE/NYC*	<b>Keynote speech (International Exchange Building Reception Room 2&amp;3)</b> - Toshio Yasui (President of eAccess, Ltd.) "The Age of Leaders of Technological Background"				
20:00 - 22:00		<b>Closing party (International Exchange Building Reception Room 2&amp;3)</b>				
8/27 (Mon)	7:30	NIYE/NYC*	Get up			
	7:30 - 8:30		Breakfast and check-out			
	8:30 - 9:00		Morning leadership short session			
	9:00		<b>Adjourn</b>			

\* National Institute of Youth Education / National Olympics Memorial Youth Center (Olympic Center)



## Leadership education sessions

To prompt all the participants to consider leadership, we had many leadership education sessions throughout the Forum. The guiding principle for the leadership education is the distributed leadership model developed at the MIT Sloan School of Management. Various cases, games, and exercises were modeled after education materials developed at MIT.

The leadership portion of the Forum was composed of three parts: leadership exercises, keynote speeches, and feedback sessions. In leadership exercises, participants experienced and learned the meaning of each of the four capabilities of distributed leadership (sensemaking, relating, visioning, and inventing) through games and discussions.

As keynote speakers, we invited Mr. Koji Omi, the former Minister of Finance of Japan, and Dr. Toshio Yasui, President of eAccess Ltd., to speak about their perspectives on leadership from the governmental and industrial points of view, respectively.

Numerous feedback sessions were held throughout the Forum, ensuring that each participant had many opportunities to reflect on their learning of leadership and to share them with each other.

## Thematic sessions

In the thematic sessions, participants explore contemporary issues through lectures, discussions, and field trips. We identified two topics for the Forum: global climate change and energy technology, and globalization and manufacturing. Participants were divided into two groups, consisting of US and Japanese students. 18 students chose the climate change and energy technology track while 17 participants chose globalization and manufacturing. They spent three and half days, learning about and discussing the topic of their choice. The thematic session consisted of advance studies (background reading and seminars), lectures, site visits (companies, factories, etc.), and discussions.

### ***Climate change and energy technology***

Human-induced climate change constitutes one of the biggest issues for the 21st century and presents challenges on both technological and political fronts. STeLA believes that this mix makes climate change an ideal case study for the Leadership Forum participants. Since energy use is the key source of greenhouse gas emissions, the world urgently needs innovation in the field of energy technology and more importantly the leadership and understanding to bring existing proven technologies into the mass market worldwide.

## Thematic sessions (continued)

To set the context for this global energy challenge, we invited two lecturers: Prof. Tatsujiro Suzuki (University of Tokyo) and Prof. Ryuji Matsuhashi (University of Tokyo). We visited Nippon Steel Corporation and Nissan to see how companies are tackling the climate and energy challenge. Students also took part in a negotiation game entitled “Another COP” organized by a student group at the University of Tokyo, AGS UTSC, and were engaged in discussions on the mitigation options in the transportation sector.

### ***Globalization and manufacturing***

Progress in information, communication, and transportation technologies has rapidly accelerated globalization. Many companies have outsourced manufacturing to developing countries in search for cheap labor, which some critics decry as a cause for decline in the manufacturing sector in developed economies. However, in the developed world many manufacturing firms with a technological niche are benefiting from globalization. In other words, globalization is a challenge and an opportunity to which businesses and countries have to adjust.

Students paid visits to firms to understand better how both national and multinational corporations of small, mid-size and large sizes are dealing with globalization; the group visited the car factory of Nissan as well as small-to-medium enterprise cluster in Ota City. We invited Prof. Hisayoshi Hashimoto (National Graduate Institute for Policy Studies) and Ms. Tomoko Sakuma (Japan Center for a Sustainable Environment and Society) to provide different perspectives on globalization. Students also played a trading game to learn about issues and problems of international trade and the continuous trend to globalization.

## Group project on Rube Goldberg machines

The participants spent the last 3 days, designing and building a Rube Goldberg machine in a competition. The competition culminated in the public presentation of the machines at the National Museum on Emerging Science and Innovation on the 26th. Students attempted to produce best machines while experimenting with leadership skills in the teamwork.

A Rube Goldberg Machine is any sequence of elements, which are put together with stored energy in order to accomplish a simple task. The machine starts from one point, and the energy transforms into the motions of the objects, and finally completes some tasks such as opening a door, displaying messages, and so on. Any material can be used and there is an infinite number of ways to achieve the same goal.

Participants spent about half an hour every day for feedback sessions to reflect on their roles within the team and to actively apply their leadership learning to practice. To make a connection with the thematic sessions preceding the group project, participants attempted to describe what they learned and the inspirations they obtained from the thematic sessions with their machine. In short, participants created a Rube Goldberg Machine that serves as a communication tool for science and technology.



## August 18

### **Welcome reception**

After long journeys, the participants from the US arrived at the National Olympic Center, the lodging venue. Following the speeches by Masaru Tsuchiya and Jiyoung Choi (Presidents of STeLA USA and Japan), Prof. Shigeki Saito (Tokyo Institute of Technology) and Ms. Patricia Gercik (MIT-Japan Program) welcomed students.

After the reception, students separated into 6 teams, each of which is of 6-7 members. Students spent the 9 days with this team.



## August 19

### **Leadership education sessions**

After Masaru Tsuchiya gave an overview of the entire program, Naoto Kanehira introduced the concept of distributed leadership developed at the MIT Sloan School of Management. He then led the session on Carson Racing, a game on decision-making in an urgent situation under technical uncertainty. In this game, participants learned that team dynamics, not just scientific and technical data, is crucial for decision-making.



In the afternoon, Joe Hsueh conducted the beer distribution game, which mimics the supply chain management for a hypothetical beer brand. The game, which was created at MIT in the 1960's, is intended to show the basic principles about the systems thinking. By playing and reflecting on the game, participants learned that the structure of the system dictates behavior, and that dealing with symptoms does not solve problems in many

situations.

Following the beer game, Masahiro Sugiyama applied the systems thinking to real-world science and technology issues. Taking examples of climate change and energy, and globalization and manufacturing, he illustrated that science and technology are, although key components, embedded in a larger system of society or an organization, and that focusing just on the science and technology is often problematic. Joe asked the participants to apply the 5-level methods of looking at the issues, and encouraged students to think in a systemic way.

In the evening, participants engaged in a deep self-introduction with other team members, sharing personal experiences.

August 20

**Thematic session: Climate change and energy technology**

In the morning, Prof. Ryuji Matsuhashi (Graduate School of Frontier Sciences, University of Tokyo) and Prof. Tatsujiro Suzuki (Graduate School of Public Policy, University of Tokyo) set the stage for the thematic session.

Prof. Matsuhashi discussed the recent scientific findings that global warming is very likely due to human-emitted greenhouse gases, and the difficulties of the Clean Development Mechanism under the Kyoto Protocol, a key mechanism for technology transfer from developed to developing countries. In terms of the post-Kyoto framework that covers 2013 and onwards, he discussed alternatives to the Kyoto-type national emissions reduction targets, especially a sector-based approach.

The theme of Prof. Suzuki's talk was the process innovation and its complexities. He focused on two cases: fast breeding reactors and the successful development of EcoCute, an efficient hot water system that utilizes CO<sub>2</sub> heat pump. Although projects of the fast breeding reactors consistently under-delivered the promised results, the government continuously supports such big projects because of the "lock-in" effect. The EcoCute was developed without any government support, but its development pathway was complex, with marginal actors playing important roles.

In the afternoon, students played a negotiation game called "Another COP," which was organized by Toshi Inoue and Mai Murayama (Alliance for Global Sustainability, University of Tokyo Student Community). Another COP is a role-play game for international negotiation on climate change. Participants learned difficulties of translating scientific knowledge into international agreement in the face of technological uncertainty and self-interests of different countries.



The negotiation game was followed by a discussion on "personal cars and climate change", which was intended to provide a context for the visit to Nissan on Aug. 22. Led by Mr. Osamu Kimura (Central Research Institute for Electric Power Industry) and Masahiro Sugiyama, students discussed various ways to reduce emissions from car usage, including efficiency improvements and switch from cars to public transportation (modal shift). They also examined possible difficulties of tightening fuel economy standards in countries like the United States, and differences between Japan and the United States.

**Thematic session: Globalization and manufacturing**

The globalization and manufacturing track kicked off with Prof. Hisayoshi Hashimoto's (National Graduate Institute for Policy Studies) talk. He discussed the impact of globalization on Japanese small-to-medium enterprises (SMEs) in manufacturing.

After the seminar, participants visited three different SMEs in Ota City, where specialized manufacturing SMEs are clustered. The first team visited Morino Kogyo Co. Ltd., which is a metal stamping factory that produces parts for displays and photocopiers, etc. The second team went to Central Giken Co. Ltd., which specializes in supersonic motor and pressure manipulators. The third one paid a visit to Daiya Seiki Co. Ltd, a subcontractor of Nissan that produces gauges.

Participants then summarized what they saw during the visit to each company, and discussed how each firm is coping with increased competition due to globalization, and talked about the future strategy of companies.

**Keynote speech: Mr. Koji Omi, the then Minister of Finance, Japan**

In the evening, the Honorable Minister Koji Omi (then Minister of Finance, Japan; Member of the House of Representatives, Liberal Democratic Party) gave a keynote speech entitled "Leadership in Science and Technology Developments for the Future of Japan and Humankind." Mr. Omi is a leading figure in science and technology policy in Japan, and helped enact the Fundamental Law of Science and Technology. He also founded the Science and Technology in Society *forum*, where scientists, engineers, policymakers, and business leaders gather to discuss the lights and shadows of science and technology from the standpoint of the future of human kind. Based on his extensive experiences in science and technology policymaking, he shared his remarkable insights with the participants. The exchange of questions and answers was very lively, and lasted for more than 30 minutes.



**Thematic session: Climate change and energy technology**

The site visit to the Kimitsu Steel Works, Nippon Steel Corporation (NSC) was both interesting and fun. Mr. Ibaraki (Nippon Steel Corporation) first explained how the Japanese steel industry is tackling the problem of reducing carbon dioxide emissions. In Japan because of its high energy price, the steel industry has been keen on improving energy efficiency. The Japanese steel companies thus boast of the highest efficiencies in the world. Although production of steel in China is growing exponentially, technology transfer has been limited since there are so many small steel firms in China, and since the efficient technology cannot be justified without high energy price. In addition to energy efficiency, NSC is also committed to improved recycling through its plastic and dust recycling programs. We saw a hydrogen production test plant, a demonstration plant for capturing carbon dioxide. We also visited the recycling facilities for plastic and dust.



**Thematic session: Globalization and manufacturing**

We played the “Trading Game” in the morning. It is intended to give the players an impression of the issues and problems connected to international trade and the continuous trend to globalization. The game aimed at helping people easily understand how trade works, and how it benefits the prosperity of some countries and not others. We discussed the impact of increasing global trade on the change of market value, and international labor division, environmental issues and so on.

In the afternoon, we invited Ms. Tomoko Sakuma (Japan Center for a Sustainable Environment and Society) to speak about globalization from the viewpoint of global citizens. She pointed out the problems with globalization, in particular, how globalization exacerbated income inequality worldwide. Following up on Ms. Sakuma’s talk, we discussed the impact of globalization from different angles.

**Leadership exercise: Ladder of Inference**

In the evening, students played a game called “ladder of inference.” When people listen to others, they do not necessarily focus on the facts but rather quickly make inferences from the observations. Sometimes inferences or assumptions themselves are treated as “facts”. Students learned the importance of suspending assumptions while examining observations.

On the fourth day of the Forum, students in both tracks visited the Oppama Factory of Nissan in Yokosuka City, Kanagawa Prefecture. After an overview by Mr. Abe at Nissan, students divided into the climate and globalization tracks.

***Thematic session: Climate change and energy technology***



The climate track began with two morning lectures. Ms. Hiromi Asahi (Manager, Global Environmental Planning Office, Corporate Planning Department, Nissan) gave an overview of Nissan Green Program 2010. Nissan regards the following three issues as paramount: reducing CO<sub>2</sub> emissions; minimizing emissions to preserve a clean atmosphere, pristine water, and nurturing soil; and the recycling of resources (reduce /reuse/recycle). Among the three issues, reducing carbon dioxide comes as the

first priority. Substantial reductions of CO<sub>2</sub> in the long run eventually require a shift from internal combustion engines to either fuel cell vehicles or electric vehicles, and Nissan is actively involved in technological development.

Next, Mr. Akihiro Iiyama (Expert Leader, Fuel Cell Laboratory, Nissan Research Center) gave a talk entitled "Fuel Cell Vehicle Development in Nissan". The technology development began in 1996 at Nissan, and the first prototype was produced in 2001. With Nissan's technologies, the performance of 2005 is nearing that of gasoline cars, and the current issue is durability and cost. The latter issue is particularly important, and cost reductions must occur both with vehicle and infrastructure.

In the afternoon, we took a ride on a fuel cell vehicle, which would be a million dollars each! Also we paid a visit to the R&D facility for fuel cell. During the conversation, reducing the cost appeared as the top priority for the fuel cell research. After the visit to R&D facilities, Nissan engineers joined us for discussions. They shared their leadership experiences and technical challenges with us.

***Thematic session: Globalization and manufacturing***

The morning session began with the lecture by Mr. Takahashi at Nissan regarding the Nissan Production Way (NPW) and Do-ki Seisan (synchronized production). The participants learned how Nissan improve the efficiency of production to cope with increasing global competition. In addition, he introduced many difficulties and conflicts that he faced in a globalized workplace.

In the afternoon, we visited the Nissan Oppama Plant, one of three Nissan's major vehicle assembly plants in Japan. The plant has been playing an important role in making sure that Nissan achieves its ambitious goal. Opened in 1961, the plant is capable of producing 440,000 units per year. Oppama holds the distinction of being the first domestic plant to introduce welding robots. It is also a pioneer in flexible manufacturing. Under its Module Production System (MPS), each parts maker uses parts to make a module and then sends the module to Oppama for assembly with other modules and parts. Previously, parts manufacturers would send unassembled parts and Oppama would assemble them into modules. The system has improved the productivity by 10 to 15 percent and is now used in all of Nissan's vehicle assembly plants worldwide. We also saw Douki-seisan (synchronized production); all parts and modules are fabricated in parallel, and many industrial robots facilitate smooth production.

After the visit to the assembly plant, we visited Oppama Plant Wharf that ships vehicles manufactured in the Oppama and Nissan's other two domestic vehicle assembly plants. Nissan ships 80,000 vehicles per a month from this Wharf to other regions of Japan and overseas to other global markets.

Later Nissan engineers joined us for discussions. They shared their leadership experiences and technical challenges with us.

***Lunch session by Prof. Heller***

During the lunch time, Prof. Daniel Heller (Yokohama National University) discussed how Nissan and Renault made use of their newly formed alliance. To analyze their successful alliance, he distinguished healthy "task conflicts" and problematic "emotional conflicts". Whenever two organizations meet, there will be a conflict. However, a conflict is not always a bad thing; it could actually enhance productivity, if it is focused on the task at hand. He noted that such conflicts have been indeed operative at Nissan and Renault since the beginning of alliance, contributing to their success.

**Leadership exercise: four-player model**

Joe Hsueh led an exercise on the four-player model. It is often assumed that in a team, somebody who takes the initiative is the most important and considered to be a leader. However, a careful look reveals a different picture. In the four-player model, the roles of team members are categorized into the following four: mover, follower, opposer, and bystander (their meanings are straightforward). Each role is important and can be considered as part of leadership. For example, the mover, who takes the initiative, cannot move the team forward if there is no follower. Moreover, team members switch their roles constantly; in other words, leadership is not a position constantly held by one person, but should be considered as activity.

**Presentation on the thematic session**

Presentations by participants concluded the thematic sessions. They were asked the following two questions:

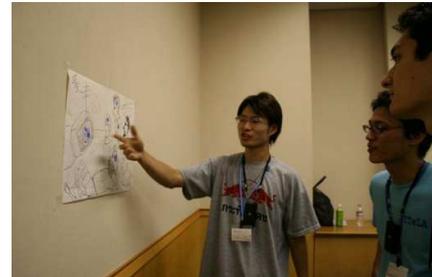
1) *You have learned a number of things about each topic of the thematic sessions. Given your learning, what kind of leadership will be required in the future to address climate change or globalization?*

2) *Your team members are diverse in technical and cultural backgrounds. To address climate change or globalization, what can you do as a team like yours, or as STeLA?*

Participants were given only one hour and half to prepare for the presentation. In spite of the extremely tight schedule, all the groups made nice presentations, summarizing what they had heard from speakers, seen from the site visits, and learned from discussions and games. Beyond issues specific to each topic (climate change and globalization), two keywords appeared. One is systems thinking to grasp the larger system in which science and technology are embedded. Whether it is climate change or globalization, science and technology play key roles, but at the heart of the problem is the interaction of technical components with politics, society, and organizations. The other issue was communication beyond barriers. Participants felt a strong language barrier since not all Japanese participants were very fluent in English. However, they did not see it just a problem. In the leadership situation, communication barriers abound. They thought of the language barrier as an opportunity to challenge a common leadership problem. Some participants also expressed their interest in organizing next year's Forum and starting some international, collaborative projects.

### **Leadership exercise: Visioning**

Leaders are often expected to show a clear vision. But what does it mean to have a compelling vision? Masahiro (“Hiro”) Ono led an exercise on visioning, one of the four capabilities of the distributed leadership model. When talking about a vision, it is easy to get confused between *what* you want to achieve and *how* you want to achieve, but the distinction is crucial. Hiro demonstrated that focusing on *what* you want to achieve is fundamental to visioning. After meditation, students wrote down who they want to be, personal qualities and relationships they want to acquire, and the ideal career they want to pursue. They then created posters to describe their vision. The products were shown and shared among participants in the poster session.



From visioning exercise, one TA joined each team. They worked as mechanical technicians during the group project. This exercise worked as an ice breaking for them as well as a leadership exercise.

### **The group project on Rube Goldberg machines**

At the beginning of the group project, Ken Endo stated the schedule, regulations, and logistics of the group project. His slides included some sample movies of Rube Goldberg Machine such as Pythagora Switch from NHK (Nippon Hoso Kyokai; Japan Broadcasting Corporation) TV program, and Meza-machine from Fuji TV. Prof. Sato, a director of Pythagora Switch, gave us some tips about how to implement ideas into machines, though he couldn't come. Ken gave participants his advice showing his machine movies. In addition, we also invited Ryo Osada and Hidehiro Yoshida, students from Tama University as assistants, who have experiences of working on Meza-machine. They gave participants technical tips of creating a Rube Goldberg Machine.

After introduction, each team drew a rough draft and planned a time line to finish it. During that time, Ryo and Hidehiro stayed there with participants and gave them some advice. Almost all teams stayed up till late to finish them. They compiled what to do and buy for the next two days.



August 24

### ***Fabrication of the machine***

Participants began to fabricate their own machine at Tokyo Institute of Technology (Tokyo Tech). Fabrication began with the safety lecture by teaching assistants (TAs) from Tokyo Tech. Ryusuke Yamaguchi gave us a lecture about how to use the facilities there. We used a very clean and large machine shop, which is equipped with various kinds of tools. In addition to TAs, Katsuhisa Jinbo and Koichi Kato helped students run such equipment as facility technicians.



Each team also went shopping to buy materials or parts they listed up, though Organizers bought some them in advance. Each team is given 20,000 yen and they could use this budget freely for their machine.

At the end of the day, almost all teams could not achieve their goals, completing only 50% of whole machines according to the facilitators. They also found a lot of conflicts caused by language or cultural difference as well as technical issues. Finally they overcame them by sincere communication.

August 25

### ***Fabrication of the machine***

Just like the day before, participants gathered at Tokyo Tech early morning and restarted to fabricate their machines. Some of teams still needed to go shopping to buy another parts.

The organizers started taking movies of their machines for the final presentation at 9pm. By that time, all teams finished fabricating their machine.

After coming back to the Olympic center, participants still needed to make presentation slides for the final competition. Slides included 1) what they have learned from thematic session, 2) description of machines, and 3) what they have experienced during the Forum. Almost all teams worked on presentation till late in order to finish them.



### ***Final competition***

All machines were carried from Tokyo Tech to Miraikan, the National Museum of Engineering Science and Innovation in early morning by the TAs and staff. As soon as participants arrived at Miraikan, they started to prepare for the final competition.

At the final competition, we invited Prof. Takashi Kiriyama, associate professor of Tokyo National University of Fine Arts and Music, Prof. Shigeki Saito, associate professor of Tokyo Institute of Technology, Prof. Hiromi Saito, professor of Tama University, and Nae Morita from Miraikan as judges. They evaluated each machine in terms of artistic quality, clarity of story, attractiveness, presentation, and reliability. Each team is given 6 minutes for the presentation.

After presentations, we opened the floor to the public and the audience walked around the machines and they voted for their favorite machines. The team that got the highest total score from judges and audience was the winner.

Finally, team 2, CO<sub>2</sub> u later, won the competition. Their story showed environmental destruction and global warming.



### ***Final reflection and participant-led discussion***

Michinao Hashimoto led the final leadership exercise. After the competition of the Rube Goldberg machines, participants reflected on what they have achieved during the Forum, and discussed what could have been changed to improve their learning. The participants raised a number of comments on what they felt during the Forum, and also raised suggestions for the improvement of the Forum in the following years. After the first 40 minutes of the session, all the organizers left the room without assigning what the participants do for the remaining time. During the discussion without organizers, the participants took an initiative to plan a small ceremony to show appreciation to the organizers, and also discussed the structure of the organization for the next year. After another 40 minutes, the organizers reappeared in the room. Participants and organizers shared what was discussed, and some members signed up for the organizers of the next year. The session was then closed.

**Keynote speech: Dr. Toshio Yasui, President of eAccess, Ltd.**

After going back to the Olympic center in the evening, we had a second keynote speech. In a speech entitled “The Age of Leaders of Technological Background”, Dr. Toshio Yasui, President of eAccess Ltd., shared his thought on leadership based on his experiences as an engineer and a businessperson. He described the strategy that his company is pursuing in the mobile phone industry, and discussed the roles expected of businesspeople with science and engineering backgrounds. This was followed by a lively discussion about the mobile phone market and technology.

**Closing reception**

The closing reception was attended by our sponsors and collaborators. Each participant was given a couple of minutes to talk about their biggest discovery during the Forum. It was a great occasion to congratulate everybody on their hard work and accomplishments.



On the morning of August 27, participants took an optional tour to **Topcon** after the closing of the Forum. Even though it was the day after the party night, 24 motivated participants and organizers joined the tour.

Topcon is one of the three global leading companies in optical equipment. Its major products include ophthalmic systems, positioning tools, GPS, and Wafer Surface Analyzer. Its R&D activities include biological imaging, optical MEMS, and image recognition.

We visited the company's headquarter located in Itabashi-ku, Tokyo, where its factories are also located. The tour started with the introduction of the company and the product demonstration, followed by the site visits to four factories. Participants were surprised by the fact that the manufacturing of the lens with world's finest precision relies on technicians' skill rather than automated machines. Participants of the manufacturing and globalization thematic session noticed the remarkable difference between the factory of Nissan and Topcon; most of the precision device production lines at Topcon factory consist of less than ten people, which is much smaller than at Nissan. Due to its small size of production lines, they can be reconfigured easily and flexibly to meet the quickly changing demand of the market.

Dr. Akira Ono, the auditor of the company, joined the lunch to answer the questions from participants. When one of the participants asked him how his background as an engineer helps his current job as a manager of a company, he answered that the engineering and management is similar in that both of them are the skills about finding problems and looking for the optimum solution.

We would like to close this page by expressing our deep appreciation for Topcon for the interesting and impressive tour, from which all participants learned a lot.

**Tour Schedule**

9:30 – 10:00	Company introduction
10:00 – 10:30	Product demonstration
10:30 – 10:50	Super precision lens polishing factory
10:50 – 11:10	Eye care device assembling factory
11:10 – 11:30	Positioning device assembling factory
11:30 – 11:50	Industrial machine assembling factory
11:50 – 12:50	Lunch and Discussion





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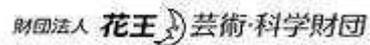
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**Tokyo Institute of Technology**

**MIT Leadership Center  
Prof. Deborah Ancona**

**MIT Media Laboratory Sensible Organizations Project  
Prof. Alex Pentland**

## Collaborators for Rube Goldberg Machine Project:

**Prof. Takashi Kiriya (Tokyo National University of Fine Arts and Music)**

**Tokyo Inst. of Tech., the 21st century COE program  
“Innovation of Creative Engineering through the Development of Advanced Robotics”**

**National Museum of Emerging Science and Innovation (Miraikan)**

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## Sensible Organizations Research Project



As a part of the joint experiment of STeLA and MIT Media Laboratory, the participants wore sensors during the Forum to visualize team dynamics in real time. The research experiment was conducted by the Sensible Organizations at MIT Media Laboratory under Prof. Sandy Pentland. Students used the sensor data during the feedback sessions to discuss leadership development.

## Media Coverage



Sep 19, 2007, The Yomiuri Shimbun, "Manufacturing experience camp for Japanese and US students: Learning leadership in science and technology."

August 29, 2007, The Mainichi Newspapers, "Science White Paper 2007: Extra Edition. Student leadership forum: Going beyond one's expertise."

August 26, 2007, NHK(Japan Broadcasting Corporation), Evening news.

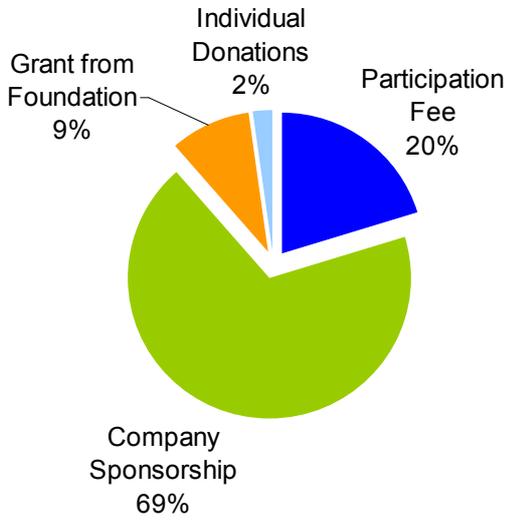
August 14, 2007, Nihon Keizai Shimbun, "Student conference of Japanese and US students in the science and technology majors in Tokyo: Focus on environmental problems, etc."

April 16, 2007, The Mainichi Newspapers, "Global warming: Japanese and US students in the science and technology majors to discuss in a conference this August."

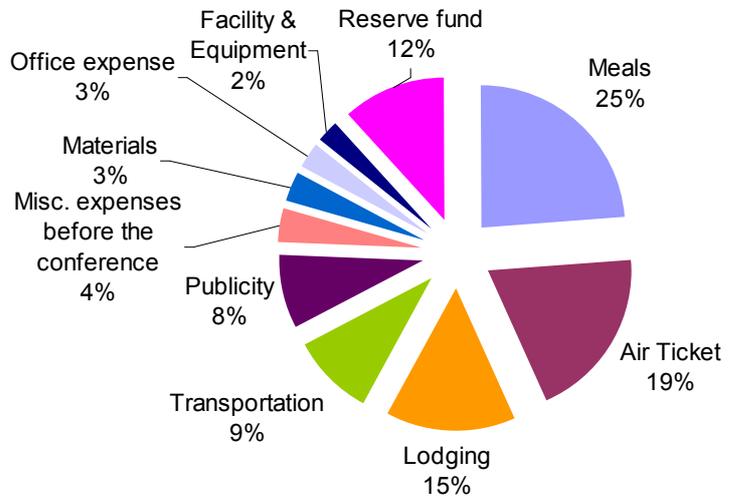
(All media coverage was in Japanese)



Revenue



Expenses





The STeLA Leadership Forum 2007 was a big undertaking, and many individuals supported our effort. In addition to our advisors, mentor, collaborators, site visit hosts, and sponsors, the student staff members wish to express our gratitude to many individuals and groups. First of all, we would like to thank our keynote speakers:

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