

# Global Study Program

Collaborative Learning Abroad

2017

Automation and Society

Chiba University, Japan

Dresden University of Applied Sciences, Germany

Automation & Society



## Topic and Research Questions

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The overarching topical frame of this year's GSP between HTW Dresden and Chiba University was "automation and its societal impact". This does not necessarily mean the impact on the human being itself, but on how automation changes the relations between human beings throughout history, but also in the future, where automation will probably play an even more significant role. In the private sphere, automation takes on an increasing role at home and on the go, making scheduling more efficient by synching our calendars across our manifold devices, and makes life more convenient as it reduces hard work and repetitive chores, or gives comfort in terms of personal hygiene etc. But automation also decreases the need for awareness and knowledge of how things work the manual way. In the official sphere, especially in the world of business and industry, automation has taken over a huge role in manufacturing processes.

Since the Industrial Revolution, processes of automation have been continuously invented and further developed. Be it assembly lines, computer programs or robots, automation seems to be everywhere, and the human as workforce seems to become unnecessary. Considering such aspects, this year's Global Study Program examined the impact of automation on society's evolution and broadened the participants views on possible merits and demerits of automation. Students had the chance to get insight into new technologies, interview manufacturers

and entrepreneurs from different branches and business sides, but who are all taking part in creating the "automated future".

When organizing this year's GSP, the hosts at Chiba University were mainly aware of the role of automation in transport and daily life, thus visiting the facilities of TOTO and planning a tour of the Railway Technical Research Institute were valuable additions to the program. NISSAN as car manufacturer of high-end cars as well as everyday vehicles, was considered as an important site of visit because not only do they create partly automated cars, but use automation in their facilities on a large scale as well. Henrob/Atlas-Copco, as companies delivering the technology to the robot that is needed when manufacturing cars, completed the picture. The staff from HTW Dresden further planned to raise student awareness of automation on a smaller scale than cars, namely the merits of 3D printing of various parts from a manifold set of materials to use in daily life, art or high-end applications.

But aside from such mainly positive and epoch-making usages of automation, questions of necessity and feasibility arise. Is the human being still autonomous when parts - or most parts - of his daily or work life are taken over by machines? How does this loss of autonomy transform into the needs of society, and what changes in society does it imply?



**A**fter all, businesses and intellectuals (be it professors or researchers at the various companies visited during the program) will only hardly see as negative what they are engaged in to create.

**H**owever, are medical robots or robots in use in the field of the care for the elderly the only solution to a problem that can be solved with appropriate political measures, especially in times of mass migration and globalization? What other challenges will lie ahead, and are there differences in acceptance of automation according to age or cultural background?

**A**ll such questions are to be tackled in group work and field research in this year's GSP. Similarly to other Global Study Programs, this program held several challenges such as those mentioned above for the participants to overcome. Students were of course not expected to know all about automation, lest the technological details of the various fields of application, but it was hoped that the students

with their manifold, varying backgrounds would collaborate, discuss and debate on the various aspects of automation that they are interested in. Another challenge was to achieve collaboration in an environment that was unknown, but exciting and alluring as is Japan, especially to those visiting it for the first time. Thus again, time constraints were also a huge challenge, especially considering the travel distances students had to endure during the program.

**I**n the end, many good ideas, even concrete solutions were presented, some of them pushing the borders of our imagination again, just as it was the case during last year's collaboration. That innovative ideas and hand-on applications of automation to the benefit of society, also the consideration of ethics, moral and technological limits were all considered among the students, again showed that diverse backgrounds and a will to learn and grow together is a guarant of fun and excitement.

**G**SPって何?この問いに対する答えは、GSPの参加者一人ひとりによって違うのではないのでしょうか。海外の学生と協働学習してみたという人、テーマについて真剣に考え議論したいという人、自らの見聞を広めたいという人…皆それぞれ異なった動機、そして異なった専門分野を持って、このGSPに参加しています。そんな仲間たちと約2週間をともに過ごし、様々な経験をしていく中で、最終的に自分は何を得たのか、何を与えることができたのか、自分にとってGSPとは何だったのか、それはまさしく十人十色であると言えるはずで。さて今年で2回目を数えるドイツHTWとのGSP、この度はドイツから14名の学生と2名の先生方を迎え入れ、計11名の日本人学生とともにここ千葉大学で開催されました。今年のテーマは「automation and its social impact」。今日、自動化という現象は我々の日常生活の中だけでなく、社会全体の様々な局面において起こっています。これからの自動化はどうあるべきか、自分たちはそれとどう向き合っていくべきか、約2週間にわたるプログラムの中で考えました。(大野亙児)



# Schedule of Activities

	Day	Contents
Pre-course	23 May	Orientation
	30 May	Automation and Innovation (Dr. Kerstin Cuhls) [skype session]
	06 June	Movie night – Screening of Metropolis (with Q&A)
	13 June	A Cultural History of Japanese Toilets (Dr. Marta Szczygiel) [skype session]
	20 June	Automation and Its Social Impact on Society (Prof. Zipser) [skype session]
	27 June	Workshop on collaborative learning, and safety concerns
	4 July	JR Railways Research Institute: history and automation projects (Mr. Nakamura)
	18 July	Automation and Nissan (Mr. Washino)
	6–8 Sep	Preparation of cultural presentations
Main Program	<b>September</b>	
	15	Arrival in Chiba
	16	Orientation, Cultural Presentations, Welcome Party
	17	Day off
	18	Visit of Miraikan
	19	Lectures on 3D Printing Technology (Prof Himmer) and on Body in White Manufacturing (Prof. Dietrich), student groups formation
	20	Visits of Science Museum and Shitamachi Museum, students survey of the general public
	21	Workshop, Visit of TOTO Technical Center
	22	Visit of JR Railway Technical Research Institute
	23	Workshop and mid-presentations
	24	Day off
	25	Visit of 3D printing company, ASPECT
	26	Visit of BiW manufacturing company, Atlas Copco
	27	Visit of NISSAN manufacturing plant in Tochigi
	28	Workshop: preparation of the final presentations
29	Final presentations, Farewell Party	
30	Departure from Chiba	
	**Visits of field sites were composed of a guided tour followed by interviews with various specialists	
Post-course	7 Nov	Feedback by specialists [skype session]



# Collaborators

## **HTW Dresden**

Mr. Thomas Himmer  
Mr. Stephan Zipser  
Mr. Jochen Dietrich  
Mrs. Juliane Trepe

## **Chiba University**

Mr. Kōichi Hayashi  
Mr. Masaharu Takahashi  
Mr. Juljan Biontino  
Mr. Ioannis Gaitanidis  
Mrs. Satoko Shao Kobayashi

## **Chiba University International House**

Mrs. Sakuta

## **Chiba University International Support Desk**

Ms. Sugiyama

## **Atlas-Copco (Henrob / SCA)**

Mr. Stephan Dietrich

## **Aspect**

Mr. Seiji Hayano  
Mr. Hidefumi Aoyama

## **Nissan**

Mr. Shoji Washino  
Mr. Takuya Nakamura  
Mr. Kazuhiko Ito

## **TOTO**

Mr. Masahiko Kudo  
Ms. Akiko Atsuda  
Ms. Mayumi Katori

## **RTRI**

Mr. Kazuki Nakamura  
Mrs. Eriko Kimoto  
Mr. Koji Iwata  
Mr. Shuichi Myojo  
Mr. Chikara Hirai

## **Fraunhofer Institute**

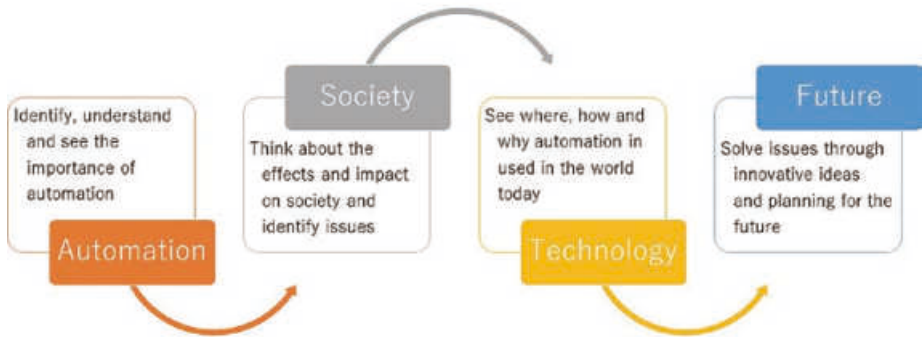
Mrs. Kerstin Cuhls

## **Others**

Ms. Marta Szczygiel



# Program Components



Factors	Challenges	Keywords
<ol style="list-style-type: none"> <li>1. Government</li> <li>2. Citizens</li> <li>3. Research institutions</li> <li>4. Small enterprises &amp; suppliers</li> <li>5. Big enterprises &amp; manufacturers</li> </ol>	<ol style="list-style-type: none"> <li>1. Law</li> <li>2. Moral and ethics</li> <li>3. Technological limits</li> <li>4. Demographic issues</li> <li>5. Feasibility and acceptance</li> </ol>	<ol style="list-style-type: none"> <li>1. 3D Printing (Manufacturing)</li> <li>2. Transport</li> <li>3. Robots</li> <li>4. Daily life</li> <li>5. Future</li> </ol>

## Mid-Presentations

3D Printing in medicine and its social impact	How robots can contribute to aging society	Automation in Daily Life	Automation of transportation	Future
<ul style="list-style-type: none"> <li>Julia Koczkodaj</li> <li>Elizabeth Scharf</li> <li>Tim Bredemeyer</li> <li>Harsh Doshi</li> <li>Melissa Poon</li> </ul>	<ul style="list-style-type: none"> <li>Andra Madzharova</li> <li>Mariaelisa Jettrey</li> <li>Yuta Ozeki</li> <li>Yoshitaka Ito</li> </ul>	<ul style="list-style-type: none"> <li>Georgios Karamanos</li> <li>Heek Seon Lee</li> <li>Yoshiko Iijima</li> <li>Yuki Ochi</li> <li>Shoichi Nakamura</li> </ul>	<ul style="list-style-type: none"> <li>Ben Wolf</li> <li>Luca Milesi</li> <li>Alisa Schmitt</li> <li>Krishna Pillai</li> <li>Nathan Scharf</li> <li>Yoshitaka Iijima</li> </ul>	<ul style="list-style-type: none"> <li>Marie Perle</li> <li>Yoshiko Iijima</li> <li>Yuta Ozeki</li> <li>Mariaelisa Jettrey</li> <li>Yoshitaka Iijima</li> </ul>

## Final Presentations

Rapid Manufacturing: 3D printing and its social impact	Manufacturing and automation "Body in white"	Medical usage of Nanorobots	Automation of transportation	Automation in Daily Life	Future
<ul style="list-style-type: none"> <li>Julia Koczkodaj</li> <li>Tim Bredemeyer</li> <li>Harsh Doshi</li> <li>Nathan Scharf</li> </ul>	<ul style="list-style-type: none"> <li>Yoshiko Iijima</li> <li>Yoshiko Iijima</li> <li>Yoshiko Iijima</li> <li>Yoshiko Iijima</li> </ul>	<ul style="list-style-type: none"> <li>Andra Madzharova</li> <li>Mariaelisa Jettrey</li> <li>Yuta Ozeki</li> <li>Yoshitaka Iijima</li> </ul>	<ul style="list-style-type: none"> <li>Ben Wolf</li> <li>Luca Milesi</li> <li>Nathan Scharf</li> <li>Yoshitaka Iijima</li> <li>Yoshitaka Iijima</li> </ul>	<ul style="list-style-type: none"> <li>Georgios Karamanos</li> <li>Mariaelisa Jettrey</li> <li>Yuta Ozeki</li> <li>Yoshitaka Iijima</li> </ul>	<ul style="list-style-type: none"> <li>Marie Perle</li> <li>Yoshiko Iijima</li> <li>Mariaelisa Jettrey</li> <li>Yoshitaka Iijima</li> </ul>

During the precourse and the orientation at the beginning of the main program, it was found that five keywords were describing the various fields where automation is in effect, namely: Manufacturing, Transport, Robots, Daily life and Future. Especially "future" is of big concern as students were shown in a lecture about innovation and predicting future trends. Because there cannot be any consideration of the future without a knowledge of the past, additionally to lectures, the screening of the German classic science fiction film of Metropolis (1926) helped to raise awareness for cultural issues of automated society and of how automation was put into action and imagined in the past. Another look at the cultural phenomenon of automation as seen in daily life was provided with a talk on Japanese toilets, their automation and ensuing consumer culture, which also prepared us for a visit to the technical center of TOTO, the company that invented the washlet seat. Seeing about automation in the past was also possible during a brief visit to the Shitamachi Folk Museum in Ueno.

An online lecture from HTW Dresden about Automation and Transportation as well as a visiting lecture by a researcher from NISSAN helped to contextualize the meaning of automation in not only transportation, but also in the manufacturing of cars and other vehicles. This stood in relation with a visit to the NISSAN plant, where students could see how automation is put into practice, but also see when automation is on purpose not implemented in order to guarantee human craftsmanship. Also, a visit to Henrob / Atlas-Copco helped to see how car bodies ("body in white") are manufactured and which adhesive technologies, automated through robots, are used. In addition, the tour at Railway Technical Research Institute, even more the three lectures provided by RTRI staff, helped to make clear that automation does not only happen in transport itself, but in deeper levels, such as the

organization of transport as well. Another glimpse into the world of manufacturing and how it is challenged by automation was given during a visit to Aspect, a company that specializes in high-end 3D Printing solutions of various materials. Lectures during the main program further increased students' knowledge about body in white manufacturing and all available subtractive and additive manufacturing processes. During the various field research, the program participants actively asked questions to guides the collaborating staff, workers and researchers.

During these field works and lectures, the five initial keywords shaped out into topics compassing questions of the advance of medical science, demographic changes such as aging society, the feasibility of comfort and costs in daily life as well as ethical concerns in cases of transportation via automated machines. Learning and thinking about the societal impact, students were often concerned with ethical and moral issues of automation. Thus the first week served as a basis to enable participants to see by themselves how technology is used in order to foster automation in the various fields as explained above. The second week's fieldwork was mainly concentrating on automation in manufacturing, which gave rise to the necessity for students to widen their scope of inquiry by including car manufacturing and automated driving into their considerations. This is why for the final presentations, a sixth group was formed in order to cover this topic. Groups in general were compiled so that members roughly shared the same interest in regards to the topics they developed during the first week.

GSFは事前教育約10日間と、9月後半2週間に渡るMain Programの2部構成です。事前教育では、今回のテーマであるAutomationについての様々な講義を受けました。事前教育を行うことで、メインとなるプログラムの学習やWorkshopに繋がります。Main programでは、HTWの学生たちと交流しながらWorkshopやFieldworkを行いました。初めにイントロとして、それぞれの国の文化紹介をしました。次にAutomationに関する5つのテーマでグループ分けを行い、調査したい内容を決め、最後のプレゼンテーションに向けてそれぞれ準備を行っていきました。今回は、日本科学未来館・国立科学博物館・TOTO・RTRI (JR鉄道総合技術研究所)・ASPECT・Atlas Copco・Nissan 栃木工場に行きました。さらに2度のSurvey time (街頭調査)がありました。2週間に及ぶ活動を経てファイナルプレゼンテーションを完成させます。(本間ひより)



## Pre-course Education

# Studying about the topic

We can divide precourse education into two parts, namely precourse education about the topic on the one hand and collaborative work on the other. Firstly, I explain the preparation for the topic, 'Automation and its social impact.' During this preparation phase, we managed the three following tasks.

1. We had some lectures from those whose professions are involved with Automation. The topics were unique and interesting, such as Automation and toilet, Automation and railway, Automation and car, Automation in factories, and new technologies for further Automation (like additive manufacturing). All of them gave us insights into the field, so as to be able use this knowledge in the main program.

2. We watched a German movie which is related to the history of automation. The title is 'Metropolis', a movie by Fritz Lang which was created in 1927. It is about the society in the future as imagined 100 years later than 1927. After watching this video, we discussed about what we saw. Thus we realized we have different perspectives on automation than in the past, but that critical thinking about automation is nothing new, but a sorrow that generations share.

3. We had homework during summer vacation. We searched about one topic we are interested in. We can say this was a meaningful time for us because thanks to this homework, we could think about what facets we are interested in concerning the main program. Later, we shared what we each searched. This

sharing time was also an excellent time to expand our horizon.

Secondary, we prepared for collaborative learning. During summer vacation, we prepared for cultural presentations. We chose topics that hopefully compelled the German students and learned to collaborate. (Daichi)

Automation and its social impact research

### Automation and its social impact on society

#### 1. Overview and Introduction



Automated Driving



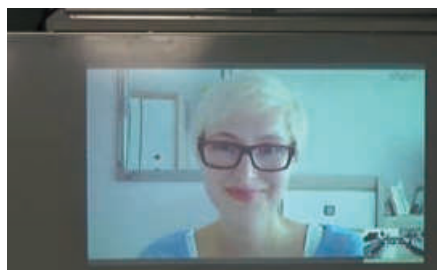
Artificial heart



Robots living with us: companions for residents of nursing homes



Leban snowbot







# Cultural Presentations

In this program, cultural presentations have three basic objectives. One is to function as an icebreaking opportunity by providing subjects which could later become objects of discussion between students. The second has to do with the instruction given to students to try to break cultural stereotypes and introduce lesser known aspects of each other's cultures. And the third objective is related to the task of presentation-making itself and of the chance to go back to the basics of group work.



The first item on the agenda of the GSP are the cultural presentations. We start the first day with discussing similarities and differences in general cultural topics like housing or school systems. The participating students get to know each other and first boundaries are overcome. Other - rather specialized - topics like the presentations about some typically Japanese cultural aspects helped to understand more about the new environment. There was a discourse about the music style 'Idol groups' as well as the background and history of the impressive buildings, that proved to be 'Love Hotels'. The presentation about traditional wooden toys made in the 'Erzgebirge' in Germany explains the story and choice of these toys as guest presents for our Japanese colleagues. Finally a presentation which is telling the story of the journey of a parcel from Japan to Germany encourages starting penfriendships and is a successful conclusion of the first meeting. (Julia)

**事**前教育は前期の火曜6限と、夏休みに数日、そして短いレポートを書く3種類のものがありました。日本人の学生の中には、自動化や工学を専門にしている学生があまり多くなかったので、この事前学習は知識を広げる良い入口となりました。毎週火曜日は基本的に専門家からの講義を受けました。ドイツの教授3人からはスカイプ講義でした。それぞれから、社会、未来、トイレと自動化をつなげたテーマで授業を受けました。その他に、日本の2つの企業の講師たちから乗り物に関する講義をして頂きました。ワークショップで企業訪問する前に、車や電車の基礎情報や、自動化に関する問題を知っておいたので後のワークショップでスムーズに進んだ部分がありました。また、宿題では「自分の興味ある分野と自動化」に関する記事を読み、要約意見を書きました。その後、夏休みの事前学習の際に発表し、それぞれの関心を掘り下げました。ワークショップが始まる前に日本人学生同士、何度も会い、意見を交わす時間があって、後ドイツの学生ともすぐに打ち解けることができました。(新津萌絵)



## Main Program: Sep 18 Visit of Miraikan



On our first day of field work, the 18th of October, we visited Miraikan, the National Museum of Emerging Science and Innovation. As the name suggests, a lot of technologies that are currently in development are showcased in this museum. One of the first things we saw after we arrived was the vast amount of different technologies that seemed rather down to earth. A lot of the inventions in this museum are already used in the industry or at least at an academic level, thus underlining that the focus of this exhibition lies mainly on showcasing real solutions instead of purely theoretical attempts that may never be introduced to the general public.

The exhibition covers many scientific fields, and while not going into too much detail for every single invention, allows for a clear overview on what is to come in the next few years. One of the most eye-catching things was the display of different service robots, some of which are modeled to look as humanoid as possible and others that intentionally differ. All of them are made to serve in households, company buildings and the like. This is just one of the many examples at the Miraikan, but it really showcases the one main goal for the future: Enhancing the live of the human society even further, while creating a safe and healthy environment! (Maximilian)



## Main Program: Sep 19

# Lectures

On the 19th of September 2017, two lectures have taken place. The first was by Prof. Himmer, who gave a lecture about 3D Printing. The lecture took place directly at the University of Chiba. The different kinds of manufacturing and 3D printing were presented as well as sintering and melting processes were explained. It was particularly exciting for students who attend a technical course. All in all, this lecture was very informative. The examples which Mr. Prof. Himmer had shown were especially interesting: printed food, medical applications made of plastic or printed household items. Additionally, he had brought some printed examples which he had shown to us. I think 3D Printing is an innovative enrichment of our daily life, because with its help the costs of materials can be saved and the economic efficiency can be increased. Besides, printed medical application might be helpful for the convalescence of injured persons because applications made of plastic are much cheaper. (Martin)

The presentation of the topic “Body in White Manufacturing” was performed by Prof. Dr.-Ing. Prof. eh. Jochen Dietrich. It was a pleasure for the audience to follow the statements of such an experienced professional of manufacturing engineering. Mr. Dietrich gave us an overview about state of the art trends of development by using the example of European car manufacturers and their motives. Therefore we learned that the main saving potentials to reduce fuel consumption can be achieved due to the reduction of car body weight. However, while car heaviness will be reduced, safeness has to be improved. To achieve such aims, car bodies where made up out of different material mixes like steel, aluminium & carbon on the one hand and various sheet metal manufacturing processes on the other hand. Furthermore he gave us an overview of different joining technologies and quality assurance by using Autogrid®. (Peer)

9月18日には、お台場にある日本科学未来館に訪れました。日本科学未来館は2016年に常設展がリニューアルされており、リニューアル後の日本科学未来館では、今私たちが日常的に接しているテクノロジーや、深海や宇宙分野などの最新技術、さらには今まさに研究が進められている新技術の説明が、単なる説明だけではなく、こちらの問題提起を誘う形でディスプレイされています。今回のGSPのテーマである、「自動化と社会」というテーマに関連している展示ブースは確かにあったが、それ以外の事を扱ったブースもあるため、総合的な分野の見学であったという印象がしました。9月19日には、ドイツから来た二人の教授による講義を受けました。午前の部では、Himmer教授による3Dプリント技術の講義が行われた。3Dプリント技術にはどういった利便性があるのかということや、出力方法や使う材料の違いによって3Dプリントに分類があり、それぞれの特徴を学ぶことができました。午後にはDietrich教授による、自動車製造における接合技術とそこにおける自動化についての専門的な内容の講義が行われました。(森田雄大)





Main Program: Sep 20

## Visit of Museums in Ueno



On the 20th of September, we visited the "National Museum of Nature and Science" in Ueno. The Japan gallery is all about the history of the Japanese islands, including people and nature. In the global gallery one can find animals of the earth, progress in science and technology or the history of our ecosystem. Our group of daily life decided to go first to the global gallery, because we had only 3 hours for this visit. At the second floor of the gallery we found the "Science and Technology" exhibition with interesting things like the GED "Global Environmental Detector" or a earthquake game where you can guess the encounter of different earthquake locations. Behind this you can find technology of the past like old calculators, computers, really old astronomy equipment and medicine of the Edo period. One can also find a remodeled exhibit of a zero fighter model 21. Then our group went to the „History of earth“ exhibition. Here one can find a round room with a projector that projected the history of life at the walls with nice background music. In this timeline, one can see the evolution of humankind in its working with tools and learn about living standards. In the last exhibition „Evolution of Life“, we learned about the human evolution in different parts of the world, reconstructed tools, a ship, a house and also a tomb. The second Museum we visited this day was the „Shitamachi museum“ with reconstructures of houses from the Taisho era. It includes a manufacturer, a wholesaler and a Nagaya row house, were we could see early samples of automatization. (Hana)





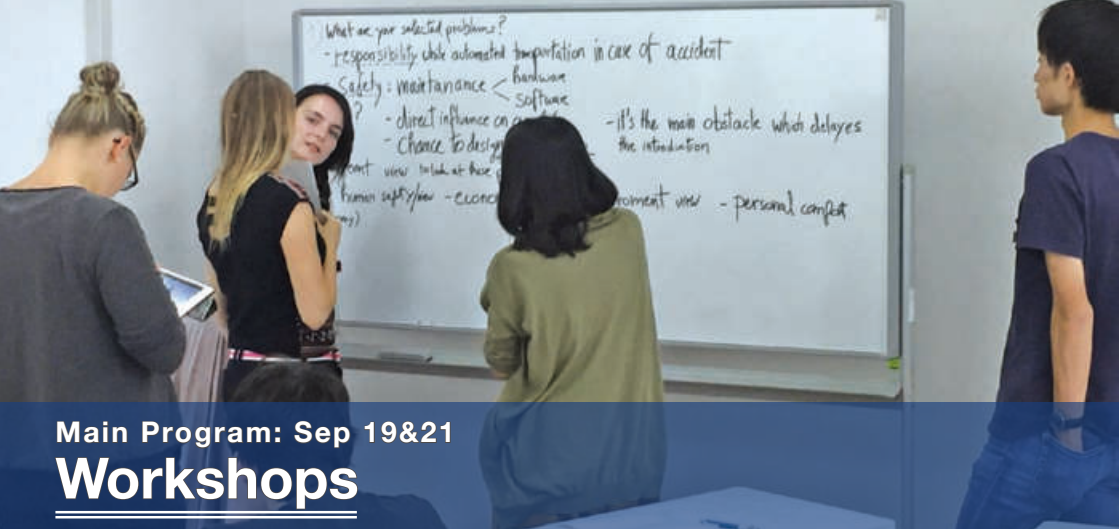
Main Program: Sep 20

## Surveys of Passers-by in Ueno



From our five groups, three groups decided to do a survey in Ueno Park in Tokyo. Ueno Park is a good place to question people, because they take a walk and don't rush. The groups mostly asked the questions in Japanese or let people write the answers down. Foreigners have been questioned in English. The groups divided into smaller teams, and talked with people about their feelings and about their fears and concerns about the automatization of their life. What can they imagine, how could the future look like and do they know if they already use automatic devices? The personal contact was important. By refraining from handing out an anonymous survey, the fellow students saw the opportunity to start a public discussion. The students collected the information and talked about them later in their groups. (Lydia)

私たちは、9月20日に上野にて国立科学博物館を訪れました。日本や世界の最先端の技術や、技術進歩の歴史、人間の進化の歴史の展示がなされており、それらが見るだけでなく聴覚触覚を刺激するような形で展示されており、もちろん多方面に亘った展示となっていました。 「自動化と社会」のテーマには、結び付けやすかったのではないのでしょうか。その後民俗博物館を訪れ、近代の歴史的下町文化を学びました。歴史や世俗は「自動化と社会」にはそぐわない内容となるのかと考えていましたが、自動化とは何のかどうして自動化が発達してきたのかを考え、学べる場所でした。その後幾つかの班は上野公園にて、インタビュー調査を行いました。私の班では、「自動化」についての6つの質問（主にロボットのこれからや医療用ロボットの使用の是非）を問いかけ、非常に貴重なお返答やご意見を園内にいらした多様な年齢層、多様な国籍、多様な社会的立場（学生サラリーマン主婦等）の方々にいただくことができ、中間発表会、そして最終発表会でも重要な参考資料として使用されました。(李浩澄)



## Main Program: Sep 19&21

# Workshops



After the newly formed groups got to know each other a little bit after the past few days, they needed to think about how to approach their assigned topics. This was quite difficult, because they were assigned only with keywords. But with ideas regarding the problems, which were gathered after a certain amount of consideration time had passed, first obstacles could be conquered. However, soon another problem arised: What shall be the main questions in our presentations? For some groups, this was a minor problem, because the group was kind of on the same wavelength, so they unconsciously gathered ideas regarding the main problem. Other groups were forced to sort out most of the ideas they had and had to choose on which ideas they should focus, which wasn't an easy choice and an easy task either, because of the language barrier. After this problem was solved, the real work started. Each group needed to think on how to include the study trips into their respective topics. Also, they needed to think of some questions for a survey, if they considered it worth performing one. To make these tasks more challenging, the professors constantly gave feedback, which sometimes made groups realize about mistakes in their thinking, so they basically needed to start from square one. So all in all you could say, that the start was quite difficult and each group had to face and overcome their own unique challenges, but group work was good to stay motivated. (Paul)



Main Program: Sep 21

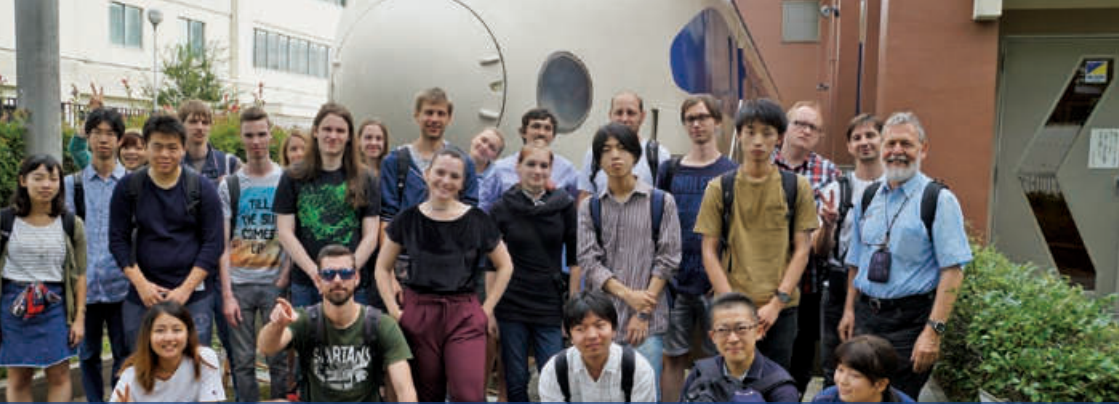
## Visit of TOTO Technical Center



On September 21st we visited TOTO, a company founded in 1917. The common motto of TOTO's technical center and the GSP is "collaboration". The technical center is there to provide advanced technologies, creating spaces and to build up knowledge. This facility provides much information about the history of TOTO in the entrance hall as well as in its modern presentation rooms. After we arrived at the technical center, we heard a speech about the overall history of TOTO, the current range of products and the latest trends in plumbing equipment. After that, we were shown around at the exhibition area, including the skeleton toilet bowl to demonstrate the latest invention of the 3.8 liter flush system as well as the water saving shower equipment. We also were shown to the diverse laboratories that are used to reproduce blueprint spaces to life size. We could experience the use of space for different applications as facilities for elderly care, hospitals and small "private spaces". (André)

9月21日は、大学に集合し、午前中はワークショップでした。ワークショップでは、中間プレゼンテーションに向けての打ち合わせを行いました。私たちのグループでやったことは基本的に調査の集計でした。その他には、次の日の調査に向けて調査方法の反省をしたり、プレゼンテーションの構成を仮決定したりと、メンバー全員で集中して取り組むことができました。午後には新宿のTOTOテクニカルセンターに向かいました。紹介の動画ではTOTOのトイレで特に有名と思われるウォッシュレットの歴史など、興味深い内容でした。プレゼンテーションの後は、TOTOの製品や技術を紹介する実際の展示を見て回ることができました。展示で私が印象的に感じたのは、水の流れを利用して発電することで、電源を必要としない自動水栓でした。自分が思っていたのと同様に、グループの他のメンバーからも「これ自分の家にも欲しいなあ」という声が多く、生活に密着した自動化を実感できたように思います。午前午後ともに内容満載という感じで疲労感もありましたが、とても充実した1日でした。(飯嶋孝)





Main Program: Sep 22

## Visit of JR Research Institute (RTRI)



On Friday the 22nd of September, we visited the Japan Railway Research Institute. After a long journey, we reached the Research Institute in Kunitachi, Tokyo. Our GSP topic was “automation and its social impact”, so one of our goals was to take a look insight of automation in the transport sector. This goal was realized by this visit. We could see the model of the oldest Shinkansen from inside and from outside. During the demonstration, we got a lot of information how to behave in an accident situation and what the motorman has to do. During the guided tour, we saw how the train reacts on a dangerous situation, e.g. to an earthquake. Unfortunately, it was only shown in a video, although the device for simulation also stood in the production hall. But there was a test in progress, so it could not be helped. However it was interesting to see the researchers in progress.

The trains must also be insensitive to rain, so the research institute has a whole hall, where the rain is imitated. We could try this imitation, of course with an umbrella. It was interesting to take a look how the Research Institute is specialized for Japan, because in Japan there are often earthquakes and it rains also more often and stronger than in Germany. After this guide tour was finished, we had a little bit time to finish our surveys. It was really interesting to visit this Research Institute because it gave very special insights, so it was a great experience. (Maxim)





Main Program: Sep 23

## Mid-presentations



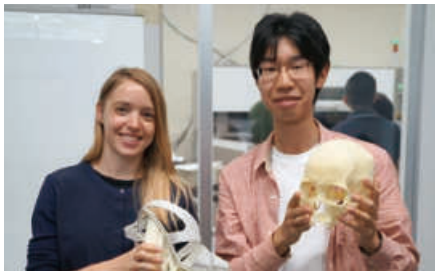
Five groups were formed for the mid-presentation, taking into account a balance between the number of Japanese and German students. Each group had to work on its own topic. The topics of these groups were: manufacturing, transportation, robotics, daily life, and future. Secondly, all of them came up with a brainstorming and had to identify problems. For the mid-presentation we all tried to include what we had learned in the Miraikan-museum, Folk Museum, Science Museum and TOTO. After each team worked out their topics and questions in greater detail, we created English and Japanese surveys on this topic, which we evaluated together during the workshop time, and then presented the results in the presentation. Finally, each group had 10 minutes to present their results and to share their insights with the other groups before they received some feedback from the professors. (Nadine)

中間発表では以下のことをグループごとに発表しました。何を問題として選んだか、何故その問題を選んだのか、異なった側面からこの問題を考えることができるのか、フィールドワークとどのように関連付けができるか、どのようにこの問題に取り組んでいくのか、グループ全体ですることと、個人がすることとの役割分担ができていくか、来週の最終発表までに何を考える必要があるのか、についてです。私は「Daily Life」というグループに所属していました。それまでのフィールドワークの時間に一般の人にしたアンケートの内容を中心に発表しました。日常生活のどこからが自動だと思ふか、どのような自動化された機械が欲しいか、などについてのアンケートに協力してくれた人々の答えをまとめました。そして、日常生活がもっと自動化していくことは良いことなのかというテーマについて主として考えていくということになったことを発表しました。また、他のグループの発表を聞き、共通点と相違点を意識でき、自分たちのグループがすべきことが明確になったと思いました。(範園菜々美)



Main Program: Sep 25

## Visit of ASPECT



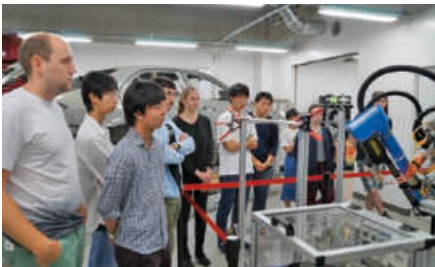
On Monday, September 25th, we started in the morning for a visit of the company ASPECT. They develop 3D printing machines and new testing materials for 3D printing products. They are located in the western part of Tokyo. We started from Chiba, Inage Station, and after a long trip with train and some walking we arrived at the company. We had to take our shoes off to enter and we got some special shoes, like slippers. First there was a presentation about the company and the different technologies of 3D printing. A special focus was on the powder printing technology, because there is the biggest experience of the company. Metal or plastics powder is applied in layers and is laser heated. In this way the final product is generated in a manner which gives very exact results. In the presentation, different 3D printed objects were shown for illustration purposes. After a short break, the president of the company honored us with his presence and was glad to answer questions. The visit of the company took place after the lecture, during the lunch break of the workers. Thus we could not see a running machine, but our guide could explain the machine and the powder technology better since the machines were openend, so we could have a look inside. After that we had a discussion about the future of 3D printing. 3D printing is a young technology but with great potential. Also, the research of other applications of 3D printed parts is an important next step. The field trip to ASPECT thus was informative and gave many new insights. (Tim)



Main Program: Sep 26  
**Visit of ATLAS**



On the 26th of September, we visited Atlas Copco. At the location in Yokohama we could find two of the six subsidiaries, Henrob and SCA. After the train ride to Yokohama, Kamoi and a 15 minute walk along the river to the German Industry Park, where the Company is located, we were welcomed by Project Manager Dr. Dietrich. He gave us a presentation about the history of Atlas Copco as well as an overview about the structure of the company, their subsidiaries, but most importantly he explained how the process of riveting and adhering works as well as the strengths and advantages of that technologies. After this introduction, we were divided into two groups and visited the laboratories at that facility. At the SCA part we could see a robot, equipped with the SCA machinery, applying adhesives with over 1000 mm/s with very high precision. There was no difference in speed between drawing a continuous line or drawing intermittent line. We could also see half of a vehicle where you could clearly see which parts were glued. On the Henrob side, we could try out to shoot some rivets ourselves at the manual machine and later saw a high speed demonstration of a robot equipped with the automated rivet supply and a programmed riveting path. There was also a vehicle body of a Mercedes E-class where you could see the parts where rivets were used. The visit to Atlas Copco helped a lot in understanding the processes used in the production of the body in white. (Alexander)

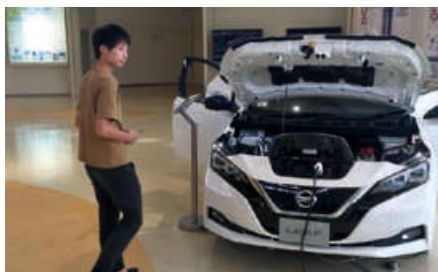






## Main Program: Sep 27

# Visit of NISSAN



On September 27th, we visited the Nissan Tochigi plant. This is one of fourteen production sites in Japan. There they produce their high end class cars. Nissan Tochigi is almost the smallest plant with only a few lines for the GT-R and a row of Infiniti models. To get a good insight, they showed us their assembly line. We saw various automated production processes referring to our theme. So most of the work steps are automated by robots. For example, the installation of the doors. First the doors are fitted for checking the gaps and then they are removed for interior installations. After that, a robot brings the doors to the workstation where they finally are installed. Also interesting was the fully automated transportation train. This train brings the attachment parts from the storage to the right place at the production line without any driver. A number of sensors at the trains and a magnetic track in the ground make this possible. To complete the day, we had the chance to have a Q&A with the vice president. All in all, it was a very impressive trip where we could collect a lot of information for our final presentation. (Allice)

**動**画や写真で知識を得ると、実際に自分の目で見るのでは全く違います。25日は3Dプリンターの開発、販売を行っているASPECTという会社に行き、本物の企業用3Dプリンターを見せてもらいました。また、様々な製法を学び、実際に3Dプリンターで作ったものに触れることで、より具体的に3Dプリンターのことを知ることができました。26日はAtlas Copcoという会社に行き、産業用機械の自動化を目の当たりにしました。完成された製品だけでなく自動化が製品を製造する過程でも進んでいることを実感しました。27日は最後の見学場所である日産栃木工場へ行きました。車の製造ラインや工場内で使われている無人カートや輸送機器などを目の当たりにし、自動化によって人の仕事が奪われるのではなく、あくまで働いている人の負担の大きい作業を補完していることが分かりました。また、工場長のお話を聞き、今後どのように自動化が進んでいくのかが分かりました。このプログラムのなかでも忙しい3日間だったが、各班プレゼンテーション完成に向け、貴重な体験をした3日間になりました。(櫻戸菜)





Main Program: Sep 28-29

## Final Workshops & Presentations



During final workshop sessions, we were divided into six groups, 'Body in White,' 'Robotics,' '3D printing,' 'Transportation,' 'Daily Life,' and 'Future.' One group was additionally created to cover the yet uncovered field of car manufacturing. Each group analyzed their surveys, discussed the topic, and created fancy slides. These activities were very collaborative. Even though we distributed tasks, we were tackling them by constantly helping each other. We faced lots of difficulties during this workshop, but we managed thanks to collaboration, and sometimes the professors gave some advice too.



In the end, all final presentations had solutions for problems of automation. After each group gave their presentation, we had Q&A session and comments time. To our joy, there were a lot of questions and comments, so the presenters could discuss with the audience. Thus I think we can say that the goals for the final presentation were successfully realized! (Daichi)

中間プレゼンテーションを経て、毎年恒例のように一部グループ異動を命じられた人がいました。より広い範囲をカバーするという目的で、新しいグループが追加され、全部で6グループとなりました。5人いたグループから1人引き抜かれることで構成され、基本的にはどのグループも4人構成となりました。最終プレゼンテーションの準備に使える時間は木曜日の9-16時、その後も作業をした場合は19時頃までは教室を利用できました。準備に使える時間が1日のみで、みな時間に追われるのかと思いきや、多くの人は16時で作業を切り上げてショッピングに出向いたりしていました。最終プレゼンテーションの発表に関する各グループの詳細については、それぞれのグループのメンバーが書いた内容を見ていただきました。全体としてはどのグループも事前に行ったアンケート結果や統計に基づいて議論ができ、資料もまとまっていました。発表を完了後はすっかり親睦も深まり、最後のタスクもやり遂げ、みな良い気分フェアウェルパーティに向かっていきました。(小澤祐太)

# Final Proposals

## 3D Printing



Our topic was “3D printing as mass production” and was especially influenced by our visit of ASPECT. In this context we analyzed different problems. For example, the change process of the powder tanks. The finished tanks are very hot and the change is done by hand, which is very dangerous. Our idea is to use automated guided vehicles “AGV” for the exchange. For our final presentation we made a structure of a 3D printing plant, where we explain the flow of the material and finished products. With this model we could better explain the ideas of our solutions. Also, we showed the social aspect of 3D printing and the resulting product. Important points are the law, education, employment, open sources and customized products. We found for every point advantages and disadvantages. But in general we think, that the 3D printing technology is still in the beginnings and have great potential for the future. The work in the group was good since everyone expressed their own ideas and opinions. (Tim)

## Body in White



Our group focussed on issues and innovative ideas we learned about at Atlas Copco, Nissan and in Prof. Dietrich's lecture, where we saw robots and devices for riveting and adhering metal parts, especially parts used at the body in white construction. In our presentation we summarized the technics and technologies used at the production line of BiW and spoke about advantages and disadvantages, especially about the usage of adhesives in the production line. Because the BiW-process is mostly automated, problems are related to the reliability of machines and robots, the quality management in the process and the limits of the used technologies to join the metal parts together. In a comparison between the German and Japanese production line, we could show the difference in automation and different solutions to occurring problems like space management, usage of manpower and reaction due to failures. In the end, we presented about the body in black, a car body build out of carbon materials to make it much lighter with maintaining same stability and safety properties. (Alex)

## The Medical Tube



To combat the shortage of doctors in an elderly society an automated solution seems to be the logical next step, but the execution is anything but simple. The concept of the medical tube incorporates multiple cutting edge solutions to showcase how this problem could be tackled in the near future. The basic concept would therefore be a room that is equipped with for example an 3D printer, something akin to the Da Vinci system, but fully automated, a body scanner or different medication to treat nonphysical conditions. While it may be possible to automate everything in the far away future, no product is ever build to the latest stages without any build up and learning process, we therefore discussed multiple smaller scale approaches to allow for a more realistic funding and development process. Thus we had to scale back on our initial vision of the medical tube and account for a limited feature set and a more limited distribution in the concept. We concluded that the basic concept seems feasible and could be applicable in a few years. (Maximilian)

It is popular to automate transportation at least partly these days. But the problem of "Who is responsible when an accident happens with fully automated transportation" arises because of this. To solve the problem, we first took a survey. We asked: 1. If there was an accident, who is responsible? Passengers, developer, government, or owner? 2. If it is fully automated, do you want to take it? aircraft, train, car, bus, and bike. 3. Do you think it is possible to transport by fully automated transportation? money, natural resources, medicines, and organs. From these questions, we found that people think most responsibility should lie with the owner. Finally we found that universal rules which should be applied by all countries are necessary, and companies or owners have to do everything in the range of the rules. They should be easy to be abided by everyone. Furthermore, universality should enable countries to trade products. The negative points of this solution are that it takes time to figure out the rules, and it decreases competition between companies. (Koichiro )

## Transportation



Our main question was: „Should there be more automation in daily life?“. The majority of the people we surveyed answered they wished for automation with cleaning, especially with garbage solutions. Because of that answer, the group focused to think of a way for taking out the garbage automatically. In short, the garbage is collected in an installed trash bin and after a certain amount of weight is reached, a trapdoor opens and the garbage falls into a large container, which lies underground. This container can be used by several households. There is also the possibility to turn off the automation via switch for those who do not want it. The next point were problems caused by automation. Our survey asked questions regarding unemployment, unhealthiness and the disappearance of craftsmanship. In addition to the survey results, a little story of a person, who fell victim to automation, gained our attention. At the end of the presentation, it was concluded, that automation should just support the people and not doing their work for them. (Paul)

## Daily Life



We chose "work" as our topic, specially, "unemployment in the future with automation". We found out that, actually, unemployment has been decreasing, and predictions about the future are rather positive. So we researched reasons and data to support it. Since our premise was broken, we tried to find other likely problems caused by automation. Then we got to our target which was the gap between high and low educated people. We decided to find ideas about how to keep low-educated, low salary-people working. In the presentation, we used what we saw in our fieldwork as well as statistics and data. We gathered our inputs from different perspectives, and made lists about which jobs might be replaced by automation or not. Finally, we got 3 elements of human jobs in the future. Human have to take jobs about creativity, safety and communication. We also could support this view by our survey. In addition to having these elements, we also need to think of some social system which can follow up low-educated people. As conclusion, we suggested 5 points for the future. (Moe )

## The Future



# Participants

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Julia Rosenberger

Getting in touch with new language, culture and customs is always an adventure and even 9000km afar, there are common, unifying points. I'm glad to participate in the GSP and finding new friends in my Japanese colleagues.

Daichi Kamimura

Thanks for this program, I was able to expand my horizon. Before this program, I studied the relationship between AI and society, and now I am convinced that I have the broader perspective in this area!

Dirk Wetzig

We got some fabulous insight into the world of TOTO toilets, already established automation in Japanese surroundings and Japanese culture wonderfully guided by our fellow Japanese students.とっても面白かった！

Nadine Saidel

The GSP was a great adventure for me and it was wonderful to see the Japanese culture, but also the common features. The cooperation with the Japanese students was especially good.有り難うございます！

Tim Wiedemann

GSP was a great experience and I learned a lot about Japanese culture. Also the exchange of ideas in the workshops and the field trips brought new views.

Wataru Ono

My second time in GSP was better than the previous one in terms of meeting my friends again in Japan and making new friends from Germany! Danke an alle!

Hiyori Honma

I learned many things through this program, not only automation but also German culture. I got these kind of stuff from communication with my friends. This especially is collaboration;) Danke!

Yuta Ozawa

Although this program was a collaborative learning program, we didn't have much time for group work and were required to work efficiently. Through this tuff program, I learned a lot by interacting with excellent German colleagues.

Lydia Miller

The best thing was to collect new experience in the field of automotive technology and be able to meet so many interesting people. I would like to participate again and to visit a second time!

Koichiro Hida

I could deepen my knowledges and experience a lot of things. I enjoyed discussing with people having different background.

Moe Niitsu

I became a really big fan of German language as well as people. The excursions and workshops were very helpful.

Maxim Fertikh

I took part on GSP for second time. It was again a great experience. I learned a lot during this program and I met new friends. I enjoyed the group working and I liked this working atmosphere. I also enjoyed the Japanese culture.

Takehiro Morita

I participated in this course with simple interest for automation. In that regard, I was very impressed with automation in the car industry, and Some of Germany students had specific knowledge, it also helped my understanding.



Hana Mathes

Japan is a wonderful country with helpful and open minded people. I gained a lot of new experience concerning the topic of automation and also about Japanese society in general as well.

Enokido Shiori

For me, this program was hard but I could get a lot of knowledge of automation and good friends. I got a great experience.

Hirosumi Ri

It was a "Gold Experience" that I got much new view and meet many great people. German students speaks so logically that I learned a lot about how to discuss.

Alexander Buchner

I think GSP was damn good! I met a lot of great people and could also learn something about myself. If I get the chance, I'll do it again.

Peer Weber

The GSP 2017 gave me the chance to experience Japan and its mechanical engineering industry in a unique way. Workshop time was quite difficult due to the different language levels and to constructive criticism. However, it was a good experience.

Martin Pöritz

It was a very nice time and I was happy to meet the Japanese students. I can recommend this program and I hope that other students can also collect good experiences. Thank you to all students and professors.

Takahiro Iijima

In the program, I could learn a lot from the interaction with group members. I realized that I should improve my English and willingness to tell my opinion.

Alice Grambow

GSP 2017 showed me the different working methods of German and Japanese students. Often it was a bit difficult to communicate but thereby I think we all got the chance to improve our English skills. I am glad that I had the opportunity to be part of such a program.

Paul J. Neumann

I don't regret to have participated in this study program. The field research was interesting, fun and well organized, the other students were really nice and the professors were helpful. Even though it was a tough schedule, there was due time for a little tourism as well.

André Hartenberger

Participating the GSP was a nice and very interesting experience, including getting acquainted with the Japanese culture and the uniqueness of the country, to make new friends and to learn about automation and its social impact.

Maximillian Juettner

The global study program once again reinstated how important a clear communication is in an international team with different cultural backgrounds. It furthermore allowed me to get a glimpse of the rich Japanese culture, which differs greatly from all European countries.

Nanami Norikuni

I found that it was very hard to discuss in English. I felt that I have to practice more to communicate better using English. But also, I want to someday go to Germany in order to see the German friends again too.



## Proposal for GSP in September 2018 in Dresden

# Gardens and Horticulture in Urban Society

The relationship between plants and mankind is permanently subject to change and transformation. Multiple aspects can be regarded from the point of view of different disciplines, for example natural sciences and botany, economy, technology and horticulture, social sciences the arts and design. In many cases rural and urban settlement patterns relate directly to forms of horticulture and gardening. Questions of horticulture are highly relevant in rural and urban societies: Pragmatic forms of urban and rural cultivation on private, common or public land, professional production in small or large enterprises, sophisticated approaches relying on closed technical systems indoors. Fundamental questions of sustainability arise and have to be qualified in analyses and concepts for the future. Global Study Programme 2018 aims to take a holistic view by exemplarily looking at the Dresden region including various situations in rural and urban space, different professional stakeholders as well as selected academic disciplines and options to structure the analytical, conceptual and informational process. Topics presented by academics and students, entrepreneurs and local initiatives can be elaborated during the international and inter-disciplinary team-work. Differing background in Asia/Japan and Europe/Germany can be introduced and, looking at the current situation, be transformed into critical questions and innovative suggestions for the future. The issues could include

- Environmental, economical and social sustainability in regional horticulture and market gardening
- Botanical and horticultural research at universities in Dresden
- Reflections in the arts, historical and current forms plant use, garden and park design
- Practical and theoretical approaches to education in schools, professional and academic institutions
- Forms of garden cities, garden suburbs, allotment gardens, community and school gardens
- Reflection of horticulture and garden-related land use in programmes and spatial plans,
- Political relevance of botany, horticulture and gardening in the future.

Participants from Chiba and Dresden could represent natural and social sciences, horticulture and business, environment and engineering, informatics and design, urban and landscape planning.

The tentative date for GSP 2018 in Dresden is September 16th-September 30th, 2018.

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# Global Study Program



Automation & Society



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