

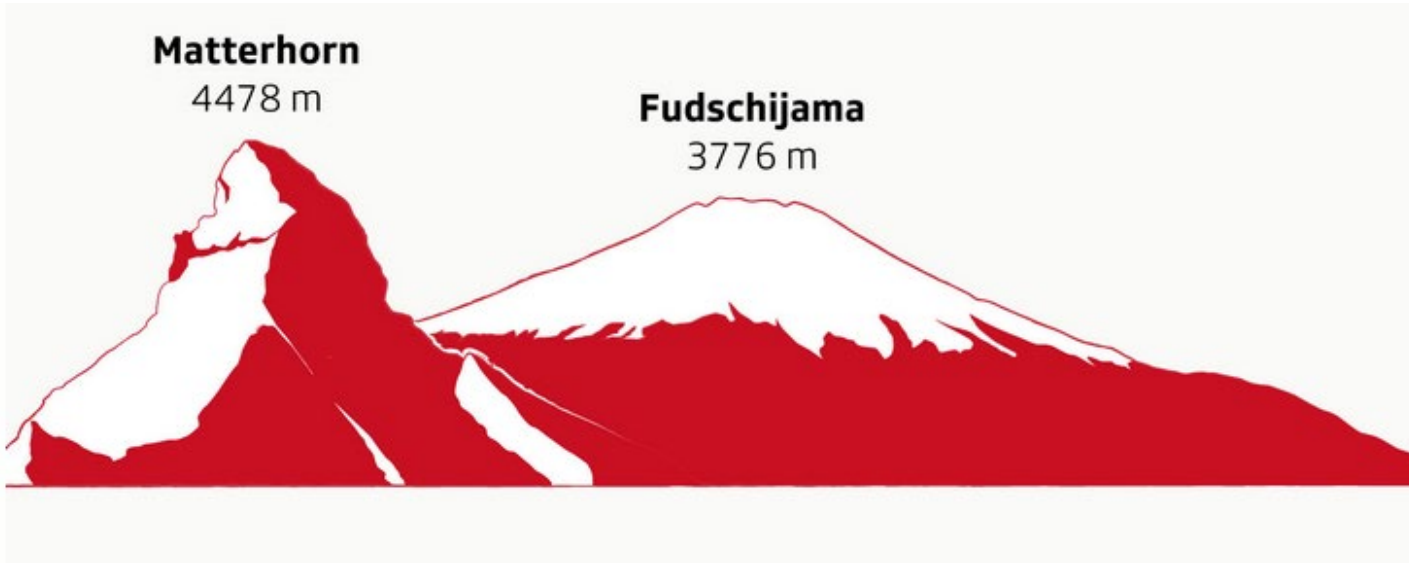
20 January 2020 / Swiss-Japanese Chamber of Commerce

Strong Partners in Research and Development: Switzerland and Japan

Prof. Detlef Günther, Vice President Research



Similarities



Source <https://www.srf.ch/news/infografik/berset-auf-staatsbesuch-die-schweiz-und-japan-im-vergleich>

ETH Zürich



Education



Basic Research



Applied Research

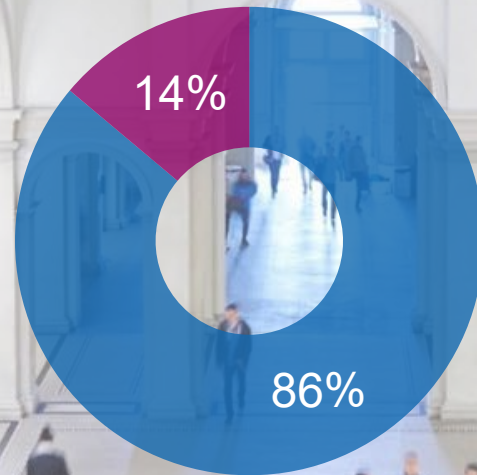


Innovation

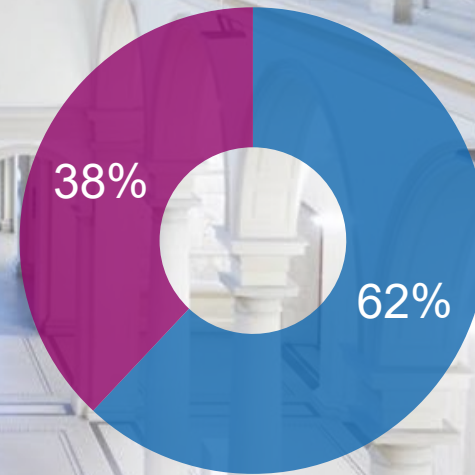
An international student community

■ Prior education in Switzerland
■ Prior education abroad

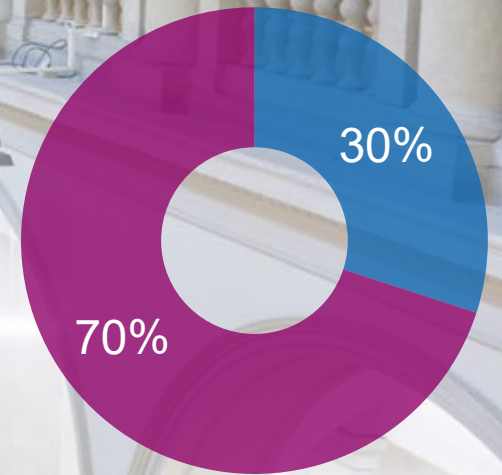
Bachelor



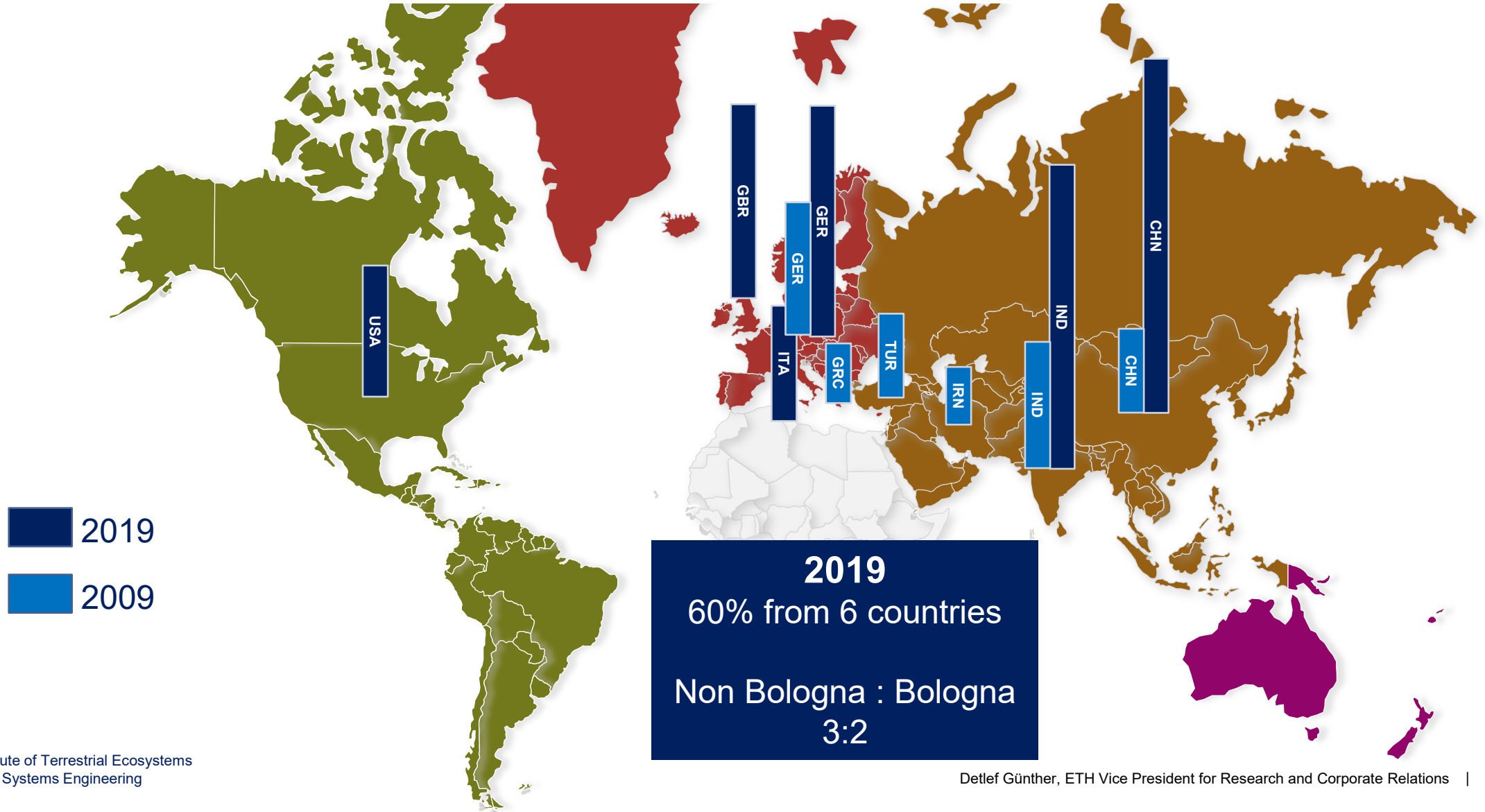
Master



Doctorate



Origin of ETH MSc Applicants – raising Asia



ETH students recruited from / sent to academic institutions in Japan

| | 2016 | 2017 | 2018 |
|-------------------------------------|-----------|-----------|-----------|
| Master | 9 | 10 | 8 |
| Doctoral students | 16 | 18 | 18 |
| Continuing education (MAS) students | 0 | 3 | 2 |
| Mobility students, incoming | 21 | 25 | 16 |
| Mobility students, outgoing | 23 | 18 | 27 |
| Visiting students | 3 | 9 | 4 |
| Total | 72 | 83 | 75 |



Student exchange programmes with:

- Hokkaido University, Sapporo
- Keio University
- Kyoto University
- Tokyo Institute of Technology (TokyoTech)
- University of Tokyo

Leading House ETH

Mandate by the State Secretariat for Education

- Bilateral Science and Technology cooperation programme of Switzerland with Japan
- Offering Scholarships and Fellowships, e.g.
 - Bridging grants
 - Innovation partnerships
 - Young researchers exchange
 - Opportunity grants for strategic initiatives

Internship Scholarships in Japan

13.01.2020

By: [ETH Global](#)


Get your work experience in Japan! In cooperation with small partner companies in the Nagoya area, the Leading House ETH Zurich offers scholarships for internships.




Source: iStock Photo, Rick Legg

Global Network – 9000 research contacts worldwide

International Collaborations (2018)

 With Universities

 With Industry Partners

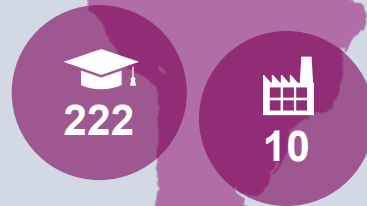
North America



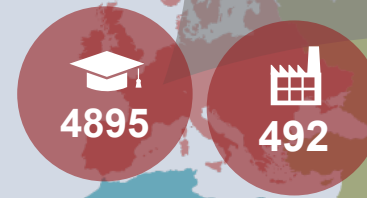
Top Collaboration Partners in Japan

- University of Tokyo
- Kyoto University
- Hokkaido University
- Tokyo Institute of Technology
- RIKEN
- Nagoya University
- Osaka University
- Tohoku University
- Tokyo City University

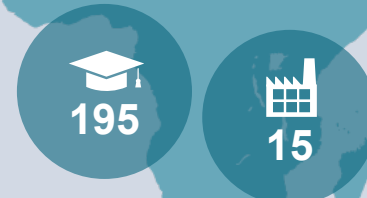
Latin America



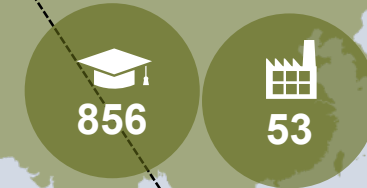
Europe



Africa

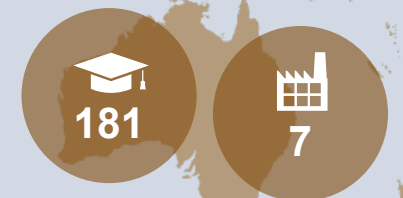


Asia



Singapore-ETH Centre (SEC)

Oceania



Research Partnerships

| Institution | Contacts |
|-------------------------------|----------|
| University of Tokyo | 32 |
| Kyoto University | 24 |
| Hokkaido University | 13 |
| Tokyo Institute of Technology | 12 |
| Keio University | 10 |
| RIKEN | 8 |
| Osaka University | 6 |
| Tohoku University | 6 |
| Nagoya University | 6 |



And..

- Institutional agreements with 13 Japanese institutions
- 3 ETH professors, 24 scientific staff and 40 students have Japanese nationality

Projects of Japanese Researchers @ ETH

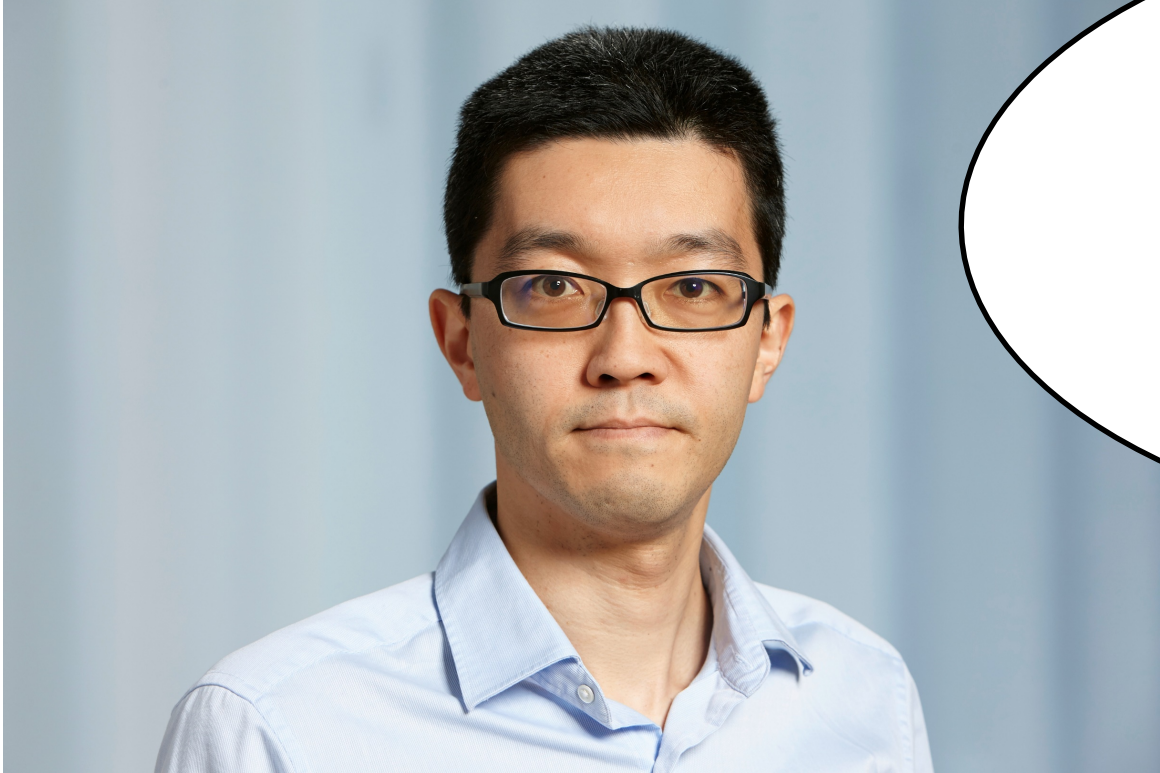


Prof. Motohiko Murakami, Earth Sciences



Prof. Momoyo Kajima, Architecture

Projects of Japanese Researchers @ ETH

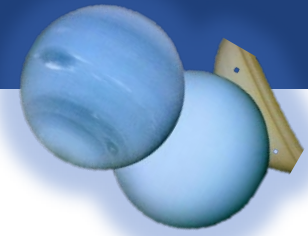


Is the earth chemically homogeneous?

What are the properties of deep Earth materials?

What was the structure of the early Earth?

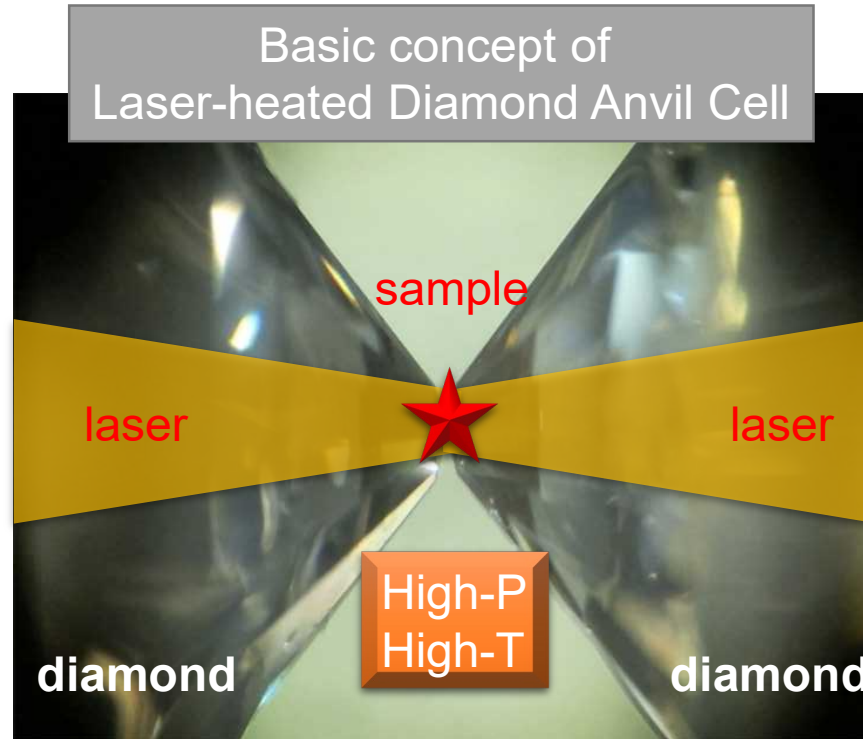
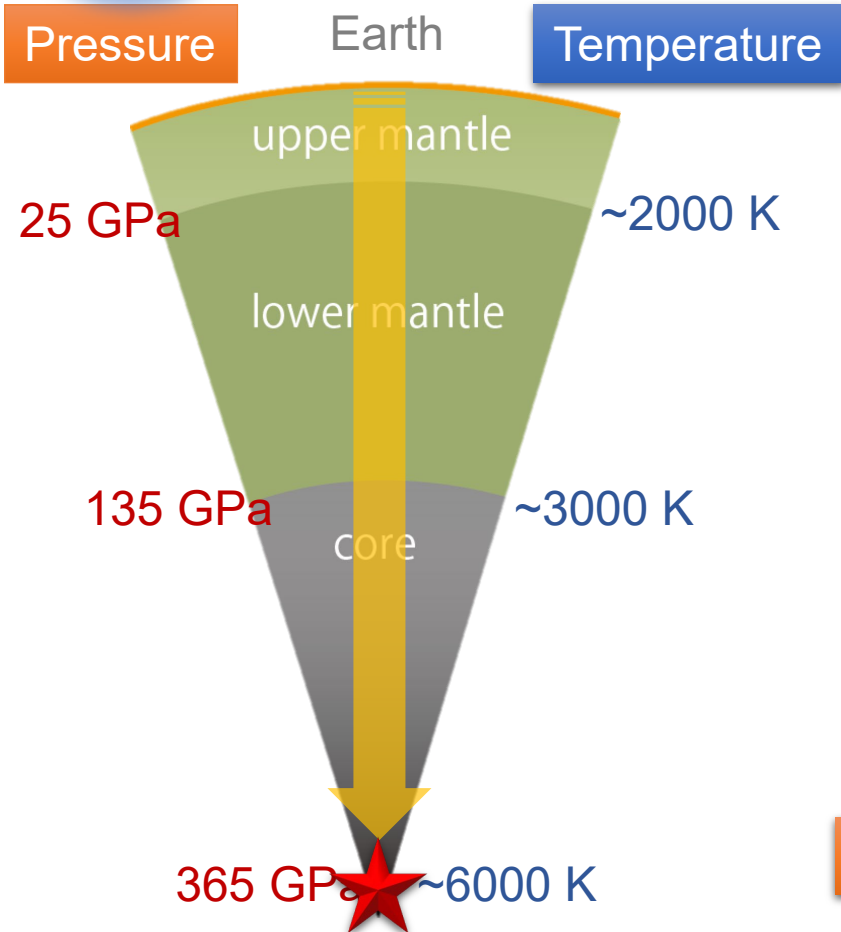
Prof. Motohiko Murakami, Earth Sciences



Exploration of deep planetary interiors in a laboratory



Simulating the extremely high-pressure &-temperature condition using **laser-heated Diamond Anvil Cell apparatus**



Reachable down to the center of the Earth!

Projects of Japanese Researchers @ ETH

Can we compare building culture in
Switzerland and Japan?

In my research I focus on creating a
better accessibility to local resources
such as nature and human skills.



Prof. Momoyo Kajima, Behavioural Architecture



Switzerland(Glarus Sud)



Japan(Shirakawa)

Japan(Shirakawa)



Collaborative projects with Japan



Prof. Jeffrey Bode, Synthesis & Chemical Biology



Prof. Stefan Wiemer, Swiss Seismological Service

Collaborative projects with Japan

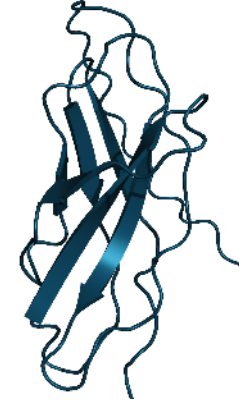


How can we make new molecules that change the world?

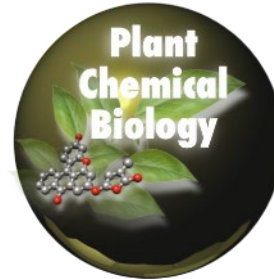
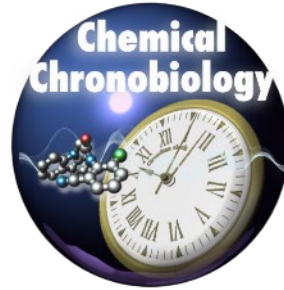
Prof. Jeffrey Bode, Synthesis & Chemical Biology



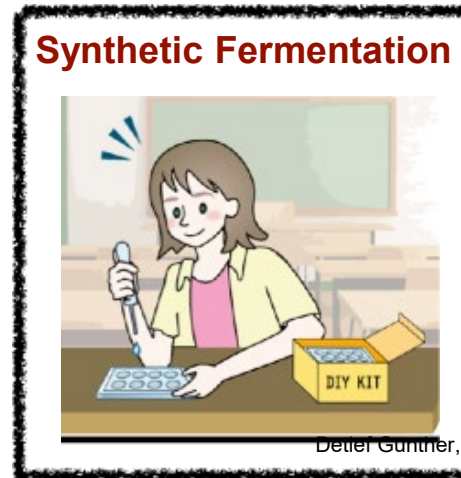
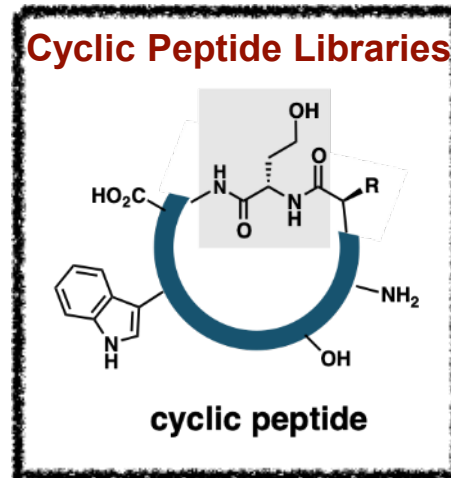
Genetic code



Peptides and Proteins



SUMO Chem Biology



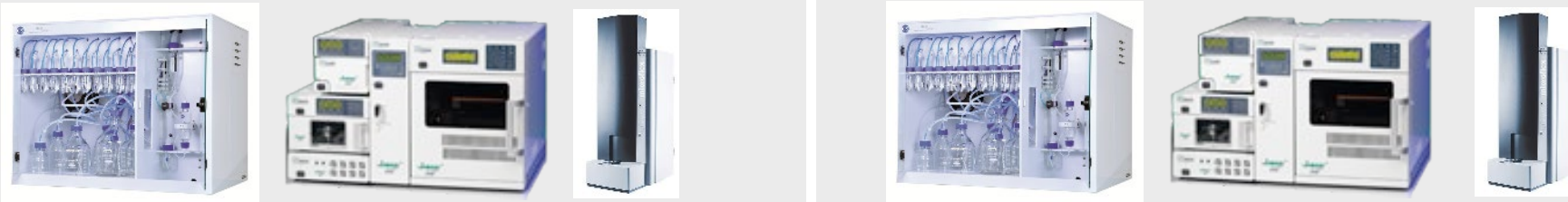
Pollen Tube Attractants

pollen tube, LURE (ligand), synergid cells, egg cell, PRK6 (receptor)



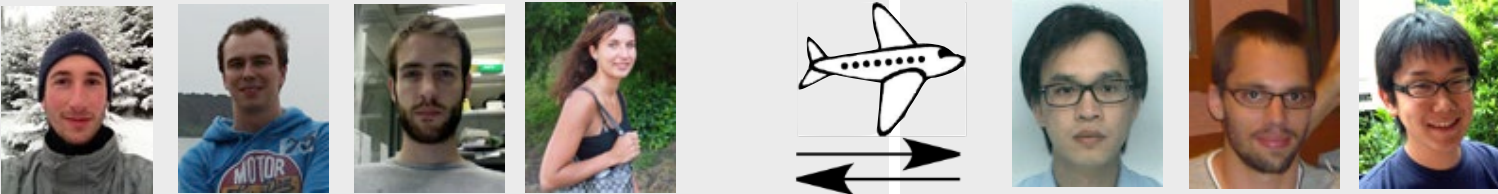
- Tech transfer
- Troubleshooting
- Shared methods
- Capacity sharing

- Identical Instrumentation, Software, and Communication Tools in Both Labs



Equipment
(running almost 24/7!)

- Students and Postdocs Exchange Easily Between Labs



- Labs Connected by Video Link, Group and Subgroup Meetings by Videoconference



Collaborative projects with Japan

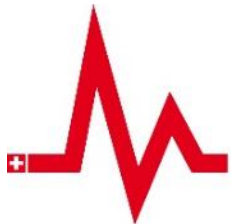
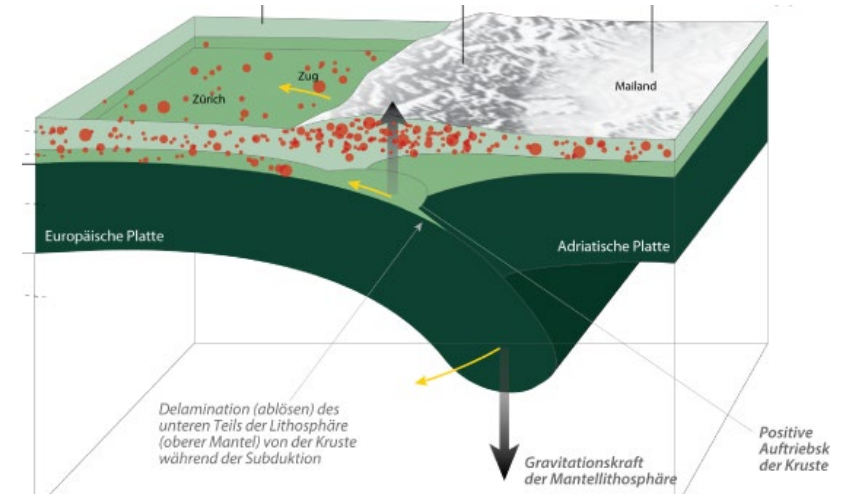
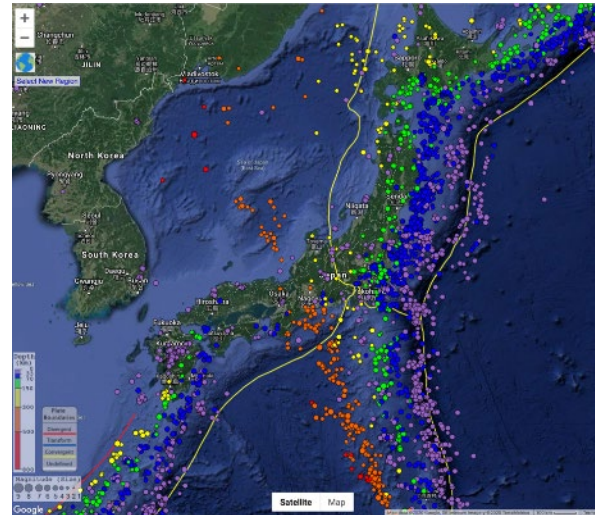
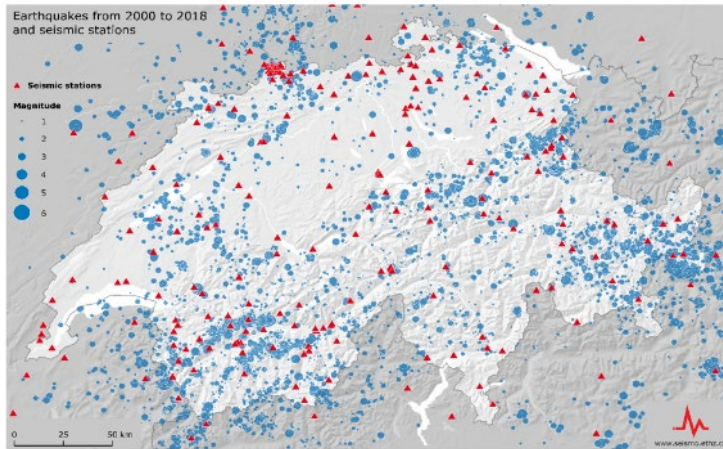
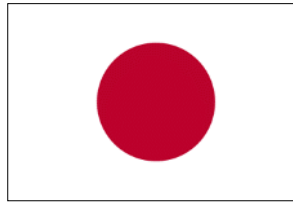
Earthquakes and their secondary effects (fires, landslides tsunamis) are the natural hazard with the highest risk potential in both Japan and in Switzerland

(even though the seismic activity in Switzerland is much lower)

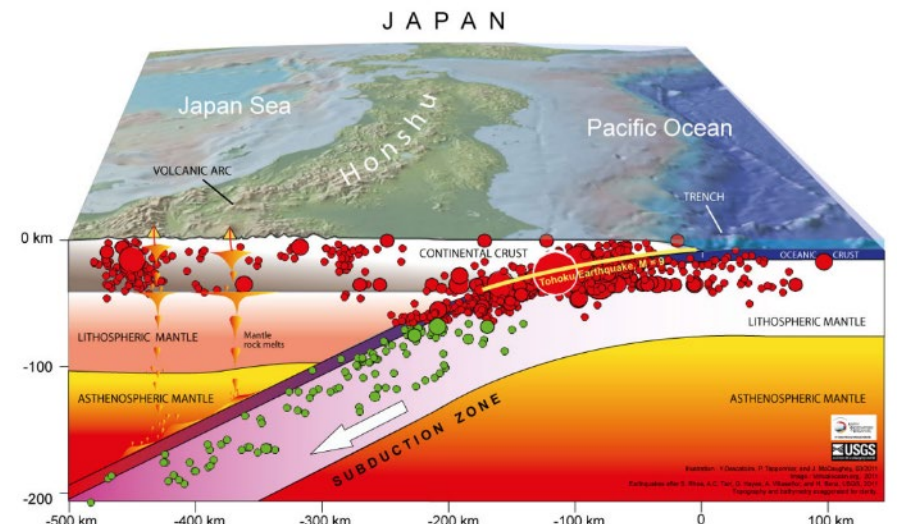
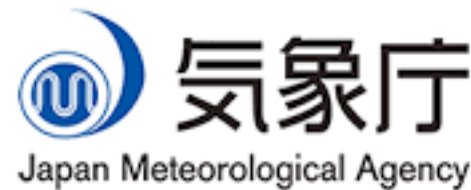


Prof. Stefan Wiemer, Swiss Seismological Service

Earthquake Countries Japan and Switzerland



Schweizerischer Erdbebendienst
Service Sismologique Suisse
Servizio Sismico Svizzero
Swiss Seismological Service



Examples of Research Collaborations

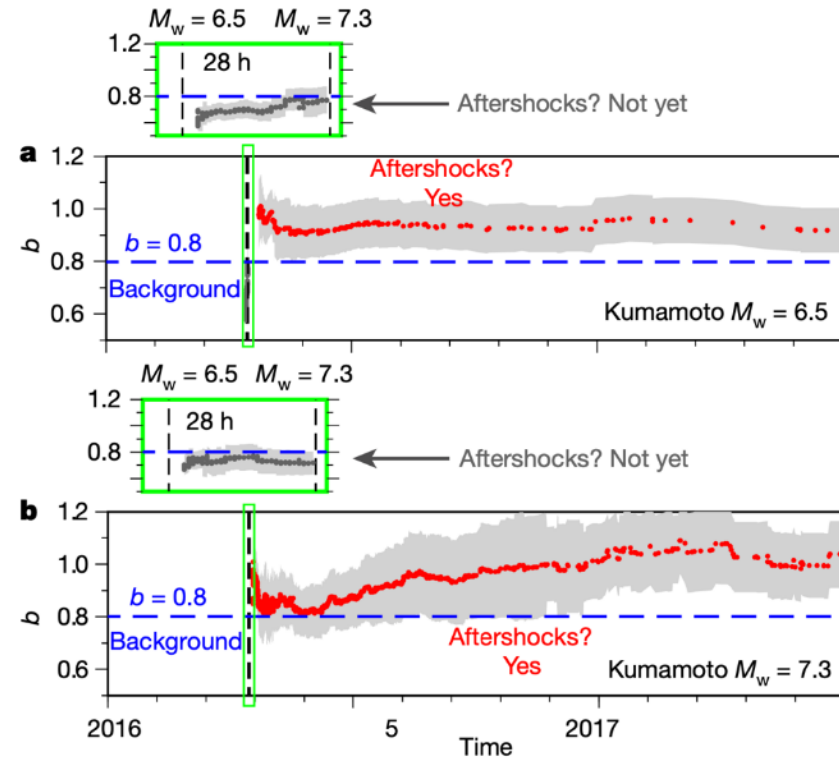
- Can we forecast more reliably if a moderate earthquake is followed by an even bigger one?
 - Can we discriminate in near real time foreshocks from aftershocks?
 - Case study Kumamoto (Japan, 2016) and Norcia (Italy) sequences.
- Collaboration of ETH scientist with the University of Kyoto, published in Nature in 2019.

ARTICLE

<https://doi.org/10.1038/s41586-019-1606-4>

Real-time discrimination of earthquake foreshocks and aftershocks

Laura Gulia^{1*} & Stefan Wiemer¹



Geophysical Research Letters

Research Letter | [Full Access](#)

The Effect of a Mainshock on the Size Distribution of the Aftershocks

L. Gulia[✉], A. P. Rinaldi, T. Tormann, G. Vannucci, B. Enescu, S. Wiemer

First published: 06 December 2018 | <https://doi.org/10.1029/2018GL080619> | Citations: 4

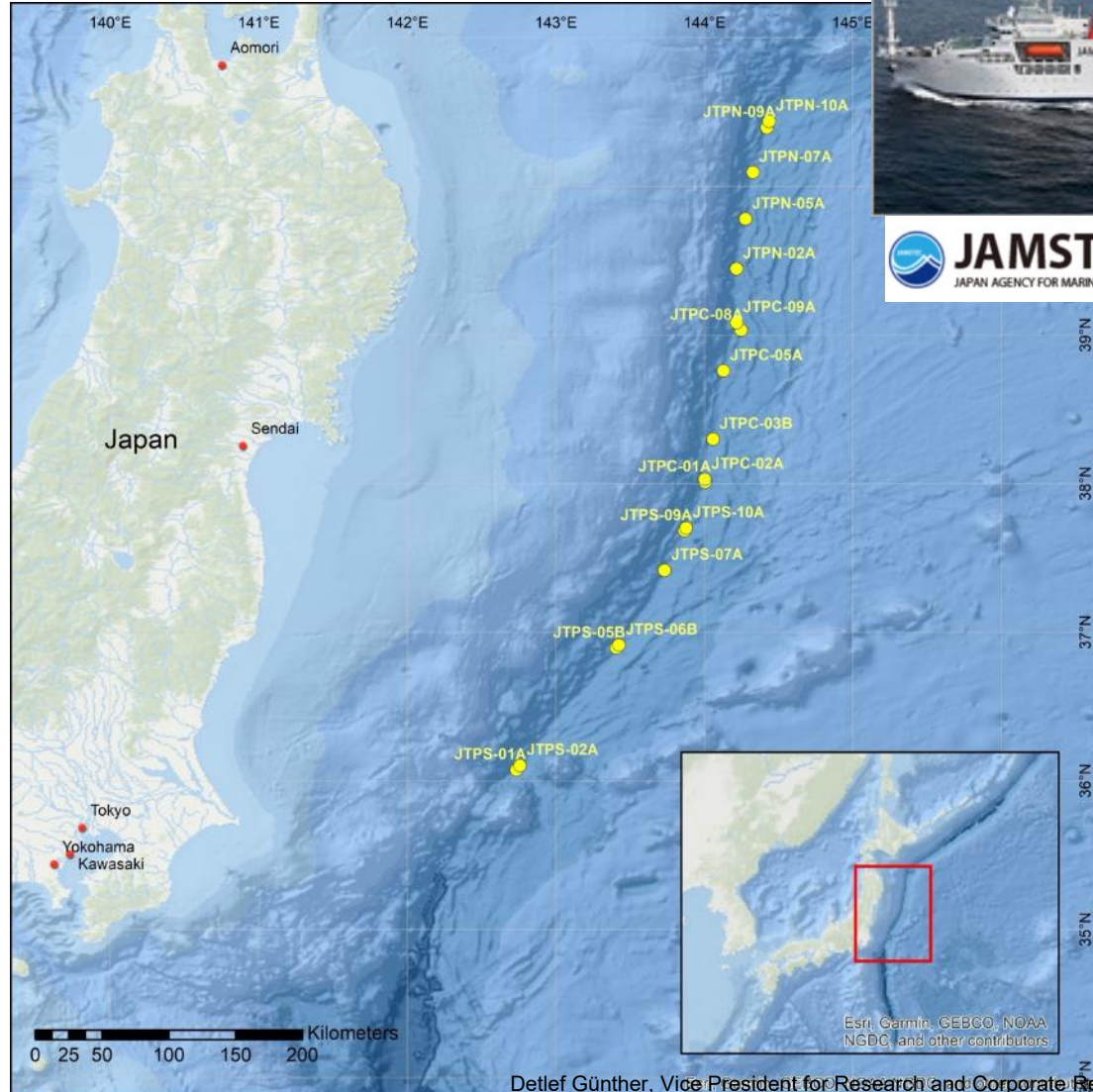


Examples of Research Collaborations

- **J-TRACK Paleoseismology:** An upcoming IODP (International Ocean Drilling Program) Mission (2021/2022) to track past earthquakes in the sediment record along the Japan Trench.
- ETH CO-PI: Eglinton and Wiemer



Proposed drill sites



New impulses for industry – ETH Spin-offs are driving innovation

Spin-off companies founded at ETH Zurich since 2000



Innovation



Prof. Adrian Perrig, Network Security



Prof. Robert Riener, Sensory-Motor Systems Lab

Innovation



Prof. Adrian Perrig, Network Security

How can we make the internet more secure?

Cooperation in several projects with

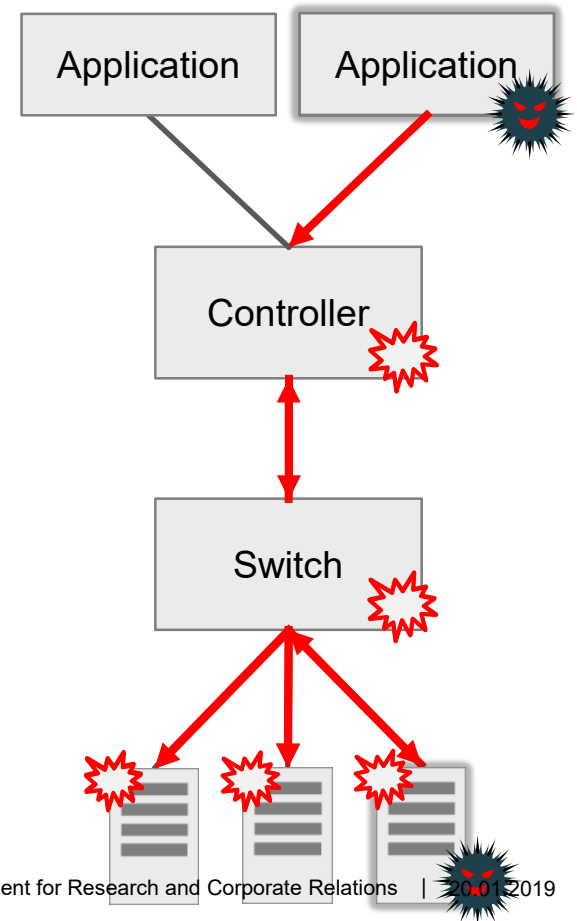


An example project Network Attacks

- A compromised component can harm the entire network
- If an attack succeeds, the target component will remain compromised for long period
 - Because processes on the controller and switches typically run for a long time without interruption or reset

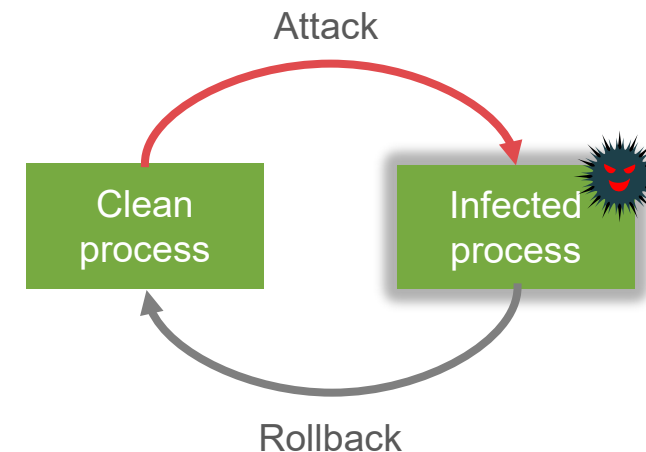
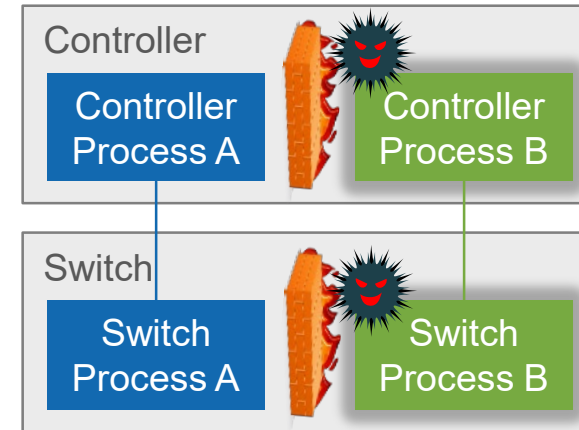
Scenarios...

- Attack from the **control plane**
 - The attacker controls the entire network
- Attack from the **data plane**
 - Vulnerability in a switch exploited
 - The attacker targets the controller via the compromised switches



Our Solutions

- Isolation mechanism
 - Controller/switch processes are separated to confine compromise
 - Isolation on a per-tenant basis
- Rollback mechanism
 - Controller and switch processes are rolled back to remove contamination
 - Performed at regular intervals (e.g., once per hour)



Innovation

Technology against handicaps: ETH is joining forces!



Prof. Robert Riener, Sensory-Motor Systems Lab

Wheelchair Series: Kawasaki, Japan, 2019



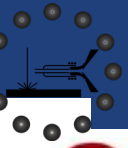
Get Ready for CYBATHLON 2020 in Switzerland



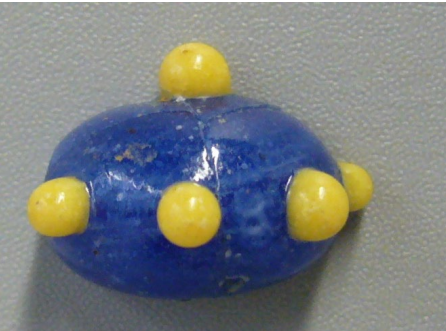
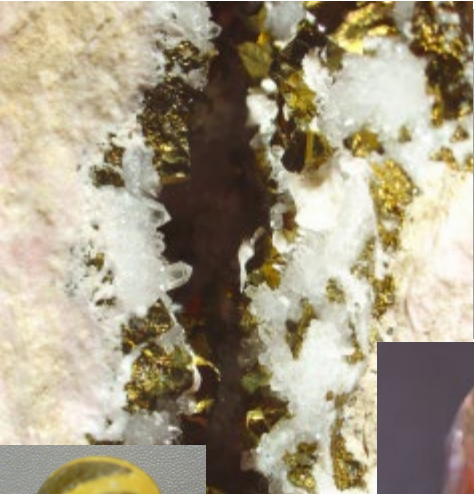
Six Japanese Teams @ CYBATHLON 2020

- 2 – 3 May 2020
- 5 Wheelchair Race Teams
 - Wakayama University
 - Keio University
 - Osaka Electro-Communication University
 - The University of Tokyo and Toyota Motor Cooperation
 - Aoki Laboratory and Matsuzaki Laboratory
- 1 Leg Prosthesis Team
 - BionicM Inc.

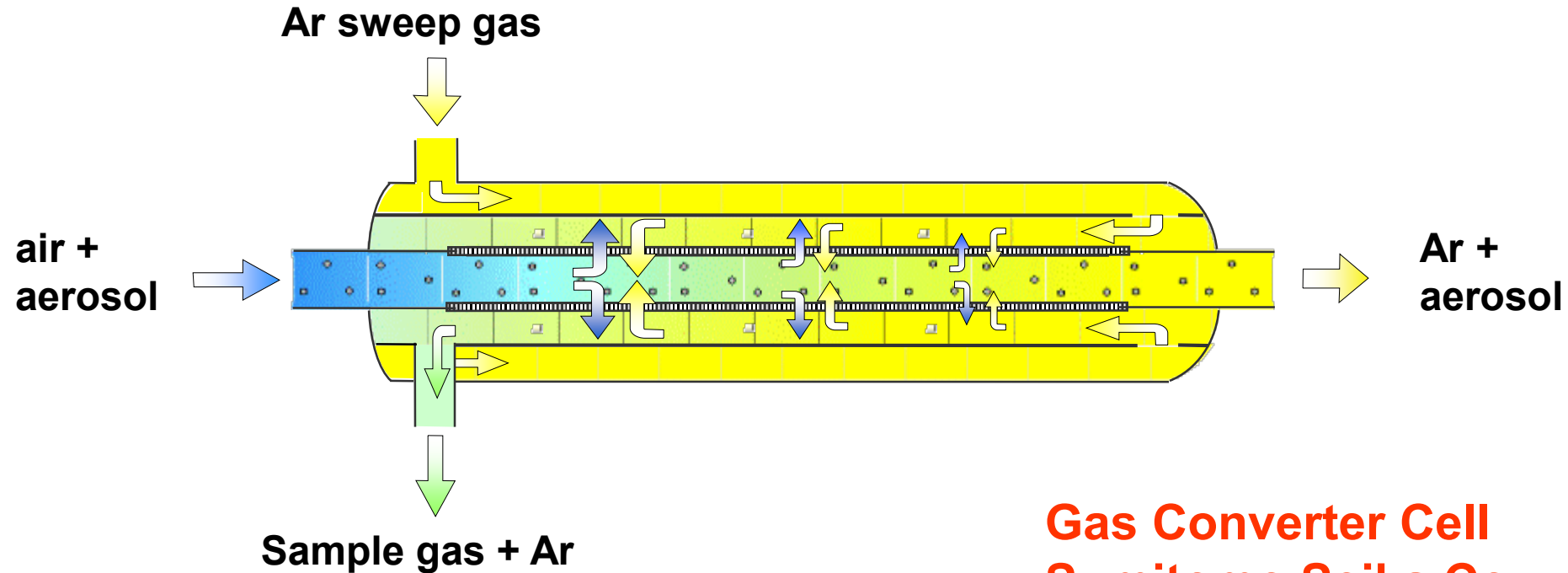
Ambassador Paroz will attend
CYBATHLON 2020



Research Group – Detlef Günther



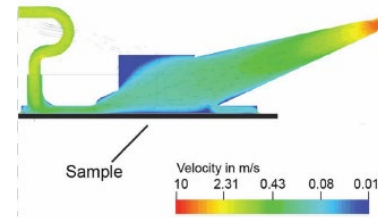
Analysis of Gas Species



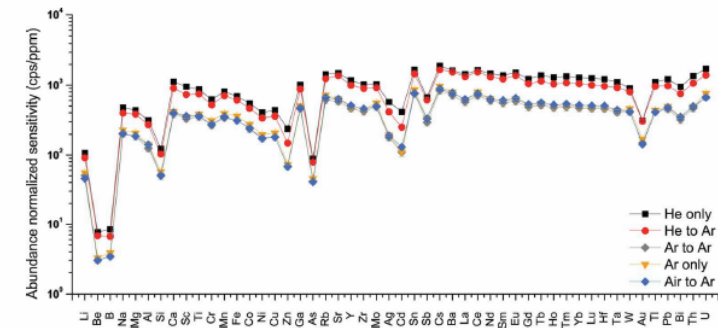
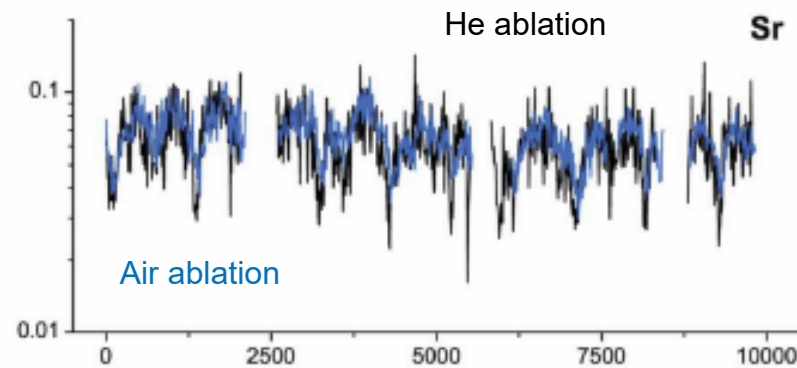
**Gas Converter Cell
Sumitomo Seika Co.,
Ltd.**

Commercial Product GED

- LA of “arbitrarily” large objects in ambient air
- Air exchange to Ar



ICPMS



Tabersky et al. 2013, J. Anal. At. Spectrom., 28, 771
 Nishiguchi et al. 2008, J. Anal. At. Spectrom., 23, 1125

Thank you for your attention!

