



International Research Training  
Group “SeleCa” at  
RWTH Aachen University

Prof. Dr. Jun Okuda  
Department of Chemistry

# RWTH Aachen University: Facts and Figures

## Location



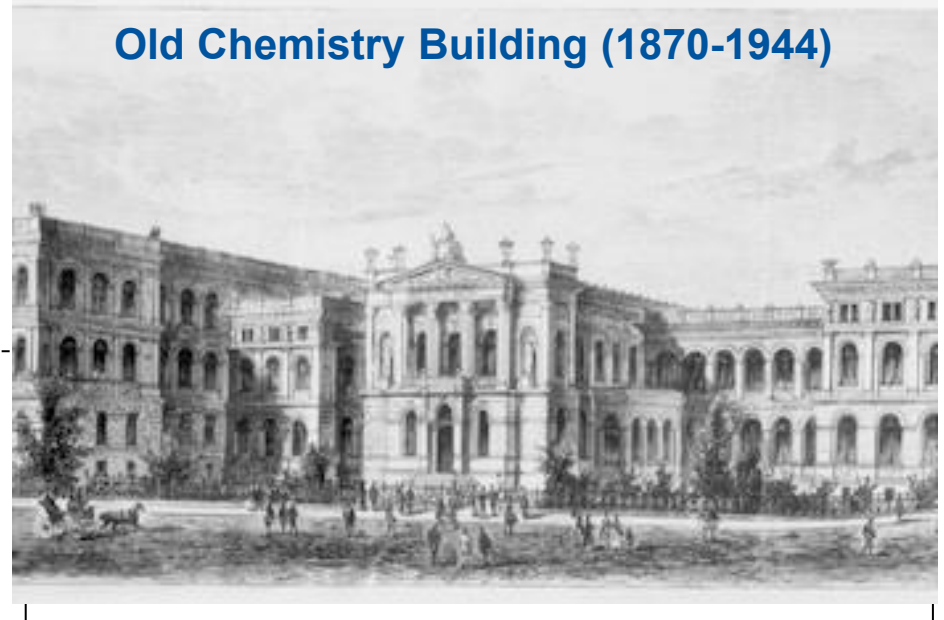
Frederic III  
(1831-1888)

**Founded in 1870 by the Prussian Crown Prince Frederic III** (Queen Victoria's Son in Law)

## Travel distance (by train):

Aachen – Brussels:	70 min
Aachen – Paris:	2.5 h
Aachen – Amsterdam:	3.5 h
Aachen – London:	4.5 h
Aachen – Berlin:	5.5 h

## Old Chemistry Building (1870-1944)



# RWTH Aachen University: Facts and Figures

## The Integrated University of Technology



> 42,000 Students



> 5,000 International Students



>500 Professors

RWTH Aachen University

Total: **813 M €**

...of which:

**416 M €** State Funding

**313 M €** External Funding

**19 M €** Tuition Fees

**4 M €** Fundraising



> 3,500 Non-academic Staff & Apprentices



> 4,000 Academic Staff

# RWTH Aachen: Faculties and Departments

## Faculty of Mathematics and Natural Sciences

Departments of Mathematics, Computer Sciences, Physics, **Chemistry** and **Biology**

## Faculty of Architecture

## Faculty of Civil Engineering and Surveying

## Faculty of Mechanical Engineering

## Faculty of Geosources and Materials Engineering

Departments of Metallurgy and Geoscience

## Faculty of Electrical Engineering and Information Technology

Engineering

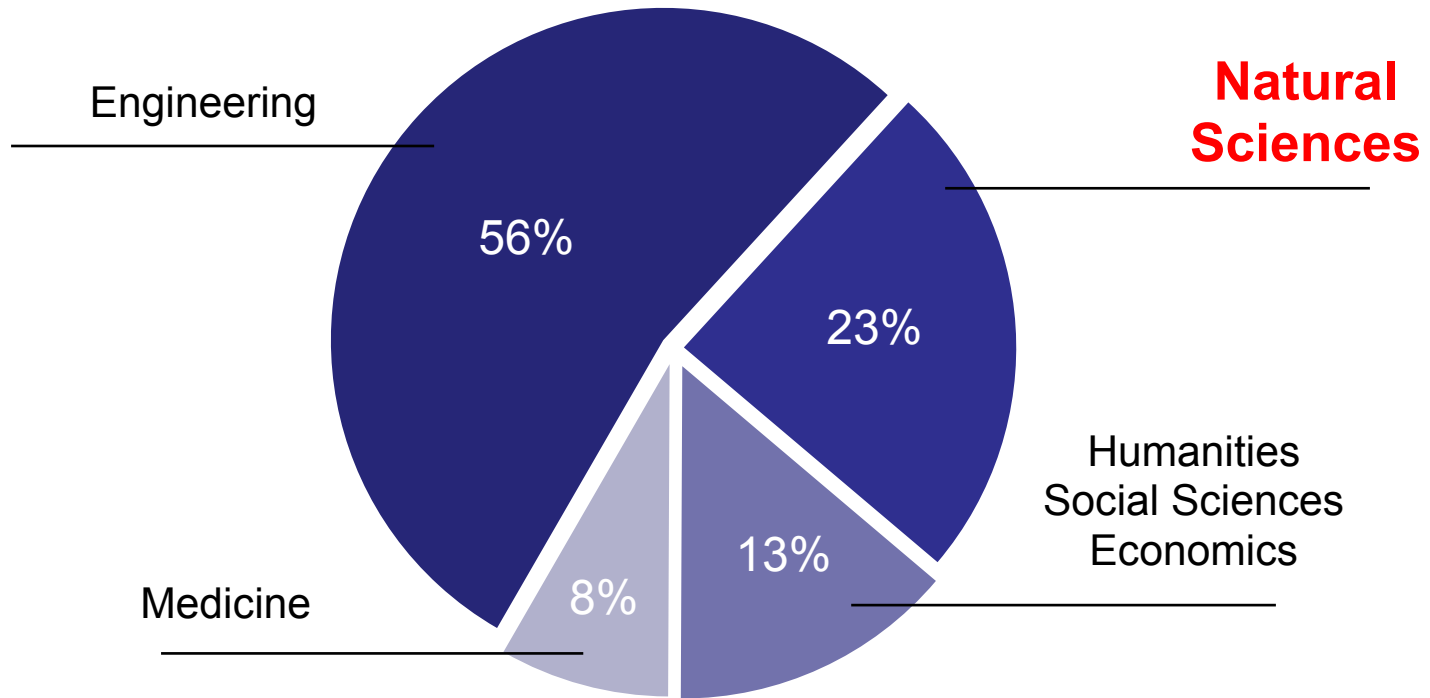
## Faculty of Arts

## Faculty of Economics

## Faculty of Medicine

# RWTH Aachen University: Facts and Figures

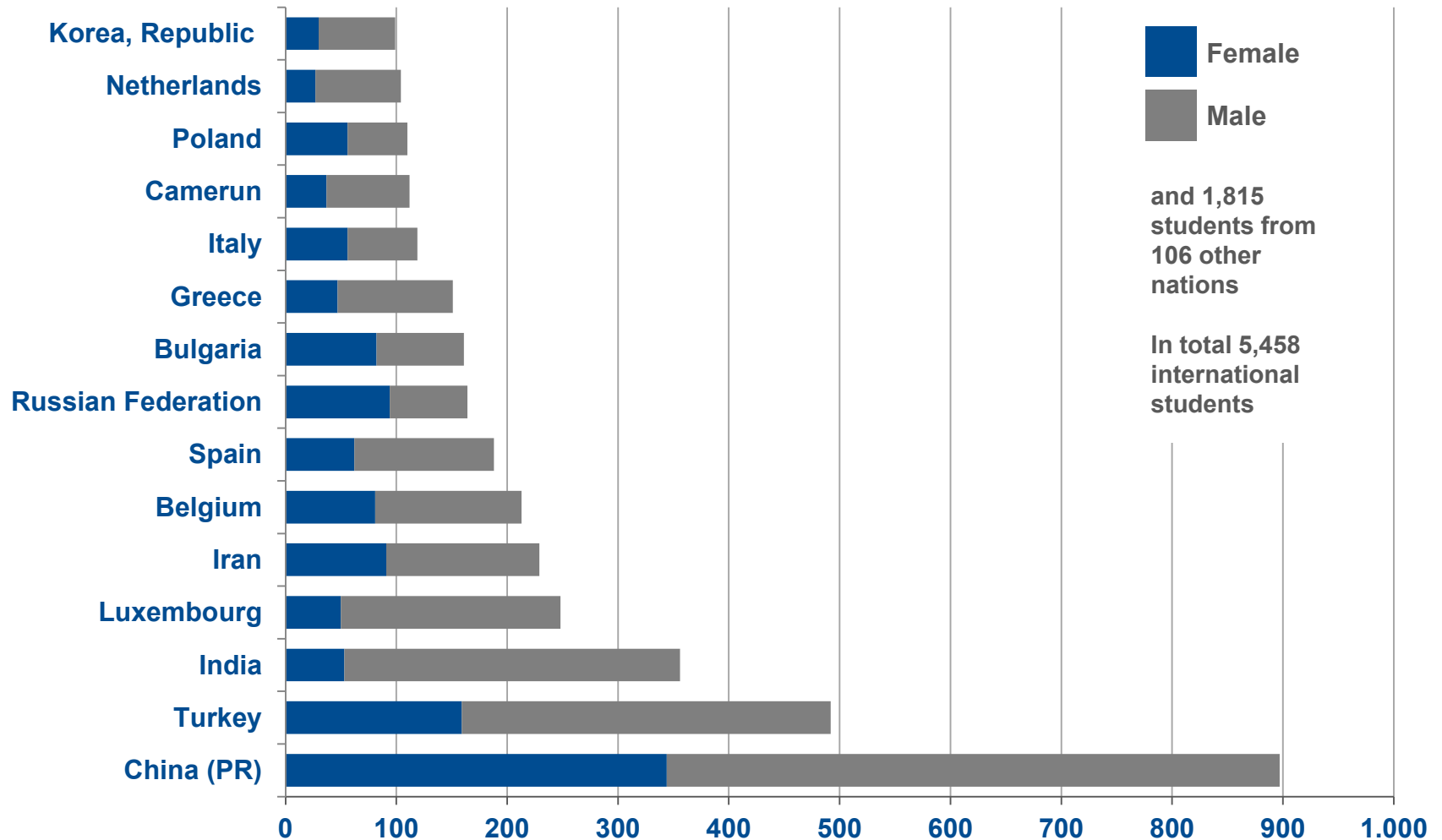
Students per Discipline: Winter 2011/12



**35.813 Students**

# International Students WS 11/12

## Top 15 Countries



# Cooperation RWTH - Japan

## Partnerships since 1956



## Recent Activities

- 2004: Foundation of German-Japanese Society in the Aachen Region
- 2005: Awarding an honorary Doctorate to Prof. Ryoji Noyori
- 2006: Celebration of 50-year cooperation anniversary with Keio University
- Keio Summer School (since 2007)
- 2010 Keio University's honorary doctorate to Prof. F. Klocke
- 2016 Planned founding of RWTH Alumni Club Japan

## Goals for future cooperation with Japan

(Re)activation and intensification of scientific contacts with selected Japanese Universities by exchange of

- Students
- Graduates
- Postdocs
- Guest Professors
- Management Staff
- Activation of Alumni

***International Research Training Group***  
**Selectivity in Chemo- and Biocatalysis (SeleCa)**

Spokesperson: J. Okuda



JSPS

Japanese-German Graduate Externship  
**Environmentally Benign  
Bio- and Chemical Processes**

Coordinators: H. Ohtake/K. Mashima

***International Research Training Group***  
**Selectivity in Chemo- and Biocatalysis (SeleCa)**

Spokesperson: J. Okuda



JSPS

環境調和を指向した生物および化学プロセス

に関する共同大学院教育プログラム (JGGE)

Coordinators: H. Ohtake/K. Mashima

# Aachen-Osaka

**March 4<sup>th</sup>, 2004**

**Agreement of Academic Exchange  
between  
Faculty of Mathematics, Computer Science  
and Natural Sciences  
and  
Graduate School of Engineering Science**

**Osaka, September 5<sup>th</sup>, 2005**



**3<sup>rd</sup> Joint Symposium 2010**



**Aachen, September 6<sup>th</sup>-7<sup>th</sup>, 2010**

**Inauguration Symposium**

**Cooperation Agreement**

**1<sup>st</sup> Joint Symposium 2006  
in Aachen**

**2<sup>nd</sup> Joint Symposium 2007  
in Osaka**

**2007-2009: Proposal preparation**

**10 Joint Teams**

**10 Aachen Scientists**

**10 Osaka Scientists**

**2 Jülich Scientists**

# Research Goal



# A German-Japanese Program

Selectivity in Chemo-  
and Biocatalysis  
(SeleCa)

(submitted in 2009;  
**renewed until 2019**)

1. Funding Period 2010-2014

2014

Approval 05/14

2019

2013

On site review

★ LRH

~~2015~~

~~Blocked~~

Final report

*Biological and  
Chemical Approaches  
to Environmentally  
Benign Processes*

(submitted in 2009;  
**renewed until 2019**)

1. Funding Period 2010-2015

2012

Intermittent  
review

2015

Renewal  
Proposal  
and hearing  
for  
2015-2019

Acceptance 02/15

2017

Intermittent  
review

2019

## ▪ Innovation

Bridging the conceptual and methodical gap between **chemo-** and **biocatalysis** based on frontier research on **selectivity** in chemo-/biocatalysis.

## ▪ Internationality

Promoting **intercultural** experience and understanding “non-European“ (research) culture.

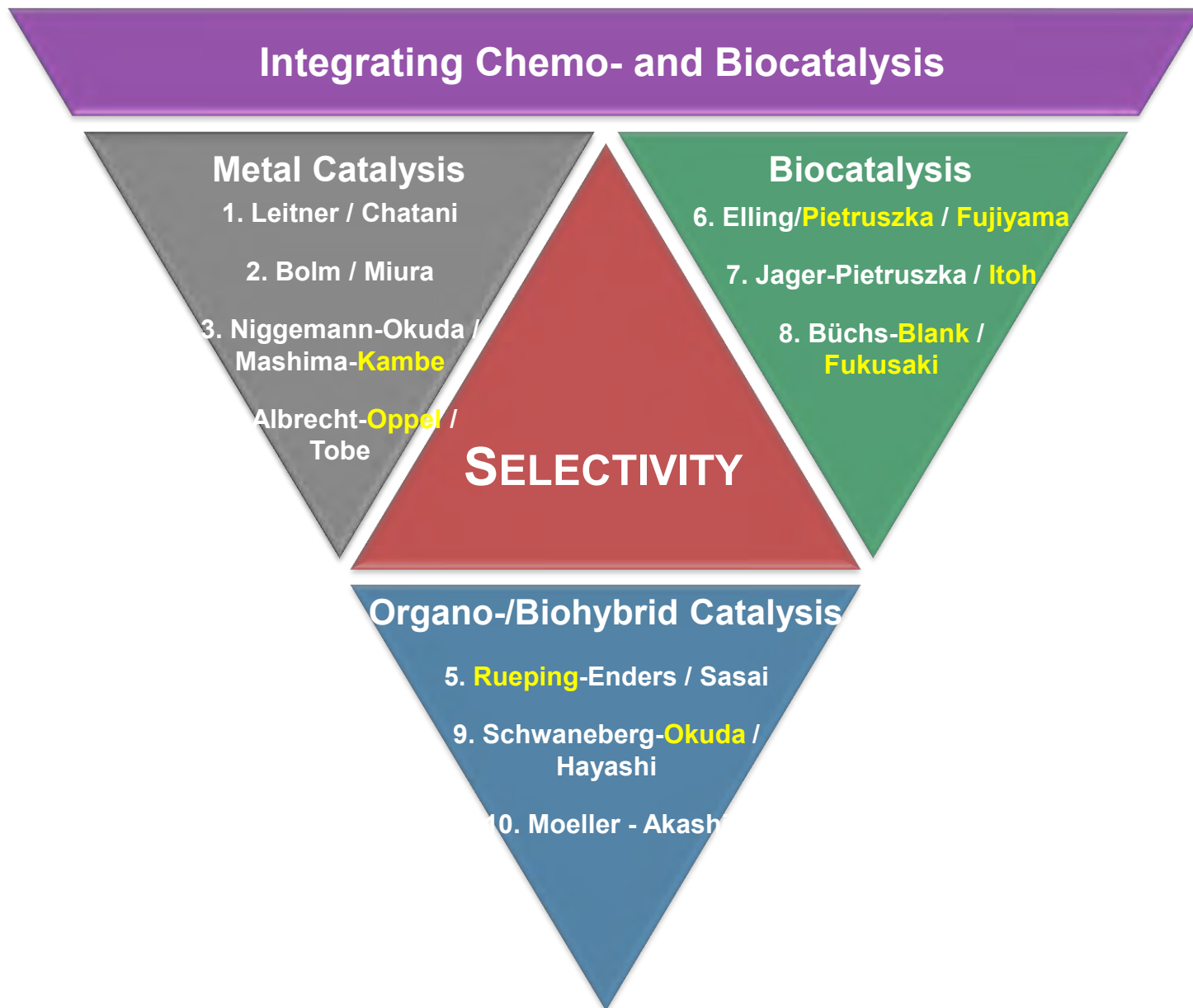
## ▪ Excellence

*RWTH Institutional Strategy:*

1. Sharpening Scientific Profile
2. Mobilizing People

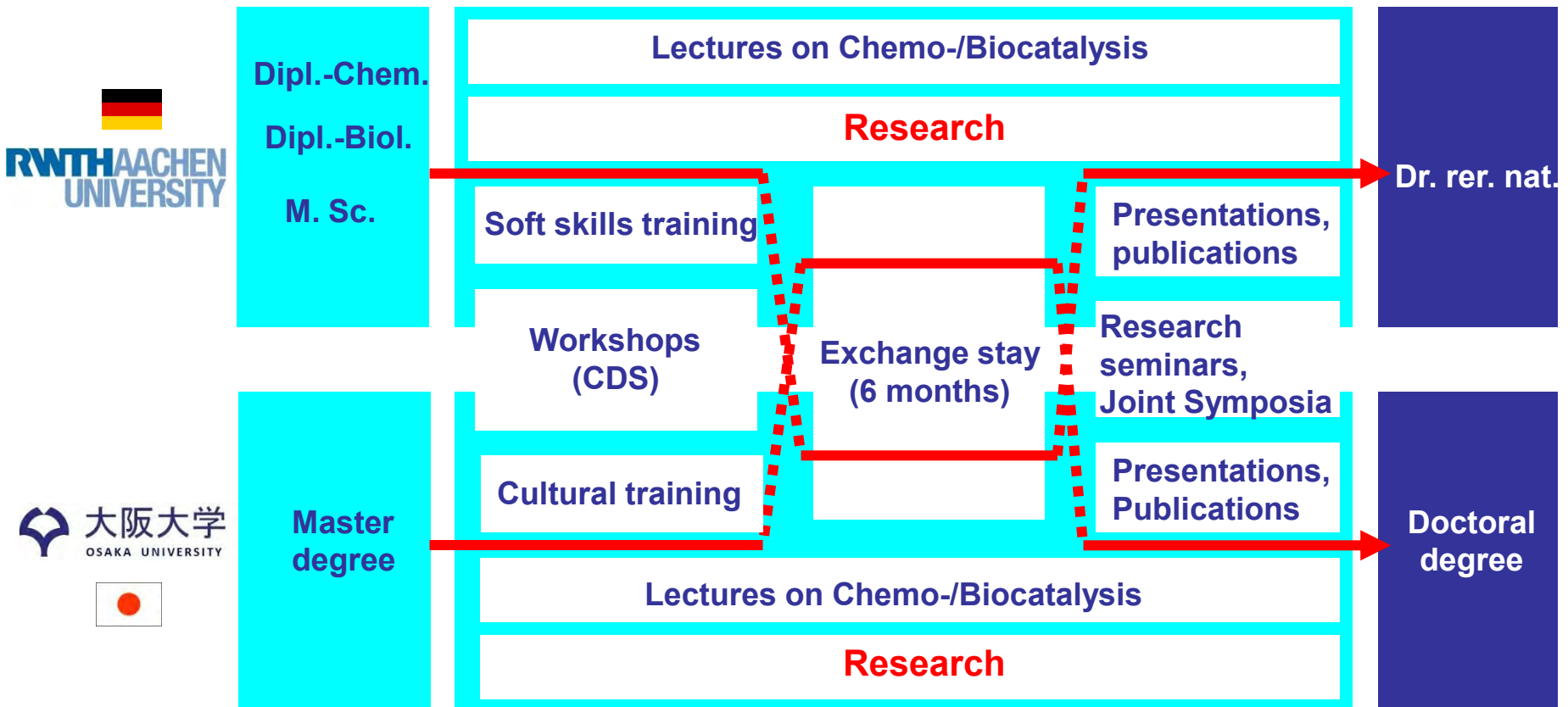


**Globally competitive researchers in *chemo-* and *biocatalysis* with *multicultural* communication skills.**



# Qualification Program

## Selectivity in Chemo- and Biocatalysis



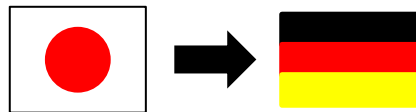
## Biological and Chemical Approaches to Environmentally Benign Processes

# Exchange Activity 2010-2013



## Exchange stays of doctoral researchers from Aachen:

- completed 15
- in progress 1
- planned in 2014 5

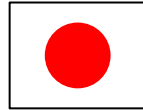


## Exchange stays of doctoral researchers from Osaka:

- completed 15
- in progress 2
- planned in 2014 4

**Joint publications between Aachen/Osaka: 15**

# Double Mentoring



**Formalized Joint  
Graduate Education  
Based on Dual Mentoring.**

## Challenges:

- **Difference in formal regulations**
- **Coordination of schedule**



**Dr. Yukiko Hayashi**  
Okuda / Mashima  
**25. 01. 2013**



**Kazuki Fukumoto**  
Hayashi / Schwaneberg  
**03. 12. 2013**



**Andreas Sauer**  
Okuda / Mashima  
**03. 12. 2013**

# Symposia

**No serious interruption after the Great Earthquake in Eastern Japan on March 11, 2011**

- 4 Joint Symposia in **2011**
- In average 2-3 Joint Symposia including *international speakers.*

## Mini Symposium April 27<sup>th</sup>, 2011



## “Sharing“ Nobel Laureates Between Aachen and Osaka

*Celebrating Honorary Doctoral Degrees to Profs. Grubbs and Schrock*



**SeleCa International Symposium  
June 28, 2013**



R. H. Grubbs



R. R. Schrock

ノーベル化学賞受賞科学者を交えた研究交流会

主催：大阪大学リーディング大学院プログラム  
「インタラクティブ物質科学・カデットプログラム」  
協賛：(独法)日本学術振興会、(一社)生産技術振興委員会、  
(公社)日本化学会近畿支部

2013年7月19日 13:00-17:00  
大阪大学秋田キャンパス 協賛会館 3階ホール

13:00-13:10 Opening

13:10-14:10 Prof. Alois Fürstner (Max-Planck Institute)  
"Catalysis for Total Syntheses"

14:10-14:30 Break

14:30-14:45 Atsushi Sanagawa  
"b-Bond Metathesis between Transition Metal Compounds and Acid Halides"

14:45-15:00 Hirotsuka Kinuta  
"Rhodium-Catalyzed Borylation of Nitriles through the Cleavage of Carbon-Cyano Bonds"

15:00-15:15 Yoshihiro Inamoto  
"Rhodium(III)-Catalyzed Direct Transformation of Esters via Double Nucleophilic Addition of Organosilicon Compounds"

15:15-15:30 Kazuki Fukumoto  
"An Artificial Metalloenzyme: Covalently Embedding a Rhodium Complex in the Cavity of Nitrobindin Mutants towards Stereoselective Polymerization"

15:30-16:00 Break

**Symposium with Nobel Laureates  
July 12, 2013**

# Gender Equality

- **Delegation of female chemistry students from Osaka University visited RWTH Aachen on 11./12. November 2011.**
- **Workshop on differences for professional women in German and Japanese society.**
- **Discussion with female master and doctoral students at RWTH Aachen.**



**With vice-rector Prof. Klee**



- **Scientific Complementarity**

Difficulty to establish thematic cooperation schemes, unless prior personal contacts exist. DFG emphasizes scientific excellence.

- **High Administrative Hurdles**

Many cultural differences between DFG and JSPS.  
Reviewing process excessively cumbersome.  
Management tedious; cross appointment difficult.

- **Education of Graduate Students**

Fundamental differences between Japan and Germany:  
Selection procedures, tuition, working hours.  
Employment schedule (Japan: April).



ハリタケ(株)  
研究員

## ○日独共同大学院プログラムに参加したことへの感想

国際感覚を養う貴重な機会となりました。研究はもちろん、単純に海外で生活できたことが自分の糧となったと思います。

## ○今のポジションにその経験がどのように活かされているか

会社では外国人中心のチームに配属され、外国人研究者と仕事をしています。日独プログラムで海外での研究生活を体験したおかげで、英語での議論にもすぐに対応でき、楽しく仕事できています。

## ○日独共同大学院プログラムに参加したことへの感想

私は当時、自分の海外経験や英語力のなさに、このまま大学院を卒業して大丈夫だろうかと強く不安を感じていました。英語は全く聞こえませんでしたし、英語でプレゼンするなんて…であったと記憶しています。しかしながら、このプログラムはそんな私に多くの成長の機会を与えてくれたと思います。はじめての英語での発表のときは、緊張のあまり覚えていた原稿を忘却するという失態ぶりでした。しかし発表を重ねるにつれ、英語で発表や質疑応答することを楽しくできるようになり、さらに他の国際学会ではポスター賞を頂けるまでになりました。

このプログラムを通じてさまざまな経験をしたことで、今では海外で生活することや英語でプレゼンやディスカッションをすることに抵抗はありません。あの悩んでいた当時の自分が、今ではとても小さく見えると感じています。



三菱化学(株)  
研究員

## ○日独共同大学院プログラムに参加したことへの感想

日独共同大学院プログラムに参加させていただいて、英語のスキルアップはもちろんのこと、年に2回の合同シンポジウムで学生のうちから国際学会の運営、進行なども経験できたことは自分にとって大きな財産になりました。

## ○今のポジションにその経験がどのように活かされているか

現在京都大学の研究員として大学の研究室に所属しています。研究室の留学生とも英語でコミュニケーションをとり、研究の指導をすることができるのはこのプログラムでの留学経験があったからだと思います。



京都大学  
博士研究員