



**Abbe School
of Photonics** | JENA

Friedrich-Schiller-Universität

The Abbe School of Photonics in Jena, Germany

Christian Spielmann

LAPHIA Symposium Bordeaux, France 12/13/2017

www.asp.uni-jena.de



Abbe Center of Photonics | JENA

Friedrich-Schiller-Universität

*Light,
Life, Liberty*

MEMBERS

49 principal scientists, ~160 doctoral students, ~120 Master students

ADVISORY BOARD

Tränkle (Speaker, FBI Berlin)

Heinzel (FSU)

Kempe (Carl Zeiss AG)

N.N. (TMWWDG)

Ritsch-Marte (Uni Innsbruck)

Sandoghdar (MPI Erlangen)

Zacharias (Uni Münster)

RESEARCH

ULTRA OPTICS

- Laser physics
- Nanooptics
- Photonic materials
- Optical systems

STRONG FIELD PHYSICS

- Ultrahigh peak power lasers
- Nonlinear & relativistic laser physics
- X-ray optics

BIOPHOTONICS

- Novel spectroscopic techniques
- Multimodal biomedical imaging & microspectroscopy
- Chip-based analytics & diagnostics

EDUCATION



Abbe School of Photonics | JENA

Friedrich-Schiller-Universität

- Master's degree program in Photonics
- Doctoral program in photonics
- Optics training laboratory
- Interinstitutional ASP seminar
- Guest professorship program

CENTER MANAGEMENT

Board of Directors

Spielmann (Executive director)

Popp (Deputy director)

Pertsch

Gräfe

Tünnermann

Administration

Helgert (CEO)

Geimecke (Administrative assistant)

Schmidt (Master's degree program)

Späthe (Doctoral program)

Vetter (Project accounting)



FACULTIES @ UNIVERSITY JENA

- Faculty of Physics and Astronomy
- Faculty of Biology and Pharmacy
- Faculty of Chemistry and Earth Sciences
- Faculty of Medicine

ASSOCIATED RESEARCH INSTITUTES @ JENA

- Fraunhofer Institute for Applied Optics and Precision Engineering (IOF)
- Helmholtz Institute Jena (HIJ)
- Leibniz Institute of Photonic Technology (IPHT)



The Abbe School of Photonics Founded in 2008

Research and International Education Programs in Optics & Photonics at the Friedrich-Schiller-Universität Jena



To establish a European center for optics & photonics education

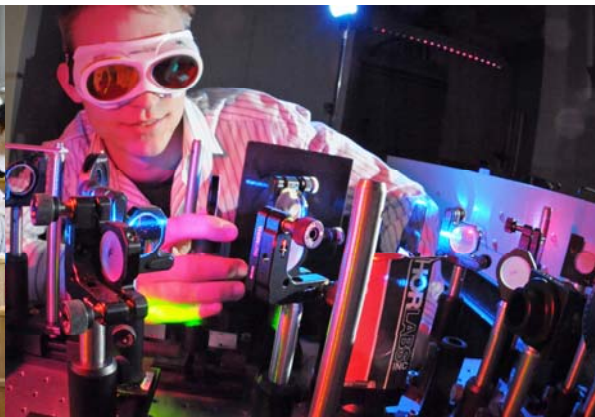
- Concentration of all education activities in optics & photonics
- Strong cooperation with German photonics industry
- Attraction of foreign students and interdisciplinarity
- Enhancement of international visibility & recognition



Abbe School of Photonics

Coherent internationalization at all levels

	iMaster	iDoc	iStaff
Incoming Mobility	> 90 % non-German > 40 nationalities Scholarships	Competitive research profile, central application system	Guest professors Int. junior groups International calls
Outgoing Mobility	Mobility windows Exchange programs	IRTG 2101 Scholarship programs (Erasmus Mundus, DAAD)	Research mobility Internat. career service
Institutional Internationalization	Joint degree programs	Global research network	Internat. management



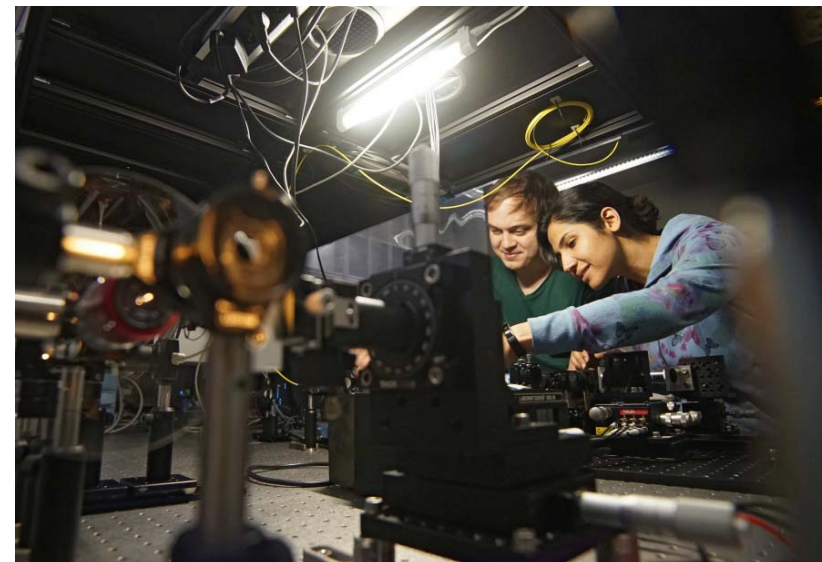
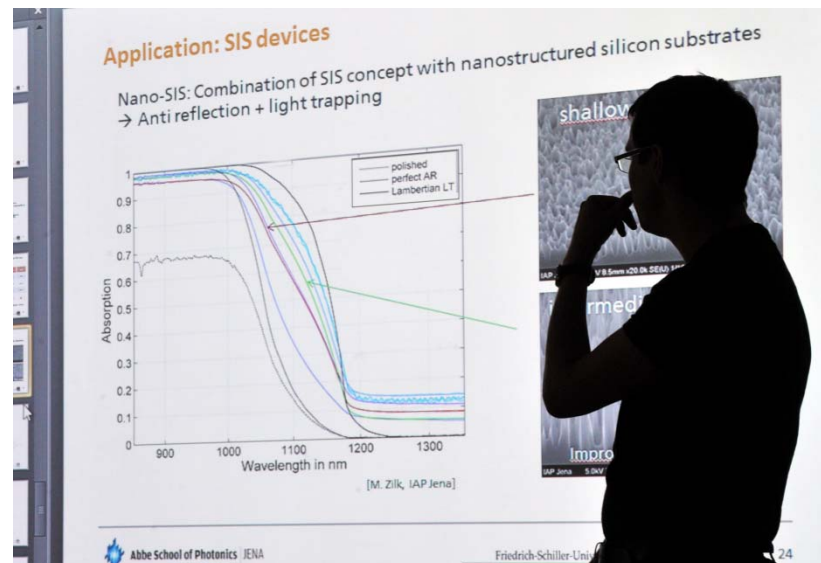
International Master's degree and Doctoral program

Master's degree programs

- ~30 students in MSc Physics with specialization Photonics
- ~120 students in MSc Photonics (~700 applications p.a., ~60 accepted p.a.)
- since 2016 MSc Medical Photonics

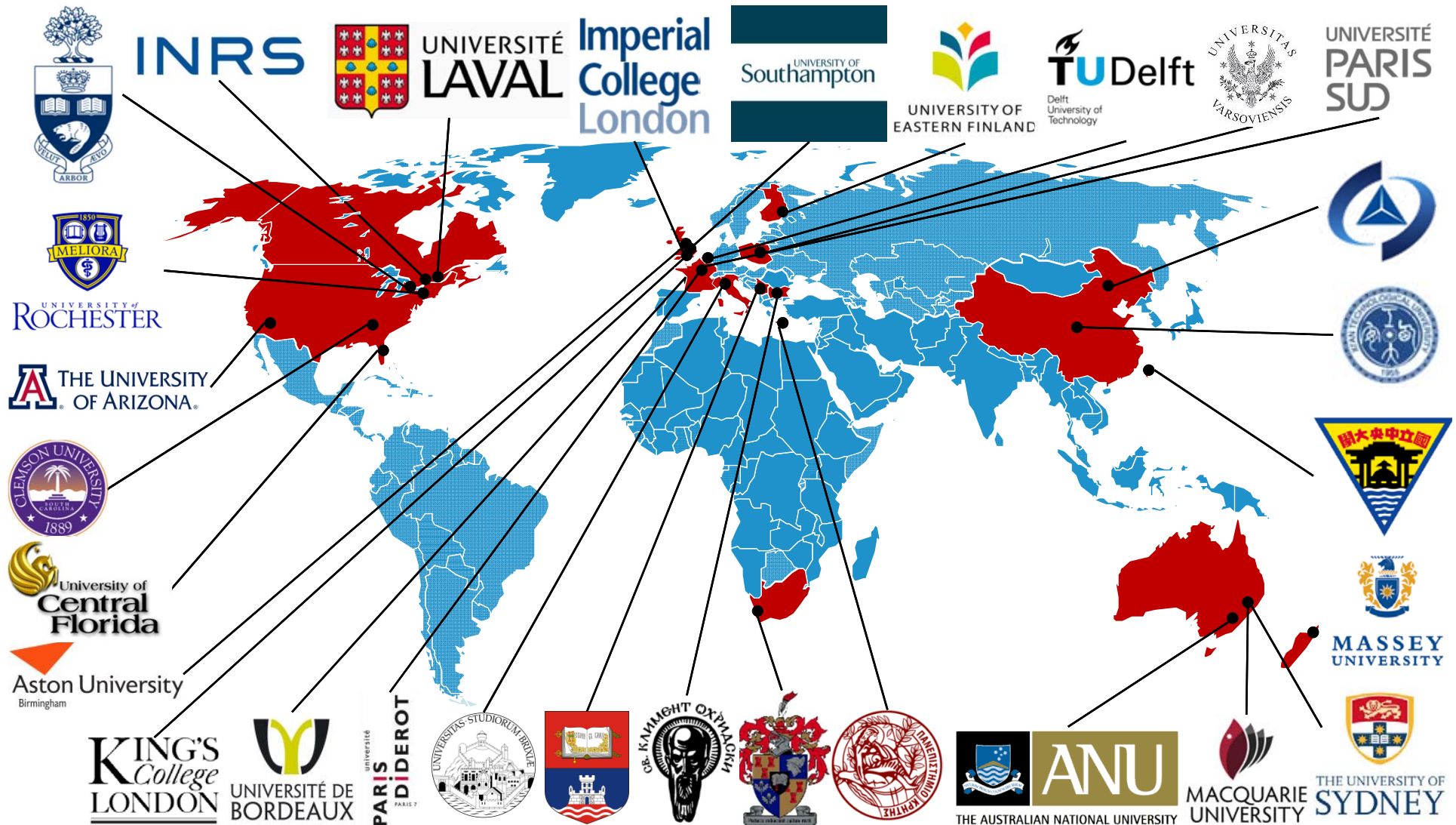
Doctoral program

- ~160 doctoral students
- researching in over 11 research institutes
- structured graduate program



ASP's international network

International premium partners in education programs



Funding

>€12 million since 2008 in Public Private Partnership



FREISTAAT THÜRINGEN 
Thüringer Ministerium für
Bildung, Wissenschaft und Kultur

 **Bundesministerium
für Bildung
und Forschung**

Unterstützt von / Supported by



DAAD

**Alexander von Humboldt
Stiftung/Foundation**

Deutscher Akademischer Austausch Dienst
Servicio Alemán de Intercambio Académico

**Stifterverband
für die Deutsche Wissenschaft**

Carl Zeiss Stiftung



>€12 million since 2008 in Public Private Partnership

- Local State Government (ProExcellence ...2020)
- German Academic Exchange Service (Erasmus+ USA, GSSP ...2020)
- European Union (Erasmus Mundus OpSciTech ...2013, Atlantis MilMi ...2014, Erasmus Mundus NANOPHI ...2018, Erasmus+USA ...2018)
- German Council of Science and Humanities (€25 million for new building ...2017)
- Federal Government & Photonics Industry (Master Photonics ...2016)
- Stifterverband (...2014)
- Private Foundations (e.g. Carl Zeiss Foundation, Alexander von Humboldt Foundation ...2015)



International Master's degree program

B.Sc. in Phys. / Chem. / Eng. / Math.

ADJUSTMENT

Fundamentals of modern optics, Structure of matter, Condensed matter physics, Semiconductor physics, Quantum mechanics

FUNDAMENTALS

Optical metrology and sensing, Optical modeling and design, Laser physics, Optics training laboratory

SPECIALIZATION

Computational photonics, Micro- & nanotechnology, Nanooptics, Image processing, Nonlinear optics, Nanomaterials, Optoelectronics, Photovoltaics, Biophotonics, etc.

INTERNSHIP

Practical training in photonics industry

RESEARCH

Optics training in advanced research labs

MASTER'S THESIS

Research thesis in university laboratories, Industry research departments, Fraunhofer Institute for Applied Optics and Precision Engineering (IOF), Institute of Photonic Technology (IPHT) and Helmholtz Institute Jena (HIJ)

Language courses

German and English

ASP Tutor System

Individual student guiding and counseling

ASP Trainings

Block courses, guest lectures on photonics, economy, patents, management and law

MSc. in Photonics Σ 4 semesters



THE APPLICATION SYSTEM FOR THE ACADEMIC YEAR 2018/19 IS OPEN NOW!

Application deadlines in 2018

- January 15 (1st priority deadline for all applicants)
- March 1 (2nd priority deadline for all applicants)
- April 15 (3rd priority deadline for all applicants, final deadline for non-EU applicants)
- June 15 (rolling admission deadline for EU applicants)
- September 15 (rolling admission deadline for German applicants)

Prerequisites and application requirements

Applicants must have obtained or be about to obtain a Bachelor's degree or equivalent qualification in Physics, Natural Sciences, or Engineering. The following documents are required for the online application:

- Bachelor of Science (B.Sc.), Bachelor of Engineering (B. Eng.) or Bachelor of Technology (B. Tech.) degree comprising significant exposure to physics fundamentals, or an equivalent or higher degree in the same areas. If you have not yet finished your current academic degree, you may apply likewise with a preliminary transcript of records including all completed courses thus far;
- a comprehensive **curriculum vitae** (CV). Please list all stages of your education in chronological order. Further, we need a clear statement about your current status and/or occupation including information on current employments, unemployment, or parental leave;
- a **letter of motivation** (500 words at maximum and to be typed);
- a copy of your **passport**;
- your **school leaving certificate** with marks;
- a **transcript of records** with marks;
- a proof of **proficiency in English** by
 - TOEFL or an equivalent English test (minimum points/grades): TOEFL PBT (550), TOEFL CBT (215), TOEFL IBT (85), IELTS (6.5), ESOL (CAE), or
 - German "Abitur", or
 - a completed former academic degree at an English-speaking university (proof given by a certificate of a university), or
 - a statement of your English skills as a native speaker.
- If applying for a scholarship, two additional **letters of recommendation** from professors are required.

Please check the [scholarship information](#) and apply for scholarship funding if you are eligible. Please indicate for which scholarship(s) you have applied. If you have more questions, please consider our [FAQs](#). Please note that we cannot accept applications via post or email.

APPLY NOW



GUEST PROFESSORS | RESEARCH | GRK 2101 | PARTNERS & FUNDING | EVENTS

THE SCHOOL

MASTER'S DEGREE PROGRAMS

DOCTORAL PROGRAM

- M.Sc. Photonics
 - Application
 - FAQ
 - Scholarships
 - Study Program
 - Course Schedule
 - Coordination Office
 - Student Support
 - Information for Current Students

M.Sc. Physics with Focus on Photonics

M.Sc. Medical Photonics

» MASTER'S DEGREE PROGRAMS » M.SC. PHOTONICS » APPLICATION » FAQ

Search




FREQUENTLY ASKED QUESTIONS (FAQ)

- A. Prerequisites and Preparation
- B. Application process and enrollment
- C. Coming to Jena and getting started

<https://www.asp.uni-jena.de/faqs.html>

International Master's degree program

Selecting the best students – Online Application System (OLAS)



Abbe School of Photonics | JENA
Friedrich-Schiller-Universität

Ricarda Knetsch

Friedrich-Schiller-Universität Jena

SEARCH

EXTENDED SEARCH

HOME

APPLICATIONS FOR MASTER

TASKS

NEWS

FILEBOX

STATISTICS

ADMINISTRATION

PREFERENCES

FAQ FOR MASTER

FAQ FOR PH.D.

CONTACT US

BACK TO ASP

LOG-OUT

SEARCH RESULTS(615)

search again

all semesters

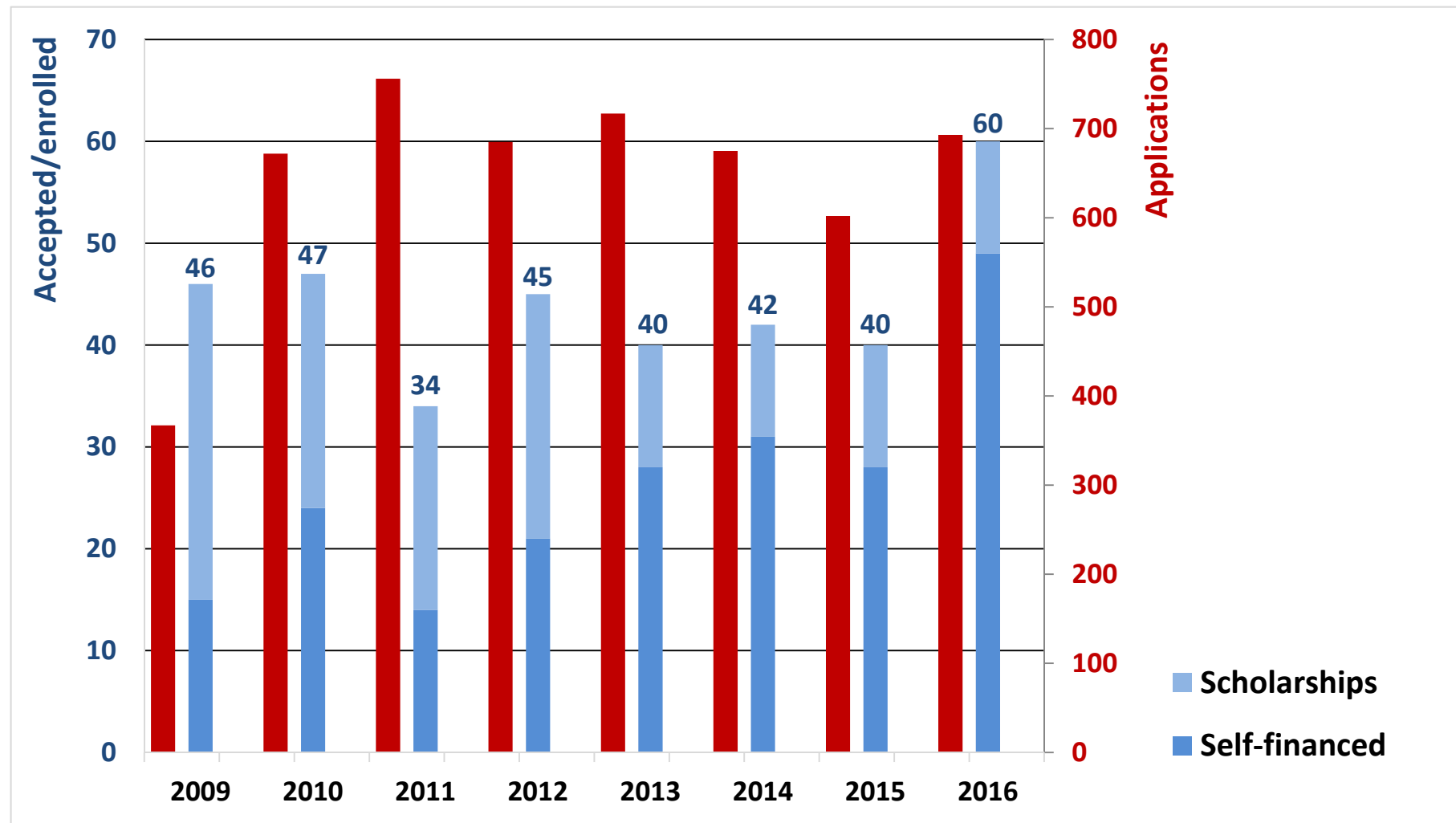
<< < 38 39 40 41 42 43 44 45 46 47 >>

Nbr	Surname/Family Name	First/Given Name	Gender	Date of birth	Nationality	S	SG	R1	R2	R3	R4	R5	R6	R1 + R2	R	Status			
			male	20/09/1983	Iran	yes										editing	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, red 2px, red 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			female	28/09/1973	Iran	no										applying	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, red 2px, red 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			male	25/12/1982	Iran	yes		2.5	3.5	2.5	3.5	3.5	6	15.5		not_admitted	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, green 2px, green 4px, red 4px, red 6px, white 6px, white 8px, green 8px, green 10px);"></div>		
			female	09/05/1989	Ireland	yes	awarded	4	4	4.5	4.5	4.5	8	21.5		admitted	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, green 2px, green 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			female	29/03/1990	Ireland	yes	denied			4.5						admitted	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, green 2px, green 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			female	02/11/1989	Ireland	yes	denied			4.5						accepted	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, green 2px, green 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			female	19/06/1990	Ireland	yes	awarded	4.5	4.5	4.5	4.5	4.5	9	22.5		admitted	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, green 2px, green 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			female	07/08/1981	Israel	no										registered	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, red 2px, red 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		
			female	06/04/1979	Israel	no										declined	<div style="width: 100%; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, green 2px, green 4px, white 4px, white 6px, red 6px, red 8px, white 8px, white 10px);"></div>		

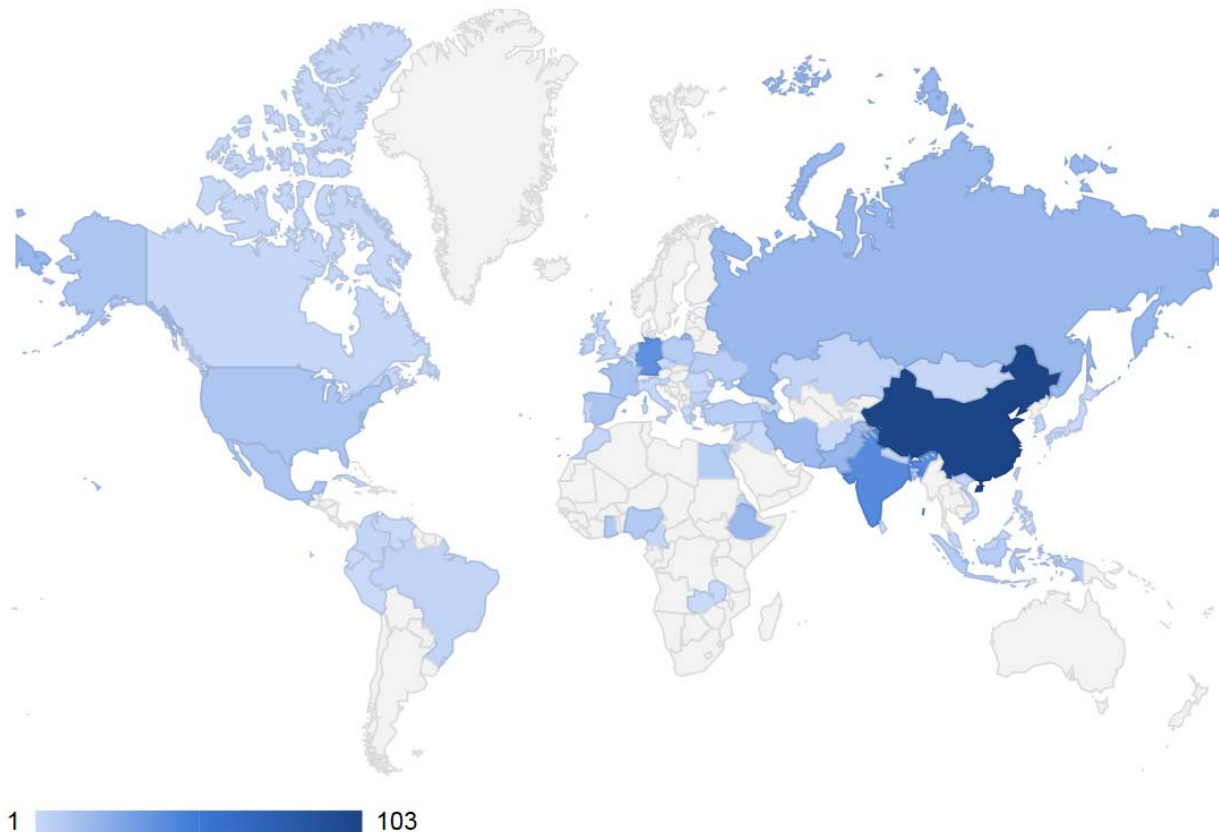
Quick access

- export applicants
- export statistics
- export marketing
- Create Tasks
- Evaluation View

M.Sc. Photonics: evolution of applications and student numbers



Countries of origin and numbers of Master's degree students



Afghanistan	1	Jordanien	1
Armenia	1	Kasachstan	4
Aserbaidtschan	2	Malaysia	3
Bangladesh	12	marokko	2
Belgium	1	Mexico	11
Brazil	4	Mongolia	2
Bulgaria	4	Nepal	3
Cameroon	2	Netherlands	1
Canada	2	Nigeria	9
China	103	Pakistan	19
Colombia	3	Peru	1
Cuba	1	Philippines	3
Czech Republic	1	Poland	8
Ecuador	1	Portugal	3
Egypt	8	Romania	1
Eritrea	2	Russia	18
Ethiopia	18	Slovenia	1
France	13	South Korea	3
Germany	39	Spain	12
Ghana	9	Sri Lanka	1
Greece	1	Syria	2
Hong Kong	1	Taiwan	6
India	42	Turkey	7
Indonesia	8	Ukraine	7
Iran	17	United Kingd	3
Iraq	1	United State	11
Ireland	5	Venezuela	1
Israel	1	Vietnam	2
Italy	2	Zambia	1
Japan	1		

→ 452 enrolled students from 59 different countries (2009-2017).

Intercultural trainings

- Fast adaption of new foreign students, senior student act as tutors
- Providing help to understand e.g. cultural differences in education and life
- Special trainings offered by ASP staff and experienced HR coaches



Professional career development

- Courses on German business and working culture
- Courses on soft and transferable skills
- Language courses
- Technical writing courses (including one-to-one coaching)
- Application workshops and coaching



Workshop at Carl Zeiss AG



Job interview with industry partner

International summer schools, workshops and science fairs

- Intercultural professional exchange with international partners
- 2009 – 2015: Paris, London, Warsaw, Delft, Jena, Joensuu, Paris
- 2015 – 2017: Munich, Toronto, Jena, Toronto, Changchun



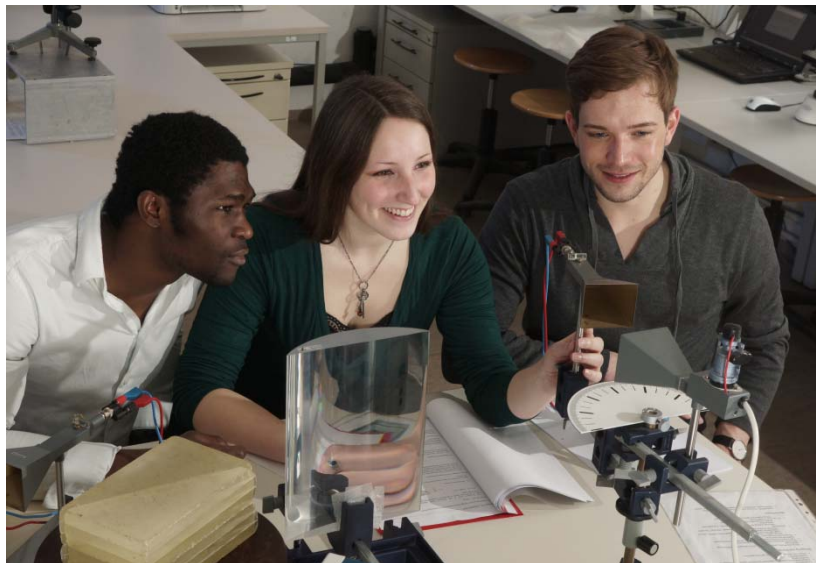
Frankfurt Optactec fair 2016



Delft photonics summer school 2012

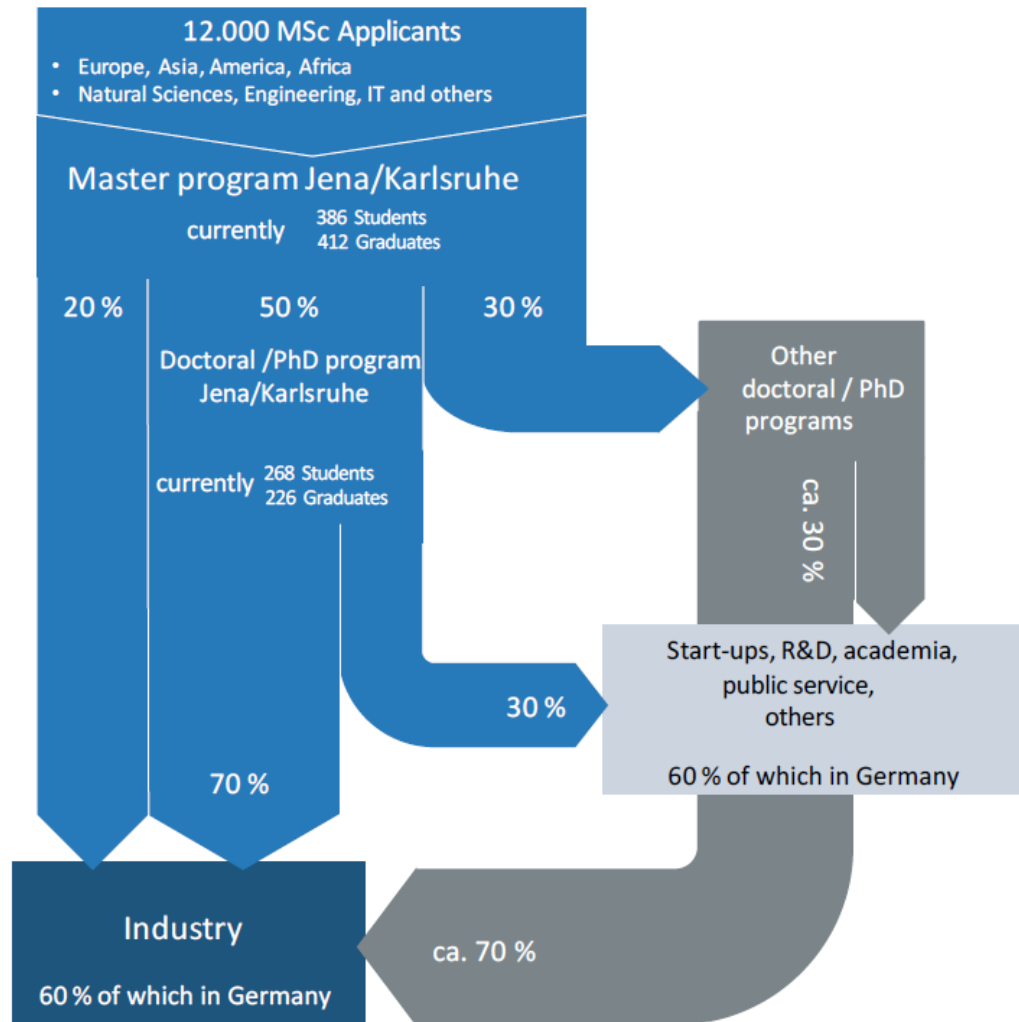
M.Sc. Photonics

- Scholarship programs and travel grants for excellent students
 - ProExcellence Master Scholarships (Thuringia), Deutschlandstipendien
 - Stipends for Chinese Students (CIOMP Changchun)
 - EU Erasmus Mundus (Australian National University and Massey University, +7 EU partners)
 - EU Erasmus Plus (University of Rochester, University of Central Florida, University of Arizona)
 - German Academic Exchange Service (University of Belgrade, University of Sydney, National Central University Taipeh)



International Master's degree program

Career paths and job opportunities for our graduates



Doctoral program

M.Sc. in Phys. / Chem. / Eng. / Math. (or Diploma)

RESEARCH PROJECT

Research projects at the forefront of applied and fundamental research in photonics science in state-of-the-art laboratories

SCIENTIFIC COURSES

Lectures on advanced topics of photonic science and supplementary subjects

TECHNICAL COURSES

Courses on modern photonic technologies combined with intensive laboratory trainings

INTERNATIONALIZATION & NETWORKING

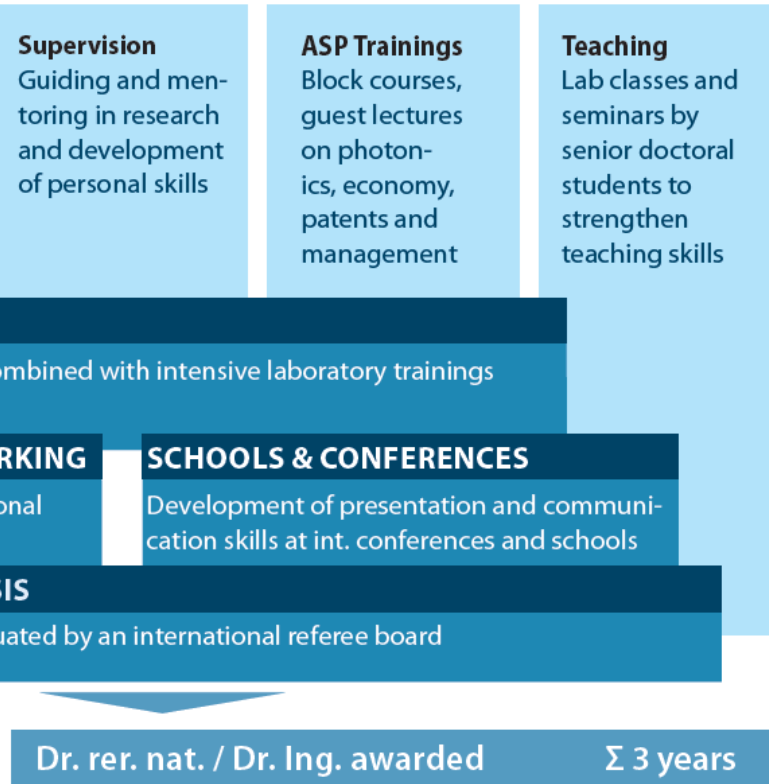
Working periods in laboratories of international partners

SCHOOLS & CONFERENCES

Development of presentation and communication skills at int. conferences and schools

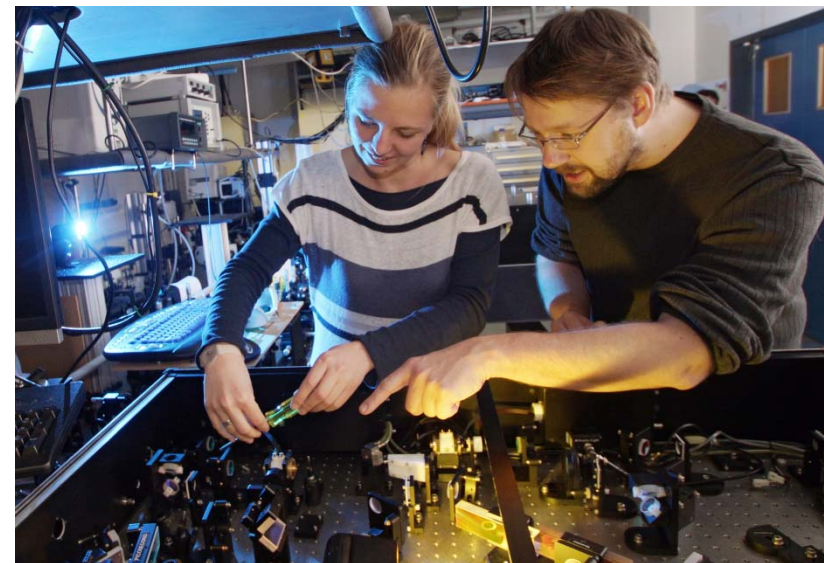
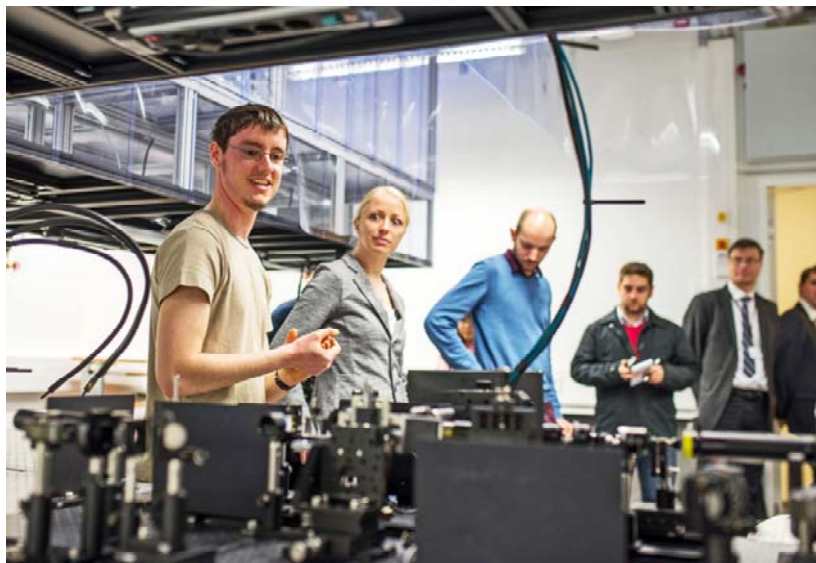
DOCTORAL THESIS

Research thesis evaluated by an international referee board



Doctorate in Photonics

- Doctoral projects connected to third party funding & scholarship programs
 - Guided light, tightly packed (German Research Foundation)
 - Optics & Photonics (local state government and industry)
 - Optical microsystems & photonic nanomaterials (federal government)
 - Erasmus Mundus Nanophotonics (European Union)
 - large number of individual project-bound doctoral positions



Interfaculty ASP seminar for doctoral students

- Closest exchange between doctoral students and professors
- > 30 student and >6 guest professor talks per year



Special training courses to increase research efficiency

- Strengthening of professional skills related to optics
- Broadening the scope of each individual doctoral student



DoKDoK - Optics conference fully self-organized by doctoral students

- Highly professional conference series on optical concepts
- Self-organized by ASP doctoral students and supported by the ASP
- DoKDoK is broadly appreciated and on the way to become a permanent part of the ASP doctoral program



ASP Doctoral students representatives



International education program

with a perspective beyond the university

Alumni program



Alexander von Humboldt
Stiftung / Foundation

- Services support alumni to maintain connections to their educational institution and fellow graduates
- Regular information exchange on individual careers
- Opportunities in partner companies



Internationalization

Strong bonds to international alumni

Long-term research alumni strategy

ACP one of eight winners in a national contest 2013

funded by the Humboldt foundation

Alumni workshops 2013 in Berlin, 2014 in Jena,
2015 in Berlin

 **Alexander von Humboldt**
Stiftung/Foundation



Prof. Martin C. Richardson

Director of the Townes Laser Institute, College of Optics & Photonics, University of Central Florida, Orlando, Florida, USA

“The M.Sc. Photonics program at the Abbe School of Photonics at the Friedrich-Schiller-Universität in Jena is in my opinion the strongest anywhere, and serves best the interests of the surrounding laser and photonics industries. (...) We now have seen nearly a dozen of these students come to the University of Central Florida as part of the Atlantis-MILMI International Master’s degree between our two universities. Every single student has been well prepared, motivated, and is a credit to the program. Part of the reason for the program’s success is the strong involvement of the local industries, which provide opportunities for internships and of course employment opportunities for many of its students.”



Prof. Federico Capasso

Robert L. Wallace Professor of Applied Physics
Harvard School of Engineering and Applied Sciences
Cambridge, Massachusetts, USA

“The strong local connections between fundamental and application-oriented science in Jena are quite unique at least in Europe. There were particularly two aspects I was extremely impressed by: First, the broad range of ideas and their integration into practice are impressive. (...). Second, **I was truly impressed by the variety and the level of expertise of the doctoral students of the Abbe School of Photonics.**

Their abilities to assemble complex optical setups with their own hands and to develop their own scientific ideas are rarely found nowadays.

I have seen many places worldwide: the Abbe Center is really a world-class operation, that's for sure.”



Prof. Yuri. S. Kivshar

Deputy Director of the Nonlinear Physics Centre & Chief Investigator of CUDOS, Research School of Physics and Engineering, Australian National University, Canberra, Australia

“I visited Jena many times and I believe Jena is a unique town not only as a special place for history of optics in Germany and the world, but also as a home for rapidly developing modern research in photonics that unifies all aspects of research from theory and experiment to technology. **I believe the Abbe Center of Photonics has the largest number of enthusiastic young researchers I ever met in any place of the world**, who will definitely drive its bright future!”



Prof. Mikhail N. Shneider
Princeton University, Princeton, USA

I believe that Abbe Center of Photonics at Friedrich Schiller University in Jena **is one of the world leaders in modern optics, photonics and their applications**, which not only provides a unique educational center for students - future scientists and engineers, but also a modern research organization, conducting the most advanced researches on a highest scientific level in close connection with industry and other research institutions.



Prof. Benjamin Eggleton

School of Physics, University of Sydney, Australia

My stay at ACP **was very enjoyable and stimulating and a great foundation for future collaboration and partnership.** It was wonderful to see the laboratories and facilities in Jena. It is an amazing optics ecosystem and certainly unique.



- Abbe School of Photonics
 - Research and international education programs in Optics and Photonics at the Friedrich-Schiller-Universität Jena
 - Funded 2008 in public private partnership
 - Master and doctoral program, different degrees offered
 - Prestigious guest professorship program
 - Worldwide network of partnerships and collaborations



- Thank you for your attention!

