BUILDING CAREERS IN PHOTONICS

The Abbe School of Photonics (ASP) is an integral part of the Abbe Center of Photonics. It provides and coordinates the graduate programs in optics and photonics at the University. Thus, ASP serves as a career springboard by promoting academic careers, as well as providing opportunities to gain job experience in the photonics industry. Its interdisciplinary education programs are embedded in ACP’s cross-fertilizing research environment. One of the school’s core degree programs is the international Master’s degree program in Photonics. In order to open up the program to students worldwide, all ASP lectures are taught completely in English.

ASP’s concept and philosophy aim at establishing Jena as one of the world’s leading educational centers in optics and photonics. ASP has been shaped by University’s traditionally broad spectrum of teaching and research activities in the light sciences. The School offers outstanding opportunities for high-level qualification at the graduate level in the areas of optics and photonics. Its academic qualification strategy is fully research-oriented and based on the principles of academic freedom, competitive research conditions and internationalization at all levels of education and research.

On the one hand, ASP’s training promotes and optimally links career phases of young scientists in academia. On the other hand, the School also recognizes the fact that many of its graduates will continue their careers in companies conducting intensive research. All of our competitive career-development measures are therefore designed to lay the foundation for successful careers in academia as well as in industry.

ASP coordinates and organizes all of ACP’s educational activities. The School was founded in 2008 as an essential part of the ProExcellence Initiative issued by the State of Thuringia. Since then, the local state and the federal governments, Germany’s optics industry and the European Union together have provided more than € 10 million in basic funding necessary to support this process. A key factor of the program is ASP’s close collaboratory work with its industrial partners. To sustain these business’ partners’ exceptionally high degree of economic development in the future, the availability of a substantial number of highly qualified employees will be required. ASP graduates are just such potential candidates, well-prepared for the German photonics industry.

A VISIONARY CAREER TRACK IN OPTICAL SCIENCES

One of the school’s core programs is its Master’s degree program in Photonics (M.Sc. Photonics). This program’s lectures and courses are taught completely in English. The recruitment is based on a global strategy - selecting the best students from around the world. On the Master’s degree level, ASP’s teaching staff is also strongly engaged in specializing its photonics courses for students in the Master’s degree program in physics (M.Sc. Physics) and in medical photonics (M.Sc. Medical Photonics). The latter program is a newly-designed, interdisciplinary course initiated by the University’s Center of Medical Optics and Photonics (CeMOP), which is to start in the autumn of 2016. Moreover, the School has also established a successive, well-coordinated doctoral program comparable to a PhD program in the USA which is directly associated with ACP’s strategic research programs.

Further academic courses and career-development work are supported by our advanced optics training laboratory and a comprehensive scholarship program for deserving graduate students. In addition to its
academic course programs, ASP organizes and carries out joint activities related to business education, run in collaboration with industrial partners and outside academic partners. Importantly, ASP develops a strong, person-oriented global photonics network by sustaining communication with its alumni worldwide.

Furthermore, ASP attracts first-class young professional scientists for photonics research work. These gain teaching experience and involve graduate students in their research projects. Other career opportunities available at ASP include the job positions of academic tutors and junior research group leaders. In summary, ASP contributes decisively to establish Jena as being one of the world’s leading educational centers for optics and photonics.

**HIGH-LEVEL PHOTONICS TRAINING LABORATORY**

Having extensive hands-on experience is one of the most valuable professional attributes by which a true expert in optics and photonics can be distinguished. In 2009, to strengthen laboratory experience already at the beginning of a student’s Master’s degree studies, ASP set up a completely novel photonics training laboratory. It is able to perform high-level experiments using strictly research-grade components and equipment. This lab’s infrastructure was given funding worth more than € 1.5 million through the ProExcellence Initiative OptoTRAIN - Training in Optics of the former Thuringian Ministry of Education, Science and Culture.

The laboratory’s equipment covers continuous-wave and pulsed lasers, interferometry, linear and nonlinear spectroscopy, optical time-domain reflectometry and optical tweezing, to name only a few. The corresponding research techniques were made available with respect to their educational value and designed by ASP’s senior scientists and academic tutors. They are fully operated by students. Currently, the photonics training laboratory is systematically incorporated into the doctoral program to enable candidates to efficiently utilize a broad spectrum of experimental methods when carrying out their research projects. This strong commitment of allowing a maximum of hands-on experience during beginning-stage studies is clearly a distinguishing feature of ASP teaching, as compared to other educational institutions. Moreover, to support our graduate students in their experimental abilities to independently analyze and solve challenges in optics and photonics, they are granted from the beginning of their training full access to ACP laboratories with their respective research equipment.

**PURSUING THE PHOTONICS CAREER**

ASP prepares its graduate students for a successful start in their professional careers. For example, in cooperation with the Faculty of Physics and Astronomy, ASP organizes an annual job fair, particularly for natural science researchers. Among these are many prospective graduates in photonics. Here, graduate students are brought into direct personal contact with our local industry partners, many of them specialized in applicational fields. This local job fair provides a setting for the efficient matching of career opportunities and expectations. Furthermore, by means of career-mentoring workshops with scientists and representatives from various businesses, students receive valuable orientation and advice. They can thus better ready themselves for a world market full of opportunity.
MASTER’S DEGREE PROGRAM

The Master’s degree programs of the Abbe School of Photonics (ASP) are the key educational activity within the Abbe Center of Photonics. Their purpose is to train students in the optical sciences via a broad array of courses and hands-on seminars. The programs are designed to provide opportunities for students to attain the necessary skills required to fill today’s challenging positions in industry and academia.

The Master of Science Degree in Physics (M.Sc. Physics), with a strong specialization in photonics, continues to be the backbone of Jena’s optics and photonics curriculum and meeting top academic standards. It is based upon the long-standing physics-teaching tradition provided by our Faculty of Physics and Astronomy. The curriculum consists of mandatory and elective lectures which are either in German or English.

In addition, ASP’s Master of Science in Photonics program (M.Sc. Photonics) offers an internationally-recognized graduate degree providing multidisciplinary coverage in the fields of optics and photonics. This program incorporates upstream scientific aspects in the engineering field along with relevant and important business courses. Students enrolled in this two-year graduate photonics program - featuring lectures and courses exclusively in the English language – are trained for technical or scientific positions in both industry and academia. While approximately 80% of our graduate students successfully finishing the program continue on the academic track and accepting PhD positions at top-ranking universities worldwide, other alumni often find suitable job positions in the optical industry, many being located in Jena and throughout Germany.

Starting in autumn 2016, and under the lead of the University’s Center of Medical Optics and Photonics (CeMOP), a new Master’s degree program in medical photonics will be launched. This degree program (M.Sc. Medical Photonics) is aimed at Bachelor’s degree students of medicine, biology, chemistry and physics. Its curriculum is designed to join these varying disciplines into a group which performs photonics research in the area of applied medicine. The teaching staff will support their interdisciplinary learning endeavors starting at the basic courses – thus helping them to understand the specific language jargon and different ways of thinking.

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

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MSc. in Photonics Σ 4 semesters & 120 ECTS

ECTS - European Credit Transfer System
All three Master’s degree programs, M.Sc. Physics, Photonics and M.Sc. Medical Photonics, are fully integrated into the course curriculum package of the Friedrich Schiller University Jena. They are directed and taught by the scientific and teaching staff of the faculties of Physics and Astronomy, of Chemical- and Earth Sciences, the Faculty of Medicine, and others. These lecturers offer many years of teaching expertise in the areas of optics and photonics, posing great benefits for those students in these programs. At the same time, the programs are embedded in the rich, stimulating research environment of the Abbe Center of Photonics. Thus, students obtain hands-on experience while taking methodology courses which take place in state-of-the-art photonics laboratories. These locations not only access our University’s various institutes, but also include the Fraunhofer Institute for Applied Optics and Precision Engineering, the Leibniz Institute of Photonic Technology, the Helmholtz Institute Jena, as well as those of some of ACP’s prominent industrial partners such as the world-renowned company Carl Zeiss AG in Jena.

Our M.Sc. Physics program is open to anyone who has successfully completed a Bachelor of Science program in Physics in the European Union. While this program has proven very successful for decades, only in October of 2009 could the first students be enrolled and welcomed into the newly established M.Sc. Photonics program.

Applying to this it is easy due to ASP’s convenient online application system. All applicants are evaluated by ASP’s selection committee and the top 50 students are selected for eligibility. Comprehensive financial support is also offered to the best students through national scholarship awarded directly by ASP. Finally, other funding for scholarships is available through the German Academic Exchange Service (DAAD) and ASP’s industrial partners.

Since 2009, an annual average of 45 students has been accepted into the M.Sc. Photonics Program. These student numbers, with respect to their countries of origin, are displayed in the world map. Since 2009, a total of individually selected 297 graduate students from 48 countries have been enrolled at ASP. Interestingly, almost 90% of these students are of foreign nationality. This fact alone fulfills one of ASP’s central goals and philosophies - to locally establish an international educational program.

SYSTEMATIC MENTORING SUPPORT

Particularly at the start of all programs, graduate students receive dedicated academic and wide-ranging administrative and mentoring support. The ASP mentoring program involves experienced Master’s degree students, doctoral students, and qualified young post-doc scientists. These mentors have the responsibility of coaching and supervising Master’s degree freshmen, helping them get used to their new environment and to other fellow students. The mentors act as contact persons for each individual Master’s degree student with regard to all questions that may
arise, particularly when they enter Germany for the first time. Accordingly, the mentors and their assigned mentees establish a trusting relationship throughout the entire degree program period, helping to ensure the development of each student’s professional and social qualifications.

In addition, Master’s degree students are assisted by ASP’s coordination office personnel, who help them get well-acclimated to life in Germany upon arrival. Additionally, ASP offers intercultural trainings to enhance the students’ intercultural competence and enable them to become an active member of the German society. Professional job training is also provided by our partners in science and industry, as well as with chosen universities and with applicable DAAD departments. The mentoring program also includes regular participation in selected job fairs, and involves work with online media. The ultimate goal of all of this is to achieve gradual professional and personal advancement for each student, developing students into full-scale researchers in optics and photonics.

PHOTONICS EDUCATION WITH STRONG PARTNERS

The ASP Master’s degree program in Photonics has its roots in the European educational system and has been funded by the Erasmus Mundus scheme of the European Union. Accordingly, the M.Sc. Photonics curriculum was jointly designed and is currently supported by some of the leading centers in European and U.S. photonics education: the Technical University Delft, the Imperial College London, the Université Paris-Sud & Institut d’Optique Paris, the University of Eastern Finland, the Warsaw University of Technology, the Université Bordeaux, the University of Central Florida (USA), and the Clemson University (South Carolina, USA). These partnerships have led to long-term exchange agreements, enabling ASP students to be highly mobile. For our German-born students, ASP offers a large network of reputable partner universities under the jurisdiction of the Erasmus Student Exchange Program.

Moreover, ASP Master’s degree students benefit from our German photonics industry partners and their dedicated involvement in our study programs. Our partners include Agilent, Berliner Glas, Carl Zeiss, Edmund Optics, Karl Storz, Leica, Linos QiOptiq, Lissotschenko Mikrooptik, Jenoptik, Nanoplus, Novaled, Osram, Philips, Polytec, Precitec, Rofin, Saueressig, Sick, Thorlabs, Trumpf, U2 Photonics, QiOptiq and Wetzel. Every graduate student experiences at least one mandatory internship focused on practical training in optics laboratories of these partner companies, or at ACP institutes. Moreover, the final Master’s degree thesis can be accomplished by successfully completing an industrial project.
The Abbe School of Photonics (ASP) is strongly committed to the advancement of highly qualified students and their promotion to early-stage researchers. Our doctoral program strongly supports the development of individual science careers in optics and photonics, provides professional and practical course opportunities and contributes to individual soft skills development.

In Jena, the roots for an exceptional scientific community specializing in optics and photonics were laid by the breakthrough work of Ernst Abbe in the late 19th century. Because of this unique historical background and throughout the decades, the numerous doctoral students who have graduated from Friedrich Schiller University were the inconspicuous but indispensable contributors to the advancement of knowledge in optics and photonics in Jena. Incorporating this rich tradition, the doctoral program of ASP (comparable with a PhD program in the USA) has become firmly institutionalized and sustainably structures the education and interconnection of young academics in optics. Since its start in 2009, ASP’s doctoral program has been denoted by a constantly growing number of doctoral students pursuing research topics in optics and photonics at the University, reflecting the successful acquisition of numerous funding for light sciences research provided by scientists of the Abbe Center of Photonics (ACP) in recent years. In October 2015, 153 doctoral students (among them 51 women) have taken the opportunity to officially register in the ASP doctoral program. While a majority of the students who join the ASP doctoral program have a physics background, also chemists, biologists, and mathematicians perform their research projects at 11 different institutes under the umbrella of the ASP doctoral program, following both the core optical disciplines and adjacent fields, such as e.g. nanochemistry or material sciences.

Funding of the ASP doctoral program is provided by many different sources. First, substantial financial support is given directly to ASP to cover students’ scholarships, infrastructure, and the administration of ASP. This direct funding is provided mainly by the ProExcellence Initiative of the Thuringian Ministry for Economy, Science, and Digital Society (TMWWDG) together in public-private partnership through Jena’s established local photonics industry and through the Carl Zeiss Foundation. Second, an even more significant amount of indirect support is obtained by the ACP scientists through various schemes of competitive third-party funding programs on quite different scales. This indirect support comes mainly in the framework of research projects including schemes of substantial support of doctoral researchers. A prominent example is the International Research Training Group (IRTG) 2101 in cooperation with three Canadian partners, and funded since 2015 by the German Research Foundation (DFG). ASP functions as the umbrella organization for the implementation of this program.

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

**RESEARCH PROJECT**
Research projects at the forefront of applied and fundamental research in photonic 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 international conferences

**DOCTORAL THESIS**
Research thesis evaluated by an international referee board

**Supervision**
Guiding and mentoring in research and development of personal skills

**ASP Trainings**
Block courses, guest lectures, intellectual property, science management

**Teaching**
Teaching of lab classes and seminars to strengthen teaching skills

**Dr. rer. nat. / Dr. Ing. awarded**
Σ 3 years
for many of such projects, to strengthen the aspects of doctoral education along with individual research, funded by public organizations as well as industrial partners.

ACP’s principal scientists serve as topical supervisors for ASP doctoral students. The acquisition of new outstanding doctoral students is facilitated by choosing among the most excellent alumni of M.Sc. Physics and M.Sc. Photonics from Jena as well as hundreds of external applications, which we receive each year from students from the entire world. To attract the best candidates to the program, a modern online application system was established. Currently, a share of 32% of ASP doctoral students are of foreign origin, with solid trends for a middle-term increase. Emphasizing its strong engagement in the further internationalization of studies, ASP is dedicated to this important primary aim of the institutional strategy of the Friedrich Schiller University Jena.

SHAPING FUTURE SCIENTISTS

A cornerstone of ASP’s philosophy is to regard and value our doctoral students as scientists in all respects. Most notable is the conscious and deep involvement of our doctoral students in ACP’s top-notch research environments. Providing them with full access to the laboratories, they can more readily contribute their individual scientific contributions to globally prevailing research questions. During the work on their individual research project, a maximum of freedom to develop their own ideas and to follow personal scientific interests is allowed of every doctoral student. It is our firm belief that this trust in our doctoral student’s liberties and their abilities to develop is the most distinguished feature in the ACP doctoral program – which in fact renders it most competitive to other comparable optics education schemes worldwide. Our experience has clearly shown that this philosophy translates into a timely advancement in self-reliance and individual responsibility of our students, which is essential for the development of their individual scientific careers at higher levels.

To further promote the ASP doctoral students’ scientific skills, participation in international conferences and presentation of their own contributions is encouraged and enabled, whenever possible. In the early stage of the doctoral phase, ASP students can realize their individual professional and personality-forming experiences on international platforms such as, in particular, scientific conferences. Further opportunities to connect with global science communities are offered locally by ASP guest professors. Besides the topical input which doctoral students obtain by attending the special lectures of the more than 40 guest professors thus far, these distinguished scientists are available for face-to-face discussions here in Jena, to share their perspectives and expertise directly with the doctoral students.

Both opportunities and particular challenges for the doctoral candidates are gained through the interfaculty ASP seminar. At topical sessions in international conference style, which take place at least thrice each semester, several doctoral students present their research to a larger audience encompassing doctoral students, ASP supervisors, and interested guests. The talks are completely given in English. This scheme offers an ideal platform for the students to receive concentrated constructive feedback from fellow students and professors, to possibly shift the student’s perspective on their work disclosing formerly disregarded aspects, and to prepare for competitive, demanding on-stage-performances as young academics.
Firstly in 2011, ASP doctoral students’ own initiative has led to the advent of a fully self-organized but professional conference series on optical concepts called DokDok. It is the purpose of DokDok to bring together young researchers from all disciplines of photonics to create networks, stimulate discussions, exchange methodological skills and share fundamental understanding. As a conference from students and for students, DokDok tries to harness the creative power of young researchers, giving them the chance to present and discuss their ideas in a motivating yet relaxed setting. Meanwhile in its fourth edition, DokDok has become well established and ultimately a permanent part of ACP’s doctoral program. As a cornerstone of ASP’s doctoral students’ networking, it is handed over as an organizational event from one generation to the next. The 4th and latest edition of DokDok took place in October 2015 in Eisenach. On average, more than 60 young researchers and industry professionals attend DokDok every year, the majority of them affiliated with ASP, but many of them also from all over Germany and abroad. Moreover, the organizational committee has proven to be able – now four times in a row – to acquire reputable international keynote speakers as well as to attract considerable funding from the photonics industry. In exchange, the industry representatives get the chance to approach their high-potential employees of the future in a very informal atmosphere.

BUILDING PERSONALITY BEYOND SCIENCE

Besides the development of high-standard scientific profiles, the ASP doctoral program supplies a sophisticated combination of scientific exchange and teaching of required skills. In particular transferable skills, which are essential both for scientific and industrial careers. Combining complementary foci, ASP in close collaboration with the Graduate Academy Jena of the Friedrich Schiller University offers a dense annual seminar schedule covering, among other aspects, transferable skills such as scientific presentations, career prospects, entrepreneurship and patent law, creativity, extramural funding, or gender topics. Additional methodological courses are organized by the ACP principal scientists, like e.g. the largely embraced courses on optical design given by Herbert Gross. Moreover, vivid participation of ASP doctoral students in partner workshops and seminars is actively promoted. Numerous opportunities are available through the regular seminars of the Leibniz Institute of Photonic Technology and the Helmholtz Institute Jena.
The future of optics and photonics will depend on highly skilled scientists. Hence, the Abbe School of Photonics (ASP) provides a full-scale program for young researchers to develop their scientific knowledge and abilities. Furthermore, ASP offers wide career opportunities to first-class young scientists, who will most likely lead the field in the years to come.

Very early on, ASP realized that, in particular, continuity in supporting scientific careers at all stages is very important if eventually the best people should systematically be elevated into leading positions in science. While Master’s degree and doctoral programs can be considered standard ingredients in scientific education, very often the development of scientific careers to higher levels is left to one’s individual responsibility. Specifically, the support of scientific careers at this beginning stage can make all the difference in the perspectives and goals of young, highly motivated people in science. Consequently, the ASP has teamed up with the Graduate Academy of the Friedrich Schiller University Jena to create a program supporting and actively developing the careers of those who are going to someday create the perspective and vision of photonics.

Inherent to the program is the idea that, at this stage, young researchers need individual support, which allows for their own unique development. Hence, instead of rules and structures, a key factor in their growth is to establish early their independence and self-confidence in research and education. In addition, these young scientists will receive the continued support they need by the ASP to help them on their way to top positions in science, e.g. by providing a world-class research infrastructure, supportive funding, a skills program devoted to research and excellent teaching, as well as guidance and encouragement through comprehensive mentoring.

TUTORS
While normally a postdoc concentrates on a particular research project supervised by an individual senior scientist, ASP offers particularly qualified young scientists the chance to participate extensively in teaching and supervision by becoming tutor of ASP. These tutors work very closely with Master’s degree students by following...
them continuously throughout the two years of their Master’s degree program. They give seminars, tutorials for professors’ lectures and supervise practical labs as well as supervise periods of student research and training. This way they remain in close contact with these students throughout their entire educational program and take responsibility for developing their qualifications while developing their own managerial skills. This continuous and responsible involvement in scientific education provides tutors with invaluable experience, from which they will profit in their future as independent scientists.

JUNIOR RESEARCH GROUP LEADERS

Young researchers who have already demonstrated their extraordinary abilities to conduct high level research can join ASP as Junior Research Group Leaders. In this way, they become increasingly independent in their research by running their own projects and labs as well as by taking responsibility in the supervision of students and young researchers within their labs. Junior Research Group Leaders have the status of a principal scientist within ACP. Currently, five young scientists run their independent research groups enabled by individual funding from external resources:

- Dr. Torsten Frosch – Junior Group Leader of Spectroscopic Sensors funded by the Thuringian government
- Dr. Jan Rothhardt – Leader of a Helmholtz Young Investigator Group on Soft X-ray spectroscopy and microscopy funded by the Helmholtz Association
- Dr. Isabelle Staude – Junior Group Leader of Functional Nanophotonic Materials funded by the Thuringian government within its ProExcellence initiative
- Dr. Adriana Szeghalmi – DFG-funded Emmy-Noether Junior Group Leader of Atomic Layer Deposition
- PD Dr. Uwe Zeitner – Junior Group Leader of Carbon Optic Technologies funded by the German Federal Ministry of Education and Research in the Centre for Innovation Competence »ultra optics«

JUNIOR PROFESSORS

The flagship program to support young scientists who have already shown great distinction in their academic development is the Junior Professorship. This career track is exclusively for those who can be entrusted with full academic rights to pave their predetermined way into a permanent position in science. ASP attracts exceptionally innovative young scientists to a career in Jena, at an early stage. Since 2010, already five Junior Professors in optics and photonics have become tenured and are involved at teaching within ASP; while two others have gained permanent positions at other universities. Junior Professors have the status of principal scientists within ACP. Currently, four young scientists are such Junior Professors, receiving funding from different external resources:

- Jun. Prof. Dr. Delia Brauer – group leader of Structure-Property Relationships in glasses funded by the Carl Zeiss Foundation
- Jun. Prof. Dr. Adrian N. Pfeiffer – group leader of Attosecond Laser Physics funded by the Carl Zeiss Foundation
- Jun. Prof. Dr. Alexander Schiller – group leader of Biomimetic Signal Transduction funded within a Heisenberg scholarship of the DFG
- Jun. Prof. Dr. Alexander Szameit – group leader of Diamond-/Carbon-Based Optical Systems funded by the German Federal Ministry of Education and Research in the Centre for Innovation Competence »ultra optics«
- Another junior professorship for coherent EUV and y-ray sources, funded by the Carl Zeiss foundation, is currently open and within the appointment process.

STEERING THE DYNAMICS OF SUGAR MOLECULES IS A SPECIAL DISCIPLINE OF JUNIOR PROFESSOR DR. ALEXANDER SCHILLER.
GUEST PROFESSORSHIP PROGRAM

The Abbe School of Photonics acquires international first-hand teaching experience by inviting internationally renowned experts in optics and photonics to lecture for a period up to three months here in Jena. The program has been established to provide our students with an overview of top-level research and to offer leading researchers the opportunity to share their work through direct contact with ACP members.

The successful ASP Guest Professorship Program (including the prestigious Carl Zeiss guest professorship) has become a truly international brand. To date, ACP principal scientists and their students have benefitted from special lectures held by more than 40 distinguished experts from all over the world. Both principal scientists and students have strongly contributed to the educational values of ASP on several levels, a contribution, which is going to be continued. First, many ASP guest professors give regular lectures within the M.Sc. Photonics program. Second, they share their perspective and expertise with the doctoral students, ACP principal scientists, and representatives from our industrial partners in devoted special lectures on the most current topics in their research fields. Last but not least, our guest professors continuously prove to open up an enormously inspiring source of novel ideas by fruitful and mostly long-term collaborations.

Since 2006, more than 40 top-ranked optics and photonics scientists have accepted our invitation to lecture in Jena for visits up to three months. With their vast experience and their cosmopolitan background in science, ASP visiting scholars regularly offer valuable feedback on our curriculum based on their personal perspectives. Some of these impressions are given here.

**PROF. MARTIN C. RICHARDSON**  
UNIVERSITY OF CENTRAL FLORIDA  
ORLANDO, FLORIDA, USA

“The M.Sc. Photonics program at the Abbe School of Photonics at the Friedrich Schiller University in Jena is in my opinion the strongest anywhere, and serves best the interests of the surrounding laser and photonics industries. 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. YURI. S. KIVSHAR**  
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, who will definitely drive its bright future!”

“My stay in Jena at the Abbe Center of Photonics (ACP) has been a really enlightening one. It is really encouraging to be immersed in an atmosphere of cooperation and collaboration within optics, being exposed to a multidisciplinary effort that covers aspects of biochemistry, optical signaling, image formation, or chemical physics, at a very high level. It has been a privilege to visit this pole of optics!”

PROF. FEDERICO CAPASSO
HARVARD SCHOOL OF ENGINEERING & APPLIED SCIENCE
CAMBRIDGE, MASSACHUSETTS, USA

“I was enthusiastic to come to Jena – a very significant connection of science, technology, and industry exists at this place which is very fruitful. Beside the strong local connections between fundamental and application-oriented science, I was impressed by the broad range of ideas and their integration into practice, and by the variety and level of expertise of the doctoral students here in Jena. Their abilities to assemble complex optical setups and to develop their own scientific ideas are rarely found nowadays. So I can really say the Abbe Center is a world-class operation, that’s for sure.”

PROF. JAVIER AIZPURUA
UNIVERSITY OF THE BASQUE COUNTRY
ST. SEBASTIAN, SPAIN

“My stay at the Abbe Center of Photonics (ACP) has been a really enlightening one. It is really encouraging to be immersed in an atmosphere of cooperation and collaboration within optics, being exposed to a multidisciplinary effort that covers aspects of biochemistry, optical signaling, image formation, or chemical physics, at a very high level. It has been a privilege to visit this pole of optics!”

PROF. BENJAMIN EGGLETON
UNIVERSITY OF SYDNEY
AUSTRALIA

“My stay at the Abbe Center of Photonics 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.”

PROF. N. ASGER MORTENSEN
TECHNICAL UNIVERSITY OF DENMARK
LYNGBY, DENMARK

“My stay at the Abbe School of Photonics has been highly rewarding and a truly exciting experience for me. Being invited to spend a sabbatical in the ‘Lichtstadt’ during the International Year of Light has been a great honour for me! I am leaving Jena with my luggage full of lasting memories and I already anticipate my return for at least shorter visits - hopefully also to see your activities flourish in the new Abbe Center of Photonics building!”