Report Nr. 33

**FINAL EVENT FOR AFGHAN STUDENTS
IN THE FIELD OF COMPUTER SCIENCE AT TU BERLIN**

September 18 - 20, 2013

Dr. Nazir Peroz
Technische Universität Berlin
Faculty of Electrical Engineering and Computer Sciences
Center for International and Intercultural Communication (ZiiK)
Fraunhoferstraße 33-36
10587 Berlin

Organization

Cooperation

Auswärtiges Amt

DAAD

Ministry of Higher Education

سفارت کبرای جمهوری اسلامی افغانستان در برلین
Botschaft der Islamischen Republik Afghanistan

Imprint

TABLE OF CONTENTS

PREFACE

The future of Afghanistan depends on the quality of its education system and on the level of education of its young generation. In this scope, the German Federal Foreign Office, the German Academic Exchange Service (DAAD) and German universities are active in the construction of academic structures, capacity building and the education of human resources. Since 2002, the Technische Universität Berlin (TU Berlin) has been supporting Afghanistan in the field of IT with a multitude of projects, one of which a computer science Master's program for Afghan lecturers.

The current Master's program for Afghan lecturers in the field of computer science is financed from funds of the 'Afghanistan Stability Pact' by the German Federal Foreign Office and is promoted by the DAAD. The first Master's program started in 2007 and was financed by World Bank. The Master's program in general aims to establish computer science faculties at the Afghan universities to educate students and create sustainable IT structures.

In 2010, already 24 Afghan students of computer science completed their Master's degree and returned to their universities to promote the development of computer science. Today, they have leading positions as Deans, Vice Deans and IT leaders at their respective universities.

Master of Computer Science Graduates at the TU Berlin in 2010 and 2013

Balkh
2010: 2
2013: 1

Herat
2010: 6
2013: 5

Kabul
2010: 12*
2013: 11*

Nangarhar
2010: 3
2013: 3

Khost
2013: 2

Kandahar
2010: 1
2013: 3

*includes Kabul University, Kabul Polytechnical University and Kabul Education University
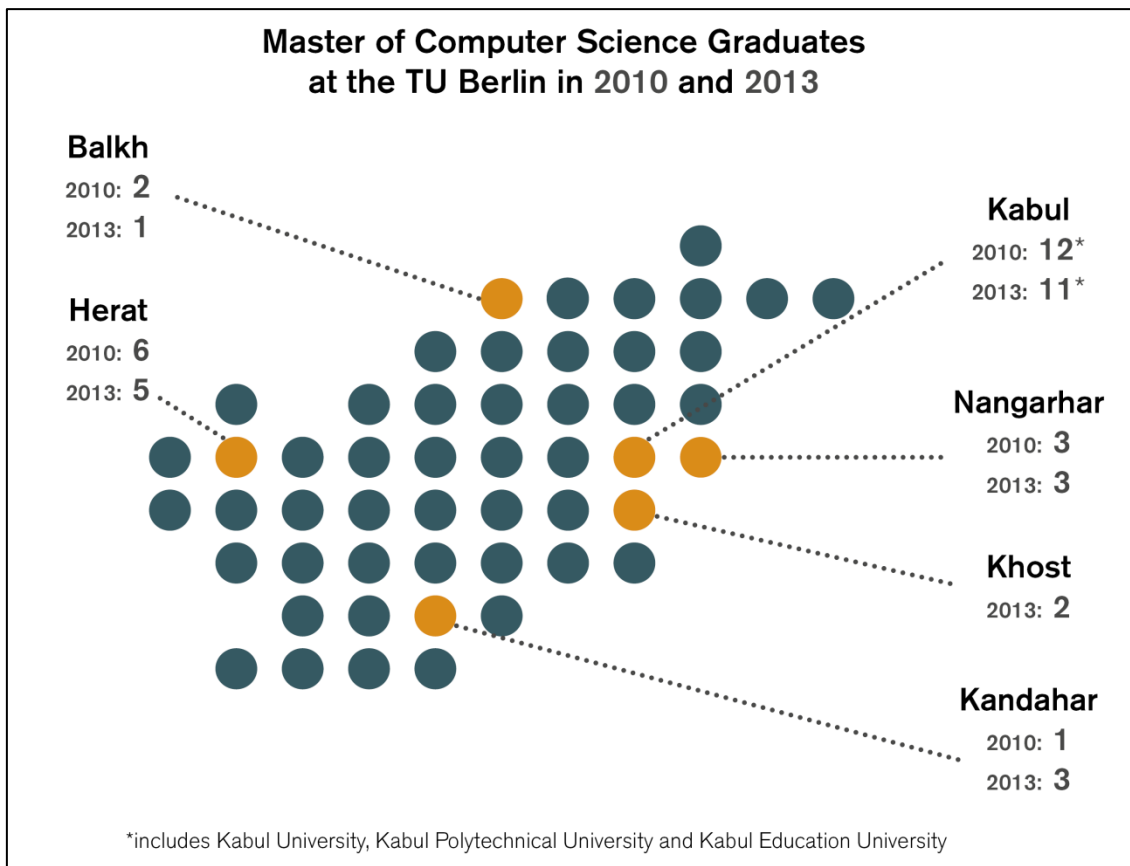
At the end of November this year, the participants of the current Master's program will graduate from TU Berlin. Then, further 24 highly qualified and committed computer scientists will be available to Kabul University, Kabul Polytechnic University, Kabul Education University, Herat University, Balkh University, Nangarhar University, Khost University and to the Ministry of Higher Education (MoHE) in Afghanistan.

The event was opened at the German Federal Foreign Office. Within this scope, a two-day series of lectures from September 18 to 19, 2013, took place at TU Berlin. In this context the Afghan students presented their Master's theses to the invited guests. The focus of their works lay on projects that deal with the development of sustainable IT structures at Afghan universities and authorities. Short summaries of these presentations can be found on pages 18 to 30 of this report.

On September 20, 2013, the strategic plan of the MoHE was presented. Afterwards, there was a round table discussion with the invited guests from Afghanistan as well as the Afghan Ambassador in Berlin, representatives from the German Federal Foreign Office, the DAAD, the German National Research and Education Network (DFN) and TU Berlin.

In the following, the particular speeches of all participants of the three-day event will be presented.

I would like to thank the MoHE, the involved Afghan universities, the Afghan Embassy in Berlin, the German Federal Foreign Office, the DAAD, the German Embassy in Kabul, the leadership of TU Berlin and the team of the Center for International and Intercultural Communication (ZiiK) for their cooperation and support.

Nazir Peroz

OPENING OF THE EVENT

Opening by Sabine Sparwasser Representative for Communication, Germany's Image Abroad and German as a Foreign Language at the Federal Foreign Office

Ms. Sparwasser opened the event and welcomed the guests, starting with H. E. Prof. Osman Babury, Deputy Minister at the Ministry of Higher Education in Afghanistan, whose visit she considered to be a great honor, and continuing with Prof. Ezatullah Amed, President of Kabul Polytechnic University, H. E. Prof. Abdul Rahman Ashraf, Afghan Ambassador to the German Embassy in Berlin, Prof. Uwe Nestmann from TU Berlin and Dr. Alexander Kupfer from the German Academic Exchange Service (DAAD). On behalf of the Federal Foreign Minister and the Federal Foreign Office Ms. Sparwasser expressed her special thanks to Dr. Nazir Peroz, being the heart and soul of the whole project.

Ms. Sparwasser addressed herself to the students and congratulated them on their graduation, expressing her pride in their great achievements during the last three years and especially during the last months. She also emphasized the importance of those achievements for Afghanistan and showed great interest in the projects which were to be presented by the students soon. Though recognizing that it might be hard to leave Berlin as a lovely place to live in, Ms. Sparwasser emphasized the special role of the students for their home country, taking back their newly learned capacities and spreading their knowledge as teachers and disseminators, which she considered to be crucial to changing and improving the lives of the people in Afghanistan. She said that Germany had great expectations in them as they highly contributed to the reconstruction of their country. This contribution could be seen as an instrument for stability and economic growth in Afghanistan. It was also a very important element of the close cooperation between Afghanistan and Germany.

Ms. Sparwasser mentioned the successful IT technician, Ms. Roya Mahboob, who was recently appointed one of the 100 most influential persons by the Time Magazine and was also trained at TU Berlin. She ended her speech by reminding the graduates of their special role as teachers of teachers and by letting them know that Germany would continue to stand by their side in the future. Not only they went back as masters of their profession but also as masters of Germany and its cooperation with Afghanistan.

**Moderation by Prof. Uwe Nestmann
Dean of Studies of the Faculty of
Electrical Engineering and Computer
Sciences at TU Berlin**

Prof. Nestmann, who moderated the opening event in the German Federal Foreign Office, first welcomed all Excellencies and colleagues, and thanked for the wonderful surrounding including the Afghanistan exhibition. He welcomed the students and the supporting staff.

Prof. Nestmann presented some important facts and figures about TU Berlin and the Faculty of Electrical Engineering and Computer Sciences to the audience. This faculty has almost 30 % of foreign students, which is above average in German universities. He said that though it might not be an accident that the idea of implementing such a Master's program grew from there, surely someone with a strong will and vision was needed to create this kind of program and to support the Afghan students in such a particular manner. From Prof. Nestmann's point of view, it was most important that the program had brought up experienced and flexible graduates in the field of IT who could provide stability in their home country.

At the end of his speech, Prof. Nestmann thanked for the financial support that had been provided by World Bank for the first iteration of the Master's program and by the DAAD for the current second and the soon beginning third iteration. He called attention to the panel discussion on the IT strategic plan of the Ministry of Higher Education that would take place on the following Friday. He gave the floor to the Afghan Ambassador in Berlin, H. E. Prof. Rahman Ashraf.

**Prof. Rahman Ashraf
Afghan Ambassador in Germany**

Prof. Ashraf welcomed the guests and then expressed his delight about his invitation to the closing event. He said it was a pleasure for him to congratulate the students on their great success. Not only had the graduates learned how to pass on their newly acquired knowledge to their students but also they had experienced how to exercise democracy. The students, however, should never forget about the cultural differences between Germany and Afghanistan and therefore try to convey both their vocational and personal experience of the past three years. He stated that Germany by the implementation of the Master's program had once again shown how important it is for the future of Afghanistan to support education

and higher education. Prof. Ashraf expressed his pride in the students' achievements and their courage to leave their families in order to become specialists in the field of IT and spread their knowledge in Afghanistan. He showed grateful to everybody who had supported the program actively and wished all students good luck for their future activities.

At the end of his speech, he highly recommended the visit of the small exhibition on Afghanistan's history which was built up in the Federal Foreign Office.

Prof. Osman Babury
Deputy Minister of Higher Education
in Afghanistan

Prof. Babury welcomed the audience and said that it was a great honor for him to participate in the closing event.
He referred to Afghanistan's longlasting history of war and the urgent need to invest in human capital in order to rebuild the country. In this context, he mentioned the Ministry of Higher Education in Afghanistan that had assumed the great responsibility to fulfil that very important task. Regarding the education sector of Afghanistan, very important achievements had been made during the last decade. Concerning the higher education system in Afghanistan, he considered quality improvements and profound developments the most crucial tasks of the aforementioned ministry for at least the following two decades.

Prof. Babury praised Germany as one of the most dedicated partners among all friends and donors who supported Afghanistan's higher education system. He took the opportunity to thank the German Federal Foreign Office, the government of the Federal Republic of Germany, the DAAD and TU Berlin.

He made clear that IT and computer science played an essential role in fulfilling the needs of the Afghan society. In this regard, he mentioned the young graduates who would highly contribute to the strengthening of education in both areas in the future. Prof. Babury referred to his predecessors who had already emphasized the importance of investing in human capital. According to him, it could not only be seen as an opportunity to strengthen the higher education system, but also to promote both the social and economic development in Afghanistan, and thereby stabilize its society. By implementing the national higher education strategic plan, the quality of higher education in Afghanistan could efficiently be improved and the intended goal could be achieved in the end.

At the end of his speech, Prof. Babury once again thanked all stakeholders of the Master's program and congratulated all students to whom he attributed a pioneering role regarding the implementation of IT into the higher education system of Afghanistan.

Dr. Gabriele Wendorf
Vice-President of TU Berlin

Dr. Wendorf welcomed the Afghan delegation and the guests on behalf of the president of TU Berlin to the closing event and expressed her delight about the possibility to do so in that wonderful framework. She also gave a special thank you to the team of the ZiiK for their successful coordination of the Master's program. She said that the participants of the second iteration of the program would now be able to bring their expertise to Afghanistan and especially to Afghan universities in order to help build up and expand IT structures there.

Dr. Wendorf let the audience know that the fertile cooperation between the MoHE and TU Berlin had already begun in 2002, when a delegation consisting of members of the German Federal Foreign Office, the DAAD, TU Berlin and two other German universities analyzed the situation of the academic IT structures in Afghanistan in order to generate ideas for the reconstruction of Afghan universities. Since then, she continued, staff of TU Berlin had supported the MoHE in Afghanistan by implementing IT concepts and strategies and by developing consistent academic IT curricula. Dr. Wendorf said that TU Berlin was delighted to continue the aforementioned fertile and highly productive cooperation.

She referred to the first important project that had emerged from that cooperation, namely the establishment of the IT center in Kabul (ITCK) in 2003, and then she also mentioned the following IT centers in Herat (ITCH), Nangarhar (ITCN) and Balkh (ITCB), as well as the Faculty of Computer Science at Herat University.

Dr. Wendorf expressed her gratitude to the German Federal Foreign Office and the DAAD for their current financial support of the second iteration of the Master's program. The program aimed to train experts who disseminate their expertise for the setup of IT structures at their home universities. Besides the Master's program, the ZiiK had also been responsible for the organization of a variety of summer and winter schools, workshops and IT conferences.

Dr. Wendorf once again thanked everyone who enriched the fruitful program with their expertise, their technical and financial support and their academic curiosity. She emphasized her strong wish to continue the successful cooperation and congratulated the students on their graduation.

Dr. Alexander Kupfer
Head of Department for Afghanistan and Pakistan at DAAD

Dr. Kupfer first welcomed all guests and the graduates. He said to be very glad to attend the event as representative of the DAAD and to convey the greetings of the Secretary General Dr. Rüland.

Dr. Kupfer stated that though the DAAD provided some 60,000 scholarships every year and therefore there were lots of opportunities to celebrate events similar to the current, this one yet was to be regarded as special. The specialty lay in the history of Afghanistan that only one decade ago had been virtually cut off from the rest of the world with a very limited rest of academic activity. At that time, achieving a Master's degree must have seemed to be utterly impossible to Afghan lecturers, living in a war-torn country and being deprived of the most basic elements of modern university teaching.

Dr. Kupfer continued that the current event also was special because it conveyed a message of hope. From DAAD's perspective, the 24 lecturers were 'pillars' for a better future of Afghanistan. Soon returning to their home country, they would be able to share their knowledge and skills with their colleagues and students. They would be vital in improving the quality of academic teaching in Kabul, Balkh, Herat, Kandahar and Khost, and thereby in helping Afghanistan to help itself.

Dr. Kupfer then asked the question why the quality of higher education was so important for the process of Afghan civil reconstruction. From his perspective, higher education, scientific expertise and knowledge were the only key for Afghanistan to become self-sufficient, to develop markets according to local demands, to preserve knowledge, to distribute it and to develop it further. He stated that quality of higher education would be the admission ticket for Afghanistan to enter into the international community, to start exchanges and to build partnerships.

Higher education and education in general provided the most powerful tools against any fraction or party who would try to trick the population into activities they would not participate in if they knew better. He considered this the reason why the Taliban were so hostile against education. According to him, in the long run one well-educated mind would be much more powerful than a loadad weapon. Education was to be seen as the most essential resource for a brighter future anywhere. Without it even the greatest efforts would be doomed to fail.

The current Master's program which was supported by the DAAD in the framework of the 'Stability Pact for Afghanistan' would not have been possible without the steady support from the German Federal Foreign Office that had been continually provided since the beginning of 2002. Dr. Kupfer took the opportunity to express his gratitude on behalf of the DAAD for the financial support, as well as his hope that it would be continued in the future to complete the job according to plan.

Dr. Nazir Peroz
Director of the Center for International and
Intercultural Communication (ZiiK)
at TU Berlin

Dr. Peroz began his speech by stating that it was a great honor to be at the German Federal Foreign Office on this special occasion. He took the opportunity to thank Ms. Irmgard Fellner from the German Federal Foreign Office who made this event possible in this location.

With his more than 25 years of experience in teaching 'computer science and developing countries' and his research expertise in this field, Dr. Peroz was convinced that the future of Afghanistan as well as every other developing country strongly depended on the quality of their education system and on the education level of the respective young generation. In this regard, information technology played a pivotal role. Education in general was the key to develop economy, science, peace and democracy within a state or society. Dr. Peroz drew the conclusion that Afghanistan needed sustainable education programs to cover the needs of the Afghan society, to train qualified teaching staff, to establish a functioning technical infrastructure, to develop a curriculum based on international standards, and to modernize the management.

As for Germany, Dr. Peroz continued, it was one of the first countries to send a delegation to Afghanistan in March 2002 after the Petersberg Resolution which took place in December 2001. The aim of that mission had been to analyze the academic structures in Afghanistan. Since that mission had been carried out, the ZiiK had been working on the development of sustainable and secure IT structures in Afghanistan. The implementation of those structures had taken place in close cooperation with the MoHE and the respective Afghan universities. It had been financed by the German Federal Foreign Office and supported by the DAAD. Further funding was provided by the World Bank. Dr. Peroz stated that the basis for a sustainable IT supply system had been laid by the establishment of already four IT centers in different Afghan cities, namely Kabul, Herat, Nangarhar and Balkh, with a fifth IT center in Kandahar still under construction. In order to better coordinate international IT projects, an IT department had been founded at MoHE which was also supported by ZiiK.

Dr. Peroz stressed that the focus of the main activities in Afghanistan was on education which was offered on two levels: Firstly, training of qualified IT staff, e. g. IT technicians and IT administrators, and secondly, education of young lecturers and academic staff in the field of computer science. In addition, TU Berlin offered a special Master's program for Afghan lecturers in the field of computer science. The program provided demand-oriented knowledge. It was for that reason that the Master's theses of the Afghan lecturers focused on the development of IT structures in Afghanistan.

Dr. Peroz welcomed Mr. Mohmand as successful participant of the first iteration of the Master's program in 2010 and emphasized his leading position as Dean of the Faculty of Computer Science at Herat University today. He ended his speech by stating that he was sure that Afghanistan had future, but it depended on its young generation which needed 'education and care, education and advice, education and support'.

Ralph Magnus
Scientific Assistant and Lecturer of the Master's Program at TU Berlin

Mr. Magnus welcomed all guests on behalf of Prof. Stefan Jähnichen and his team from Software Engineering at TU Berlin who had been actively supporting the Master's program since its implementation in 2007. He said that he wanted to present the Master's program in more detail to the audience and first gave a short introduction to it.

The motivation for the establishment of the Master's program arose as a result of several fact finding missions and demand-oriented analyses which had been implemented before. Those missions had clearly shown the lack of qualified IT lecturers at Afghan universities and, at the same time, the strong wish of many students to be trained in the field of computer science. Consequently, the main question had been how to bring together Afghanistan's young generation and IT.

One of the first achievements had been the implementation of a Bachelor's program in the field of computer science at different Afghan universities and the set-up of computer science faculties. A further goal had been achieved through the implementation of a computer science Master's program at TU Berlin, whose participants had been selected from a group of successful graduates of the Bachelor's program. The next follow-up program would be a PhD-program. Mr. Magnus referred to Dr. Peroz whose declared goal was a number of at least 500 Master's and 50 PhD graduates in Afghanistan until the year 2020. About 25 students from six Afghan universities participated in the first iteration of the Master's program and 24 from eight Afghan universities in the second.

Mr. Magnus shortly described all phases of the program, beginning with the selection process which took place in Afghanistan. He continued with the two-semester preparatory course at TU Berlin and the four-semester phase of general studies which included the application project and the writing of the Master's thesis. The last official chapter of the Master's program was followed by a month-long phase of analysis and discussion in order to improve the coming iterations of the Master's program.
Mr. Magnus highlighted the application project as it was oriented to the real needs of Afghanistan. It had been conducted during the graduates' six-month stay at their home universities in Afghanistan. The information and data that had been gathered during the application semester already provided the basis for the Master's theses which necessarily had to focus on the reconstruction and development of IT structures in Afghanistan.

Looking back over the past six years, since the Master's program had been implemented, Mr. Magnus drew a positive balance with regard to its graduates. Working as lecturers, those participants of the first iteration already were disseminators of their knowledge and those of the second soon would be. The Master's topics of the first iteration meanwhile had become concrete real-world projects at hospitals, universities, schools etc.

Mr. Magnus gave a positive outlook on the probable impact of the Master's program. According to that outlook, the 48 graduates of the first and second iteration could reach another 2,500 students in the field of IT and computer science at their home universities in the next three years. He ended his speech by referring to the necessity of a PhD program to create academic prospects.

Hamid Mohmand
Dean of the Faculty of Computer
Science at Herat University

Mr. Mohmand welcomed the Excellencies, the hosts of the event, his colleagues and mentors, and congratulated the graduates. He addressed the graduates by quoting Gandhi: *If you want to change the world, start with yourself*. After that, he told them that with the help of their potential the long awaited change in Afghanistan could be made. A bigger task lay before them after three years of studies in Berlin.

Mr. Mohmand told the audience about the history Dr. Peroz and himself had shared since the director of the ZiiK had first come to Herat in 2004 to help rebuild the almost completely demolished computer science faculty which lacked adequate buildings and personnel. He assured Dr. Peroz, Dr. Kupfer and the German Federal Foreign Office that their projects concerning higher education in Afghanistan would be successful. The former and today's graduates of the Master's program proved that. They would care for IT and IT infrastructure and thereby improve the situation of Afghanistan at least in that field.

Mr. Mohmand referred to the picture gallery made by students of Herat University which showed the history of computers. He told the audience that the launch of the gallery had to be cancelled because of the latest attack on the U.S. consulate on the preceding Friday. Due to the proximity of the consulate, the explosion also had had an impact on Herat University. Mr. Mohmand assured that no matter what happened they would move on. He encouraged the students by telling that he was convinced of the fact that the following days of presentations would be a great success since he had heard plenty of positive things from their lecturers and mentors. He emphasized the need to carry on with the Master's program and alumni programs.

In this regard, Mr. Mohmand thanked everyone who was involved in those activities and welcomed the idea of a third iteration of the Master's program which was to start soon. He also welcomed the implementation of a PhD program for Afghan lecturers at TU Berlin. Bringing the expertise and competencies back to Afghanistan would help the country to promote both education and higher education.

**Foawziah Naseri
Representative of the Afghan
Students at TU Berlin**

Ms. Naseri began her speech by thanking for the given opportunity to speak on behalf of the participants of the Master's program who came from eight different universities, and by announcing her intention to inform the audience on the past, present and future goals of the program. Her special thanks went to the German Government, the DAAD and TU Berlin for providing all the support.

Ms. Naseri told the audience about the last decades where most young people, especially females had been deprived of their civil rights and their right of access to education. She said that though there were still acts of violence against women, the situation yet had improved thanks to the help of Afghanistan's supporters and friends who aimed to bring democracy to the country. But still lots of challenges had to be faced in order to strengthen the ability of the Afghan society to rebuild and rehabilitate their country by their own means. In this respect, education and technology were to be seen as most powerful tools. Ms. Naseri again thanked the German Government for supporting Afghanistan's attempts to achieve sustainability and autonomy which had always been the main objective of the Master's program at TU Berlin. She stressed the central idea of the program by quoting: *Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime*.

Ms. Naseri assured the audience that there would be a revolutionary change in the entire system of the Afghan society and that all necessary steps would be taken in order to accomplish the long-desired goal, namely to build a peaceful and developed Afghanistan. She addressed the issue of corruption in the country which hindered the process of peace, stability and development, and afterwards she expressed her faith in the ability of the young people to fight corruption with knowledge. Ms. Naseri emphasized the particular importance of IT in this regard. She asked the German Government to further support all future efforts of young Afghans towards getting better education and rebuilding their home country.

Ms. Naseri ended her speech by thanking all teachers at the Faculty of Computer Sciences and Electrical Engineering at TU Berlin and the friendly community of Berlin for their hospitality.

PRESENTATION OF THE MASTER'S THESES

Wednesday afternoon, September 18, 2013
TU Berlin, FH building

Moderation by Chi-Thanh Christopher Nguyen, TU Berlin

In the beginning, Mr. Anselm Busse and Prof. Frank Pallas introduced their working areas.

Anselm Busse
Scientific Assistant and Lecturer at the
Department Communication and Operating
Systems at TU Berlin

Mr. Busse presented the teaching and research of the Communication and Operating Systems (KBS) department. The department is headed by Prof. Richling and Prof. Heiß, who is currently Vice-president of TU Berlin.

The teaching conveys the prerequisites and fundamentals for developing complex and distributed systems with special focus on operating systems.

The research topics are located in the domain of resource management, mainly from the perspective of the system software. The group focuses on operating systems (both embedded and non-embedded), distributed systems such as parallel, cluster, grid, swarm and cloud systems, as well as middleware for such systems. Closely related and also a research area of this group is the evaluation of performance and security engineering in distributed systems.

In the cluster/grid/cloud computing focus, the current research topics are virtual resource management, resource reservation, prediction of program behavior and the creation and evaluation of grid workflows.

In the parallel systems focus, a major research topic is the efficient utilization of multicore/manycore architectures, in particular methods to achieve energy efficiency at the operating system level and co-scheduling for such systems.

In the security engineering focus, research topics are the test and analysis of network firewalls, quantitative access control and trusted computing.

With respect to mobile distributed systems, the research focus is on introducing a swarm operating system that enables both multi-programming on swarm systems (by allowing multiple independent swarm applications in parallel) as well as programming abstractions for swarm applications.

Prof. Frank Pallas
Chair of Computer Science and Society
at TU Berlin

Prof. Pallas began his introduction to the field of computer science and society with the question how social and computer science overlap. He showed that the questions of privacy and data protection, intellectual property and internet policy are only some of the relevant fields to explore in this intersection.

He said that the message to take away from this is that one should not only focus on technology because sooner or later it would no longer be sufficient. The complex interaction between technologies and societal questions, he continued, should be fostered and promoted by national IT societies. They could establish ethical guidelines, provide expert knowledge to public bodies and play an important role in shaping the public opinion. Another task would be to make sure that these questions, which would surely confront each computer scientist one day, are covered in curricula.

Prof. Pallas finished his presentation by reiterating that although often overlooked by technically minded scientists, questions of computer science and society are important for each society that employs modern technology.

Niaz Mohammad Ramaki
Urban Wireless Mesh Solutions for Connecting
Educational Institutions

Mr. Ramaki presented his goals of providing inexpensive access to the Internet for schools and other institutions, by leveraging existing or planned infrastructure and augmenting it with equipment at minimal additional expense.

The Afghanistan Research and Educational Network (AfgREN) acts as an Internet service provider (ISP) for educational institutions, teaching hospitals, public libraries, and research centers at national level. Universities are connected to the Internet via national fiber backbone, or via satellite. The goal of AfgREN is to plan, operate, and maintain such a national infrastructure for academic purposes. This thesis analyzes opportunities to extend this reach to non-academic educational institutions such as schools by employing low-cost wireless mesh networks.

Saminullah Sameem
Building Network Infrastructure at Shaik Zayed University, Khost with Wireless Mesh Networks

Mr. Sameem introduced the audience to the campus network at Shaikh Zayed University (SZU), which is located in the far south-east province of Khost, Afghanistan. The university has a large campus, built with support from the United Arab Emirates. As other institutions throughout the country, SZU is also facing internal network infrastructure and power supply problems. The current infrastructure of the network is limited to twisted-pair ethernet cables. In this thesis, the option to augment and extend the infrastructure by employing wireless mesh networks which are run by a sustainable power source such as solar power is analyzed. Mobile and stationary users will be able to connect and access the Internet everywhere on campus rather than only at fixed points. This way, a wide area can be covered with low cost, configurable, manageable, free and open firmware based routers.

Ali Aqa Naseri
Developing a Single Sign-On System for Higher Education in Afghanistan

Mr. Naseri motivated his talk by pointing out the increased mobility in IT applications today. Within modern IT, with users moving beyond a single administrative domain, accessing local resources not only from the inside but also from the outside of an organization, has become critical.
Running businesses or providing education services in a federated fashion is contemporary today. The focus of this thesis is the technical analysis for proposing a single sign-on solution to governmental universities in Afghanistan.

Ghulam Sanaie Ghaznawi
Securing the Transition to IPv6 in the Afghanistan Research and Educational Network (AfgREN)

Mr. Ghaznawi began his talk by describing the need for Afghan ISPs to respond to the upcoming changes in the basic protocol that drives the Internet. The Internet Protocol version 6 (IPv6) is the latest revision of the Internet Protocol. Its predecessor IPv4 is the current key component of the Internet, but due to the exhaustion of the IPv4 address space, it is now considered insufficient for sustaining the future growth of the Internet. Replacing IPv4 with IPv6 is not possible within one day. It is rather expected that IPv4

and IPv6 will coexist for a long time, while ISP networks gradually move towards native IPv6. Mr. Ghaznawi's thesis sheds light on this transition with focus on security considerations.

Abdulaziz Akbary
IPv6 Transition Action Plan for Afghan Academic Institutions

Mr. Akbary introduced his work and outlined the reason for its importance for the future of IT in higher education in Afghanistan. The expansion of the World Wide Web, the growth of Internet users, web and file hosting providers are increasing the global volume of Internet traffic and hosts. The expansion is predicted to outgrow the IPv4 address space soon. Academic institutions develop IPv6 migration strategies in order to implement IPv6 in their own respective organization. This Master's thesis is dedicated to explain the structure of IPv6 and the transition mechanisms, to develop an IPv6 transition action plan for Afghan academic institutions and to evaluate the quality, and security of IPv4 versus IPv6 networks.

Mohammad Bedar
Analysis of Programming Abstractions in Partial SDN Deployments and their Limitations

Mr. Bedar's work looks into Software Defined Networking, an emerging trend in computer networks. It brings the control and management of network into software, and allows innovation by opening the network control plane. Networks can benefit from capabilities that are realized with SDN: such as Consistent Network Updates, automated troubleshooting and more. Realizing these benefits in the enterprise network setting is a challenge, however: Enterprises cannot just throw away and replace the entire existing network infrastructure with SDN capable devices.
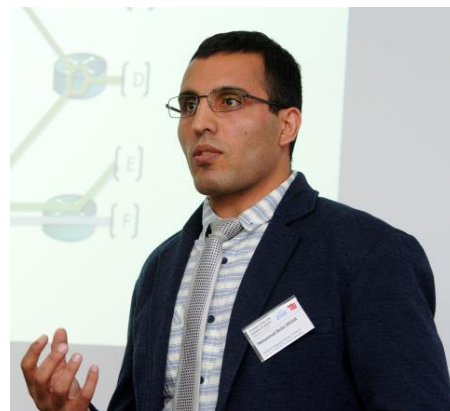
Following this motivation, Mr. Bedar introduced the approach he looked into: In order to realize the benefits of SDN, while still using most of the existing network devices, only a subset of devices is upgraded, employing an architecture and methodology called Panopticon. It provides a way to control and manage legacy networks and provide a logical SDN abstraction to SDN controller platforms. However, from the SDN controller's point of view, Panopticon sacrifices network control to some extent. Mr. Bedar's thesis aims to capture the notion of how much network control we have in a partial SDN deployment and how it can be compared to the amount of control in a full

deployment. It tries to answer those questions by simulating and analyzing SDN programming abstractions in incremental deployments.

Mr. Bedar continued to show the results of his simulations and the conclusions that can be drawn from them. He closed by outlining how his topic can be relevant for deploying modern network infrastructure in Afghanistan.

Khwaja Zubair Sediqi
Side-Effect Analysis of Map Reduce Optimization in the Data Center

Mr. Sediqi motivated his presentation by giving an overview of the Internet's rapid growth. He stated that the growing trend of Internet applications made it necessary to serve millions of users around the globe, so the amount of generated data is huge as well. Users who interact with the Internet generate various data such as click-stream data, crawled web documents, web requests, logs and more.

Traditional database systems have difficulties to manage these large amounts of data. To solve these problems, Google invented the Map-Reduce methodology, which was inspired by older ideas from the functional programming, distributed computing, and database communities. It was originally used as a solution to build search indexes, but since then it has been used by many other industries. MapReduce is a programming paradigm used to process large datasets and Hadoop is an open source implementation of MapReduce. Hadoop runs on clusters of computers and processes the data in a distributed and parallel manner.

The focus of Mr. Sediqi's thesis is to analyze the performance of optimized Hadoop schedulers like the capacity scheduler, fairshare scheduler and speculative tasks execution. The side of collocated datanodes is also covered in his work.
He proceeded to present the results of the work he did in an experimental test bed, showing that according to his initial results the collocation of nodes has a negative impact on job completion time.

Ahmad Siar Mehri
Extending the Operating System Support of the Karma VMM

Mr. Mehri began by introducing the concept of virtualization and outlining its advantages and prospects. He pointed out that it extended the security of systems and improved recoverability. This was followed by a short overview of the technology stack that is at the center of his thesis: The Karma virtual machine monitor that builds on a micro-kernel architecture and thus allows to run different simulated

machines on one physical machine. He continued by pointing out the contributions of his thesis in which he implements a solution for wider operating support for the Karma VMM. He concluded with an assessment how this technology can be used to increase the security of server systems in Afghanistan.

Moderation by Tilman Schieber, TU Berlin

Opening by Salim Saay
Head of the IT Department at the Ministry of Higher Education

Mr. Saay welcomed the participants and thanked for the opportunity to take part in the final event. He referred to the development of IT at Afghan universities. Many of them had been connected to the internet by now and were being modernized currently, using the Higher Education Management System (HEMIS) of the MoHE. Mr. Saay also mentioned AfgREN as one of the most important projects and was pleased that the results of many Master's theses could be integrated into both systems. According to him, the results of the Master's theses could be regarded as a major contribution to the development of the country.

Foawziah Naseri
Dealing with Design-Actuality Gaps in the Development of Information Systems (IS) in Developing Countries: The Example of a Hostel Management System for Herat University

Ms. Naseri motivated her talk by illustrating the common problem of implementing information systems in developing countries. She cited scholars whose research showed clearly that the gaps between the planned system and the actual implementation are huge and account for a large amount of failures. Estimates say that more than half of those systems fail either completely or partially. After outlining the theoretical framework in which these differences between idea and execution can be looked upon, she introduced her own project: She planned and implemented a hostel management system for Herat University that was developed by directly integrating feedback and opinions of the administrative personnel currently running the dormitories. She showed the results of both her empirical research and her implementation efforts to illustrate how a demand-oriented IS development can look like.

Ahmad Nawid Mustafazada
Developing and Deploying a Modular Learning Management System for Afghan Universities

Mr. Mustafazada presented the current state of learning management systems in Afghanistan. After discussing the main features and their relevance for teaching and administration at Afghan Universities, he discussed the different Open Source implementations currently available. Concluding that Moodle fulfills most of the requirements of Afghan universities, he introduced his ideas for an automatic deployment solution. Especially universities without dedicated IT staff can use the scripts and installers developed by him in order to deploy a ready-to-use learning management system. Mr. Mustafazada closed his talk by pointing out that his solution constitutes a pragmatic approach that can be used to quickly make IT systems available at universities that have some infrastructure but far too few qualified people.

Abdul Razzaq Hamraz
Overcoming Accessibility and Localization Challenges in Software Development in Afghanistan: Hajj Pilgrimage Management System

Developing software in developing countries comes with a specific set of challenges. One of those is to adapt the developing process and the finished product to the socio-cultural context. On the one hand, this obviously means to provide the user interface in the local languages. On the other hand, in countries with low literacy rates, this has to be taken into account and the user interface should be usable by people with limited reading skills. Mr. Hamraz explores in his thesis the different challenges that occur in this context and shows how those can be overcome in the context of his own prototype implementation of a management system for the Hajj pilgrimage. He had researched the administrative processes underlying this pilgrimage in Herat and presented how they can be mapped to a web application that is usable by the target group in Afghanistan.

Wazir Khan Ahmadzai
A Distributed Database System as the Backbone of a Modular Campus Management System for Afghan Universities

In Mr. Ahmadzai's thesis, the structure of the information management system HEMIS is comprehensively analyzed and an alternative structure and concept is proposed.
HEMIS is operating since 2011 in the environment of the Ministry of Higher Education of Afghanistan. Mr. Ahmadzai suggested that due to the underlying model of a centralized system, it is largely ineffective and hardly used productively. A distributed database backbone concept is presented as a possible improvement of the current system and as a basis for a future system. This would alleviate the concern that the centralized structure of HEMIS constitutes a single point of failure and that given Afghanistan's limited Internet infrastructure the distributed nature of such a data backbone would increase availability and robustness. He also introduced his prototype of a data backbone, noting that it constitutes a data access layer that can be used in principle by any kind of middleware or frontend system.

Ashiqullah Alizai
A Concept for a Distance Education Framework and its Deployment in Afghanistan

This thesis explores how distance education can fit in the context of Afghanistan's educational landscape. It gives an overview of the Afghan higher education system and explores different theories about distance education. It focuses on a theoretical perspective based on the transactional distance theory by Michal Graham Moore, which fits well into Afghanistan's context. The main components of this theory are the dialogue between instructors and learners, the structure of the course, and the autonomy of the learners. Mr. Alizai presented the model in a practical way by putting it in the context of empirical data collected at Herat University. He concluded that the model presented methods that encompass the whole lifecycle of the development process of a distance education framework.

He then showed his own modifications to the process, which focused on making the model more malleable in order to better adapt to the situation of developing countries, and presented strategies for deploying distance education in Afghanistan.

Moderation by Ralph Magnus, TU Berlin

Opening by Prof. Ezatullah Amed
President of Kabul Polytechnic University

Prof. Amed welcomed the participants and briefly introduced Kabul Polytechnic University (KPU). This university was founded in 1963 and destroyed during the war. Since 2002, KPU has developed into an important institution of higher education in Afghanistan, aiming to accomplish the following goals: Education of engineers up to PhD level, development of science and technology, training of students for the re-creation of Afghanistan, pushing forward research in different areas of technology. KPU has a computer science faculty since five years. Prof. Amed told the audience that he is very pleased to take part in the current event and that he is especially proud of the students from KPU who will graduate soon. He thanked TU Berlin for the support.

Somaia Zabihi
The Impact of Component Based Software Development Exemplified by an Inventory Management System for Herat University, Afghanistan

The first objective of Ms. Zabihi's thesis is to discuss about the Component-Based Software Development (CBSD) as one of the advanced methodologies. The context is set to component-based development of an inventory management system for Herat University in Afghanistan.

Meanwhile, her second objective is to find out answers to the questions whether CBSD can be a proper approach in Afghanistan, particularly in the context of the Herat University Inventory Management System (HU-IMS), and how cost and time-efficient CBSD is in all aspects.

The paper discusses the lifecycle of HU-IMS according to the V model. It only focuses on details to cover the selected phases such as requirement analysis, system design, selection, adaption, and the test phases of system development in the V model. The results of the thesis confirm applied CBSD considerations when designing HU-IMS which of course is a proper approach in the Afghanistan scenario.

Ghezal Ahmad Jan Zia
Concept for a Student Information Management System Supported by Near-field Communication Technology for Afghan Universities

In his thesis Mr. Zia describes a concept to overcome current problems of the educational system and to provide improved facilities for the future of student self-administration. In his thesis he focuses on a Student Information Management System (SIMS) for Afghan universities, based on a concept of Free Open Source Software (FOSS) and using the application of Near Field Communication (NFC).

One of the current and discussed problems is the 'student attendance system'. The conventional system of taking attendance by calling student names in a class of 250 students is time-consuming and insecure. Therefore, a computer and NFC based attendance management system will assist universities and lecturers in this process. The resulting concept of his paper can be handled as a reference for schools in Afghanistan.

Mahmood Asgharzada
Analysis of Agile Methodologies and Software Quality Implications for Countries with a Young Software Development Industry

Even though agile methodologies have optimized software development processes and outputs, software testing still is the critical failure reason for software projects. Although agile implementation of software testing can optimize the outputs in terms of quality, iterations in software testing are much more expensive in terms of value. The optimal solution is to implement testing as sufficient as possible in each single step before moving to the next steps in order to reduce the iterations as much as possible.

In his thesis Mr. Asgharzada introduces the principle of 'good enough' as a quality level for an optimal solution. The principle requires defining value propositions of all project stakeholders and then influences and decides on the adequacy of testing in each different level accordingly. Since stakeholders play a significant role for the principle, they, as non-technical factors, can have a huge influence on the output. Thus, further precise analysis and adaption is probably required.

The objective of his thesis is to analyze and implement the principle of 'good enough' as an agile methodology in order to optimize and achieve a maximized value of a software project – exemplified by a concrete case study at Herat, Afghanistan.

Mohammad Rafi Bahez
Concept for a Reliable DNS-Based Redirection Mechanism for Educational Portal Systems in the Context of Regions with Weak IT Infrastructure

Providing services remotely is a common approach for regions with relatively poor IT infrastructure (e.g. Afghanistan). A problem with such a system is that the availability and contents retrieval time depend on the availability and speed of the Internet connection. Providing web-based services from inside the country faces the same problem. Accessing a server in the same country leads to route traffic via neighbor countries and then back to the respective server.

In his thesis Mr. Bahez presents a module which dynamically configures the BINDv9.x DNS server in a way that it provides the closest server's IP address respective to the user's location. The redirector can operate by using three policies. Each policy uses different criteria to redirect a user to the closest server.

Hamidullah Khan Zai
Concept for a Plagiarism Detection System for a Research Exchange Platform at the Academy of Science, Afghanistan

In his thesis Mr. Khan Zai provides a concept for the implementation of a plagiarism detection system adapted to be able to detect plagiarized parts in papers written in Afghanistan's national languages Pashto and Dari. The thesis also discusses different types of algorithms for plagiarism detection and challenges between right-to-left and left-to-right languages, especially when fingerprint algorithms are used.

Waheedullah Sulaiman Khail
Development of a Strategy for a Sustainable Migration of Proprietary Software to FOSS for Afghan Organizations

In his thesis Mr. Sulaiman Khail provides a deeper look into Open Source Software, its history and the philosophy behind it. Different characteristics of Open Source and proprietary software are discussed as well as advantages and impacts of migration processes from proprietary to Open Source based solutions in public organizations.

The described migration process is recommended to be deployed in three main steps which can be implemented independently. In his thesis Mr. Sulaiman Khail first identifies the client level migration, second the community building phase and as the third step the server migration process.

The thesis proposes an implementation concept for each of these three phases. Besides, Mr. Sulaiman Khail formulates a framework to increase the availability and accessibility of Open Source software and related to important security updates in regions like Afghanistan.

Ashraf Ali Tanin
Application of Aspect Oriented Methodologies
to the Development of a Web-Based Scholarship
Management System for Afghan Students

In his thesis Mr. Tanin discusses the application of aspect oriented programming paradigms in the context of the implementation of a student scholarship management system. His main discourse is about the identification of relevant cross-cutting concerns and the implementation of the respective aspects to create a maintainable and reusable source code.

Walida Fayez Sardari
Analysis of the IT Situation at the Universities of
Balkh Province in Afghanistan (Balkh, Aria and
Sadat)

The availability of universities and opportunities for higher education play an important role in the development and progress of information technology, knowledge, and research in developing countries like Afghanistan, especially in Balkh Province.

The objective of this thesis is to find out and analyze the status of the IT situation at three public and private universities (Balkh, Aria and Sadat) of Balkh Province in Afghanistan through two aspects: IT infrastructure availability and accessibility and IT education, human resources availability and their capacity. A structured qualitative observational research method (interviews, questionnaire, discussions, field notes, review of the relevant documents, reports, and policies) has been chosen to collect data for the analysis of the IT situation at the three selected universities (Balkh, Aria, and Sadat).

Beside the major findings, this research showed that there is a lack of IT centers and computer labs, little availability of functional IT equipment and a large number of non-

functional IT equipment, a serious lack of IT professionals and of licensed software, and the non-existence of a general IT policy or protocol for the universities to define criteria for the creation of a computer science faculty. It also revealed that the government and donor support plays a very important role in the availability of IT infrastructure, equipment and resources.

As a conclusion it can be said that applying the concept which has been introduced in this research is to improve the current status of IT at the universities of Balkh Province in Afghanistan. Government, donor will, support and close coordination are needed to develop and implement projects in order to improve the current status of IT at the universities of Afghanistan.

Sayed Abdullah Walizai
Improving Computer Education at Afghan Schools

In his thesis Mr. Walizai does research about the current computer education at Afghan schools. He tried to analyze the current situation through interviews with teachers, students and computer science professionals, and to develop an appropriate solution based on an analysis of these findings.

Computer education at Afghan schools is facing several challenges, most notably in terms of syllabus development, teacher proficiency and IT infrastructure. As the results of Mr. Walizai's research show, the syllabus in most Afghan schools consists of rather a few Microsoft applications under Windows. The teachers themselves are non-professionals and many of them did not receive a particular training in the field of computer science. They are also mostly unaware of the concept of Open Source. The situation of IT infrastructure is also poor. A few computer labs exist with little reliable equipment and Internet connections are rare.

As a solution, Mr. Walizai proposes a concept to improve the situation. This approach includes a syllabus renewal according to international standards which contains theoretical concepts and supports abstract thinking and creativity as well as IT security issues. A professional syllabus committee is to be set up and put in charge of this task. To improve teacher proficiency, trainings for teachers, both in-service and pre-service, are to be established. For the IT infrastructure, computer labs at schools need to be set up or extended with reliable hardware equipment, stable power supply and Internet connectivity.

As a conclusion, it can be said that computer education in schools is an important subject which needs broader attention of the policy makers in the government to be improved. It can help to enhance students' creative and abstract thinking. As computer technology is almost used in every part of our daily life, students in schools must learn this field.

Huma Yari
Concept for the Development of Quality Assurance and Accreditation Processes for Higher Education in Afghanistan

Quality of higher education and the need for effective quality assurance mechanisms beyond the institutions are becoming prioritized topics in national strategies for higher education. Afghanistan has passed more than two decades of war and now it is in the time to reconstruct everything from scratch. Literacy and higher levels of knowledge and expertise can help Afghanistan reach its goals.

The quality of knowledge of graduated students is related
to the quality of their institution. Therefore, rebuilding, promotion and quality improvement of the higher education institutions of Afghanistan has a major impact on many aspects of the development of the country. In her thesis, Ms. Yari analyzes quality assurance processes in Afghan higher education and develops a concept to improve these processes in order to enhance accountability and quality improvement and to gain sufficient outcomes.

Since almost two years, quality assurance and accreditation is a special focus of the Ministry of Higher Education in Afghanistan. To develop successful processes, the cooperation of all stakeholders, who are participating in it, and good mechanisms are required. On the one hand, it is thus very important to first examine the situation which is required for applying the process, and on the other hand, the motivation of the participants is also crucial.

Involving modern technology can support the development of the process. Therefore, a concept of a web application is suggested to enable the participants of quality assurance processes to use information technology facilities. This will provide transparency, accuracy and other benefits for the development of quality assurance processes.

Sayed Ahmad Mahboobi
Concept for the Improvement of ICT's Usage for Education at Kandahar University

Innovation and a rapid development of technologies have influenced each aspect of human life. In the world today, Information and Communication Technologies (ICTs) are counted necessary requirements in changing and modernizing working conditions, solving problems and improving performances. Particularly, in the education system ICTs have an impact on the improvement of teaching and learning methods, facilitating approaches for learning anytime and anywhere, and providing opportunities to have access to a wide range of world-wide information resources.

Looking at the relevance of ICTs in education, a survey has been conducted within the scope of this thesis to understand the status, usage, and awareness of modern technologies at Kandahar University. The main components of the survey were to evaluate IT infrastructures, Internet facilities, library resources, awareness of e-resources and the main challenges and opportunities in the field of ICT. In addition, the survey involved questionnaires for lecturers and students to acquire a general understanding of the computer education level, the usage of information resources and the library for learning purposes.

Based on the survey findings, Mr. Mahboobi's thesis proposes a concept for the development of ICT and for the improvement of its usage in the education system at Kandahar University and throughout Afghanistan. These improvements will help facilitate modern technologies, enhance the level of education and enable learners to use information resources and technology in their learning activities in a better way. The proposed concept introduces three initiatives that have to be implemented: Developing an information literacy training program, establishing an IT center and creating an ICT committee. These innovations will provide a good starting point toward the development of ICT and its usage in the education system in Afghanistan.

FINAL EVENT

**Moderation by Prof. Uwe Nestmann
Dean of Studies at the Faculty of Electrical
Engineering and Computer Sciences at TU
Berlin**

The host Prof. Nestmann opened the event. He
began by extending a warm welcome to the
Afghan delegation, the representatives of the
German Federal Foreign Office and other guests.
Then he gave an overview of the afternoon's
schedule and introduced the first speaker, Vice-
president of TU Berlin, Prof. Heiß.

**Welcoming by Prof. Hans-Ulrich Heiß
Vice-President of TU Berlin**

After giving a short overview of the history of TU
Berlin, Prof. Heiß presented a variety of facts
and figures. He emphasized the strong inter-
national profile of the university which is
illustrated by the fact that every fifth student
hails from abroad.

He outlined the research priorities of TU Berlin
and its faculties. Among those, the Faculty of
Electrical Engineering and Computer Sciences
employs sixty professors and has about 4,800 students.

Prof. Heiß then introduced the Faculty's Center for International and Intercultural
Communication (ZiiK). He recounted the various activities of the center from its
inception in 2000: teaching and research in the area of computer science and
developing countries, advising of foreign students, intercultural competency. Beside
many other projects, the ZiiK became involved in the reconstruction of academic
structures in the field of IT in Afghanistan in 2002, including establishing IT centers in
Afghanistan, developing the country's computer science curriculum and providing
training to IT experts.

He continued with a description of the computer science Master's program for Afghan
lecturers whose second iteration had just been completed with financial support from
the German Academic Exchange Service (DAAD). This program is central to the ZiiK's
efforts to develop human resources in the field of education in Afghanistan. Those
efforts will be furthered by the third round of the program that will go ahead in the
coming semester. Prof. Heiß closed his talk with thanks to the Federal Foreign Office,
the DAAD, the Afghan Ministry of Higher Education and the staff of the ZiiK.

Opening by Rüdiger König
Former German Ambassador to Afghanistan in Kabul, Federal Foreign Office

Mr. König began by extending his thanks to all the contributors to the Master's program and especially the students who graduated successfully. Their efforts, he emphasized, are very special as they pertain to the very thing that makes societies work: knowledge and expertise. He continued that these two things are even more important in a country like Afghanistan where qualified young people like the graduates are sorely needed – a need that has already been successfully addressed by this program.

Establishing successful businesses and creating administrative structures is impossible without experts and it will allow the Afghan people to regain control over societal developments, the decision making process and their overall independence. Mr. König remarked that he is proud that the German Government helps Afghanistan in this regard and that he is especially proud that they supported this successful graduation which represents an extraordinary program.

He recounted when Dr. Peroz first approached the Federal Foreign Office with his idea to establish such a Master's program. At first, they were reluctant but he convinced them to invest in his idea. Now, ten years later, it is easy for him to convince donors because he can point to the outstanding successes. Mr. König then related that when he had been German ambassador in Kabul he had witnessed the return of the first group of graduates to Afghanistan with great pride. They had returned to their country and had made a difference with their skills and abilities. This program, he concluded, therefore is extraordinary because it achieves what few similar endeavours can claim: avoiding brain-drain and strengthening the Afghan higher education system sustainably.

Mr. König congratulated the graduates and closed with the remark that Afghanistan could be proud of them.

Abed Nadjib
Minister Counsellor at the Afghan Embassy in Berlin

Mr. Nadjib extended his welcome to all guests and expressed his joy that he could be there. This celebration, he emphasized, was part of an ongoing German-Afghan commitment to peace. He recounted the story of the friendship between Afghanistan and Germany which began with the establishment of a German school in Kabul in 1923. The special role of Germany was that they always lent a helping hand without interfering in Afghanistan's internal affairs. Mr. Nadjib then related how this friendship was renewed at the Petersberg Resolution of 2001 when decades of unrest and war in Afghanistan had come to an end.

He then warned that despite the things that had been accomplished since then, many issues of Afghanistan were not simple to solve. He pointed out that some of the solutions were right in front of him: the graduates of the current Master's program who will bring a culture of peace and prosperity to Afghanistan and teach them to their fellow countrymen.

He continued with the story of his trip to Kabul University with the former German ambassador. He recounted that there had been no power line and no network connection while today it was possible to hold videoconferences. Another outstanding effort, he continued, were the four IT centers that had been established in Afghanistan by TU Berlin and were even more modern than similar facilities in Germany.

He pointed out that those fruits of Dr. Peroz' and the Ministry of Higher Education's hard work are estimated highly by the leaders of Afghanistan. This is shown by the visits of the Minister of Higher Education Prof. Obaid Obaidullah in 2012 at TU Berlin and the participation of Deputy Minister Prof. Babury in this event.

Mr. Nadjib expressed the wish that 150 IT experts can graduate from this program in the next years. On behalf of the Afghan government and its people he requested the German administration to help with this task. He explained further that IT was central to the steady development of the country.

He then recounted how he had listened to the students' presentations of their theses during the past two days. Though he had not understood much of the technical details he had noticed that they all had picked a topic that helps Afghanistan. He then extended his sympathy and condolences to the relatives of the German soldiers who died for the peace in Afghanistan. He also expressed his sadness that Prof. Akbar Popal, former President of Kabul University, had passed away recently.

Finally, Mr. Nadjib addressed the graduating students once more, wished them all the best for their future and told them they had a golden ticket back to their home country where they will contribute to peace and prosperity.

Lars Gerold
Head of Section Afghanistan, Pakistan, trans-
regional Programmes Good Governance at the
German Academic Exchange Service (DAAD)

Mr. Gerold began by stating that we could look back now to more than ten years of cooperation with Afghanistan funded by the German Federal Foreign Office. He expressed his gratitude about the fact that this support made it possible for the DAAD to implement projects concerning higher education and infrastructure, and then emphasized the important work of Dr. Peroz and his team in this regard. For these projects, he continued, the cooperation and support of the Afghan Ministry of Higher Education was central from the very first fact finding mission in 2002.

He recounted the different aspects of the projects in the field of higher education that had been implemented in the last ten years: Educating the staff at the ministry, setting up structures for teaching, developing a curriculum for computer science and especially educating teachers. He noted that though the number of 24 graduates might appear small, the impact they have on Afghanistan's future is enormous, considering the fact that they will teach more than 2,000 students.

Mr. Gerold congratulated the students to the successful completion of their studies and encouraged them to now teach their own students what they learned, and contribute to an emerging academic life in Afghanistan. He invited them to take advantage of the DAAD alumni network and stay in contact with the friends they had won in Germany. However, he emphasized, they should not forget that their country and their students need them. He closed with the promise that the DAAD will continue its financial support in the future.

KEYNOTE SPEECH

Prof. Osman Babury
Deputy Minister of Higher Education
in Afghanistan
Strategic Plan of the Ministry of Higher
Education in Afghanistan

Prof. Osman Babury opened by welcoming the guests and congratulating the students. He gave a quick overview of his keynote speech that explored new avenues for higher education in Afghanistan and strove to show the challenges and prospects of those developments. His presentation began by exploring the history of Afghanistan's intellectual life, starting with the ancient scholar Abu Sina. He then recounted the beginning of a modern higher education system in 1932 and the promising developments in the following decades. After the decline of higher education into isolation and single-mindedness during the years of the civil war, a new period began in 2002.

By the time the Interim Government was in place, the condition of higher education was disastrous – almost every campus had suffered damage, many had no water, one no electricity, labs had been looted, libraries vandalized, and little maintenance had been possible during this period. Thus, the Ministry began the challenging job of trying to repair the higher education infrastructure, recruit new faculty members, encourage former faculty staff to return, and rebuild the sense of community and culture of learning that had been lost.

Schools and higher education institutions were reopened to female students, but for higher education in particular, the pool of women was very small since secondary schools had been closed to women. In those first years most female students who returned to universities were refugees from Pakistan and Iran with a few coming from underground secondary schools that had managed to survive the struggle.

The first few years starting in 2002, focused on repair and re-staffing. The task was monumental with almost no university having been spared. Even the offices of the Ministry of Higher Education had no water or electricity when they reopened in 2002.

By 2009, the most serious damage had been repaired, water and electricity restored, and much of the infrastructure was back in usable, if not ideal, condition. About 20% of the laboratories were functioning again, facilities reopened, and efforts were made to retrieve faculty staff back from abroad. The first faculty members without Master's or PhD degrees were sent abroad for training, a new legal foundation was established for higher education, administrative performance was improved, and legislation passed to allow the establishment of private higher education institutions – which had been forbidden prior to 2006.

Prof. Babury then described how the MoHE started to work on a higher education strategic plan in 2009, collaborating with a broad segment of universities, specialists from abroad, donors, and NGOs. This effort took place over a ten-month period and culminated in the inauguration of the plan in December of that year.

Prof. Babury continued by summarizing the main features of the strategic plan:
Its two main goals were to improve the quality of higher education, while increasing access at the same time.

Quality assurance and accreditation were high priorities, with the latter starting in July 2012, and the first site visits by peer reviewers taking place early in 2013. Thirteen universities have completed their institutional self-assessments and five site visits have taken place with decisions about to be made on 'admission to candidacy for accreditation' – the first step in the process.

Dorms and classrooms were built. A special effort was made to encourage women who had very little housing opportunities. In the last year, two new dorms for women were completed (Nangarhar and Ghazni) – a MoHE priority to help increase the percentage of women. Three more women's dorms are underway thanks to donor funding.

NATO facilitated the Silk Internet Network which has reached eighteen higher education institutions and will be expanded to include nine more soon. A number of libraries have been built, additional classrooms as well as office space and administrative buildings constructed.

Prof. Babury emphasized that Germany has been actively involved in the construction of higher education in Afghanistan since 2002. The involvement concerns the following areas: information technology and computer science, economics, Good Governance, public administration, German language etc. The TU Berlin established IT centers at Kabul University, Herat University, Balkh University, Nangarhar University, supported the IT department at MoHE, and today educates lecturers and staff members.

Prof. Babury concluded that the strategic plan strives to accomplish these goals in a realistic, cost-efficient and economically sound manner. He stated that they cannot be achieved by a centralized system but that the individual responsibilities of the faculties need to be emphasized. Core to this is the education of the academic staff of which already 514 have a Master's degree and which is furthered by eight Master's programs and two PhD programs that are underway.

He continued with another problem of the Afghan higher education system: the high number of school graduates who want to enter the universities. Although this is a challenge, the statistics show that Afghanistan's education index is on par with Pakistan which is already astounding given Afghanistan's lower Gross Domestic Product (GDP).

The next steps should focus on enhancing the existing infrastructure, improving the governance by strengthening autonomy and efficiency in general as well as the financial autonomy of the higher education institutions. Furthermore, more thorough quality control is needed for the private universities, and public-private partnerships should be established.

Quality can be improved by implementing a merit-based competitive and efficient system and by focusing on research that is relevant for Afghanistan. The access to higher education can be improved by not only increasing the amount of university students but also by focusing on technical vocational education and training. Currently, the responsibilities are split between nine ministries. This situation can be alleviated by establishing Community Colleges under the supervision from the Ministry of Higher Education.

Good Governance in the field of higher education encompasses decentralizing, delegating and involving the private sector. The government should increase the funding, and the financial aid of international donors has to be coordinated better. IT plays a central role in this process. Therefore, more IT experts need to be educated for these tasks.

Prof. Babury then summarized the prospects beyond 2014. He emphasized that the rapid expansion of the Afghan higher education system should no longer be at the cost of quality. Increasing funding through the government and donors while furthering decentralization would further that goal. He expressed his contentment with the overall progress, especially considering the difficult context of Afghanistan's current situation, and then he stated that efforts should now be undertaken to consolidate the achievements.
Prof. Babury closed his keynote speech by thanking the German Government, especially the Federal Foreign Office, the DAAD, GIZ and mostly TU Berlin and other donors for the continued funding of higher education, and by expressing the wish that this successful cooperation would continue in the future.

After his closing remarks, Prof. Babury awarded a letter of appreciation to Prof. Heiß and handed over a present from the ministry to Ms. Fellner. Finally, Dr. Peroz received the emblem of the ministry for his role as senior advisor to the minister.

ROUND TABLE DISCUSSION

After Prof. Babury's speech, a round table discussion hosted by Prof. Uwe Nestmann took place with the invited guests.

- Prof. Osman Babury, Deputy Minister of Higher Education for Academic Affairs in Afghanistan
- Dr. Philipp Ackermann, Head of Task Force for Afghanistan and Pakistan at the German Federal Foreign Office
- Prof. Abdul Rahman Ashraf, Afghan Ambassador to Germany in Berlin
- Prof. Hans-Ulrich Heiß, Vice-president at TU Berlin
- Lars Gerold, Head of Section Afghanistan, Pakistan, Transregional Programmes Good Governance at the DAAD
- Dr. Christian Grimm, Head of International Relations at the German National Research and Education Network (DFN)

Each of these participants was invited to issue an introductory statement. Prof. Nestmann first gave the word to Prof. Babury.

Prof. Babury began by reiterating some of the main points of his keynote speech. He pointed out that the achievements in the field of higher education in the last ten years were not a product of chance but of pragmatic and strategic planning.

One of the central pillars of future plans and a fundament for future endeavors are the young people of Afghanistan. However, the already achieved goals are threatened by political unrest, a difficult security situation, lack of governance and the slow pace in which the mentality of Afghan society changes. Nonetheless, the ministry is

committed to sustain the change with the strong teams who built it in the first place. These teams, the deputy minister emphasized, are not only at the ministry but also at universities and abroad. He closed his statement by thanking all the contributing parties again for this success and suggested to continue on this road, remarking that he hoped for further support from the German Government.

Dr. Ackermann from the German Federal Foreign Office began with an overview of the German support for Afghanistan's post-war development.

This support extends beyond higher education in information technology, including economics, public administration and the mining sector. Overall, Germany's commitment to Afghanistan in the last thirteen years is without precedent and stems from the long friendship between the two countries. It encompasses the military presence, a variety of civil projects and the police training. This strong commitment will continue until at least 2016, but the focus could shift noticeably to other countries which will need more urgent support. Dr. Ackermann pointed out that it was clear that this level of support cannot go on forever, and the elections on April 5, 2014, will be an important benchmark for the international community how much trust can be put into the democratic structures that have been established in Afghanistan.

He concluded his opening statement by ensuring Germany's continued support to the important projects like an upcoming PhD program. Higher education, he said, was seen as paramount to Afghanistan's further development.

The Ambassador **Prof. Ashraf** added that Afghans should know that they cannot rely on international support forever. He remarked that he, however, hoped for a continued partnership with friends from other countries with Germany playing a major role. Another hope, he said, is for a better cooperation with Afghanistan's neighbours who are crucial for the long-term stability of Afghanistan. He then addressed the young generation of Afghans, saying that they were the key to the country's future and that they should take the initiative.

Prof. Nestmann gave the word to TU Berlin's Vice-president Prof. Heiß, posing the question what role he sees in the cooperation between Germany and Afghanistan.

Prof. Heiß answered this question by first describing the support to higher education as a bootstrapping process. Though the foundation is now laid, it will need some time until Afghan universities can play a role in the international scientific community. He mentioned that the involvement of TU Berlin in Afghanistan is considered to be a blueprint that can be used for similar programs in order to help other countries in a similar situation. Prof. Heiß then came back to the original question by answering that the next level of involvement, offering PhD scholarships, is underway.

Mr. Gerold from the DAAD stated that the challenges being discussed today were already on the table for seven years. He emphasized that he saw his role as that of an advisor and the processes catalyzed by this advice take some time to cause changes. He thanked the German universities that are interested in working with Afghanistan and said that these were fruitful cooperations as they allow research into new ways of helping developing countries. He closed his statement by reminding that academic cooperation is the DAAD's core competency and that he saw future projects more geared towards education and training rather than building infrastructure.

Dr. Grimm from the German National Education and Research Network (DFN) continued by summarizing the workshop held last Tuesday at the ZiiK. He judged that the plans for the Afghan research network are well-engineered and that the human resources which are necessary for its completion are the neuralgic points. As brain drain is a challenge for developing countries, he stated his hopes that nonetheless adequate personnel can be found. Although the workshop focused on questions of administration and not technical details, he was confident that the technical issues are easy to solve once sufficient human resources are educated and allocated to the project.

DISCUSSION

After these initial statements, Prof. Nestmann opened the discussion and gave the word to Mr. Salim Saay, head of IT at the MoHE.

Mr. Saay took the opportunity to express his thanks for the good cooperation between TU Berlin and the MoHE and also for the successful workshop a few days earlier with Dr. Grimm. He continued by giving an overview of the IT projects currently coordinated by the ministry.

Prof. Amed, President of Kabul Polytechnic University (KPU) introduced KPU and the rapid developments that have been taking place there in the last decade. The Faculty of Computer Science with only five years is the youngest faculty, but it has already 300 students. He remarked that this rapid growth does not happen at the cost of decreasing quality, as already more than half of the lecturers have at least completed a Master's degree. As most of these degrees were achieved at TU Berlin, he expressed his thanks especially towards TU Berlin but also to the other countries contributing to similar programs.

Mr. Mohmand, Dean of the Faculty of Computer Science at Herat University and one of the graduates of TU Berlin's Master's program in 2010, gave his personal account of the impact these initiatives have in Afghanistan. He advised the current graduates to get ready as a lot of challenges but also great chances expect them in Afghanistan.

He recounted the story of his friend Omid, whose participation in a winter school at TU Berlin brought him on track for a career which ultimately led him to become the head of development at Etisalat, a major telecommunication provider of the region.

Mr. Mohmand then mentioned Roya Mahboob, who took part in a training in Berlin and completed her Bachelor's degree of computer science at the faculty in Herat which was supported by TU Berlin. Today, she heads a software company with branches in Afghanistan and New York. Furthermore, these are not random examples as there are now six software companies operating in Herat. Mr. Mohmand asked the panel to consider those success stories and urged to pave the way for new Master's and PhD programs.

Mr. Gerold answered to this by pointing out that the DAAD is already committed: The third Master's program is decided and although there is no special PhD program in the field of IT for students from Afghanistan, the DAAD scholarships for obtaining a PhD are always open to individual applicants.

The Ambassador **Prof. Ashraf** reminded the panel that he also received a scholarship from the DAAD and that Afghanistan considers Germany as an especially close partner. He pointed out that this also meant that Afghans expected more from Germany than from other countries and that he especially wishes for long-lasting cooperation instead of short-lived programs.

Dr. Ackermann encouraged the students to go home and make a difference in their home country. They should see that they are privileged and have a great opportunity. He continued that their future was back home and that it was a promising future.

Prof. Babury added to the discussion that he was not concerned that Afghan students who achieved their education abroad will not return to their country. He pointed out that of the 516 faculty members who obtained a Master's degree abroad only about ten to fifteen percent are now working in other countries.

He again emphasized the importance of an academic cooperation between Afghanistan and Germany, and brought up the idea of establishing a German-Afghan university. **Dr. Ackermann** replied that though there were precedents for German-foreign universities and such a project in Afghanistan is within the realms of possibility, the Federal Foreign Office, however, does not consider the time to be right for administrative and security reasons. Although it is on the agenda, it probably will not come up in the next years.

Prof. Nestmann then brought back the topic of PhD programs for Afghan students and asked Prof. Heiß how Afghan students can find a supervisor for a PhD thesis in Germany. He replied that they needed a letter of recommendation from a German professor so the best course of action was to pick a topic they were interested in, find a professor who is willing to support this research and apply.

Mr. Naseri, a graduate of the current Master's program, took the opportunity to contribute the story how he was brought up in a poor rural region in Afghanistan. He thanked everyone present for the opportunity to be there this day as a participant of this Master's program.

He asked the panel first what they made of President Karzai's claim that foreign aid efforts misused their budget causing corruption in Afghanistan instead of alleviating it.

His second question was what they made of the relations to Afghanistan's neighbours and how the relation to them is influenced by close cooperation with western countries like Germany.

Dr. Ackermann replied that foreign aid constitutes such a huge amount of money in Afghanistan that a certain amount of misuse cannot be prevented. He said that the problems with Afghanistan's neighbours often appear bigger than they actually are and that he was hopeful that they would improve further in the future, especially given the recent political changes in Iran.

Another Master's graduate, **Mr. Sediqi**, gave his opinion by reiterating the point made by Dr. Ackermann: The security of Afghanistan also depends of him as a person and the young generation. He thanked the Germans for being able to study in Germany and to learn about new technologies. With him, a piece of security will also come to Afghanistan. As Germans have a good image in Afghanistan, there are actually high expectations. He continued to point out that changing a country depended on changing the mentality of its people and though he was not a politically minded person, he was hopeful that the politicians would find a way to achieve this.

Dr. Ackermann replied that he was well aware of the points made by him but that there was a discrepancy of what is asked and what can be provided. Germany has limited financial capacities as well. However, there will still be a lot of aid going on in the next years. He closed by expressing the hope that he would soon be able to congratulate the next 25 graduates of the third Master's program at TU Berlin.

Finally, **Prof. Babury** thanked again the German government, the Federal Foreign Office, the DAAD and TU Berlin for the support since 2002 and he emphasized once again that Afghanistan needs Germany as an important partner. He stated that it is crucial for a successful development in the area of higher education to receive support which is well-coordinated and follows a clear goal.

Prof. Nestmann closed the discussion, thanked all participants and invited them to the final celebration on that evening.

ATTACHMENT

HONORS

At the end of this event, Prof. Babury gave presents to Ms. Sparwasser, Ms. Fellner, Dr. Wendorf on behalf of the Afghan Government and the Ministry of Higher Education. He honored Dr. Kupfer, Prof. Heiß and Dr. Peroz for their contributions to the creation of academic structures in Afghanistan.

MORE PICTURES OF THE EVENT

X