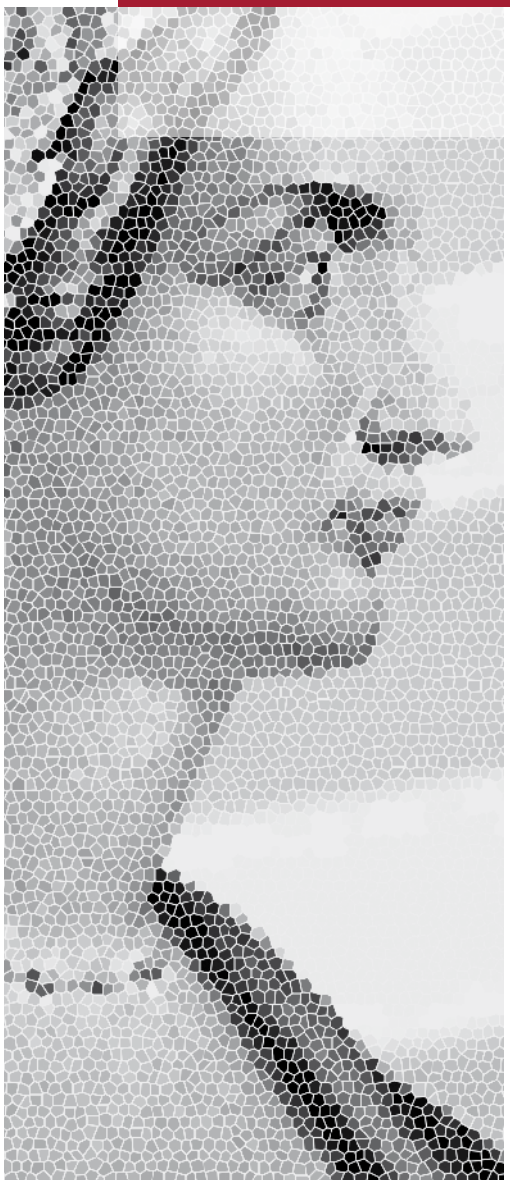
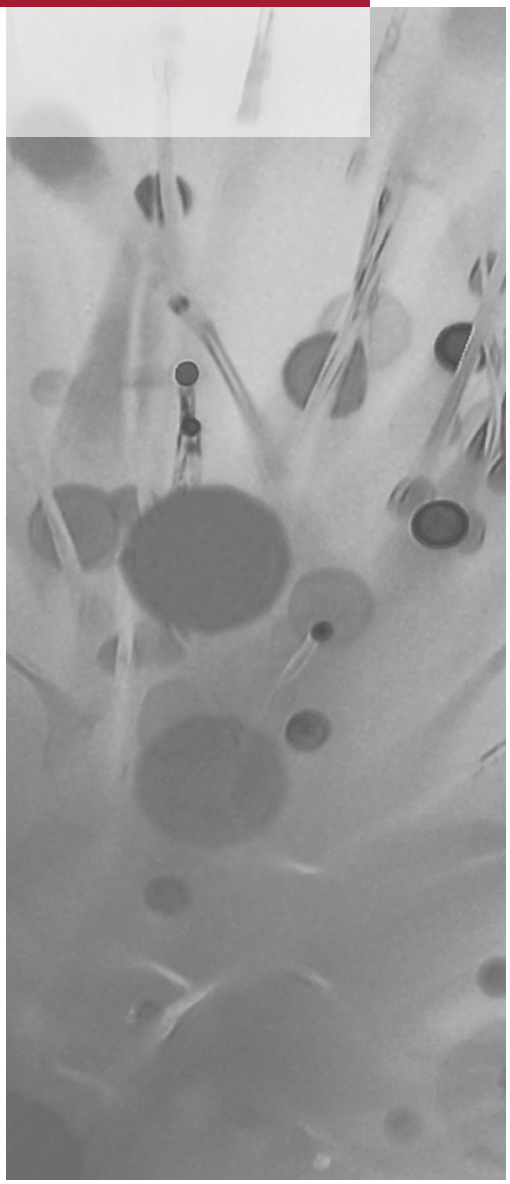
Bundesministerium für
Wirtschaft, Familie und Jugend

Laura Bassi Centres of Expertise

At the interface of science and industry





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„Every day she holds public debates in her house,
attended by those who are in the mood for discussion,
and she fears nobody, and frequently someone,
who is not afraid of her, leaves very bewildered
and with their horns flattened.“

Giampietro Zanotti, writer & sculptor

Laura Bassi, portrait by Carlo Vandi (ca. 1750)

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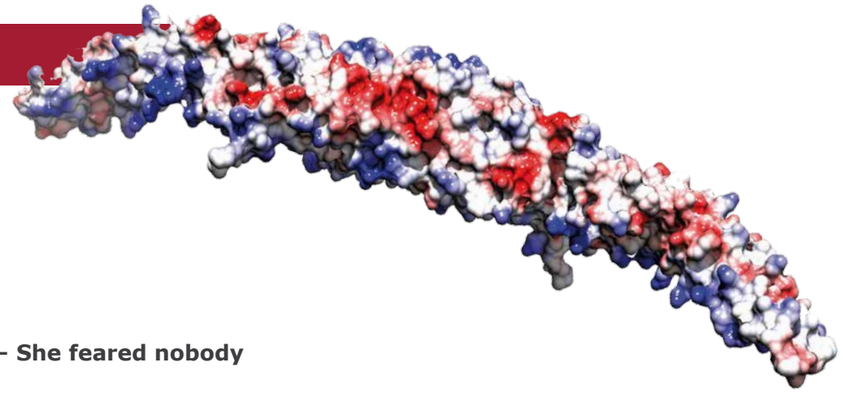

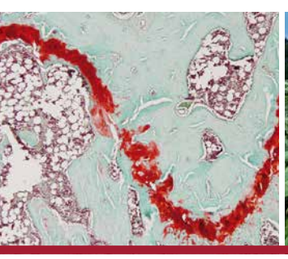

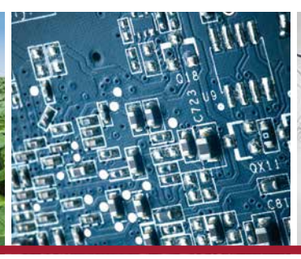


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Foreword

More women in research

The economy and science need each other more than ever before. A small, open economy like Austria is especially dependent upon innovation in order to assert itself amid global competition. The Federal Ministry of Economy is thus committing itself on all levels to the efficient transfer of scientific findings into enterprises.

„We want to provide greater visibility to excellent research performances from women.“

It is especially important to us that even more women achieve managerial positions. It is for this reason that 2009 saw us implementing the „Laura Bassi Centres of Expertise” Programme. The initiative, which is the only one of its kind in Europe, combines cutting-edge research with a focus on equal opportunities and an innovative research culture. Outstanding performances and team orientation shape these Centres, the heads of which are both researchers and good managers. These are precisely the role models we need in order to make the excellent research activities of women more visible and to even more greatly motivate young female researchers to embark upon a science career.

Dr. Reinhold Mitterlehner
Federal Ministry of Economy,
Family and Youth

Success through diversity

In our capacity as Austrian Research Promotion Agency (FFG), our central task is to sustainably reinforce the business and science location of Austria. Every year, we promote numerous application-oriented research projects at the interface to industry. One thing has been confirmed within the framework of this funding activity: The more diverse the perspectives on research topics, the larger the pool of innovative ideas and the freer the thinking, then the greater the success of the project. Thus, the FFG doesn't merely view the Laura Bassi Programme under gender aspects. Indeed it is all about offering outstanding researchers appropriate opportunities for excellent research. However, just as important is the general improvement of equal opportunity in the science system. The selection process, which has additionally been introduced for the Laura Bassi Programme, can make an important contribution to this. It ensures that all researchers have the same opportunities and includes management criteria for the first time. It is only with a research culture, which takes into account the diversity of people and life journeys, that Austria will also be successful as a business location in the future.

„Equal opportunity in the science system must be further improved.“

Dr. Henrietta Egerth
FFG management board

Equal opportunities for all

Since 2009, the heads of eight Laura Bassi Centres have been conducting researching in the areas of medicine, life sciences and IT. At the same time, excellent research is only one central aspect.

230 publications, 21 dissertations, 2 patents and 2 licences. These are only selected figures, which make the scientific success of the Laura Bassi Centres tangible since the start of the Programme in 2009. In spring 2013, following a strict international peer review process, all Centres were therefore recommended for the second funding period.

A unique impulse programme

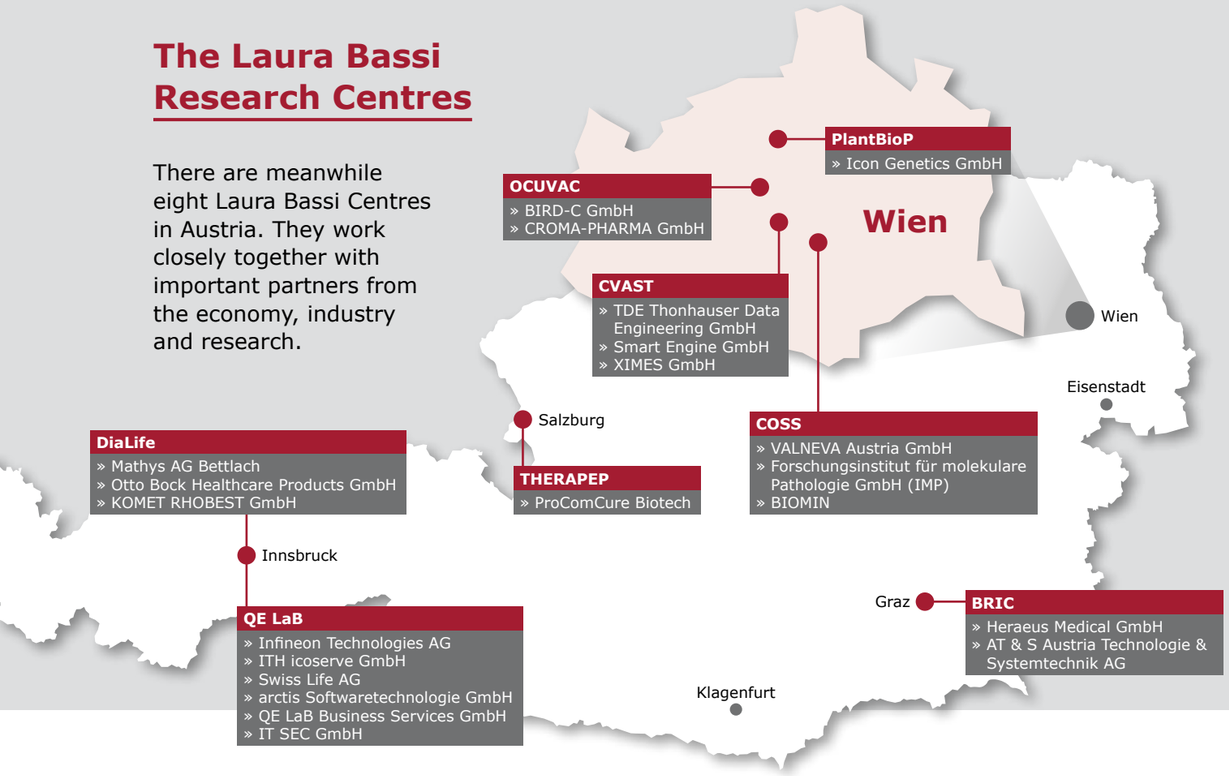
The impulse programme, which is unique throughout Europe, nevertheless stands for much more than these figures are able to express. Alongside the research excellence, it puts the focus of its funding activities on equal opportunity in collaborative science and, furthermore, attempts to establish a contemporary research culture at the interface of science and industry. Giving her name to the Centre is Laura Bassi who, in 1733, was the first woman in Europe to become a university professor. Her life acts as a symbol for many aspects of the BMWFJ with a total of 15 million € of funded „Laura Bassi Centres of Expertise" Programmes. It demonstrates that only one thing counts in science: excellence in research and the spirit that drives it forward. However it also shows how much potential remains untapped for the scientific community, if people are exposed to structural barriers. In the run up to the study by the Austrian Society for Environment and Technology (ÖGUT), commissioned by w-fFORTE, the structural barriers, which are still being encountered by women who strive for a scientific career, are clearly identified and confirmed today. Non-transparent award procedures, male alliance structures, as well as too little opportunity for networking with the industry are just a few of the factors preventing more women from carrying out research in leading positions.

Creating role models

The „Laura Bassi Centres of Expertise", initiated in 2008 by the Federal Ministry of Economy, therefore wants to provide greater visibility for excellent women in collaborative research and to create role models for new generations of researchers. In the call for proposals for the centres of excellence, targeted scientists were encouraged to apply for the Centre management with their research projects in the area of technology and natural sciences. A two-phase selection process, which is the only one of its kind in Europe, ensures that it is not just the candidates' scientific performances to date that are evaluated. Their future potential in the areas of management, team leadership, as well as career planning also flow into the assessment process. It is intended that this new type of evaluation will contribute to establishing greater equal opportunity in the science system, by expanding classic excellence criteria. An equal balance of good project management, a more interdisciplinary approach, far-sighted personnel development and team leadership are indispensible in application-oriented research. This management-oriented research culture is lived out and evaluated on a project basis in the Laura Bassi Centres. The Laura Bassi Programme is therefore understood as a learning initiative, which wants to contribute to establishing a new culture in the research landscape. The next pages provide an initial insight into how this three-phase approach of scientific excellence, gender sensibility and new research culture is being concretely implemented. «

The Laura Bassi Research Centres

There are meanwhile eight Laura Bassi Centres in Austria. They work closely together with important partners from the economy, industry and research.



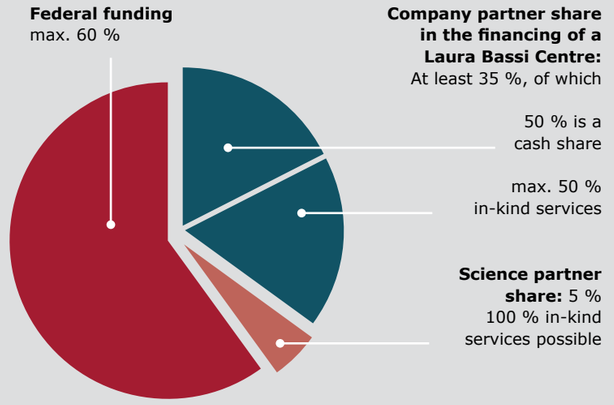
The Laura Bassi Programme in figures

Initial results:

» **230** publications
» **87** researchers
» **21** dissertations
» **41** theses & master theses
» **2** new patents
» **2** new licences

Key data for the entire duration:

» **15** million € in funding (BMWFJ)
» Total budget: **25.5** million €
» max. **320,000** €/year/centre via BMWFJ
» **7**-year duration



The Laura Bassi Programme stands for:

» Excellent application-oriented research
» Management skills
» Interdisciplinary approach
» Team orientation
» Career development

She feared nobody

The extraordinary career of philosopher and physicist, Laura Bassi, continues to inspire scientists today.

On 17 April 1732, four intellectuals and three distinguished scientists entered into a public debate in the town hall of Bologna. The doctors' adversary is Laura Bassi, who is just 20 years old. In fluent Latin, she discusses metaphysics and moral philosophy in such an eloquent and faultless manner that her arguments are interrupted time and again by applause from those listening. Just a short while later, the talented young woman from a good family receives a doctorate for this performance. Following a further public debate, in which Laura Bassi makes nature philosophical observations about water, she is appointed a professorship in nature philosophy – and therewith becomes the first female professor in Europe.

Although Bassi, on account of her sex, is only able to hold lectures on rare occasions at the university, she finds herself at the centre of lively exchange with all of the key personalities of the scientific community of the 18th century – on the one hand through a Europe-wide exchange of correspondence, on the other through her private lectures, which are well-attended and sought out by famous travellers. Laura Bassi becomes a celebrated child genius and a role model for many women. However, she doesn't allow herself to be reduced to the role of representative – she wants to research. Pope Benedict XIV ensures that Bassi is accepted in the circle of the so-called Benedettini, an elite group of scientists who receive a fixed salary from the Academy. Together with her husband, the medical scientist Giuseppe Verati, she conducts numerous experiments in her observatory. She consciously chooses a partner, „who, like myself, is advancing on the path of science and of whom, through long experience, I could be sure that he would not dissuade me from this".

Courageously leading the way

Bassi's scientific interest is primarily in mathematics and natural sciences. With the aid of geometry and infinitesimal calculus she proves that the centres of gravity of two masses, with uniform motion and different speeds, encounter each other with equal uniformity. Furthermore, she develops a theoretical process in which hydraulic engineers are able to ascertain the optimum size and position of pipe openings underwater. The experimental physicist also concerns herself time and again with the subject of air. In 1746, she holds an Academy lecture entitled „On the compression of air", in 1747 „On the bubbles observed in free flowing liquids" and, in 1748 „On bubbles of air that escape from fluids". Together with her husband, Bassi experiments with the little researched phenomenon of electricity – long before Luigi Galvani made his famous attempt with frogs' legs around 1790. Upon Bassi's instigation, 1752 sees the world's first lightning conductor being attached to the roof of the Bologna Academy – although it is dismantled shortly afterwards on account of protests from the sceptical public.

Another important merit of Laura Bassi lies in promoting the reception of the Newtonian Doctrine and therewith the new orientation of natural sciences in Italy, which – until the 18th century – were under the influence of the mechanistically shaped physics of Galilei. It is also arguably herein that lies the base of Laura Bassi's influence on science history: In her visionary power and the unwavering courage, with which she always approached things in such an exemplary way. «

Located in Bologna is the oldest university of the Western world, which – after its founding in 1088 – was also the centre of international sciences over the course of many centuries

Biographical data

1711 Laura Maria Caterina Bassi is born on 29 October in Bologna.

1723 As her family's only surviving child, she is given special encouragement by her father. In her parents' salon, the twelve-year-old amazes guests with her knowledge of French and Latin. In the following year, the Bassi's family doctor gives her lessons in metaphysics, nature philosophy and logic, teaching her the art of debate.

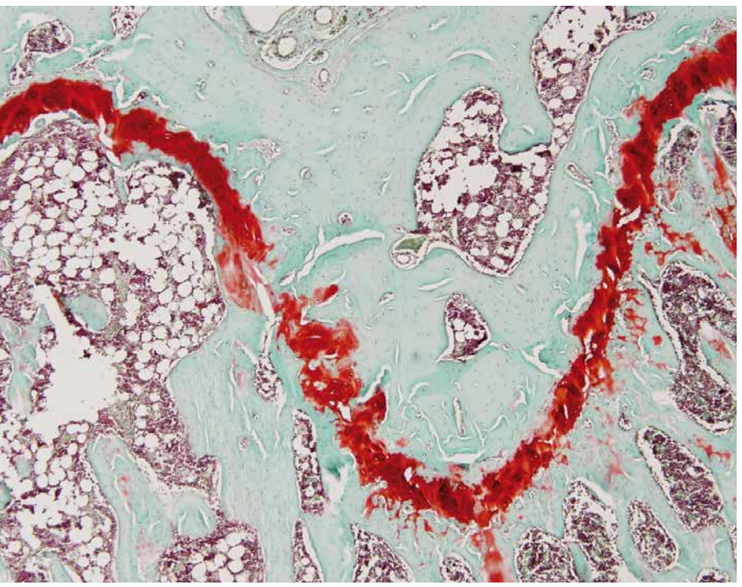
1732 Following her first public debate, Bassi is awarded a doctorate; two months later she receives a professorship at the University of Bologna.

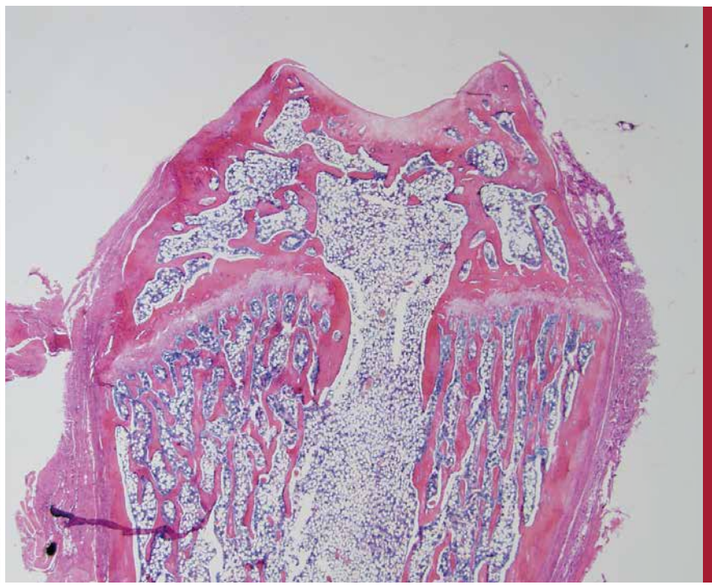
1738 Bassi marries the penniless medical scientist Giuseppe Verati. This marriage produces eight children, five of whom reach adulthood.

1752 The dedicated researcher experiments with air and electricity and contributes to Newton's reception in Italy.

1772 A professorship becomes available at the Bolognese Institute. Laura Bassi spends years fighting for this position. 1776 she is finally appointed – also because her husband relinquishes the professorship out of loyalty to her.

1778 On 20 February, Bassi dies of heart failure aged just 67 years old.





Swallowed by the body

University Professor Annelie-Martina Weinberg conducts research on implants, which dissolve in the body.

If children suffer from broken bones, it is often necessary to use more flexible forms of therapy than in adults. In order to prevent that bones grow together incorrectly, difficult fractures have to be stabilized by implants that have to be removed approximately one year later. Absorbable materials make it possible to avoid a second intervention. However, until now, it was not clear how long the implant ought to remain in the body and which stability and mechanics must be guaranteed. In addition, the currently available absorbable implants result in chronic infections. Within the framework of the Laura Bassi Centre, BioResorbable Implants for Children (BRIC), the trauma surgeon and orthopaedist Annelie Weinberg, of the Department for Orthopaedic Surgery of the University of Graz, is now able to fulfil a lifetime dream and develops implants that are „swallowed" by the body, without complications. The project has meanwhile reached the next important stage of development: the first implants have already been tested. Furthermore, thanks to the Laura Bassi Centre, new doors have opened for the medical scientist: Thus, within the context of the Programme, it has been possible to procure additional third-party funds in the amount of 1.5 million €, including a Marie Curie EU project.

Company partners

» **Heraeus Medical GmbH** manufactures bone cement and biocompatible material for orthopaedic surgery and trauma surgery. The company therewith makes a decisive contribution to the support of the OP team and, subsequently, to the improvement of the operation results.

„Through the proximity to the medical or surgical practitioner, a multitude of new ideas can be generated and further research projects developed, uniting the university and industry in the long-term."

Dr. Klaus-Dieter Kühn, Heraeus Medical GmbH

» **AT & S Austria Technologie & Systemtechnik AG** is Europe's largest manufacturer of printed circuit boards and one of the leading producers of technologically high-end circuit boards.

» **Consortium leader:** Medical University of Graz

Triggering an avalanche

The passion with which Annelie Weinberg realises her lifetime dream is not restricted to her surgical and scientific activity. As head of the Laura Bassi Centre, BRIC, the surgeon's management style is very much in tune with that of the Programme: „I place a great deal of importance on the ongoing further qualification of my team members, not only medically, but also in the area of soft skills." Before taking over management of the Laura Bassi Centre, she herself had completed an MBA degree in health management. The researcher is therefore especially conscious of the importance of transparency vis-à-vis her team: „I endeavour to make it clear what I expect from each team member, which challenges we are going to be confronted with in the project and what we want to achieve. In return, I frequently receive positive feedback, since many clearly recognise for the first time the criteria that are to be fulfilled." Also accompanying this is a clearly defined career plan. For Annelie Weinberg, the Laura Bassi Programme thus represents the appropriate framework with which to establish an innovative, highly professional approach in research, for which – in her opinion – it is high time in the field of science. «

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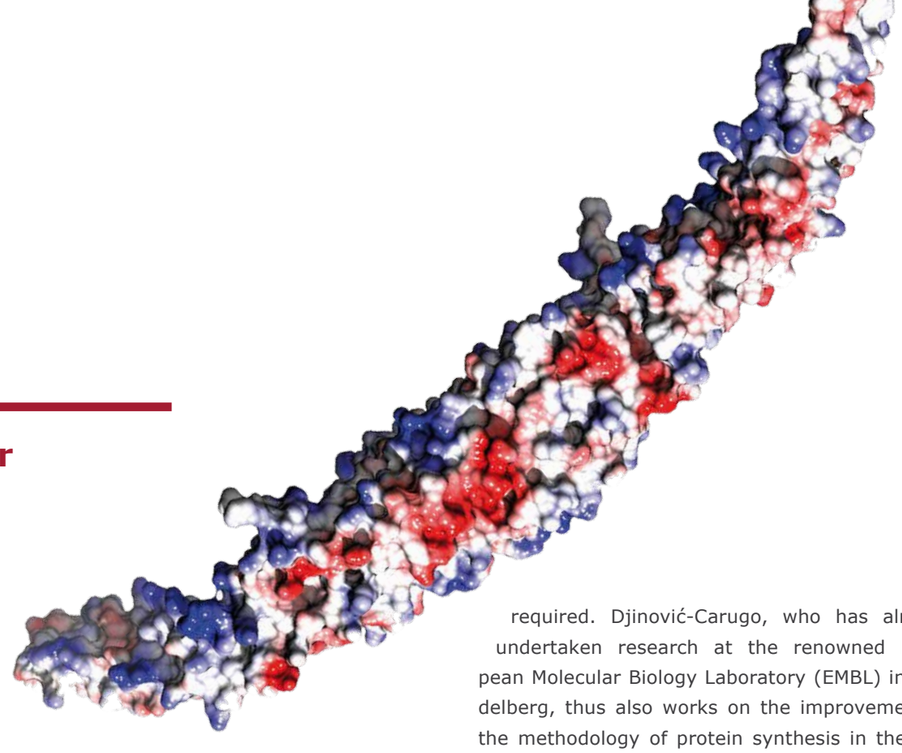
„The Laura Bassi Programme represents the appropriate framework with which to establish an innovative, highly professional approach to research. It is high time for this in the science field."

Annelie Weinberg, on the management culture in the Laura Bassi Centre BRIC

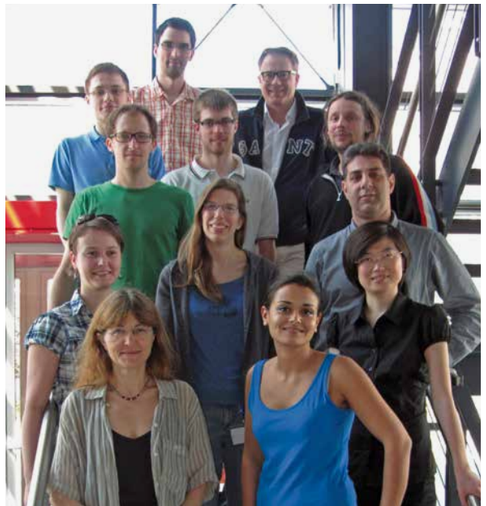
Crystal clear insights

Together with her team, University Professor Kristina Djinović-Carugo investigates the structure of proteins.



Proteins form the building blocks of life. A challenge in their research is the analysis of the structure of this material, which is too small for microscopes.

In the Laura Bassi Centre, COSS, the head of the Department for Structural and Computational Biology at the Max F. Perutz Laboratories of the University of Vienna is examining methods for the manufacture of proteins in the laboratory. To this end, together with her team, she is analysing the structure of certain proteins in order to research their function in the organism. Proteins comprise chains of amino acids, they transport materials naturally produced in the body and control important processes in the cells. Their three-dimensional structure thereby plays a decisive role. Disulfide bonds and other linkages within the proteins create wrinkles and indentations to which the molecules are able to attach. Resulting from this are biochemical reactions. The spatial structure of a protein may thus provide information about its role in biological processes. In order to investigate the impact of the structure on the functioning of proteins – particularly in connection with the development of illnesses – a methodology for the efficient analysis of the three-dimensional structure of this protein is unavoidable.



Within the framework of the Laura Bassi Input Programme, the COSS team has been able to establish an efficient platform for the production of recombinant proteins.

Long-term experiments

X-ray structure analysis is applied as an important instrument for the three-dimensional representation of protein compounds. In the process, x-rays encounter crystalline atomic lattices and are diffused in line with the atomic structure. It is thus possible to make the structure of the protein visible, atom-by-atom. Finally, it is thereby possible to present the protein three-dimensionally and to better analyse it through turning and zooming in on it. However, in order for this process to be applied, the proteins must first be transformed into their crystalline form. This process is one of the focal points of research at COSS. It is often only after years of attempts that numerous proteins allow themselves to crystallise. However, once the team surrounding Kristina Djinović-Carugo has generated crystals and determined the structure of the proteins, this knowledge can be applied to further global research. The comparatively long duration of the Laura Bassi sponsorship is therefore ideal.

Proteins from the laboratory

Countless experiments are necessary for the research on the crystallisation and 3D structures for which large amounts of pure proteins are required. Djinović-Carugo, who has already undertaken research at the renowned European Molecular Biology Laboratory (EMBL) in Heidelberg, thus also works on the improvement of the methodology of protein synthesis in the laboratory. During the initial „Laura Bassi Centre of Excellence" funding period (2010-2013), the team surrounding the COSS head was able to establish an efficient platform for the production of recombinant proteins. The proteins in question were biotechnologically produced proteins, which were generated with the aid of genetically altered organisms or cell cultures. Protein generated in this way is suitable for structural and functional biological studies. Together with her experts, the Centre head wants to expand the platform on protein synthesis in the second part of the funding period. Above all it is intended that the biotechnological production of proteins in new systems, as well as the research into the interaction between proteins, form the focal points of the further activities in this area.

Interdisciplinary orientation

The structure analysis of proteins also has powerful medical components, alongside the biological ones. The interdisciplinary approach of both the Laura Bassi Centre, as well as the Max F. Perutz Laboratories (University of Vienna & Medical University of Vienna) in their capacity as lead management for the project, provides the Slovenian-born structural biologist the ideal framework for her studies, which are also certain to bring her recognition among the international scientific community in the coming years. «

„The Laura Bassi Centres promote women, who undertake excellent research, and not women because they are women – I believe this is the correct approach."

Kristina Djinović-Carugo, on the Laura Bassi Programme

University Professor Dr. Kristina Djinović-Carugo
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Company partners

» **VALNEVA Austria GmbH** is specialised in the development of prophylactic and therapeutic vaccines against infectious diseases.

„In the ideal situation, the developed methods would make the industrial manufacture of protein-based vaccines more efficient."

Markus Hanner, group leader for expression and purification of recombinant proteins, Valneva

» **The Research Institute of Molecular Pathology (IMP)** is committed to fundamental biomolecular research.

» **BIOMIN** provides sustained and qualitatively high-end feed supplements and preblends.

» **Consortium leader:** University of Vienna

Trans-forming data into images

Associate University Professor Silvia Miksch develops computer programmes, which translate confusingly large data volumes into easily comprehensible images.

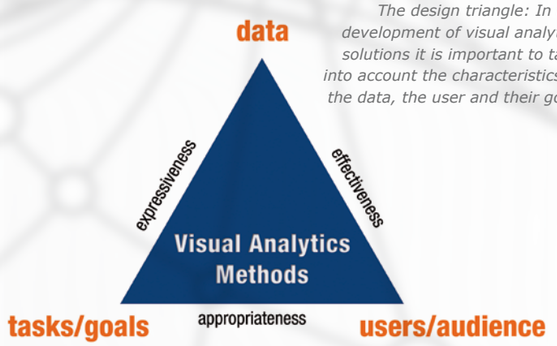
At the Vienna University of Technology, internationally renowned IT expert Silvia Miksch and her team are developing software, with the help of which complex situations can be presented in a simplified way by means of images and interactive graphics. The scientist's field of research, the so-called visual analytics, is becoming increasingly important today – especially on account of the growing data volume. It combines computer-supported methods of visualisation and analytical data evaluation with methods of perception and recognition theories. In her research, the information technology professor uses the enormous automatic processing possibilities of computer systems. From any amount of gathered data, the continually expanding computer capacity enables her to identify the aspect that is relevant for diverse problems, and to present it in a way that is easier to analyse. By translating it into visual information, which is immediately comprehensible for people, it is significantly easier for users to draw rapid conclusions from the data material to hand.

Versatility of application

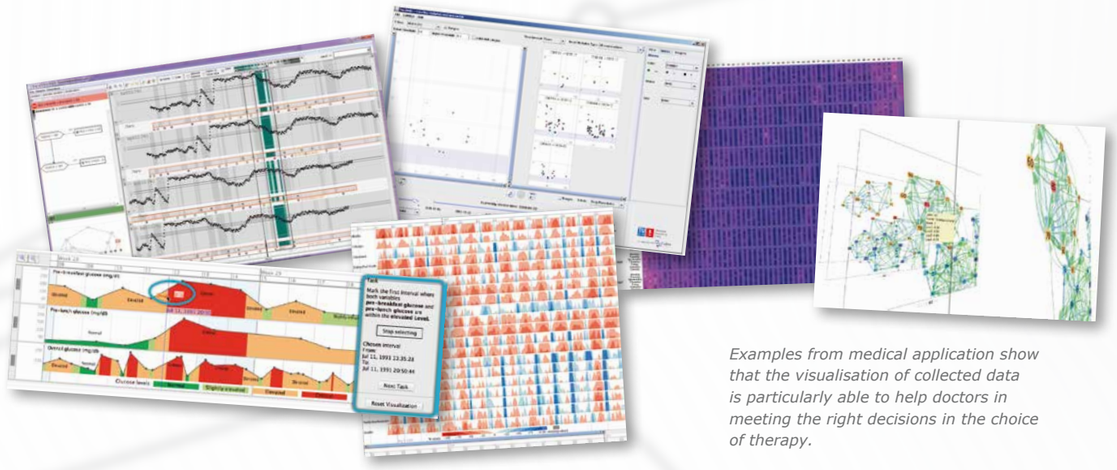
Thanks to visual analytics, the fluctuating frequency of air passengers can be presented in such a way, according to the time of day and holiday periods, so that it can be understood at a glance. Based upon this, every airport management is much more precisely able to plan personnel and maintenance schedules for the coming months. The analysis of passenger flow is just one conceivable application. By means of many further scenarios, the CVAST team also evaluates the usability and utility of visual analytics software.

„I provide support for people, who are faced with large volumes of data, to analyse these and to make decisions accordingly."

Silvia Miksch



The design triangle: In the development of visual analytics solutions it is important to take into account the characteristics of the data, the user and their goal.



Examples from medical application show that the visualisation of collected data is particularly able to help doctors in meeting the right decisions in the choice of therapy.

In touch with latest research trends

The framework for this research is provided to the head of the CVAST Centre by the Laura Bassi Programme, of which she particularly values the interdisciplinary approach: „For the first time, I am combining two modern research areas of information technology (visualisation and analysis) with cognitive sciences. Whilst there are many methods of visualisation and also numerous analytical approaches in existence, the two are interwoven all too infrequently. This openness for pan-disciplinary science is the great strength of the Laura Bassi Programme. It is very difficult to receive funding for this in the traditional funding environment, although this manner of researching is very much in trend." She sees a further advantage in the duration period of up to seven years, since it thereby makes it possible to run through the entire interactive development process of software. „The traditional funding periods amount to a mere two to three years. This period facilitates a flexible planning in the application-oriented fundamental research," explains the professor.

The longer time span also makes her employees' career development easier to plan. Regular fixed days and employee discussions are just some of the measures which are intended to contribute to team members being able to submit their dissertations in a timely and targeted manner. When asked about her own career, the professor also has a tip for young researchers: „Don't let yourself be distracted from your path, continually work on the theme and get your work published. This strategy has paid off." «

Associate University Professor Dr. Silvia Miksch
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Company partners

» **TDE Thonhauser Data Engineering GmbH** is engaged in the planning and optimisation of deep drilling for the international crude oil industry.
» **Smart Engine GmbH** provides software and consulting in the area of target marketing.
» **XIMES GmbH** provides software and consulting on the subject of working hours and personnel requirement planning.

„An added value is the longevity of the collaboration."

Dr. Johannes Gärtner, XIMES, managing director

» **Consortium leader:** Vienna University of Technology

High-tech for the body

The physicist and entrepreneur, Dr. Doris Steinmüller-Nethl, is developing diamond coating of titanium implants for skin penetration.

The company, which was founded by Doris Steinmüller-Nethl in Innsbruck, develops synthetic, thin diamond films and diamond particles in the nano-crystalline segment. In the Laura Bassi Centre, DiaLife, these extremely hard, synthetic diamond films serve for the coating of medical titanium implants. Thanks to the diamond coating, the implants become more stable and less frequently rejected by the body's own tissue. The healing process can thereby be accelerated and the likelihood of infections is reduced. This represents great progress for patients with bone defects, since the healing rate of implants in osteoporotic bones is diminishingly small. Furthermore, the team of the Frankfurt-born scientist is working on sensors, which can be integrated in the diamond coating. They are intended to measure how quickly bones heal and how quickly a biofilm forms. They facilitate a permanent monitoring of the healing process. This also gives rise to hope for new findings in this area and simultaneously minimises the number of necessary animal experiments.

In the laboratory, the bone healing process can be better researched with the aid of new sensors directly in the diamond coating.

Sustainably helping with Biomatrix

However, the greatest challenge within the context of DiaLife lies in producing larger bone parts with a good blood supply. In collaboration with the EU project „VascuBone", under the direction of Prof. Heike Walles (University of Würzburg), it is intended that the body be supplied with biomaterials, which have been modified with a non-diamond coating, populated with stem cells and furnished with a biomatrix. Doctors are thus able to provide better and, above all, sustained help following serious accidents or after operations to remove tumours.

Doris Steinmüller-Nethl and her team have already received a great deal of recognition for their research efforts. Several awards recognise the innovative potential of her company and she has already registered several patents. She is particularly excited about the project's interdisciplinary approach. In her capacity as physicist, she today works with partners from medicine, biotechnology and industry: „DiaLife is representing interdisciplinary pioneering work in the scientific field. As a result, I am personally able to expand my network and develop new medical products," she says.

„In the field of science, DiaLife represents interdisciplinary pioneering work."

Doris Steinmüller-Nethl

Professional self-determination

The researcher is also fully in tune with the spirit of the Laura Bassi Programme ideology when it concerns her young team: „Here, it is intended that training is provided for independently working scientists, who are able to enter into both research and industry," says the researcher, naming a further important aspect of her work. For why shouldn't women with outstanding training have the same opportunities for professional self-determination as everyone else, asks Doris Steinmüller-Nethl openly – expanding upon this when asked about the gender aspect of the Laura Bassi Programme: „Projects promoting women always run the risk of being reduced to the women's issue. Scientific excellence ought to be emphasised here.
Clearly improved framework conditions must be created here, in order to give parents – women as well as men – the possibility of reconciling family and career. This a political challenge, but also one for companies and universities." «

Dr. Doris Steinmüller-Nethl
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Company partners

- **Mathys AG Bettlach** manufactures innovative hip, shoulder and knee implants and develops biomaterials.
- **Otto Bock Healthcare Products GmbH** produces functional artificial limbs, leg braces and wheelchairs, as well as neural implants.
- **KOMET RHOBEST GmbH** is the technology leader in the field of nano-diamond coating.

- **Consortium leader:** Medical University of Innsbruck

„I find it brilliant that, in Austria, research funding is being distributed in accordance with application-oriented criteria."

Dr. Daniel Delfosse, development manager Mathys AG Bettlach

OCUVAC Occular Vaccines

Friendly ghosts

Associate University Professor Talin Barisani-Asenbauer is conducting research on a vaccine against trachoma, an eye disease that robs millions of people of their sight. The carriers for the vaccine are „bacterial ghosts”.

More than 500 million people worldwide live with the risk of falling victim to trachoma. This chronic ophthalmitis is triggered by the bacteria chlamydia trachomatis, is highly infectious and can only be treated with antibiotics to a limited degree. Those affected are primarily people in Africa, Southeast Asia, the Middle East and Central Australia. In these regions it is particularly women, who are continually infected with the virus via their children, and their risk to become blind rises dramatically. For Talin Barisani-Asenbauer, who has been committed to ethical principles in research since completing her training, becoming actively involved as a medical scientist holds a special importance: „The people of the southern hemisphere also have a right to health,” she stresses.

Continual further education

The staunch women’s networker has put a competent team together for the Laura Bassi Centre, OCUVAC. In order to achieve optimum results, she has been promoting her employees since the start of the project by means of a regular mentoring programme, further education and team-building measures. Together, her team is now working intensely on the development of a vaccine against trachoma. The special thing about this: It is intended that it will be administered in the form of eye drops. This idea by Barisani-Asenbauer was initially dismissed as utopian by more than a few of her colleagues – however, just recently it has been possible to provide evidence that the surface of the eye is suited for vaccination. So-called bacterial ghosts are employed as a carrier of the vaccine: These are empty bacterial cell envelopes, which are produced when a controlled hole is created in the wall of gram-negative bacteria and the content of the cell escapes. It is a process that has been developed by the Austrian biotechnology company BIRD-C. The intact bacteria envelope can be filled with vaccines or medicines. Barisani-Asenbauer’s supposition, that E. coli Nissle bacteria are especially suited as a carrier for vaccines across the surface of the eye, has already been proven in tests.

A vaccine for global use

In a next phase, the search is now starting for antigens, which enable the development of a vaccine that can be used globally. Both the pathogen and the infected people display regional genetic differences. 1800 tissue samples from people from affected areas have been collected for this purpose. In the next two years the focus of the work will be placed on testing the suitability of the identified antigen as a vaccine. From 2015, the first clinical tests can then be carried out on people. «

The OCUVAC employees are currently searching for antigens in order to be able to develop a vaccine for global use.

Images © Medical University of Vienna; private

„By means of the Laura Bassi Centre, we are positioning ourselves on what is quite unfamiliar territory in Austria: collaborative research between medicine and industry.“

Talin Barisani-Asenbauer

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Company partners

» **BIRD-C GmbH** has specialised in a new class of vaccines.

» **CROMA-PHARMA GmbH** manufactures pharmaceutical product specialities and surgical products. Through the development of innovative products in the area of ophthalmology, osteoarthritis and aesthetic dermatology it is making a contribution to the improvement of general health

» **Consortium leader:** Medical University of Vienna

„At CROMA we are committed to the development and marketing of innovative products, which increase patient wellbeing and are safe, effective and simple to use. Our goal is to set new standards wherever possible.“

M. Prinz, CROMA PHARMA

Healing with tobacco

From tobacco plants, Associate University Professor Herta Steinkellner obtains protein for the manufacture of biopharmaceuticals.

The demand is constantly growing and cannot be covered by the current production capacity: Biopharmaceuticals, considered to be one of the largest emerging markets, are now indispensible in many areas of medicine, such as in the treatment of cancer, muscular sclerosis or metabolic disorders. However, biotechnologically manufactured medicines are complex to produce and therewith expensive.Within the framework of the Laura Bassi Programme, Herta Steinkellner has been breaking new ground in the production of biopharmaceuticals since the establishment of the PlantBioP Centre. With a production process based upon tobacco plants, it is intended that medicines will be less expensive, on the one hand, and therapeutically more effective, on the other. „The leaves of these genetically modified plants are infiltrated with constructs, which contain human genes," says Steinkellner, explaining the complex process. The leaves are harvested after ten days and the resulting proteins yielded, from which the medicines can be produced.

Motivational working atmosphere

The Laura Bassi Centre for plant-generated biopharmaceuticals, which is based at the University for Natural Resources and Life Sciences in Vienna, doesn't just meet the criteria for scientific excellence of the impulse programme. The management qualities and promotion of her team are also self-evident for the researcher: „All of the employees in my team have further qualified; laboratory technicians have become academics, scientific employees have become professors." In her research group, she also encourages colleagues to push themselves forward in male domains of expertise. For, on account of male-dominated hierarchies, the path for women in research is often linked with obstacles, says the PlantBioP manager. It is therefore all the more important to always point out one's own achievements. «

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„Even if I have already experienced the new management culture, the Programme is an incentive to pay even more attention to it."

Herta Steinkellner, on the management qualities demanded by the Laura Bassi Programme

Further qualification is obligatory in Herta Steinkellner's team.

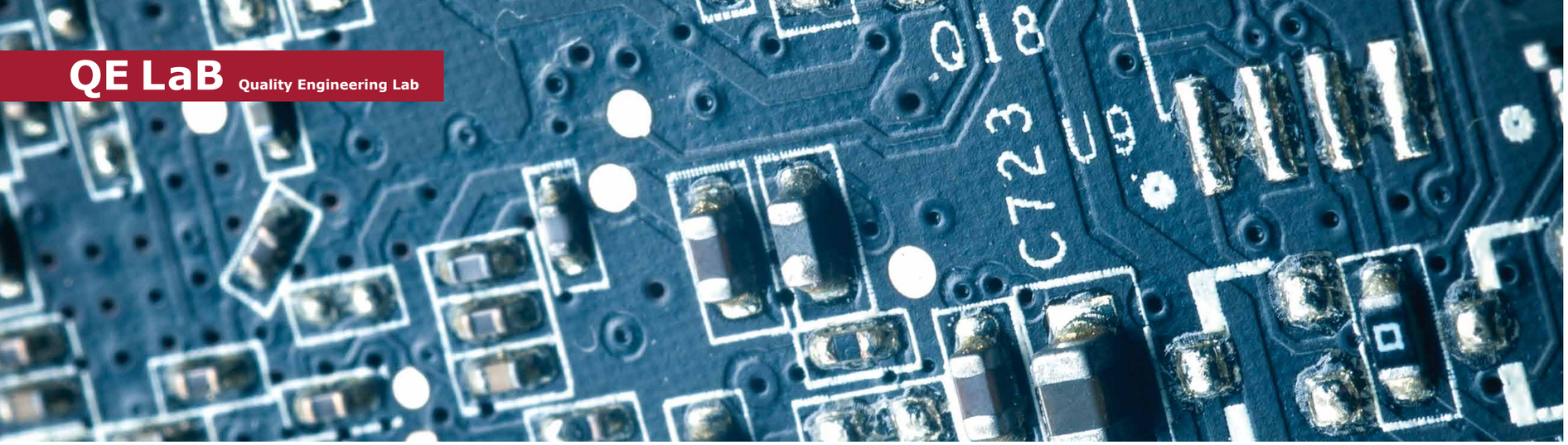
Company partner

» **Icon Genetics GmbH** is developing new biopharmaceuticals and high-quality protein products with the aid of foliage plants.

» **Consortium leader:**
University for Natural Resources and Life Sciences, Vienna

„A very efficient, pragmatic approach for transferring the scientific excellence of our academic partners directly to the practice – to the benefit of all three parties involved: science, industry and society."

Victor Klimyuk, PhD, COO Icon Genetics GmbH

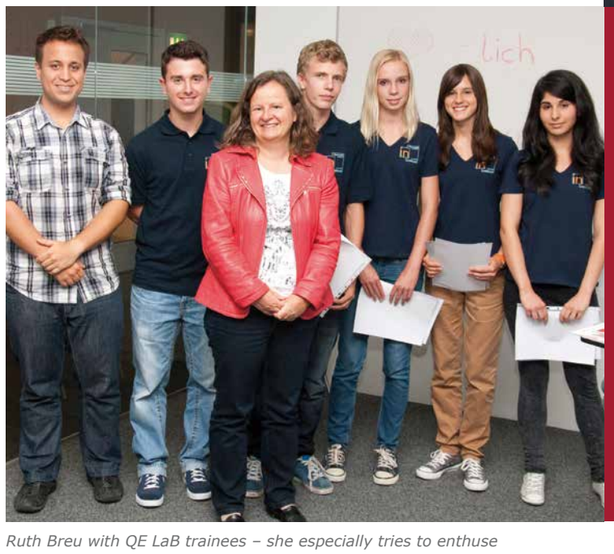


When cars talk

University Professor Ruth Breu is revolutionising the quality management of collaborative IT systems with the concept of „living models”.

New IT technologies enable any integration of information and open up unimagined possibilities of data exchange. Thus, the future could see cars communicating with one another in order to avoid traffic jams, or doctors could cooperate concerning the exchange of data for the good of patients. However, the quality requirements on these collaborative systems are enormous – especially with regards to their reliability and security. Ruth Breu has already spent the past two decades dealing with the improvement of quality in software development. Since 2009, the international pioneer in this sector has been managing the Laura Bassi Centre of Excellence, Quality Engineering Lab (QE LaB). Playing a special role in her work are model-based techniques, which enable an analysis of systems and business processes and represent the fundamental conceptual framework for the software development.

By means of the „living models” concept, Breu has developed a completely new paradigm for the model-based management, development and operation of changing systems. Living model environments not only enable a complete picture of a system’s quality status, but also to continually update this and to support the collaboration of all parties in such a way that the required level of quality can be achieved.



Ruth Breu with QE LaB trainees – she especially tries to enthuse young women for the subject Information Technology.

Images © University of Innsbruck; colourbox; private

„Through the participation on management skills workshops, I today manage my research team with much greater awareness.“

Ruth Breu on her participation in the Laura Bassi Programme

Women to the forefront

At 30 %, the share of women in the research team of the QE LaB head is barely higher than the average, since only 10 % of those studying computer sciences in Austria are women. Increasing this share is something that concerns Breu: „I want to change people’s minds about the image of lonely, junk food-eating computer experts, and to motivate women to get involved in shaping the future of this exciting subject. I encourage my employees to put aside the supposedly female virtue of modesty for once and to step to the forefront.” In addition, she makes available her excellent contacts to industry partners within the science community and therewith supports dual careers. This close link between theory and practice results from her personal background. Alongside her university career, the researcher has also worked successfully as a freelance consultant for renowned companies in the software field. A lively, interdisciplinary exchange continues to be important to her. The same also applies to the collaboration with companies. In the last five years, she has carried out more than 20 third-party projects and approx. 200 seminar paper in cooperation with companies. «

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Company partners

» **Infineon Technologies AG** counts among the world’s leading providers for semiconductor products in the automobile and industrial electronics markets, as well as chip cards.

» **ITH icoserve GmbH** is an internationally operating, comprehensive provider of innovative software solutions for health care.

» **Further partners:** Swiss Life AG, arctis Softwaretechnologie GmbH; QE LaB Business Services GmbH; IT SEC GmbH

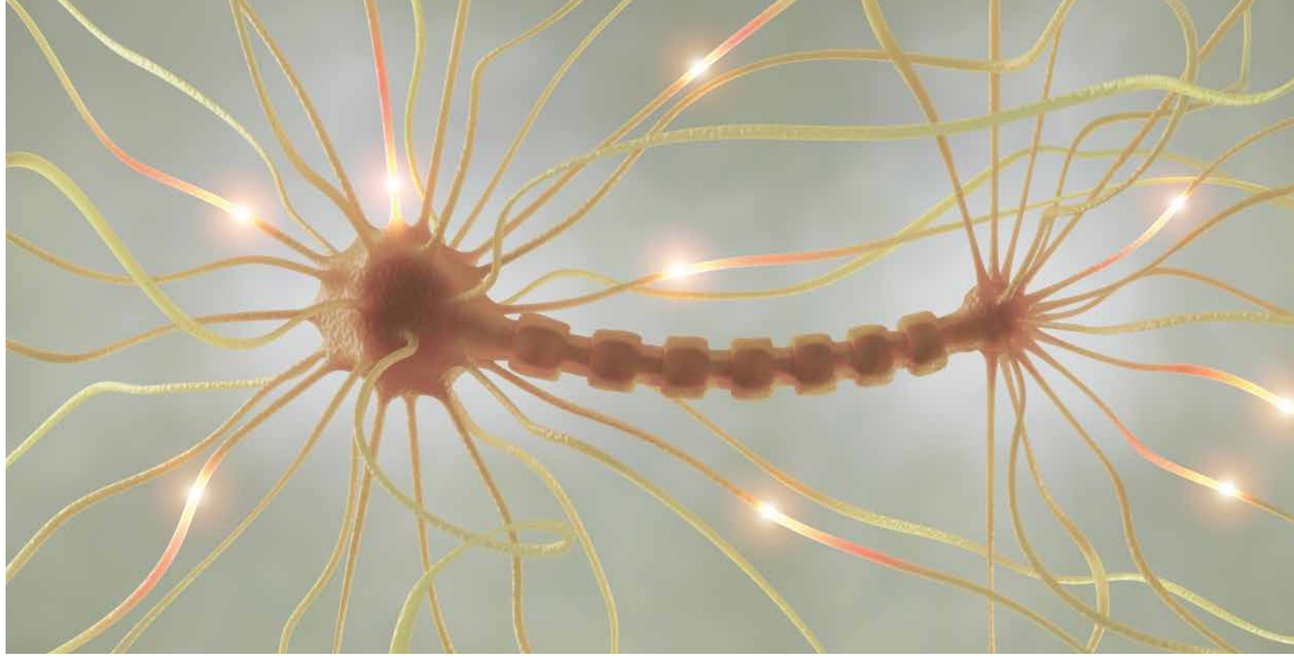
» **Consortium leader:** University of Innsbruck

„The output of the research collaboration supplies us with important basic information. Research results of the highest level rapidly find their way to successful software production on the market.“

Dr. Thomas Schabetsberger, ITH icoserve technology for healthcare GmbH, company partner

Small messengers, a big future

University Professor Barbara Kofler is working on the development of a mild alternative to cortisone.



Irrespective of whether we are hungry, sad, in love or stressed – our brain regulates these feelings by means of neuropeptides. These are protein hormones, which control the biochemical emotional balance, but also metabolic processes and bodily functions. One of these minute hormones has been discovered by Barbara Kofler. She named it Alarin and assigned it to the family of the so-called galanin-neuropeptides, which she is researching in the Laura Bassi Centre, THERAPEP. She has already been able to successfully prove that three galanin peptides (galanin, GALP, Alarin) have a powerful anti-inflammatory effect on the skin and that one (GMAP) can be successfully employed against fungal infections. Furthermore, it has been demonstrated that a relatively high concentration of GMAP is to be found in human sweat and belongs to the body's immune defence. Together with her interdisciplinary team, the neuropeptide expert is currently researching into the functioning of their mode of actions.

„If we understand exactly how the galanin petides work, we will then also be able to use them for therapeutic purposes," explains the scientist. The goal is the development of a mild alternative to cortisone. Particularly for those people who suffer from chronic inflammatory conditions, such as asthma, or whose immune system has been severely weakened through a chemotherapy treatment, medicines with entirely new active ingredients could represent an important, perhaps even pivotal change. Since neuropeptides work in an entirely different way to antibiotics, the research being carried out by THERAPEP also holds new chances in the battle against therapy-resistant microbes – a health problem that is on the increase worldwide.

A stable working environment

However, the path to the development of a new medicine is long. This is accommodated by the long duration of the Laura Bassi Programme: „In this way, a stable working environment has been created that also enables me to promote people in their development," says the professor and Centre head. In the process, she passes on the experiences that she has gathered during her two-year research period at the Department for Neurobiology at the Garvan Institute of Medical Research in Sydney, Australia. „I wish to communicate management skills, which cannot be learnt through scientific study." Clear structures, flat hierarchies and the frequent, open exchange within the team create an environment in which excellent research of the highest level is possible. «

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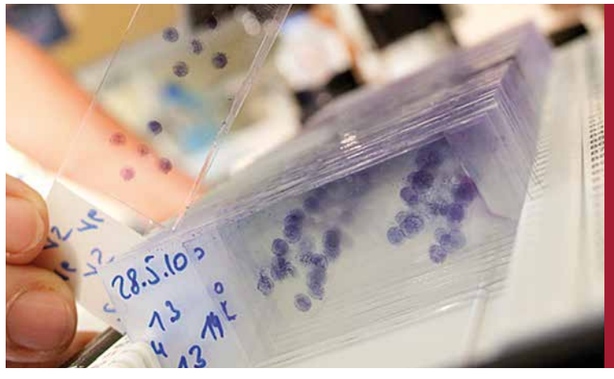
„We need role models, who demonstrate that women are undertaking excellent research."

Barbara Kofler, on the subject of the Laura Bassi Programme



Histologic colouring of immune cells

Company partner

» **ProComCure Biotech** is a biopharmaceutical company from Krems an der Donau, which focuses its activities on the research of protein-protein interactions.

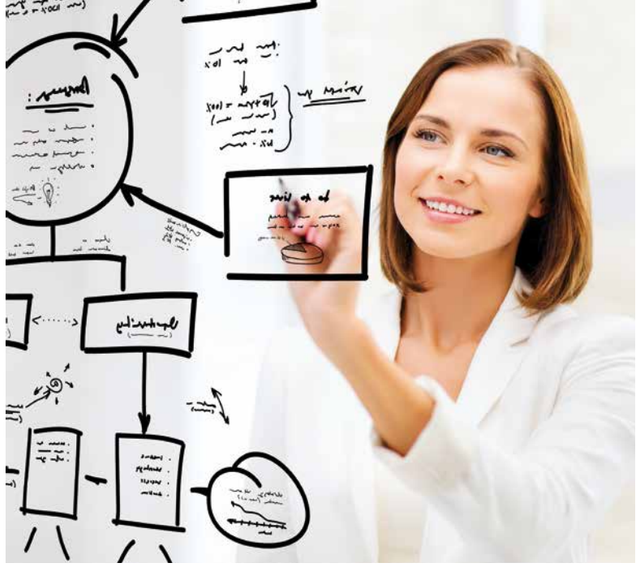
» **Consortium leader:** Gemeinnützige Salzburger Landeskliniken Betriebsges.m.b.H.

„Thanks to the Laura Bassi Programme, ProComCure Biotech is able to apply and improve its technology platform in the area of therapeutic neuropeptide development."

Private lecturer Dr. Kamil Önder, ProComCure Biotech

A learning initiative

The Austrian Institute of SME Research accompanies the Laura Bassi Programme with regular evaluations. Their results help to continuously develop the initiative's approach.



The accompanying evaluation of the Laura Bassi Programme is a strategic monitoring with a strong focus on the opportunities for learning and further development. Until the end of 2014, annual progress reports based upon activity evaluation are being compiled, the first results collected and recommendations on programme management and development given.

Analysis of the selection process

In 2010, the first year of the accompanying evaluation, the thematic focus lay on the analysis of the section process and the evaluation criteria. In addition, the perception of the Programme in the research policy community was picked out as a central theme. Those responsible for the Programme in the relevant ministry (BMWFJ), the Programme management (FFG), the jury members, those parties involved in the conception of the Programme, as well as two managers of „Laura Bassi Centres of Expertise" were also questioned in qualitative interviews. The key essence of the replies: The scientific quality of the research is „conditio sine qua non" of the Programme. It is viewed by those involved in the project as a condition for the Programme's acceptance and perception and represents a meaningful „entrance barrier" for the two-phase selection process.

Unique Programme

The „special" thing about the Programme was at the centre of the analysis in 2011. In qualitative interviews, the eight Centre heads reported on the learning effects that were sparked in them through the Programme and selection process. Above all, they felt that occupying themselves with questions of management and personnel development within the context of the call for proposals had triggered the learning process. It was particularly in the initial phase of the Centres that the heads found this very helpful, since they were already able to further work on the prepared career models, indicators and project management tools. Furthermore, several heads also stated that, in the subsequent application process, they have successfully employed the presentation of management and personnel development concepts required in the selection process. Alongside the evaluation of the learning effects, the first activities in the area of „knowledge transfer" were set. In June 2011, the results of the selection process were presented for the first time to an expanded group of stakeholders from FFG, BMVIT and BMWFJ. Based upon this, the participants discussed the transferability of elements from the selection process to other FTI programmes. Above all, the project design's commitment to gender equity and the focus on management skills met with a positive reaction.

Quantitative online survey

In the third year of evaluation, the evaluation team examined the functionality and perception of the „Laura Bassi Centres of Expertise". To this end, heads and employees of the „Laura Bassi Centres of Expertise" were surveyed online, as well as opinions gathered from stakeholders and online players in the FTI funding. The results of the quantitative online survey substantiate the positive effects of the impulse programme. They are not just noticeable in the increase of expertise in specialist knowledge and methodological skills, but especially in the area of the creation of communication processes, team-building, project management, the ability to cooperate and the forming of relationships with partners from different working cultures. More than half of those surveyed stated that they have gained additional expertise in the points named. Furthermore, new career opportunities have resulted for three quarters of them. For example, 60 % of those surveyed can now imagine working in industry, 50 % are striving for a scientific career in the university system. Although the university sector was cited as preferred workplace following employment at a Laura Bassi Centre, it was primarily the Centre employees that could also imagine working in another research institute or in industry. Some 70 % of the employees and 90 % of the heads see a future activity in the collaborative research area, although almost half were previously active in fundamental research.

A reference for the FTI programme

The selected results document the importance of evaluation as an instrument for the Laura Bassi Centres. Alongside this, they can also be an important point of reference for the research policy community in the implementation of current and future FTI programmes, especially in terms of equal opportunities in the design of selection and award procedures. «

Progress reports on the accompanying evaluation are available for downloading on the w-fFORTE website:
www.w-fforte.at > scientific findings > Impulses from the Laura Bassi Programme

Management skills workshops

Alongside excellent science, the Laura Bassi Programme puts the focus on excellent research management. In four accompanying workshops, the understanding of the importance of management and career expertise is intensified. The Centre heads develop solutions by means of concrete examples from daily working life. The entire know-how acquired is supported in workshops by means of the academic input of both national and international external experts. The workshops are embedded in a network meeting, within the framework of which the heads are given the opportunity to compare notes on their experiences, challenges and successes.

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