

CUTEC-News

CUTEC CELEBRATES 20TH ANNIVERSARY
- ENERGY PARK NOW IN ITS 10TH YEAR

CAUTION, FRESH OFF THE PRESS!



I am not sure that the ink has even had time to dry on this issue of CUTEC News which you are now holding in your hands. We had to really hurry to meet the publication deadline. Why? Because this year, we are celebrating CUTEC's 20th anniversary, and there is also another birthday marked on the calendar. Clausthal Energy Park, which we operate in partnership with TU Clausthal and the local utility company, turned 10 in February. A symposium will be held in just a few days (September 23rd) at CUTEC to celebrate this event. The topic of discussion will be - you guessed it - the 10-year anniversary of Clausthal Energy Park. You are cordially invited to be our guest. Read on to find out more about the upcoming festivities. Just two days later, we invite you to attend Open Day at the Energy Park to mark "Energy Day". 2010 has been declared the "Year of Science" by the German Ministry of Education and Research. We look forward to welcoming you again on September 25th, when you will have the opportunity to hear first hand from the experts how a sophisticated mix of renewable energy sources can provide

enough electricity to meet the needs of the CUTEC building without any reliance on the local grid.

The scientific research articles in this issue focus on physical-biological process technology. We share research information with you about the production of bi-methane from energy beets, efficiency enhancements based on biomass recycling using membrane technology, and methodologies for breaking down digestate. Turn to pages 3, 4 and 6 to read these reports. A project for deploying neuronal networks as control systems at waste incineration facilities addresses a different field of research, but it is equally fascinating. The in-depth report appears on page 5.

I hope that you enjoy reading the latest edition of CUTEC News, and I look forward to welcoming you at the upcoming events in Clausthal.

Yours sincerely, Otto Carlowitz

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SYMPOSIUM TO CELEBRATE THE 10TH ANNIVERSARY OF CLAUSTHAL ENERGY PARK

As was announced on a number of occasions, a half-day symposium has taken place to mark the 10th anniversary of the Energy Park project. The event got underway on the 23rd of September at 2 P.M. with a few words of welcome and an introductory talk by German MP Hans-Josef Fell who spoke about 10 years of renewable energy in Germany. As a member of the Bündnis 90/Die Grünen

parliamentary party, Mr. Fell played a major role in drafting the text for the Renewable Energy Act (EEG) in 2000. Following the coffee break, the project partners presented a review of the Clausthal Energy Park project, and information was provided on other follow-on projects at CUTEC and on our collaborative activities with TU

Continued on page 2

CUTEC ACCOMPANIES NEW LOWER SAXONY MINISTER PRESIDENT DAVID MCALLISTER ON TRIP TO CHINA

CUTEC was scheduled to be part of a delegation which was to accompany Minister President Christian Wulff on a visit to China. Wulff had personally invited Dr. Onyeche to make the trip to China on July 2nd – 11th, 2010. However two days prior to departure, it was unclear whether the Minister President would be travelling to China as planned. When Christian Wulff was elected as the new German President on June 30th, 2010 and resigned as Minister President of Lower Saxony, there was no longer any doubt that he would not be making the trip. In the event, the 90-person delegation from Lower Saxony left for China on July 2nd under the direction of Deputy Minister President Jörg Bode.

Then, on July 5th, Wulff's successor David McAllister, who had only been in office for four days, took charge of the delegation.

Astrid Grotelüschen, who was recently appointed as Minister of Food, Agriculture, Consumer Protection and Development, also accompanied the delegation to China. This gave CUTEC the opportunity to make three new contacts. The new Minister President welcomed the opportunity to meet Dr. Onyeche in person, as he had visited Clausthal four years ago and was familiar with CUTEC. He gave the assurance that he would follow in the footsteps of his predecessor and continue the collaborative relationship on environmental issues during delegation visits. On July 7th, McAllister asked Dr. Onyeche to accompany him to one of the events on his political itinerary. The meeting with Mrs. Yongchen Wang from Green Earth Volunteers and the German Ambassador in China, Dr. Michael Schaefer, took place in the Ambassador's residence in Beijing. Mrs. Wang outlined the range of environmental problems in China and had an in-depth discussion with Dr. Onyeche. She expressed genuine interest in a partnership with CUTEC for her region.

The itinerary included stops in Hefei, Nanjing, Beijing, Jinan, Qingdao and Shanghai. A symposium organized by the Lower Saxony Aviation Initiative, an agrotechnology symposium (biogas was one of the topics of discussion) and a partnering session for agricultural firms were all on the agenda.



Dr. Theodore Onyeche (left) with Lower Saxony Minister President David McAllister

At the conclusion of the visit to EXPO 2010 in Shanghai, the delegation went to the German Pavilion at the end of Lower Saxo-

ny week and also attended an event in the Lower Saxony-Anhui Innovation Pavilion. The itinerary also included a visit to a production plant, a Chamber of Commerce Training Centre in Taicang, the University of Nanjing and Sichuan University.

In Dr. Onyeche's view, the trip to China had a number of benefits including the opportunity to make contact with high-ranking members of the delegation and Chinese politicians who expressed an intense interest in a cooperation agreement on waste

management, sewage treatment, soil restoration and environmental training.

(on/sz)

Continuation from page 1 SYMPOSIUM TO CELEBRATE THE 10TH ANNIVERSARY OF CLAUSTHAL ENERGY PARK



The Clausthal Energy Park building

Clausthal. The spokesperson for the Lower Saxony Energy Research Association (FEN), Prof. Kurrat, and a representative from E.ON Avacon also addressed the audience. The concluding talk in the lecture theatre at CUTEC outlined the future potential of renewable energy and implications for the future. The well known Prof. Jischa from the TU Clausthal had been invited. The visitors then had the opportu-

nity to tour the Energy Park where they were able to ask questions at some of the stations and see the equipment first hand. The proceedings came to an end over a light snack and a glass of champagne. Some of the lectures are available for download under www.cutec.de. In addition, there was an open house at the Energy Park on Saturday, the 25th with many visitors from the general public.

(sie)

PRODUCTION OF METHANE FROM ENERGY BEETS

New FNR grant project



Sugar beet harvest

More than 4,500 biogas plants with a total output of roughly 2,000 MW are currently in operation in Germany along with around 40 plants which upgrade biogas and feed it into the gas distribution network. Germany is playing a pioneering role in biogas production. However overall efficiency is currently only in the 20 % - 40 % range, which is unsatisfactory. (Note: overall efficiency is defined here as the amount of externally useable energy compared to the energy which is chemically bound in the substrate.)

There are many ways of improving the efficiency of biogas plants. In this issue of CUTEC News, in addition to the approach outlined in the following article, we will also tell you a bit about two other projects (the Membrane Project for biogas plants, page 4, and the Thermal-Enzymatic Hydrolysis Project, page 6).

The common thread which all of these approaches share is the goal of achieving the following improvements: an increased level of putrescibility and improved reaction kinetics during the digestion process; a reduction in energy consumption (electricity and heat); maximum extraction of energy from methane either with CHP technology or by using methane as a fuel. Expanded use of biomethane depends on

the availability of upgrading technology, and in most cases the gas has to be fed into the distribution network, because the location of the biomethane plants generally precludes full, sustained use of the heat energy.

The suggested approach to improving the efficiency of biogas plants described below is based on the use of optimised substrates which primarily contain readily degradable substances. An FNR grant project will investigate this approach using energy beets as an example. Of all of the substrates, energy beets appear to be the best option in terms of putrescibility and decomposition rate, because up to 90 % of the organic mass consists of quickly fermentable sugar. A number of studies have shown that volumetric loading rates in excess of 10 kg ODR/m³d* are feasible. This means that the size of conventional fermenters used in practical application could be reduced by more than 50 %. Putrescibility levels in excess of 90 % are realistic, reducing the cost and effort involved in digestate treatment and recycling. From the agricultural perspective, beets are a useful supplement to energy maize, and they can help reduce competition in the use of arable land for biogas production and food/animal feed production.

We are part of an interdisciplinary breeding, research and systems engineering consortium which also includes KWS AG, INPUT GmbH, Sehnde and Deutsches Biomasseforschungszentrum gGmbH. These organisations have joined forces to investigate whether competitive,

unsubsidised biogas production is feasible in Germany if the optimisation potential is fully exploited.

The consortium will need to determine what development work on plant breeding, fermentation and biogas upgrading technology will be needed to place biogas production on a competitive footing over the long term. Engineering and business models will be used to develop breeding, engineering and economic benchmarks. As new breeding goals are defined in an iterative process, the benchmarks will be used to define the biogas production costs which are expected to be achievable in the future.

The CUTEC subprojects will involve experimental decomposition trials with different genotypes from current breeding programmes. The experimental investigations will include batch and continuous trials. In the latter case, the trials will be scaled up to pilot scale with a fermenter volume of 1 m³. During the course of the experiments, models will be developed to describe the microbiological decomposition processes. Particular attention will be paid to the dynamic characteristics of continuous processing, because this could provide access to optimisation potential which has not been exploited up to this point. (si)



Biogas plant developed by INPUT GmbH

* kilograms of organic dry residue

IMPRESSUM

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OUR CONGRATULATIONS: PROF. CARLOWITZ AWARDED THE VDI BADGE OF MERIT



Prof. Carlowitz with the Badge of Merit

The Clean Air Commission (Kommission Reinhaltung der Luft) presented the VDI Badge of Merit to Prof. Carlowitz at the “Emissions Reduction 2010 – current status – concepts – advances” conference which was held on June 8th – 9th, 2010 in Nürnberg. The award was presented in recognition of his long years of active, voluntary membership in various air quality committees at VDI and DIN, and for his special contribution to the preservation of air quality. We extend our sincere congratulations to our Managing Director for this award.

To give you a bit of the background, VDI (Association of German Engineers) was

founded back in 1856. The association currently has 139,000 members, and it is Europe’s largest engineering/scientific association. The head office is in Düsseldorf.

The Bronze Badge of Merit has been awarded by VDI since 1948 in recognition of the contribution made by voluntary members. The image of a torch bearer appears on the front side surrounded by the inscription “Working for the common good”. The VDI gearwheel and the inscription “In recognition of a special contribution to engineering and VDI” are on the back. Prof. Carlowitz also received a needle with miniature badge on a blue ribbon. (he)

MEMBRANE TECHNOLOGY FOR BIOGAS FERMENTERS

A project to investigate ways of increasing the efficiency of biogas plants has been launched in partnership with DMS within the framework of the ZIM (SME Innovation) programme. The researchers hope to increase biogas production by concentrating the microorganisms and substrate in the fermenter. The plan is to use CR (cross rotation) filter technology to increase the concentrations. However there is still work to be done on this technology. In particular, it needs to be adapted for use in biogas plants.

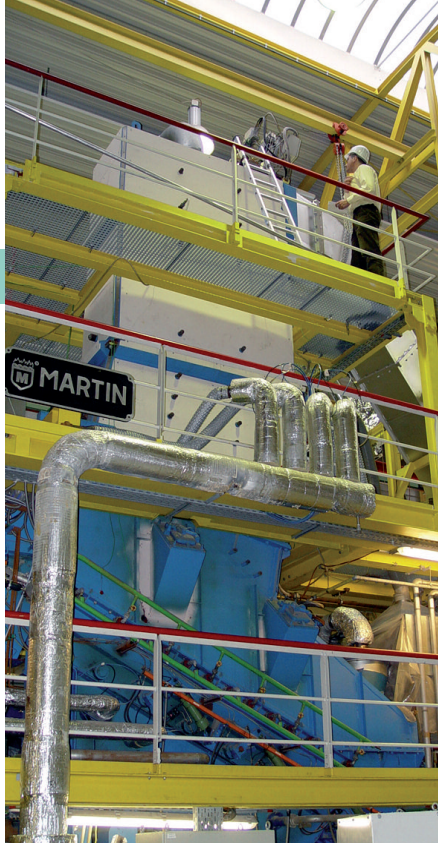
The combination of bioreactor and membrane technology is already a familiar concept in sewage treatment and sludge digestion applications, and the associated performance enhancement is also well known. However, there are significant obstacles to deployment of this technology in biogas plants. There is a high risk of fouling, and the fibre in the reactor is likely to cause blockages. The CR filter is an ultra-filtration membrane system which is somewhat more energy intensive than for example the submersed membrane technique, but it is significantly less susceptible to fouling and it can be used with very high viscosity suspensions. The researchers hope to exploit these properties during the project.



DMS CR filtration system

DMS has responsibility for development of the filtration technology. Process development and optimisation of the operating parameters will take place at CUTEC. Lab and pilot scale systems with continuous charging will be built and/or existing systems will be modified. Trials will be run over a period of several months on dual-line

systems, furnishing reliable long-term data and providing a basis for direct comparison between conventional and intensive digestion. Based on a detailed analysis of the operating conditions including an evaluation of the energy yield, filter material consumption and process efficiency, DMS will be able to assess the market potential. (si)



Reverse-action pilot system at CUTECE

NEURONAL NETWORKS IN WASTE INCINERATION APPLICATIONS

possibly with the support of fuzzy logic systems, are used.

Artificial neuronal networks may be the solution, because their real strength lies in their ability to handle imprecise or incomplete data. The networks ascertain the process behaviour based on a large set of existing operating data and generate an implicit system model, providing the basis for model predictive control. If you know what is about to happen, you can react quickly to deviations from the desired operating state. The result is more uniform and efficient combustion

and improved compliance with emission control regulations.

The system which the project team is working on will be used for three types of pilot-scale and industrial-scale grates (roller, reverse-acting and forward-acting), and the team will assess the quality of the predictions and the resilience of the system. Waste-to-energy plant supplier MARTIN GmbH along with GMVA Oberhausen and MVV Mannheim have already expressed an interest and have indicated their willingness to collaborate. (bi)

Building on the results of the AiF-funded Innovative Grate Combustion Control Systems research project, the Modelling and Simulation Department under the direction of Dr. Matthias Reuter has acquired a two-year DFG (German Research Foundation) project which got underway on July 1st, 2010. The project has an interdepartmental dimension, as the Thermal Process Technology Department under the direction of Dr. Stefan Vodegel is also involved in the project.

The goal of the project is to create a neuronal network based model of the combustion process, providing a tool for predicting the process characteristics of different grate combustion systems. Exact mathematical models for predicting future operating states are still not available, at least not at the desired quality level. The processes involved in combustion are highly complex, and the time dependency between operating and control parameters varies over a wide range. One major problem which makes it difficult to create an explicit mathematical-physical model is the varying characteristics of the waste (composition, moisture, calorific value) which normally cannot be determined in advance and remain unknown.

As a result, model predictive control is either not feasible or only to a limited extent, and conventional PID regulators,

DETECTINO PROJECT: LAND OF IDEAS AWARD CEREMONY



Award ceremony in Hildesheim

On May 25th, 2010, an award ceremony was held for Detectino, a system which is used to detect underground utility lines and enter the data into mapping systems.

In his address at the ceremony, the Lord Mayor of Hildesheim, Kurt Machens, expressed his satisfaction at giving recognition to another award winner from the city: "Hildesheim is a city of ideas. It gives me immense pleasure to see that we have been able to maintain the continuity of our

success story. Every year since the competition began back in 2006, we have submitted a successful entry to the "365 Localities in the Land of Ideas" competition.

Following the mayor's address, the Detectino rover was presented live on Hildesheim's historic square in the presence of Minister of State Eckart von Klaeden and Lower Saxony Finance Minister Hartmut Möllring. Eckart von Klaeden made the following comment: "Innovative products like this boost Germany's competitiveness."

Several individuals from Detectino GmbH attended the event, and CUTECE was also represented. Prof. Otto Carlowitz, the development team from the Modelling and Simulation Department under the direction of Prof. Matthias Reuter, and Project Manager Dr. Torsten Zeller were all on hand.

Andreas Herbst, Deutsche Bank; Stefan Viezens, Managing Director of Detectino GmbH; Dirk Bettels, Workers Council Chairman at Detectino GmbH; Hartmut Möllring, Member of the State Assembly; Prof. Rolf Warmbold, President of the Lower Saxony/Bremen Builders Association; MP Eckhart von Klaeden; Kurt Machens and Wolfgang Staudinger, Managing Director Detectino GmbH are shown in the photo of the award ceremony. (reu)

THERMAL-ENZYMATIC HYDROLYSIS BOOSTS PRODUCTIVITY AT BIOGAS PLANTS

Under the umbrella of the ZIM project, we will be developing a process for improving the productivity of biogas plants in partnership with INPUT Ingenieure GmbH. The efficiency gains will be achieved by breaking down the digestate which will be returned to the anaerobic digestion process. Initially on a laboratory scale, the team will develop a thermal-enzymatic method for breaking down dewatered digestate, which consists mainly of ligno-

cellulose, and convert it to a bioavailable substrate. Because the material has already gone through biological digestion and the matrix has already decomposed, enzymatic hydrolysis is expected to be significantly more efficient and thermal conditions should be more moderate compared to substrate pre-treatment. Preliminary trials will be run to select suitable enzyme systems and optimise throughput performance. A very effective

high-throughput screening process will be developed at CUTEC to assess the reaction kinetics of various enzymes and enzyme mixtures. The illustration below shows our programmable pipetting robot, which can handle 100 – 400 micro reactors in parallel, together with our microtitration plate instrumentation systems. Automatic parameterization (dilution series, enzyme composition and concentration) along with automated filtration and photo-optic monitoring of the reaction sequence in all reactors will enable the researchers to identify the optimal enzyme systems. Based on the results, a continuous-mode pilot system will go into operation to model the entire process including digestate hydrolysis and incremental gas production. The operating parameters will be initially optimised at the laboratory scale. The team will then determine suitable pilot-scale operating parameters. Based on the results of the pilot trials, the researchers will assess the expected increase in productivity and the overall efficiency of the biogas plant in relation to the substrate and disposal costs. If the results are encouraging, the plan is to design a demonstration system for a selected biogas plant. (si)



Pipetting robot (left) with the associated instrumentation (right)

INTERNATIONAL CONTACTS

Waste to Energy workshop Training provided to a Nigerian delegation

The Nigerian-German Business Association arranged a visit to the Waste to Energy show in Bremen, and in that context a seminar and workshop were held at CUTEC on May 7th - 8th, 2010. 28 individuals from Nigeria and one person from South Africa made the trip to Germany to learn more about the latest advances in the field of environmental technology, waste management and the production of alternative energy from biomass. The workshop included a tour around the CUTEC Institute and talks on waste management, the regulatory framework in Germany and especially the generation of energy from biomass and sludge gasification. A visit to the waste management centre in Goslar added a practical dimension to the theoretical information which was shared with the visitors.

The group did not allow the cold, damp weather to dampen their spirits, and they were impressed with what they saw. Several of the visitors expressed an interest in developing a partnership with CUTEC, and they are already in contact with Dr. Onyeche. (on/sz)



Group photo taken outside the CUTEC Institute

Foreign delegations at CUTEC

A seven-member South African delegation headed by Mcebisi Jonas, MEC for Financial, Economic Development and Environmental Affairs in Lower Saxony's partner province Eastern Cape, visited CUTEC on June 7th. The members of the delegation are actively involved in the political and public service sectors. A delegation from Chile visited the institute on June 23rd as part of a programme that was mapped out by VDI/VDE. The 18-member delegation included officials from Chile's mining and sewage treatment industries. All of the visitors were visibly impressed with the size of our institute and the extent of our facilities. Several members of the South African and Chilean delegations who expressed a keen interest in a joint project with CUTEC have subsequently contacted Dr. Onyeche. (on/sz)



Prof. Dr.-Ing. Wolfgang Calmano

Profile:

SCIENTIFIC ADVISORY BOARD

Prof. Wolfgang Calmano

Wolfgang Calmano was born in Oberursel near Frankfurt in 1948. He obtained a chemical engineering degree from TU Darmstadt in 1975 and received a doctorate in 1979. The title of his thesis was "Radioanalytical investigations on the behaviour of trace elements on suspended matter in the Rhine and Main". He held a postdoctoral post at the Institute for Polar and Marine Research (Alfred Wegener Institute) in Bremerhaven from 1980 to 1982 before moving on to TU Hamburg-Harburg which became his scientific home base. As a Senior Engineer, he conducted research on various aspects of environmental engineering from 1982 to 1994. He earned a post-doctorate degree in 1990. The title of his thesis was "The chemistry of contaminated solids and aquatic chemistry". In 1995, he was appointed Professor of Aquatic and Environmental Chemistry in the Environmental and Energy Department. Prof. Calmano's research activities have focused on environmental chemistry, environmental engineering, contaminated sediment, soil and industrial effluent, chemical speciation of heavy metals and fine dust from straw and wood incineration. He has also acted as Chairman at a number of international conferences and works as a soil protection and contamination consultant for the Chamber of Commerce. He is Chairman of the Basic Science Steering Committee at the Aquatic Chemistry Association which is part of the German Chemical Society (GDCh). The committee along with a joint European project group which he is also coordinating will be studying and assessing the effects of extreme climate change on water pollution levels. Prof. Calmano has acted as editor or co-editor of six books and is the author or co-author of around 180 publications. At TU Hamburg-Harburg, he is the coordinator for two international environmental engineering programmes: the Environmental Engineering course and the Joint European Master Programme in Environmental

Sciences (JEMES) which receives funding from ERASMUS-Mundus. In a partnership which includes universities in Aalborg (Denmark), Aveiro (Portugal) and Barcelona (Spain), JEMES offers students from around the world the opportunity to obtain a joint Masters Degree in Environmental Engineering and Environmental Management.

Prof. Calmano joined the CUTEC Scientific Advisory Board in 2007. When asked what motivates him, he said the following: "I believe that there is a lot of common ground with CUTEC in the treatment of industrial and process effluent. I welcome the opportunity to support CUTEC in the development and evaluation of innovative, sustainable methodologies, espe-

cially in the field of advanced oxidation and electrochemical processes. I am particularly interested in closing the loop between basic and applied research. I am pleased to contribute my expertise in particle research and speciation analysis, and I hope that I can help CUTEC to utilise and enhance its extensive analytical capabilities.

I am very committed to sustainable resource stewardship and to the future of renewable energy. CUTEC has made a major scientific contribution in both of these fields. I am keenly interested in supporting the research activities, contributing my critical assessment and raising concerns, and I am looking forward to continuing my work on the Scientific Advisory Board." (he)

REPORT FROM THE WORKERS COUNCIL

Workers Council elections are held every four years, and it was time to go the ballot box again on April 29th, 2010. The high turnout (around 70%) which included the research assistants was due in large part to the excellent work put in by the Election Committee consisting of Kristina Filip, Lutz Gründler and Dr. Sven Schäfer (Chairman), and we would like to thank them for their efforts. As we have more than 100 employees, there are seven members on the Workers Council. The Election Committee counted the ballots on

Election Day in accordance with the election rules and determined that 72 ballots were submitted with a total of 353 valid votes cast. Gerd Cronjäger, Karl Dammeyer, Carmen Kiefer, Markus Lenk, Kay-Morten Schenk, Hans-Adolf Teegen, and Dr. Torsten Zeller were elected. Dr. Zeller was elected as Chairperson and Mrs. Kiefer was elected as Deputy Chairperson at the constituent session of the new Council. On May 5th, we set the initial priorities for our future activities. The list of priorities includes regular feedback on what we are doing, in particular via our IT-based information system and the notice board. We will be focusing on employment contracts, the personnel situation, youth development and optimisation of internal collaboration. During this term of office, the Workers Council will continue to participate in the ongoing organisational development process. We are looking forward to maintaining a good working relationship with the Institute management team. (ze)



The new Workers Council: Dr. Zeller, Karl Dammeyer, Carmen Kiefer, Kay-Morten Schenk, Markus Lenk and Gerd Cronjäger (left to right) / not at the photoshoot: Hans-Adolf Teegen

OUR
CONGRATULATIONS
TO:

Heike Eberhardt
and
Markus Lenk
for passing their final
examinations

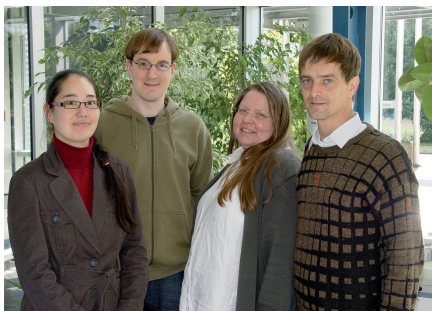


Several years ago, CUTEc was looking to find a replacement for our designer who has now retired. The Senior Management Team decided to give future responsibility for this activity to two existing employees and help them to obtain their qualifications in parallel with their normal working life. (A report on this decision appeared in CUTEc News 4/2008). In the summer of 2006, Heike Eberhardt and Markus Lenk embarked on a 3½ year CAD Designer correspondence course.

The course curriculum included statistics, design, CAD skills, integrated production/CNC, basic PC skills, maths and materials science. The students also attended a two-day CAD seminar at the Institute of Technology to reinforce what they had learned. During the course of studies, tests were sent to the students every quarter, which they completed and returned to the instructor for correction and grading. The final grade was awarded based on the tests which the students had returned by post and on the results of a four-part written examination. They both received their correspondence course diplomas in the spring of 2010. (he)

NEW ADDITIONS TO THE TEAM

Operating departments receive welcome reinforcements



From left: Mrs. Gründler, Mr. Szepanski, Mrs. Schmidt and Dr. Casties

Christian Szepanski joined CUTEc on March 1st, 2010. He obtained a degree in Process Engineering from TU Clausthal and received his Masters Degree from the Metallurgical Institute at the same institution in 2006. The title of his thesis was "Testing new anode materials for direct methane oxidation in high-temperature fuel cells (SOFC)". He subsequently worked as a research assistant at the TU Clausthal Metallurgical Institute. He coordinated the activities of the project partners on an EU-funded project, and he was responsible for the scientific aspects of the project. Following project completion, he joined CUTEc. He works in the Chemical Process Technology Department and is supporting our successful development activities on SOFC fuel cell components and systems. His main responsibility is to manage the CUTEc work modules within the framework of the Lower Saxony SOFC Research Consortium, and he also coordinates the activities of industrial and academic consortium partners.

Ute Schmidt has been providing much-appreciated assistance in the Chemical Process Technology Department since December 2009. In her role as technician, she looks after a number of test systems and provides valuable assistance to the scientists during their project work.

Dr. Achim Casties began working in the Modelling and Simulation Department on July 1st, 2010. Dr. Casties studied chemistry and mathematics at TU Clausthal and TU Braunschweig. He received his doctorate from TU Braunschweig. The title of his thesis was "Various descriptions of the A+1/2 B2 reaction on surfaces". He recently spent a lot of time outside the country working on high-performance

computing. He is working on the Detectino Project at CUTEc.

Nicole Gründler is no stranger to CUTEc, as she has already worked here as a research aide. Since August 1st, 2010, she has been working on resource efficiency in the metals engineering section at the Sustainability Management Cluster. She is responsible for optimising the scrap analysis test bed as part of the BMBF dezinking process.

Entering the world of work is one of the biggest events in any young person's life. Four young people took their first steps into the real world of work on August 2nd, 2010.

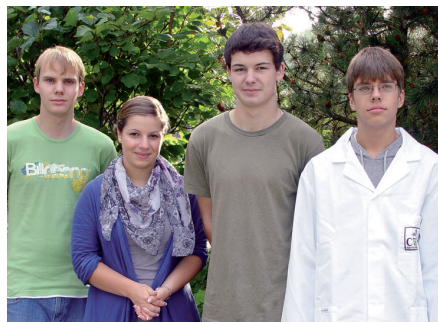
That day was a Monday, and it was the first day at work for admin trainee Alina Zech. Alina is already a familiar face at CUTEc, as she spent a year here during her work experience programme.

Filing, turning, drilling and milling are the first industrial skills which Adrian Wahlert will be learning. During his industrial mechanic training course, Adrian will be acquiring a broad range of skills and knowledge in the Mechanical Workshop over the next few years.

A new member has also joined the team in the Electrical Workshop. Stefan Müller has started his vocational training in industrial electronics. He can now look forward to a range of interesting and challenging tasks in the field of electrical systems, electronics and instrumentation.

On that same Monday, Marius Hartmann began training as a chemical lab technician. He will spend the next few years learning how to prepare and carry out trials and chemical analysis and synthesis, and generate test reports to summarise and document the results.

(wes)



From left: Mr. Müller, Mrs. Zech, Mr. Wahlert and Mr. Hartmann