International Council of Associations for Science Education

Supporting and promoting science education internationally
The ICASE Newsletter

JANUARY-FEBRUARY 2014

Welcome to the ICASE January-February 2014 Newsletter!

The ICASE Newsletter is a regularly distributed publication containing current information about topics of interest in the field of science education. The table of contents for this issue is located in the right hand column.

The International Council of Associations for Science Education (ICASE) was established in 1973 to extend and improve science education for chldren and young people throughout the world. Today, ICASE is a network of science teacher education associations, institutions, foundations and companies, working together to promote science and technology education around the world. ICASE facilitates communication and cooperation at national, regional, and international levels.

International Council of Associations for Science Education

http://www.icaseonline.net

Over the past 40 years, over 200 organizations have been members of ICASE. Currently, there are **30 organizations from 20 countries** contributing to the financial administration of ICASE. www.icaseonline.net/membership.html

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Science Education International

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http://www.icaseonline.net/seiweb

Contents of Newsletter

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ICASE News

The International Council of Associations for Science Education celebrates a successful 4th ICASE World Conference on Science and Technology Education

Over 450 ICASE attendees from 34 countries were present at the ICASE World STE2013 Conference on the island of Borneo in Kuching, Malaysia. We thank UNESCO and all registrants for their contributions and active participation throughout the conference via presentations, poster sessions, panel discussions and input to the Kuching Declaration. The declaration, focusing on generally applied actions and directions that may be used over the next three years to lead improvements in Science and Technology Education, as well as Sustainability or Environmental Education, is provided below.

ICASE Kuching Declaration on Science and Technology Education

The ICASE World Conference on Science and Technology Education was held in Kuching, Malaysia 29 September - 3 October, 2013. We, the conference participants from 34 countries, believe that Science and Technology Education at all levels should prepare students for their future lives as global citizens.

Access to high quality education is a fundamental right for all. In times of global vulnerability, issues such as sustainability, health, peace, poverty alleviation, gender equity and biodiversity conservation need to be at the forefront of thinking, planning and actions related to strengthening Science, Technology, Engineering and Mathematics (STEM) education. While the relative balance and emphases of these disciplines varies around the world, it is the interrelatedness and combination of these that will propel progress.

Planning and implementing effective STEM education includes an emphasis on the development of life competencies such as evaluative inquiry, problem solving and decision-making skills, and working collaboratively in teams. The development of confident life-long learners with skills and attitudes to thrive in complex societies is a high priority. Implementation efforts should make health, safety and environmental sustainability an integral and important part of education. Social responsibility should be established as an educational goal for all. Education is essential for Sustainable Development.

The conference participants call upon all involved in research, policy development and the teaching of STEM disciplines to carry out their roles actively in implementing this Declaration in their regions of the world, acknowledging the key roles of teachers.

We resolve that:

1. Learning through STEM disciplines should prioritize activities and content that are relevant to children's worlds, including their environment, communities, resources, cultures and interests.

2. Learners can be activated through a range of pedagogical approaches that provoke meaningful thinking about scientific issues from a young age to help them develop social responsibility.
3. The quality of teachers of science and science teaching is paramount. Opportunities for ongoing teacher professional learning through collaboration are critical.
4. ICASE through its members and member associations will create opportunities for teachers of science at all levels to be involved in collaborative feedback opportunities to benefit from lessons learned internationally.
5. High quality teacher education programmes should model evidence-based practice where teachers of science use evidence of student progress to adapt and modify what they do.
6. Science Teachers Associations are encouraged to form in all nations. They should take responsibility for representing teachers' and students' voices and needs in science, STEM and sustainability education at all levels.
7. Member organizations of ICASE will support joint initiatives to develop quality free online teaching resources. Associated workshops should support the development of innovative approaches to using ICT and utilize established resources developed by Science Teacher Associations around the world as well as UNESCO.
8. ICASE through its members and member associations will contribute to policy development and evaluation of the impacts of STEM education initiatives.
9. Policy should ensure investment in interdisciplinary sciences at all levels of education to provide sufficient numbers of science and STEM professionals and innovators.

Given the importance of environmental sustainability to the future of our planet, ICASE members also resolve to take action on the following:

1. Provide students of all ages with opportunities to experience and connect with the natural environment.
2. Promote a sense of care and shared responsibility for the Earth through STEM education about global issues and environmentally sustainable development principles.
3. Empower all students to develop the skills and attitudes to address issues and solve problems in their current and future lives.
4. Revise teacher education programmes to include critical thinking related to environmental and sustainability education that engages authentically with local communities.
5. Environmental sustainability programmes should take account of local and indigenous worldviews as well as science ideas.
6. Disseminate research information on the impacts of human activities on the environment, such as climate change and biodiversity, to better enable this information to be incorporated into STEM education.
7. Science education associations must prioritize environmental and sustainability education within their committees, support and opportunities that they provide.

ICASE acknowledges and appreciates the valuable input provided throughout the development of the Kuching Declaration on Science and Technology Education from our colleagues in the Science Education Thematic Cross Cutting Unit, Natural Sciences Sector at UNESCO Headquarters in Paris, and from UNESCO's Regional Science Bureau for Asia and the Pacific in Jakarta.

ICASE Stand at the Annual Meeting of the Association for Science Education, UK (ASE)

The ICASE stand - visitor Dr. Rob Toplis, Brunel University London, with Dr. Sue Dale Tunnicliffe (left, new ICASE European representative from the Commonwealth Association of Science, Technology and Mathematics Educators-CASTME) and Dr. Declan Kennedy (right, outgoing European representative from the Irish Science Teachers Association-ISTA) .

The ICASE stand enabled ICASE to be represented at the ASE meeting and gave Sue and Declan the opportunity to meet delegates and explain the work of ICASE to them. Thanks to assistance from Dr. Teresa Kennedy (ICASE President-elect), ICASE promotional materials were available at the stand and it is hoped that these promotional materials will help to inform teachers around the world about the work of ICASE and to increase the membership of ICASE. The ICASE stand also contained many examples of PROFILES teaching materials developed as part of the collaboration between ICASE and University College Cork on the EU funded FP7 PROFILES project. ICASE wishes to thank the ASE for providing the stand free of charge.

The Irish Science Teachers Association (ISTA) Conference will take place in Galway from 11 - 13 April 2014. Don't miss this event!

Primary/Pre-secondary Science

Paddleboat

Dr Steven Sexton, ICASE Primary/Pre-Secondary convenor

The paddleboat is a good choice for a classroom practical activity as it is a toy that both performs and is easily made. This paddleboat is affordable. It is made with low cost and generally easy to locate materials.

The instructions are straight forward, which means most age groups can construct the paddleboat. The toy is more suitable for Primary/Elementary school-aged children but could be done in an early childhood setting as a group activity or a one-on-one activity, where the teacher is accessible to help the children make the boat. It works well with most middle to upper Primary/Elementary school aged groups because it supports their fine motor skills. Teacher support would be required with younger aged children especially those in early childhood who may have not developed these fine motor skills and therefore may find it more difficult.

Materials needed in the construction:

- Stiff plastic/thick paper/card paper
- Scissors
- Two pencils/dowels/thin sticks
- Long rubber bands/string
- Short rubber bands
- Empty drink Carton
- Sticky tape

The materials required to construct the paddleboat are generally affordable and usually easy to source.

How it is made:

1) The construction starts with sealing the end of the carton with tape, if necessary. Then fix the pencils/dowels/sticks to the sides, one on each side of the carton with several long rubber bands/string holding them in place. Make sure they are tightly held in place. (see pictures 1 and 2)

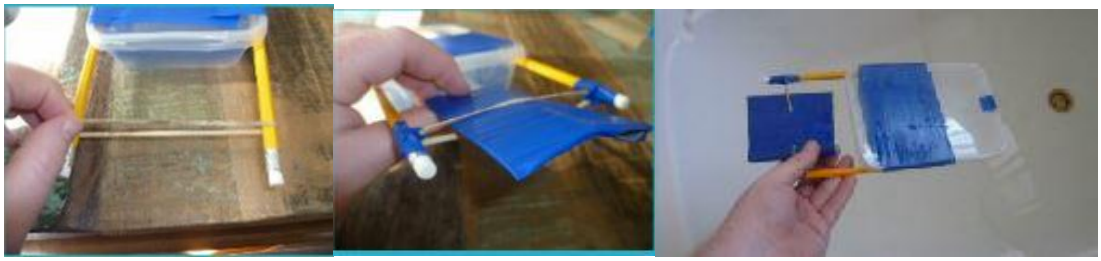
2) At this stage of the construction, adults should be present to assist or guide how to make the paddlewheel. Cut a rectangle out of the stiff plastic so that it is about the same size as the back of the carton. (see picture 3) If using paper/card, cover with sticky tape to make it stiffer and waterproof. (Discussions later on about how changing the size and shape of this affects the paddleboat offer multiple options for further investigations)

3) Fit a short rubber band around the pencils with the paddlewheel – this needs to be a rubber band and not string. (see picture 4) Taping the rubber band onto the pencils holds it in place. You should also tape the paddlewheel to the rubber band. (see picture 5) This will generally lead into more investigations on how students are able to make a stronger or more efficient paddlewheel.

4) Wind the paddle wheel until the rubber band is tight, put the boat in the water and let it go. (see picture 6) If students wind to tight and the rubber band breaks, simply replace and this can be used as a learning opportunity.

1. 2. 3.

4. 5. 6.



How the toy works:

Once the children wind up the paddlewheel, the paddleboat is ready. They get to watch it move through the water using its own power. They get to see how self-powered vehicles have to push backwards in order to move forward. The boat travels across the water, powered by the paddle. The paddle wheel turns as the rubber band unwinds. The blades push against the water as the paddle wheels turns. This action pushes the boat forwards.

Relevant science: Physical world - movement, friction, velocity

This paddleboat runs on elastic potential energy stored in the rubber band attached to the paddle wheel. As you wind the paddle wheel, the attached rubber band also winds storing potential energy. The more you wind the more potential energy is stored. When the boat is released the rubber band unwinds, in turn causing the paddle wheel to rotate and the boat to move. There are a few different energies involved in this toy. The energy of twisting the rubber band and winding it up is converted into kinetic energy, which is the energy of motion, when released. There is an energy loss due to the elastic being stretching in the form of heat. As the paddlewheel hits the water, there is more energy loss in the form of sound. Finally, the boat moving through the water results in more loss of energy due to friction. It is because of all this energy loss that the boat slows down and stops.

Nature of Science

Understanding about the Science:

Through this toy construction children can ask questions about the science of the toy. This toy leads itself to further discussions about the Physical World's energy and how energy transforms from one form to another along with how energy is lost due to friction, heat and sound. Through asking questions, this should lead to more involvement and expanding their knowledge of science and the physical world. They could ask questions such as:

- Which way does the boat move when the paddle is wound towards or away from you?
- How could we make the boat move faster/in more of a straight line/farther?
- What would happen if the boat/paddlewheel is made from other materials?

Investigating in Science:

Through this toy construction, the children are expanding their knowledge about their world. They get to play with the paddleboat and even able to use it as a game. It models what a boat does and how it moves through the water. It can be used as an activity and can be played with and used repeatedly. They have to follow instructions to make the initial toy and can then problem-solve ways to make the boat better/different.

Communicating in Science:

Through the construction of and playing with the paddleboat, the children are talking about the science involved and using the targeted vocabulary, such as elastic potential energy, kinetic energy, friction, heat, etc. Teachers should use the vocabulary needed to discuss the science and work with their students as they learn how to use the terms correctly. During the construction and use of the paddleboat the children should be using vocabulary necessary to discuss what is happening. Then the teacher is able to hear how the students are making sense of the science involved in this activity. Children do not necessarily need to be able to spell the words; they do need, however, to understand the terms used and the meaning behind them. This will help them understand the science involved in the toy.

Participating and contributing in Science:

Many children should be able to relate the paddleboat to their own world. Many children find them interesting. It can therefore be something they enjoy learning about, as it is also a fun toy for them to play with. Science involves people investigating the living, physical, material, and technological components of their environment and making sense of them in logical and creative ways. Learning in science is fundamental to understanding the world in which we live and work. It helps people to clarify ideas, to ask questions, to test explanations through measurement and observation, and to use their findings to establish the worth of an idea.

Safety in Science Education

James A. Kaufman, Ph.D.President/CEO, The Laboratory Safety Institute (LSI)
Chair, ICASE Safety in Science Edcuation Standing Committee

Could Safety in Science Education depend on the Power of Praise?

Late one evening I was flying back to Boston. The flight attendant offered me a beverage. When he handed me my diet Sprite, I said "Thank you". He looked at me and replied: "I've been flying since this morning and you're the first person who has said 'thank you'." I found that pretty disheartening to think that you could provide good service for any entire day and no one could muster a single 'Thank you'.

A few years later, I was invited to speak at "LabTech2008" in Bahrain. It's a lab conference and expo for Middle East countries. I met many wonderful folks from Saudi Arabia, Qatar, Jordan, Oman, and more.

KLM was one of the major sponsors of the conference. They provided complimentary flight tickets for the keynote speakers. When I went to the exhibit hall on the first day that it opened, I saw the KLM booth. I walked over and introduced myself to a young man and thanked him for the plane tickets. He said: "You are welcome."

Two years later, I was invited to LabTech2010 which was again at the Gulf Hotel in Bahrain's capitol city, Manama. This time I bought the tickets myself and was later reimbursed by the conference.

When I entered the exhibit hall, I saw the KLM booth. I walked over to see what they were doing.
A young man got up and walked toward me smiling. Unfortunately, I did not recognize him. I said, "Hello" and he replied, "I know you." I said, "You do?" He replied, "You were the only one who thanked us for the plane tickets!"

Whether it's taking good safety precautions in science education, receiving a fifty cent can of soda or a $2,000 plane ticket, people appreciate it when you say THANK YOU. It's hard for me to imagine that it is seemingly so rare.
What's your experience?

When it comes to the workplace, surveys consistently have shown that being appreciated for the work you do is one of the highest ranking factors in job satisfaction (often ahead of pay).

The moral of this tale
So, if you are wondering how you can motivate others to pay more attention to health and safety, think about praise.
Give more compliments for good safety performance. Say "Thank you" for getting it right. Try more carrots and fewer sticks.

Identify the best lab of the month and ask the dean or provost to send them a thank you.

Remember the power of praise.

Zoo Talk

P.G. Patrick, Texas Tech University, Lubbock, TX, USA;
S. Dale Tunnicliffe, University of London, England, UK and ICASE European Prepresentative

▸ Provides a new look at informal education and education in zoos through the development of an Informal Learning Model and a Zoo Knowledge Model
▸ Suggests activities for classroom educators to employ before, during, and after a zoo visit
▸ First book focusing on how children learn about animals and children's discourse when viewing animals
▸ Offers a visual explanation of students' knowledge of zoos
▸ Identifies potential learning opportunities such as narratives, inquiry science, and cross-curricular activities

Founded on the premise that zoos are 'bilingual'—that the zoo, in the shape of its staff and exhibits, and its visitors speak distinct languages—this enlightening analysis of the informal learning that occurs in zoos examines the 'speech' of exhibits and staff as well as the discourse of visitors beginning in the earliest years.

Using real-life conversations among visitors as a basis for discussion, the authors interrogate children's responses to the exhibits and by doing so develop an 'informal learning model' and a 'zoo knowledge model' that prompts suggestions for activities that classroom educators can use before, during, and after a zoo visit.

Their analysis of the 'visitor voice' informs creative suggestions for how to enhance the educational experiences of young patrons. By assessing visitors' entry knowledge and their interpretations of the exhibits, the authors establish a baseline for zoos that helps them to refine their communication with visitors, for example in expanding knowledgeof issues concerning biodiversity and biological conservation. The book includes practical advice for zoo and classroom educators about positive ways to prepare for zoo visits, engaging activities during visits, and follow-up work that maximizes the pedagogicalbenefits. It also reflects on the interplay between the developing role of zoos as facilitators of learning, and the ways in which zoos help visitors assimilate the knowledge on offer.

In addition to being essential reading for educators in zoos and in the classroom, this volume is full of insights with much broader contextual relevance for getting the most out of museum visits and field trips in general.

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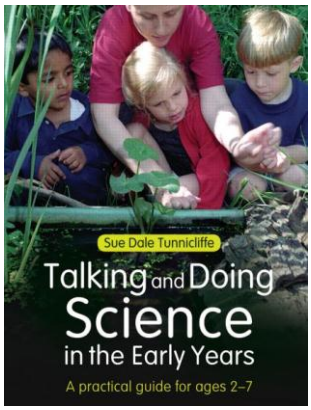
Talking and Doing Science in the Early Years

A Practical Guide for Ages 2-7 By **Sue Dale Tunnicliffe**



Sue Dale Tunnicliffe is a senior lecturer in Science Education at the Institute of Education, University of London, UK and ICASE European Representative.

Young children are intuitive, emergent scientists – they observe, raise hypotheses, experiment and notice patterns. Most of our everyday actions at home and in other settings, inside and outside, have a scientific basis and it is through these early experiences that children formulate their ideas about the world in which we live.

This accessible book introduces the simplest form of the principles and the big ideas of science and provides a starting point for encouraging children to have an interest and experiential understanding of basic science and engineering. It shows you how you can support young children in exploring everyday phenomena and develop their scientific language skills through readily available resources and hands-on experiences. Each chapter focuses on a different aspect of science and includes:
a summary of the 'big ideas' to refresh your own scientific knowledge
numerous activities that encourage young children to observe, question and carry out their own investigations
a useful list of everyday resources and relevant vocabulary.

Providing a wealth of exciting, meaningful ways to promote scientific experiences and learning, this highly practical book will help you to build on children's natural curiosity about the world and develop their understanding through your everyday provision in early years settings and at home.
*Routledge is offering **20% off** all Routledge titles when ordered from our website.. Discount not shown on flyer. To order visit: www.routledge.com. Please quote **IRK69** when ordering. **Offer ends 31/12/2014.**

New Publication

Title: Science Education: A Global Perspective

Ben Akpan, Editor

Published 2013 by Next Generation Education Ltd, Abuja, Nigeria

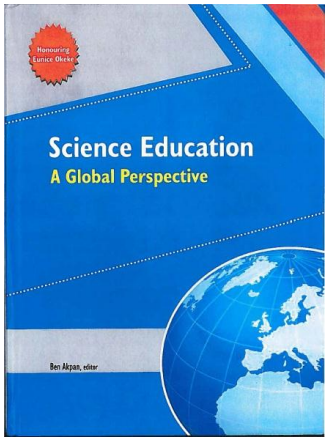
Contact for inquiries: ngebooksonline@gmail.com

This 502-page book is 'global' both in content and authorship.

Its 25 chapters by different authors seek to bring to the fore current developments in science education and the implications arising therefrom. It offers a coverage of a wide range of topics within science education from both an international perspectives and various national developments in Africa, Asia, and Latin America.

This book addresses a number of issues facing science education internationally, such as the nature of science, motivation and evolution, providing equitable access, teachers' expectations, instructional models, involvement of women in S&T employment sectors, use of computers, and the pervasive masculine image of STEM.

The book examines the future of science education research highlighting trends, issues, and the implications for research. It ends on an optimistic note by looking at science education in 50 years' time with a recommendation, among others, for stakeholders to take the responsibility of preparing children towards a blossoming science education sector in an anticipated future world.



2014 is the German-Turkish Year of Research, Education and Innovation, a joint initiative of the German Federal Ministry of Education and Research and the Ministry of Science, Industry and Technology of the Republic of Turkey.

The German-Turkish Science-Year's aim is to bring attention to the importance and successes of the cooperation between the two countries and to build on the existing cooperation within research, education and innovation through forward-looking projects. The two countries seek to use this Year of Science to tackle global and social challenges by researching solution strategies and their implementation using new technologies and innovations.

The workshop proposal on the Science and Technology was accepted by the TUBİTAK.

The main aim of this workshop is to prepare action plans which will provide effective brain circulation on science and technology education between two countries.

The main focus fields will be science curricula, science communication, H2020 collaboration, attitudes and interests towards science and technology, Mobile technologies in science education.

Approximately 40 science educators from Germany and Turkey will be invited to this Workshop.
The workshop will be held in Antalya between 19 and 21 March 2014. The workshop will be coordinated by Dr.Bulent Cavas, ICASE President-Elect.

For futher information, contact Dr.Bulent Cavas via bulentcavas@gmail.com

GOOGLE SCIENCE FAIR

The fourth annual Google Science Fair is now launching February 12, 2014.
With nearly two weeks to go until the competition opens we'd like your support to offer this opportunity to as many young scientists as possible.

We're connecting with national and international science and engineering organisations globally to enlist them as education supporters in communicating to their teachers and students. Get in touch now to find out how you and your organisation can get involved.
Visit www.googlesciencefair.com today to be inspired by our previous finalists and winners.

Calendar of Events

22nd Symposium on Chemistry and Science Education to be held at the University of Bremen, 19-21 June 2014

Science Education Research and Education for Sustainable Development (ESD)

Rationale

The 22nd Symposium on Chemistry and Science Education will coincide the end of the United Nations worldwide Decade of Education for Sustainable Development (DESD) spanning from 2005-2014. Already in the past, the Dortmund-Bremen-Symposia on science education focused the question of how science education research can help to improve science teaching and learning, and also which are the objectives to be followed. In recent years, debate on the challenge of the sustainable development of our future added another dimension towards this discussion. This additional focus and the coincidence with the end of the DESD provoked the organizers of the symposium to entitle the 2014 symposium: "**Science Education Research and Education for Sustainable Development (ESD)"**

This title simultaneously maintains and further develops many topics of the past symposia, in which we discussed the orientations and directions of science education research, questions of contemporary and successful science learning, and the role of research on science teacher education for it. The symposium in June 2014 will reveal and evaluate all these aspects even more in connection to a goals and strategies focusing Education for Sustainable Development within science education.

The main questions addressed will include:

- What does science education research revealed about students' and teachers understanding of sustainability issues and ESD?
- Which curricula and pedagogies are available to strengthen ESD in science education on secondary and tertiary level and what do we know about their effects?
- What do we know from research about fostering and hindering factors concerning the implementation of science education operated by an ESD approach?
- What do we know about attitudes, motivation and PCK of practicing teachers concerning sustainability issues and ESD in science teaching?
- How is science teacher training for ESD (pre- and in-service) operated and what do we know about the development of teachers' competencies in successfully applying ESD in science classes?
- Which research-based strategies do we have for implementing ESD thoroughly into to chemistry and science teaching by fostering science concepts simultaneously?
- What consequences does the interdisciplinary nature of most sustainability issues have for chemistry and science education?
- Which role might the informal and non-formal educational sector play to support ESD?

Information

The 22nd Symposium on Chemical and Science Education at the University of Bremen will take place as announced. The symposium will start on Thursday (19 June 2014) at 10:00 a.m. and will be closed on Saturday (21 June 2014) at 2:00 p.m.

- **Call for posters**: The symposium will include a poster exhibition with poster short presentations. All poster contributors will be invited to contribute to the book of invited papers after the symposium. Applications for posters (authors, title, abstract of 5-10 lines) are welcome before January 03, 2014. A maximum of 25 posters can be accepted. Contact Ingo Eilks for further information at ingo.eilks@uni-bremen.de.

Provisionally, oral presentations are invited from speakers from 12 different countries and include:
Avi Hofstein (Rehovot, Israel) and Ingo Eilks (Bremen, Germany)
Franz Rauch (Klagenfurt, Austria)
Debbie Corrigan (Melbourne, Australia)
Shu-Nu Chang Rundgren (Karlstad, Sweden)
John Oversby (Reading, United Kingdom)
Susanne Bögeholz (Göttingen, Germany)
George Bodner (West Lafayette, USA)
Vania Gomez Zuin (Sao Paolo, Brazil)
Rachel Mamlok-Naaman (Rehovot, Israel)
Jesper Sjöström (Malmö, Sweden)
Nicole Garner (Bremen, Germany) and Martin Gröger (Siegen, Germany)
Andy Dicks (Toronto, Canada)
Jan Alexis Nielsen (Copenhagen, Denmark)
Yael Shwartz (Rehovot, Israel)
Thomas Roßbegalle (Dortmund, Germany)
Mageswary Karpudewan (Penang, Malaysia)
Maija Aksela (Helsinki, Finland)
Ute Stoltenberg (Lüneburg, Germany)

Conference chairs

Prof. Dr. Ingo Eilks, Institute for Science Education (IDN), Didactics of Chemistry, University of Bremen, Leobener Str. NW2, D-28359 Bremen, Germany, *ingo.eilks@uni-dortmund.de*
Prof. Dr. Bernd Ralle, Department of Chemistry, Didactics of Chemistry I, Dortmund University of Technology, Otto-Hahn-Str.6, D-44227 Dortmund, Germany, *bernd.ralle@tu-dortmund.de*

Information about venue, programme, travelling, accommodation:

http://www.chemie.uni-bremen.de/eilks/symp2014/index.html

Final programme

The final program will be published by January 2014 on the web at
http://www.chemie.unibremen.de/eilks/symp2014/index.html

Conference fees and registration

A conference fee is not raised. Costs for travelling, accommodation and social events are on the participants. Although the symposium is free of any charge a registration for the symposium will be warmly requested. This is done to allow better planning. For the social evening a binding registration will be requested. All information and the registration form will be published on the web accompanying the final program in January 2014.

ICASE Executive Committee

ICASE membership spans the world led by a Management Committee (President, President-Elect, Immediate Past President, Secretary, and Treasurer) responsible for the day-to-day administration and operation of the Council, working closely with Regional Representatives and Chairs of Standing Committees.

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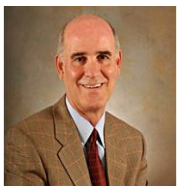

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