

## BULLETIN DU GROUPEMENT

d'informations mutuelles



SE CONNAÎTRE, S'ENTENDRE, S'ENTRAIDER

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If you would like to become a member of the AMPERE Group, you can register online under: **[www.ampere.ethz.ch](http://www.ampere.ethz.ch)**

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## Editorial

Dear AMPERE colleagues,

hopefully you have noticed the new AMPERE logo on the cover page. To introduce it we have for once decided to print a color cover.

EUROMAR 2013 in Hersonissos on the beautiful Greek island of Crete was a great success. Despite the surroundings that invited for swimming, sunbathing, and cultural trips, the lecture halls were well filled, testifying to the attraction of Magnetic Resonance and to a well balanced, interesting scientific programme. I wish to thank Georgios Papavassiliou and his whole team for organizing this event. One of the highlights was the Prize Session, with the Raymond Andrew Prize of Groupement AMPERE given to Michael Tayler, see p. 2. Nominations for the 2014 Raymond Andrew Prize are invited on p. 3.

This Prize for an outstanding Ph.D. thesis will be awarded in the same session as the biannual AMPERE Prize at EUROMAR 2014 in Zürich (pp. 4-11). With the invited speakers and tutorial lectures already being known and your own field being well represented, you have no excuse for missing this event. Registration will start on December 1<sup>st</sup> 2013 at <http://www.euromar2014.org/>.

This year, a special AMPERE Summer School was organized in Volterra, Italy on Analyzing Cultural Heritage using Portable Magnetic Resonance (p. 12). Such Summer Schools are useful not only for educating the next generation of scientists, but also for fostering contacts and seeding collaborations.

Such events do not happen spontaneously. Groupement AMPERE depends on its members- that is you- for being a lively and modern organization. Your suggestions for activities are most welcome.



Gunnar Jeschke  
Secretary General of Groupement AMPERE

## Raymond Andrew Prize 2013 to Michael Tayler

In memory of Professor Dr. Raymond Andrew and to honour his pioneering work in the field of magnetic resonance the AMPERE Bureau has decided to found a Raymond Andrew Prize. The prize is awarded to young scientists for an outstanding PhD thesis in magnetic resonance.

The Raymond Andrew Prize 2013 was awarded to Dr. Michael C. D. Tayler during the EUROMAR congress in Hersonissos, Crete, Greece in July 2013 for the thesis: „Theory and practice of singlet nuclear magnetic resonance.“ written in the group of Malcolm Levitt.



Dr. Tayler studied chemistry at University of Cambridge, where he received the Unilever Prize 2008 for his M.Sc. thesis supervised by Dr. James Keeler. A paper published during his graduate studies at Southampton University in the group of Prof. Malcolm Levitt was selected for the Ernst Award 2012 of the Magnetic Resonance Discussion Group of Gesellschaft Deutscher Chemiker.

After graduating in August 2012, Dr. Michael Tayler moved to Radboud Universiteit Nijmegen, where he now works on sensitivity enhancement in NMR spectroscopy as a Postdoctoral researcher in the group of Prof. Arno Kentgens.

## **Raymond Andrew Prize 2014 Call for nominations**

Call for Nominations for the Raymond Andrew Prize for an outstanding PhD thesis in the field of magnetic resonance:

For the Raymond Andrew Prize 2014 the AMPERE Prize Committee is seeking your help in searching for qualified candidates who completed their dissertation during the period of 2012/2013. The prize will be presented during the EUROMAR in Zürich (Switzerland) from June 29th to July 3rd 2013.

You are kindly invited to submit nominations by e-mail to [andrewprize@nmr.phys.chem.ethz.ch](mailto:andrewprize@nmr.phys.chem.ethz.ch)

Suggestions must be received by 15th February 2014 and should include the following documents:

- Nomination letter
- Curriculum vitae
- List of publications and presentations at conferences
- PhD thesis in PDF

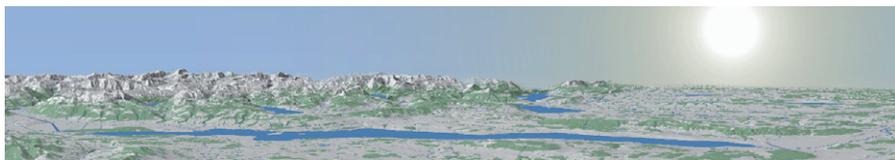
The thesis should be written in English. In exceptional cases, the thesis may also be submitted in triplicate as a hardcopy to the AMPERE Secretariat. Please note that the nomination letter cannot be written by the candidate herself or himself.

Submissions that arrive too late will automatically be transferred to the next year. The prize committee will reconsider excellent contributions for two years in a row.

For a list of past Andrew Prize winners see: [http://www.ampere.ethz.ch/andrew\\_prize.htm](http://www.ampere.ethz.ch/andrew_prize.htm)

Sincerely yours,  
Gunnar Jeschke

# Euromar 2014



June 29 - July 3 | ETH Zurich Switzerland  
[www.euromar2014.org](http://www.euromar2014.org)

## Welcome to Euromar 2014

Euromar 2014 will be held at ETH Zürich, the Swiss Federal Institute of Technology. The two most recent Nobel Prizes related to Magnetic Resonance were awarded to scientists whose scientific home was ETH Zürich, in 1991 to Richard R. Ernst „for his contributions to the development of the methodology of high resolution nuclear magnetic resonance (NMR) spectroscopy“ and in 2002 to Kurt Wüthrich „for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution“. Today, method development in all major branches of magnetic resonance, liquid- and solid-state NMR and EPR spectroscopy as well as MRI, is pursued at ETH Zürich.

The conference will commence in the historic main building of ETH Zürich, designed by Gottfried Semper, who was also a Professor at ETH, then called the Polytechnikum. You can expect nice views from the terrace on Lake Zurich, Uetliberg, and the Alps and you will be close to the many pubs of picturesque Niederdorf, as the part of Zurich's old town right of the Limmat river is called.



The aim of the EUROMAR 2014 is to present the latest scientific breakthroughs in magnetic resonance and to stimulate discussion and collaboration, true to the motto of Groupement AMPERE „se connaître, s'entendre, s'entraider“, to get to know each other, to listen to each other, to aid one another.

On behalf of the Local Organizing Committee, let me cordially welcome you to Euromar 2014 in Zürich.

Gunnar Jeschke  
Chairman, EUROMAR 2014 Conference



## Plenary Speakers

|                      |                          |
|----------------------|--------------------------|
| Silvio Aime          | University of Turin      |
| Hashim M. Al Hashimi | University of Michigan   |
| Martin Blackledge    | IBS Grenoble             |
| Richard Bowtell      | University of Nottingham |
| David Cafiso         | University of Virginia   |
| Marius Clore         | NIDDK Bethesda           |
| Christophe Copéret   | ETH Zurich               |
| Lyndon Emsley        | ENS Lyon                 |
| Steffen Glaser       | TU Munich                |
| Song-I Han           | University of California |
| Fedor Jelezko        | Ulm University           |
| Ann McDermott        | Columbia University      |
| Gareth Morris        | University of Manchester |

## Topics

Advances in Instrumentation  
Biomacromolecules (Solution and Solid State)  
Computation and Theory  
Cultural Heritage Applications  
Imaging Methods  
In Cell and In Vivo Studies  
Industrial Applications  
Inorganic Materials  
Metabolomics  
New Experimental Techniques  
Paramagnetic Systems  
Relaxation and Dynamics  
Sensitivity Enhancement  
Small Molecules and Pharmaceuticals  
Solid State Physics  
Spin Physics  
Synthetic Soft Matter  
Transport and Diffusion

## Registration opens on December 1<sup>st</sup>

|                        | Early Registration<br>until April 15 <sup>th</sup> | Late Registration<br>until June 22 <sup>nd</sup> | Onsite Registration |
|------------------------|--|--|---------------------|
| Participants           | Euro 500   | Euro 550   | Euro 600            |
| Ampere<br>Members      | Euro 450   | Euro 500   | Euro 550            |
| Students               | Euro 250   | Euro 300   | Euro 350            |
| Accompanying<br>Person | Euro 100   | Euro 120   | Euro 150            |
| Conference<br>Dinner   | Euro 70   Students Euro 35                         |  |                     |

## Euromar 2014 Timetable

27 - 28 June 2014, COST European Network on Spin Hyperpolarisation  
Physics and Methodology in NMR and MRI, Satellite Meeting

### Sunday, 29.6.2014

- 10:00-16:15 Registration
- 14:00-16:15 Tutorial Lectures on NMR Basics (James Keeler), the Connection between NMR and Molecular Dynamics (Rafael Brüschweiler), and on Measurement of Hyperfine Couplings (Daniella Goldfarb)
- 16:30-18:45 Opening and Prize Session- AMPERE and Raymond Andrew Prizes 2014
- 19:00-21:00 Welcome Mixer

### Monday, 30.6.2014

- 08:30-18:00 Registration
- 08:30-09:50 Plenary session (2 talks)
- 09:50-10:20 Coffee break
- 10:20-12:20 Parallel sessions
- 12:20-14:40 Lunch
- 14:40-16:00 Poster session 1 (presenters of odd numbers present) & Coffee
- 16:00-18:00 Parallel sessions
- 18:10-18:50 Plenary session (1 talk)

## **Tuesday, 1.7.2014**

- 08:30-18:00 Registration
- 08:30-09:50 Plenary session (2 talks)
- 09:50-10:20 Coffee break
- 10:20-12:20 Parallel sessions
- 12:20-14:40 Lunch
- 14:40-15:30 Poster session 2 (free roaming) & Coffee
- 15:00-17:30 Parallel sessions
- 17:40-18:20 Plenary session (1 talk)
- 18:45-20:00 Richard Ernst honorary session
- 20:00-21:30 Apéro riche (Snacks and Beverages)

## **Wednesday, 2.7.2014**

- 08:30-18:00 Registration
- 08:30-09:50 Plenary session (2 talks)
- 09:50-10:20 Coffee break
- 10:20-12:20 Parallel sessions
- 12:20-14:40 Lunch
- 14:40-16:00 Poster session 3 (presenters of even numbers present)  
& Coffee
- 16:00-18:00 Parallel sessions
- 18:10-18:50 Plenary session (1 talk)

## **Thursday, 3.7.2014**

- 08:30-18:00 Registration
- 08:30-09:50 Plenary session (2 talks)
- 09:50-10:20 Coffee break
- 10:20-12:20 Parallel sessions
- 12:20-14:40 Lunch
- 14:40-16:40 Parallel sessions
- 16:40-18:30 Closing plenary session (2 talks)
- 20:00-23:00 Conference dinner

## Parallel Session Speakers

Lecture titles are preliminary.

There are 72 additional slots for contributed talks.

### Small Molecules & Metabolomics

|                      |   |   |
|----------------------|---|---|
| Christian Griesinger | MPI for Biophysical Chemistry, Göttingen, Germany |   |
| Ruth Gschwind        | University of Regensburg, Germany                 | Intermediates and Interactions in Photocatalysis and Organocatalysis                |
| Burkhard Luy         | TU Munich, Germany                                | Novel Pulse Sequences and Applications for Small Molecules                          |
| Teo Parella          | Autonomous University of Barcelona, Spain         |   |
| Klaus Zangger        | University of Graz, Austria                       | Simplifying proton-detected spectra by spatially and frequency-selective excitation |

### Instrumentation

|                  |                                   |  |
|------------------|-----------------------------------|--|
| Bernhard Blümich | RWTH Aachen, Germany              | Compact NMR: Nondestructive Testing and Real-Time Spectroscopy |
| Andrew Coy       | Magritek, Wellington, New Zealand |  |
| Jan Korvink      | University of Freiburg, Germany   |  |

### EPR Methods

|                |  |   |
|----------------|--|---|
| Robert Bittl   | Free University of Berlin              |   |
| Thomas Prisner | University of Frankfurt, Germany       | Conformational dynamics of DNA and RNA determined by multi-field/multi-frequency PELDOR |
| Stefan Stoll   | University of Washington, Seattle, USA | New developments in computational EPR   |

|                      |                                  |  |
|----------------------|----------------------------------|--|
| Sabine Van Doorslaer | Universtiy of Antwerpen, Belgium |  |
|----------------------|----------------------------------|--|

### Liquid-state NMR Methods

|                      |  |  |
|----------------------|--|--|
| Ad Bax               | NIH, Bethesda, USA                               |  |
| Geoffrey Bodenhausen | ENS, Paris, France & EPFL, Lausanne, Switzerland |  |
| Rolf Boelens         | Utrecht University, The Netherlands              | Dynamics of Transcription Complexes                                    |
| Lukas Tamm           | University of Virginia, USA                      |  |
| Gerhard Wagner       | Harvard University, Boston, USA                  | Advances with Acquisition and Processing of NMR Data of Large Proteins |

### Relaxation & Dynamics

|                  |                               |  |
|------------------|-------------------------------|--|
| Fabien Ferrage   | ENS, Paris, France            |  |
| Stephan Grzesiek | University Basel, Switzerland |  |

### Solid-state NMR Methods

|                   |                               |   |
|-------------------|-------------------------------|---|
| Marina Caravetta  | University of Southampton, UK | $^{14}\text{N}$ Overtone MAS NMR  |
| Robert G. Griffin | MIT, Cambridge, USA           |   |
| Rachel Martin     | UC Irvine, USA                | Instrumentation Development for Switched-Angle Spinning NMR of Semi-Solid Samples |

### Sensitivity Enhancement

|                  |                                       |   |
|------------------|---------------------------------------|---|
| Eduard Chekmenev | Vanderbilt University, Nashville, USA | Hyperpolarized Functional Contrast Agents by PHIP and Xe-129 SEOP           |
| Arnaud Comment   | EPFL, Lausanne, Switzerland           | Pushing the Sensitivity Limit of in vivo Hyperpolarized $^{13}\text{C}$ NMR |

|                     |   |   |
|---------------------|---|---|
| Ivan Dmochowski     | University of Pennsylvania, Philadelphia, USA | New Biological Applications for Hyperpolarized Xe-129 NMR |
| Walter Köckenberger | The University of Nottingham, UK              | New Developments in Dissolution DNP                       |
| Dieter Suter        | TU Dortmund, Germany                          |   |

### **Imaging, Diffusion & Spatial Resolution**

|                |   |  |
|----------------|---|--|
| Raffi Budakian | University of Illinois at Urbana Champaign, USA |  |
| Gil Navon      | University of Southampton, UK                   |  |

### **NMR on Paramagnetic Systems**

|                  |                                      |   |
|------------------|--------------------------------------|---|
| Claudio Luchinat | CERM & University of Florence, Italy |   |
| Guido Pintacuda  | ENS de Lyon, France                  | Broadband Solid-State NMR: From Paramagnetic Metalloproteins to Battery Materials |

### **In cell & In vivo Magnetic Resonance**

|                    |                             |  |
|--------------------|-----------------------------|--|
| Melinda Duer       | University of Cambridge, UK |  |
| Philipp Selenko    | FMP Berlin, Germany         |  |
| Masahiro Shirakawa | Kyoto University, Japan     |  |

### **Materials**

|                    |                           |  |
|--------------------|---------------------------|--|
| Steven Brown       | University of Warwick, UK | Applications of High-Resolution $^1\text{H}$ Solid-State NMR Methods to Supramolecular Self-Assembly and Pharmaceuticals |
| Bradley F. Chmelka | UC Santa Barbara, USA     |  |

|                   |                             |  |
|-------------------|-----------------------------|--|
| Clare Grey        | University of Cambridge, UK |  |
| Jeffrey A. Reimer | UC Berkeley, USA            |  |

### Proteins & Nucleic Acids

|                         |   |  |
|-------------------------|---|--|
| Enrica Bordignon        | Free University of Berlin                         | Structure of Oligomeric Bax at the Membrane: A Step Towards the Understanding of Mitochondrial Outer Membrane Poration |
| Teresa Carlomagno       | EMBL Heidelberg, Germany                          | RNA-Protein Complexes in RNA Metabolism: An Integrative Structure Biology Approach                                     |
| Christopher P. Jaroniec | The Ohio State University, Columbus, USA          |  |
| Adam Lange              | MPI for Biophysical Chemistry, Göttingen, Germany | 3D Structures of Bacterial Supramolecular Assemblies by Solid-State NMR  |
| Hartmut Oschkinat       | FMP Berlin, Germany                               |  |
| Michael Sattler         | TU Munich, Germany                                |  |
| Robert Tycko            | NIH, Bethesda, USA                                |  |
| Michele Vendruscolo     | University of Cambridge, UK                       |  |

## Ampere Summer School on Analyzing Cultural Heritage using Portable Magnetic Resonance

Tyler Meldrum

In June 2013, scientists, conservators, and art historians from nearly 10 countries came to the mountainous Tuscan town of Volterra, Italy to participate in the Ampere Summer School on Analyzing Cultural Heritage using Portable Magnetic Resonance. The four-day workshop, jointly organized by RWTH Aachen University (Germany) and the Pratt Institute (New York), began on the evening of Wednesday, June 12 with a public lecture offered by Prof. Donatella Capitani, head of the NMR unit at the National Research Center in Rome, Italy. Her talk was attended by approximately 35 people, including the mayor of Volterra, Marco Buselli, who officially opened the workshop in the medieval town. Members of the Italian press were also present, documenting the opening ceremonies as well as measurements performed on a Volterran treasure—a fresco of the Annunciation and Four Saints, located in the council hall in the Palazzo dei Priori. The TV news spot, recorded in Italian, is viewable on <http://www.youtube.com/watch?v=Dp1uhchOGRQ>.

The next two days of the workshop, Thursday and Friday the 13<sup>th</sup> and 14<sup>th</sup>, were dedicated to theoretical and practical aspects of using single-sided NMR to analyze cultural heritage, including several talks on NMR theory, applications of NMR to art, and practical lectures on how to perform measurements, as well as over three hours of hands-on experience working in small groups with the NMR-MOUSE. Three complete single-sided NMR setups were brought to Volterra and participants learned how to measure  $T_2$  using a CPMG sequence,  $T_1$  using saturation recovery, measure depth profiles, and measure the self-diffusion coefficient of water in a saturated fresco sample. Some participants brought their own samples to the workshop, including parchment, leather, and wood, while other samples (paintings, frescoes, canvas) were provided by the organizers.

On Saturday, June 15, the hands-on experience continued with all-day measurements in the council hall of the *Palazzo dei Priori* and in the lecture hall, *Sala Melani*, access to both generously provided by the City of Volterra. In the afternoon, a very productive panel discussion was held wherein the participants and organizers discussed current problems in cultural heritage research and how NMR could be used to address these problems. The workshop adjourned in the late afternoon.



Figutr 1: Tyler Meldrum, RTWH Aachen University, leads a hands-on tutorial session in the *Sala Melani* at the Volterra Summer School.

Number of Attendees: 38

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Bernhard Blümich <sup>a</sup>  
 Antonio Cosentino <sup>b</sup>  
 Eleonora Del Federico <sup>b</sup>  
 Licio Isolani <sup>b</sup>  
 Tyler Meldrum <sup>a</sup>  
 Amadeo Mercurio <sup>c</sup>

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 Cindie Kehlet <sup>b</sup>  
 Tyler Meldrum <sup>a</sup>  
 Wasif Zia <sup>a</sup>

<sup>a</sup> RWTH Aachen University, <sup>b</sup> Pratt Institut, New York, <sup>c</sup> Provinces of Pisa and Livorno, <sup>d</sup> City of Volterra, <sup>e</sup> Villa Palagione Intercultural Center, <sup>f</sup> The Metropolitan Museum of Art, New York

# **Ampere Summer School on Analyzing Cultural Heritage using Portable Magnetic Resonance**

Volterra, Italy

## **Wednesday, 12 June 2013; Toscano Palace, Sala Melani**

16:30 Registration

17:00 Public Lecture: NMR Methodologies in Cultural Heritage  
Donatella Capitani

## **Thursday, 13 June 2013; Toscano Palace, Sala Melani**

09:00 Opening, Eleonora Del Federico

09:10 Diagnostics of Art and Cultural Heritage by NMR  
Bernhard Blümich

### Tutorials

09:30 Principles of NMR I (fundamentals through relaxometry)  
Tyler Meldrum

10:15 NMR of Paintings  
Tyler Meldrum

10:45 Break

11:15 NMR of Modern Materials and Analysis  
Cindie Kehlet

11:45 NMR of Pigment/Binder Interactions  
Eleonora Del Federico / Silvia Centeno

12:30 Lunch

### Contributed presentations moderated by Cindie Kehlet

13:30 Degradation of Parchment Investigated by NMR Relaxation  
A. Marchi Netto; RWTH Aachen

13:55 Tradition and Innovation in Sixteenth Century Tours:  
Poyer, Bourdichon, and The Master of Claude de France  
Frank Trujillo, The Morgan Library

14:20 The Restoration of a Roman Urn with the Erbium: YAG Laser  
Adele DeCruz, Duke University

14:45 Poster presentations and break

### Hands-on Experience

15:30 How to Measure: Calibration and Relaxation  
Wasif Zia

- 16:15 Practical work in parallel groups School Participants
- 18:00 End
- 18:30 Wine and cheese reception and screening of the documentary film "Licio Isolani, a Volterrano Artist from New York" by Gerhard Wahl (optional, film ca. 25 minutes)

**Friday, 14 June 2013; Toscano Palace, Sala Melani**

Tutorials

- 09:00 Principles of NMR II (molecular motion and data analysis)  
Tyler Meldrum
- 09:45 NMR of Buildings and Building Materials  
Federica Presciutti
- 10:30 NMR of Oil Stains on Works of Art on Paper  
Cindie Kehlet
- 11:00 Break
- 11:30 NMR of Acrylic Paint Films  
Silvia Centeno / Eleonora Del Federico
- 12:00 NMR of Ethnographic Materials  
Torunn Klokernes / Eleonora Del Federico
- 12:30 Lunch

Contributed presentations, moderated by Silvia Centeno

- 13:30 NMR Relaxometry for a Better Knowledge at the Nano and Subnano Scale of an "Old-Modern" Material: the Cement  
Leonardo Brizi; University of Bologna
- 13:55 Non-invasive Investigations with an NMR-MOUSE within an  
Archaeological Site: the Case of Herculaneum  
Alessandra De Vita; Herculaneum Conservation Project
- 14:20 Analytical Study of Ancient Artifacts—Bone, Glass, Pottery and  
Pigments from the Archeological Sites Tell al-Husn and Khirbet  
ed-Darieh in Jordan  
Wassef Sekhaneh; Yarmouk University
- 14:45 Poster presentations and break

Hands-on Experience

- 15:30 How to Measure: Molecular Motion and Data Analysis  
Wasif Zia
- 16:15 Practical work in parallel groups  
School Participants
- 18:00 End
- 19:30 Dinner at Villa Palagione (ticket required, 45 EUR)

**Saturday, 15 June 2013, Sala del Consiglio,  
Volterra Palazzo dei Priori**

- 11:00 On-site measurement on a wall painting at the Sala del Consiglio  
School Participants
- 13:00 Lunch
- 14:00 Panel discussion: NMR in Cultural Heritage—Present and Future  
Directions, led by Silvia Centeno and Eleonora Del Federico
- 15:00 On-site measurement on a wall painting continues
- 17:00 School adjourns
- 17:30 Optional hike “The Philosopher’s Walk”

## **Executive Officers and Honorary Members of the AMPERE Bureau**

The AMPERE BUREAU includes the executive officers (which take the responsibility and the representation of the Groupement between the meeting of the committee), the honorary members of the Bureau and the organizers of forthcoming meetings.

### **Executive Officers 2009 - 2012**

|                         |                            |
|-------------------------|----------------------------|
| President               | B. Blümich                 |
| Vice Presidents         | J. Dolinšek<br>A. Böckmann |
| Secretary General       | G. Jeschke                 |
| Executive Secretary     | M. Ernst                   |
| EF-EPR Representative   | G. Smith                   |
| SRMR Representative     | B. Balcom                  |
| MRPM Representative     | C. Arns                    |
| MR-FOOD Representative: | J. van Duynhoven           |
| EUROMAR Representative  | L. Frydman                 |
| EUROMAR Treasurer       | M. Pons                    |
| Past President          | B.H. Meier                 |
| Honorary Member         | St. Jurga                  |
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## Future conferences

### Ampere events 2014

|              |                             |                        |
|--------------|-----------------------------|------------------------|
| MRPM 12      | Wellington<br>(New Zealand) | February 9-13<br>2014  |
| EUROMAR 2014 | Zurich<br>(Switzerland)     | June 29-July 3<br>2014 |