



**European  
Microbeam Analysis Society**

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**Institute for Geosciences and Earth Resources  
Padua O.S.U.**



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

**Department of Geosciences**

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**EMAS 2012**

**10th EMAS Regional Workshop on**

**ELECTRON PROBE MICROANALYSIS OF  
MATERIALS TODAY - PRACTICAL ASPECTS**

**including a session on  
EBSD - electron backscatter diffraction**

***17 - 20 June 2012***

**Padua, Italy**

***ANNOUNCEMENT AND PROVISIONAL PROGRAMME***

Organised in collaboration with:  
CNR - Institute for Geosciences and Earth Resources  
and Department of Geosciences - University of Padua

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## 1. AIMS AND SCOPE

The EMAS Regional Workshops are biennial events designed to provide postgraduate-level and research workers in materials science, material engineering and related subjects, with basic knowledge of the capabilities and limitations of electron probe X-ray microanalysis. The workshops are organised as low-budget meetings with lectures on practical and theoretical aspects of EPMA given by internationally recognised experts. The format and content of the meetings are tailored to the needs of the practical microanalyst routinely dealing with problems of instrumental procedures, specimen preparation, data collection and quantification, as well as those of research workers keen to obtain a deeper understanding of the physics underlying X-ray production, measurement and analysis.

Past EMAS Regional Workshops were held in Finland (1994), Hungary (1996), Spain (1998), the Czech Republic (2000), Poland (2002), Slovenia (2004), Germany (2006), Italy (2008), and The Netherlands (2010).

The core topics of the 10th EMAS Regional Workshop are:

- Electron beam - specimen interactions
- X-ray spectroscopy (WDS and EDS)
- Light element analysis
- Quantitative electron probe microanalysis (incl. basic Monte Carlo simulation)
- X-ray microanalysis in the TEM
- Basic electron energy loss spectroscopy (EELS) in the TEM
- Sample preparation

Since the Padua Local Unit at CNR. - Institute for Geosciences and Earth Resources and at the Department of Geosciences of the University have an ongoing interest in electron backscatter diffraction (EBSD), the Workshop will include three technical sessions dedicated to this subject.

Topics covered in the sessions dealing with electron backscatter diffraction will include:

- EBSD - Theory and practice
- Instrumentation for EBSD (the manufacturer's view point)
- Applications of EBSD in the earth sciences
- Applications of EBSD in material sciences
- Applications of EBSD in cultural heritage materials
- Applications of EBSD in electronics
- Applications of EBSD in steels
- Applications of EBSD in nanotechnology

## 2. SCIENTIFIC PROGRAMME

The programme will consist of invited lectures delivered by renowned experts, and two poster sessions. Two round-table discussions will also be held during the workshop. The invited lectures and poster abstracts will be published in the Workshop *Book of Tutorials and Abstracts*. Selected papers of accepted poster contributions will be published in the journal *Microscopy & Microanalysis*, subject to the standard peer review procedure. The official language of the workshop will be English.

### Preliminary programme

#### *Sunday 17 June 2012*

17h00 Registration (Aula Studio of the Geosciences Department Building)  
18h00 Welcome reception (Aula Studio)

#### *Monday 18 June 2012*

08h00 Registration (Aula Studio of the Geosciences Department Building)  
09h00 **Welcome and Opening Addresses**  
*Anna M. Fioretti*, Head of C.N.R. - Consiglio Nazionale delle Ricerche,  
Istituto di Geoscienze e Georisorse (IGG), Padua, Italy  
- EMAS President Representative

#### Session I

09h30 **Introduction to EPMA and SEM**, *Hans Dijkstra*, ThermoFisher Scientific BV, Breda, The Netherlands  
10h15 Coffee  
11h00 **Sample preparation for EPMA (generic)**, *Silvia Richter*, R.W.T.H., Gemeinschaftslabor für Elektronenmikroskopie (GfE), Aachen, Germany  
11h45 **Performance characteristics of EDS detectors**, *Michael B. Matthews*, AWE Plc., Aldermaston, Great Britain  
12h30 Lunch

#### Session II

14h00 **Performance characteristics of WDS detectors**, *Michael B. Matthews*, AWE Plc., Aldermaston, Great Britain

- 14h45 **Light element analysis**, *Hans Dijkstra*, ThermoFisher Scientific BV, Breda, The Netherlands
- 15h30 Refreshment break / Poster Session I
- 16h15 **Quantification in EPMA (incl. Monte Carlo simulation and thin films)**, *Xavier Llovet*, University of Barcelona, Centres Científics i Tecnològics (CCiT), Barcelona, Spain
- 17h00 **Introduction to TEM and electron diffraction in the TEM**, *János Lábár*, Hungarian Academy of Sciences, Research Institute for Technical Physics & Materials Science, Budapest, Hungary
- 17h45 **X-ray microanalysis and electron energy loss spectroscopy (EELS) in the TEM**, *János Lábár*, Hungarian Academy of Sciences, Research Institute for Technical Physics & Materials Science, Budapest, Hungary
- 18h30 Round-table discussion:  
**EPMA - EDS/WDS - Light element analysis - quantification - TEM - EELS**  
*Moderator: Romano Rinaldi*, Università di Perugia, Dipartimento di Scienze della Terra, Perugia, Italy
- 19h00 End of session

## *Tuesday 19 June 2012*

### Session III

- 09h00 **Introduction to electron backscatter diffraction (EBSD)**, *David Mainprice*, University of Montpellier 2, Laboratoire Géosciences Montpellier, Montpellier, France
- 09h45 **Crystal preferred orientation and diffusion creep**, *Richard Spiess*, Università di Padova, Dipartimento di Geoscienze, Padua, Italy
- 10h15 Coffee
- 11h00 **Looking into the earth's mantle deformation microstructures**, *Florian Heidelbach*, University of Bayreuth, Bayerisches Geoinstitut, Bayreuth, Germany
- 11h30 **High resolution EBSD mapping of quartz deformation microstructures**, *Michel Bestmann*, GeoZentrum Nordbayern, Erlangen, Germany
- 12h00 **Future perspectives on EBSD**, *David Mainprice*, University of Montpellier 2, Laboratoire Géosciences Montpellier, Montpellier, France
- 12h30 Lunch

### Session IV

- 14h00 Commercial: 4x15min. presentations (Edax/TSL - Bruker - ThermoFisher Scientific - Oxford Instruments/HKL)
- 15h00 **Electron backscatter diffraction: a tool to solve different questions in the steel industry**, *Patricia Romano Triguero*, Tata Steel, Microstructure & Crystallography & Thermal Analysis, IJmuiden, The Netherlands
- 15h30 Refreshment break / Poster Session II
- 16h15 **Reconstruction of ancient metallurgical processes based on information from EBSD**, *Vania Virgili*, C.N.R. - Consiglio Nazionale delle Ricerche, Dipartimento Patrimonio Culturale, Rome, Italy
- 16h45 **Use of EBSD in steel microstructure assessment**, *Andrea di Schino*, Centro Sviluppo Materiali SpA, Rome, Italy
- 17h15 **In-situ hot stage and low vacuum EBSD**, *François Brisset*, Université Paris-Sud, Institut de Chimie Moléculaire et des Matériaux d'Orsay, Orsay, France
- 17h45 **Combined EBSD and Kossel measurements on ceramic and metallic materials**, *Enrico Langer*, Dresden University of Technology, Institut für Festkörperphysik, Dresden, Germany
- 18h30 Departure for guided city tour followed by workshop dinner

## Wednesday 20 June 2012

### Session V

- ,09h00 **EBSD for analysis of materials in cultural heritage**, *Luca Peruzzo*, C.N.R. - Consiglio Nazionale delle Ricerche, Istituto di Geoscienze e Georisorse (IGG), Padua, Italy
- 09h30 **EBSD application to photovoltaic materials**, *Florence Robaut*, Institut Polytechnique de Grenoble, Consortium des Moyens Technologiques Communs, Saint Martin d'Hères, France
- 10h00 **Interactive area analysis with EBSD**, *René de Kloe*, Edax BV, Tilburg, The Netherlands
- 10h30 Coffee
- 11h15 **Novel EBSD-TEM like technique: texture analysis, orientation and phase maps on nanostructured materials**, *Stavros Nicolopoulos*, NanoMEGAS, Brussels, Belgium

- 11h45      **Advances in EBSD hardware and software, enabling efficient low kV analysis for high spatial resolution and beam sensitive materials**,  
*Keith Dicks*, Oxford Instruments NanoAnalysis Ltd., High Wycombe, Great Britain
- 12h15      Round-table discussion:  
**Electron backscatter diffraction**  
*Moderator*: Luca Peruzzo, C.N.R. - Consiglio Nazionale delle Ricerche, Istituto di Geoscienze e Georisorse (IGG), Padua, Italy
- 13h00      **Closing ceremony**

## **Posters presentations**

All participants to the workshop are invited to make a poster presentation. Abstracts must be submitted electronically to the workshop secretariat at the address given below before 15 April 2012. The International Scientific Committee will review all submitted abstracts. Authors will be notified of the acceptance of their poster(s) by 30 April 2012.

### **Abstract format**

One camera-ready A4 page (3 cm all-round margins, no indents, 12-point font size, single line spacing) containing:

TITLE OF ABSTRACT

N. Ames, O.F. Authors

Affiliations

(free line)

Text of abstract without figures, photographs or tables.

Abstracts should be sent in Word or WordPerfect or Rich Text Format (RTF) by e-mail to the workshop secretariat with an accompanying electronic version of a passport-style photograph of the presenting author (in either tiff- or jpeg-format; 300 dpi resolution at a size of approx. 5 cm high by 4 cm wide). The photograph will be reproduced in the *Book of Tutorials and Abstracts* to assist other participants to contact the author during the Workshop.

## **Proceedings**

Selected authors will be invited to submit a manuscript for publication in an issue of the journal *Microscopy and Microanalysis*, to appear some months after the Workshop. All submitted papers will be peer-reviewed. Manuscripts will have to be submitted using the journal's on-line submission procedure.

### 3. REGISTRATION

Participants are requested to complete and return the attached registration form to the workshop secretariat as soon as possible, preferably before 15 May 2012.

#### Workshop registration fees

|                       | Early registration<br>(before 15 May) | Late registration<br>(after 15 May) |
|-----------------------|---------------------------------------|-------------------------------------|
| EMAS member           | € 350                                 | € 400                               |
| Non-member            | € 400                                 | € 450                               |
| Student (ID required) | € 175                                 | € 200                               |
| EMAS grant            | free                                  |                                     |
| Accompanying person   | € 125                                 |                                     |
| 1-day ticket          | € 150                                 |                                     |

The registration fee for respectively EMAS members, non-members, students and EMAS Grant recipients, includes a copy of the workshop's *Book of Tutorials and Abstracts* (invited lectures manuscripts and poster abstracts), two lunches, and coffee/refreshment breaks during the workshop, the welcome reception (Sunday 17 June), and the workshop dinner (Tuesday 19 June).

The accompanying person fee includes all lunches and coffee/refreshment breaks during the workshop, the welcome reception (Sunday 17 June), and the workshop dinner (Tuesday 19 June).

The 1-day ticket includes a copy of the workshop's *Book of Tutorials and Abstracts*, lunch and the coffee/refreshment breaks on the day of attendance.

#### Payment

Payment of the registration fee, without charges to the beneficiary, should be made to the European Microbeam Analysis Society. Payment can be made by:

- a) bank transfer to EMAS 2012 IBAN account no. BE72 9530 3981 3516, BIC/Swift code: CTBK BE BX, at the Citibank (Statielei 95, BE-2640 Mortsel, Belgium);
- b) a bank cheque in Euro, drawn on a Belgian bank, to the order of EMAS 2012 (attn. Luc Van't dack) and mailed to the workshop secretariat;
- c) credit cards: Visa, Mastercard, American Express (please complete and sign the relevant part on the registration form).

## **Cancellation policy**

A refund of the registration fee (less € 50 administration costs) will be granted only if notification of cancellation is given to the workshop secretariat before 1 June 2012. After this date no refund will be made. Refunds will be processed after the Workshop.

## **EMAS grants and support for participants**

Some EMAS grants are available to undergraduate and PhD students, young scientists (< 30 years of age) and technicians. Applicants need to be (student) members of EMAS. Applications should be made to the workshop secretariat as soon as possible, and not later than 15 April 2012, enclosing a copy of their student ID if applicable, and a letter of recommendation from their supervisor. Grant recipients are required to present a poster (the abstract should be included with the application). Included in the EMAS grant is a free registration and a maximum of 3 nights hotel accommodation in a shared twin room assigned by the workshop organisers. Grant recipients will have to submit a duly completed registration form by the early registration deadline of May 15th, 2012.

## **Personal data**

Personal information supplied to EMAS will be held on computer and will be used only for purposes connected with the activities of the European Microbeam Analysis Society.

## **Insurance**

The organisers cannot be held responsible for any personal accident or damage to the property of the participants.

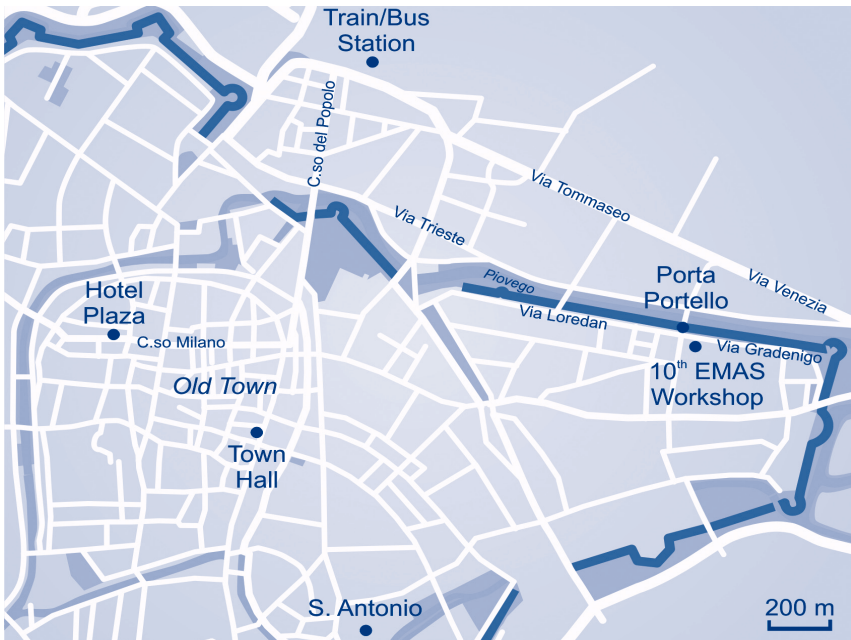
## **Hotel accommodation**

Hotel accommodation is widely available in Padua. The following website can help you choose the one you desire: <http://www.welcomepadua.it/search/hotel/en>

## 4. LOCATION

The workshop will be held at the Department of Geosciences, via G. Gradenigo 6, Padua, close to “Porta Portello”, one of the old city gates (built in 1518). The entrance of the Department, a modern, black building, is about 20 m east of the gate, on the southern side of the Piovego canal.

For further information, see <http://www.geoscienze.unipd.it/>. The workshop venue can easily be reached from the city centre on foot or by public transport.



### How to get to Padua ...

- **By air:** several airports are located in the vicinity of Padua (Venice, Treviso, Verona, Bologna) with fast train or bus connections to the city.

- **By train:** Padua is very well served by the train system. EurostarCity and Intercity trains require a supplementary tariff, and sometimes a seat reservation; in this case tickets are valid only for the train specified when buying the ticket. Tickets have to be stamped at validating yellow machines before boarding the train.

Information: [http://www.ferroviedellostato.it/homepage\\_en.html](http://www.ferroviedellostato.it/homepage_en.html)

- **By car:** Padua is linked by highways with Venice (A4), Milan (A4) and Bologna (A13). Highways require a toll; major credit cards are accepted using the lanes marked: “FastPay” or “Viacard”; cash lanes are unmarked. Exit “Padova Est”.

## Sightseeing

After having explored the many tourist sites in Padua and surroundings (<http://www.turismopadova.it/>), participants are advised to take advantage of the proximity to Venice (1/2 hour train ride, frequent runs) and add at least one day to their stay.

## About the Istituto di Geoscienze e Georisorse (IGG) - C.N.R. and the Dipartimento di Geoscienze - Università di Padova

The Institute for Geosciences and Earth Resources (IGG) is part of the Department of Earth and Environment of the Italian National Research Council (C.N.R.). IGG headquarters are in Pisa, it consists of six operative research units located in Florence, Padua, Pavia, Pisa, Rome, and Turin. IGG deals with both basic and applied research in mineralogy, petrology, geochemistry, geodynamics and geophysics on issues regarding both the interior and the surface of the Earth. Its mission is to investigate the technological use of geo-materials, the mitigation of natural hazards and the management of Earth resources for a sustainable development. Research topics of the Padua local unit include the application of analytical techniques used in the field of Earth Sciences to other fields such as cultural heritage, archaeology, ceramics, cements and other industrial materials. CNR-IGG and the Department of Geosciences of Padua University are jointly expanding their research activities into the application of EBSD techniques to the most diverse kind of solid materials.

For more information see the Institute's websites:

- <http://www.igg.cnr.it/>

- <http://www.geoscienze.unipd.it/>

## 5. KEY DATES

|                        |   |
|------------------------|---|
| <b>15 April 2012</b>   | deadline for submission of abstracts for poster presentations |
| <b>15 April 2012</b>   | deadline for applications for grants and financial support    |
| <b>30 April 2012</b>   | notification of acceptance of poster contributions            |
| <b>30 April 2012</b>   | notification of decisions on grants and financial support     |
| <b>15 May 2012</b>     | early registration deadline                                   |
| <b>17-20 June 2012</b> | EMAS 2012 Workshop, Padua, Italy                              |

## **6. WORKSHOP COMMITTEES, SECRETARIAT, WEBSITE**

### **International Scientific Committee**

|                              |    |
|------------------------------|----|
| Hans Dijkstra                | NL |
| Anna M. Fioretti             | IT |
| János Lábár                  | HU |
| Xavier Llovet                | ES |
| Michael B. Matthews          | UK |
| Luca Peruzzo                 | IT |
| Silvia Richter               | DE |
| Romano Rinaldi (Chairperson) | IT |
| Richard Spiess               | IT |

### **Local Organising Committee**

|                                |    |
|--------------------------------|----|
| Anna M. Fioretti (Chairperson) | IT |
| Luca Peruzzo                   | IT |
| Romano Rinaldi                 | IT |
| Luc Van't dack                 | BE |

### **Workshop Secretariat**

European Microbeam Analysis Society (EMAS)  
c/o University of Antwerp  
Department of Chemistry, Research group PLASMANT  
Mr. Luc Van't dack  
Campus Drie Eiken, Universiteitsplein 1  
BE-2610 Antwerp-Wilrijk, Belgium  
tel: +32-3-265.23.43, fax: +32-3-265.23.43  
e-mail: luc.vantdack@ua.ac.be  
URL: <http://www.emas-web.net/>