microscopie

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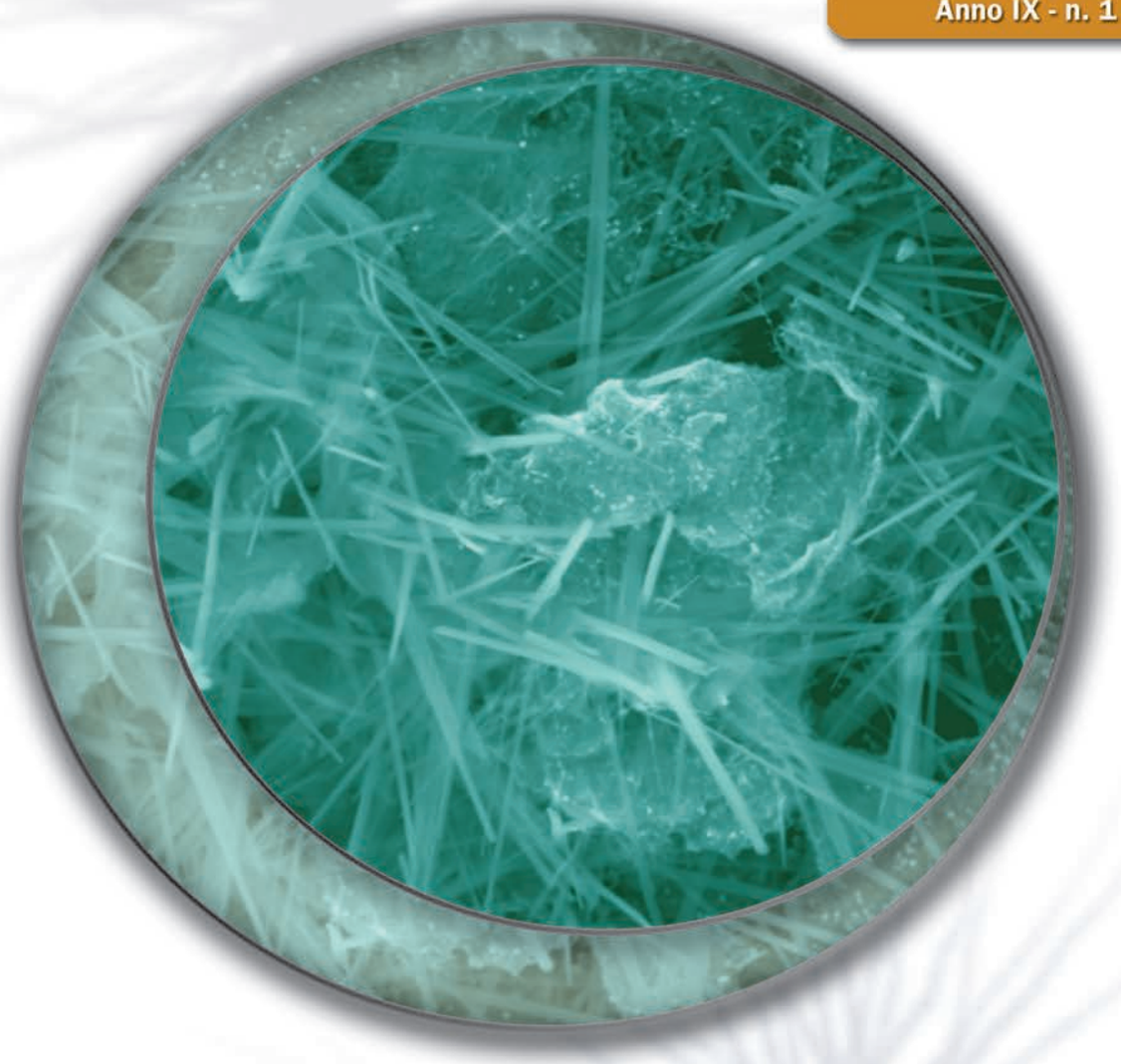

Attività SISM 2012
Dreiländertagung MC 2013
Ernst Ruska Prize 2013

Società Italiana
Scienze Microscopiche

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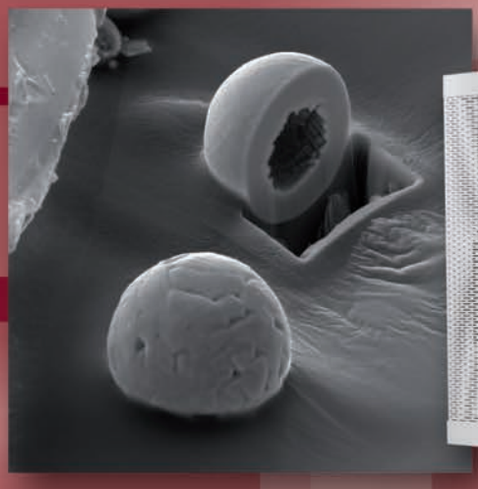

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http://www.sism.it

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Aut. Trib. n. 688 S.P. del 26 marzo 2008

In copertina: *Cristalli di ossido di magnesio su nanotubi di carbonio a parete multipla al SEM*
di Daniele Mirabile Gattia, ENEA, Roma

Indice

ISCRIZIONE

Possono iscriversi alla Società i ricercatori e gli operatori professionali comunque attivi nel campo delle diverse microscopie. Per l'iscrizione alla Società è necessario compilare la richiesta di associazione ed inviarla al Presidente. La scheda di associazione può essere compilata direttamente sul sito web della società all'indirizzo www.sism.it oppure può essere reperita in questo periodico ed inviata via fax. Le richieste verranno valutate dal Consiglio DIrettivo nella prima riunione utile e l'approvazione dei nuovi Soci sarà comunicata personalmente agli interessati. Dopo tale comunicazione il nuovo socio può procedere al pagamento della quota sociale secondo le modalità riportate sotto.

QUOTA SOCIALE

La quota sociale è di € 35 per i soci ordinari e di € 25 per i non strutturati. I soci non strutturati, unitamente alla quota sociale, dovranno far pervenire al Presidente della Società una dichiarazione attestante il proprio status.
Modalità di pagamento:

a) mediante carta di credito dal sito www.sism.it
b) mediante invio di un assegno bancario non trasferibile intestato a S.I.S.M.
l'assegno deve essere spedito alla Dott.ssa Amelia Montone, ENEA, Dipartimento Tecnologie Fisiche e Nuovi Materiali, C.R. Casaccia, Via Anguillarese, 301 - 00123 Roma
c) mediante bonifico bancario intestato a S.I.S.M.
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SOCIETÀ ITALIANA SCIENZE MICROSCOPICHE

Richiesta di associazione

Si ricorda che le richieste di associazione verranno valutate dal Consiglio Direttivo e l'approvazione dei nuovi Soci verrà comunicata personalmente agli interessati.
Il pagamento della quota di associazione deve essere effettuato solo dopo il ricevimento della comunicazione dell'approvazione, da parte del Direttivo, della richiesta di associazione.

Il sottoscritto rischiede l'ammissione alla SISM in qualità di:

❑ Socio ordinario (35 euro)

❑ Socio non strutturato (25 euro)

Titolo, Nome e Cognome

Data di nascita

Titolo di studio e qualifica

Tipo di istituzione

❑ Università ❑ CNR ❑ Industria ❑ Commerciale ❑ Altro ente pubblico di ricerca

Istituto/Ente/Ditta

Dipartimento

Indirizzo

Città CAP

Telefono Fax E-mail

Indirizzo cui inviare la corrispondenza, se diverso dal precedente

Settore di attività

❑ Biomedico ❑ Scienza dei materiali ❑ Commerciale ❑ Altro (specificare) _____

Come deliberato nell'Assemblea Generale del 24/09/2001 ogni Socio SISM è anche Socio EMS.
Questi stessi dati saranno pertanto automaticamente inviati anche all'EMS, di cui la SISM fa parte. I dati dei Soci sono utilizzati dalla Segreteria EMS per distribuire il Notiziario in forma elettronica, per annunciare informazioni importanti come Congressi, Corsi, Scuole e per pubblicare l'Annuario dei Soci EMS.
Se si desidera che i propri dati personali non compaiano nell'annuario EMS, selezionare l'apposita opzione.

❑ Chiedo che il mio indirizzo privato non compaia nell'annuario EMS
❑ Chiedo che il mio numero di telefono/fax non compaia nell'annuario EMS

Data _____ Firma _____

Inviare via fax a:
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ENEA, Dipartimento Tecnologie Fisiche e Nuovi Materiali C.R. Casaccia, Via Anguillarese, 301 00123 Roma
Tel +39.06.30484762/4764 Fax +39.06.30483176

Editoriale

Cari Amici,

mancano pochi giorni alla scadenza della sottomissione degli abstract all'EMC 2012, the 15th European Microscopy Congress, Manchester Central, United Kingdom dal 16 al 21 Settembre 2012. Per favorire la partecipazione dei giovani a questo evento, la Società Italiana di Scienze Microscopiche ha bandito il premio SISM 2012 che scade in concomitanza con la deadline degli abstract dell'EMC 2012. Sta iniziando l'organizzazione per l'MC 2013, Microscopy Conference, che si terrà a Regensburg dal 25 al 30 Agosto 2013, attraverso i primi contatti con le diverse Società di Microscopia coinvolte. L'IMC 2014, International Microscopy Congress che si terrà a Praga, ha già presentato il programma scientifico (www.imc2014.com). La SISM è fortemente attiva e presente in tutti questi eventi internazionali.
A livello nazionale saranno organizzati quattro eventi, due più focalizzati sulla strumentazione e due su applicazioni specifiche alla microscopia, troverete all'interno della Rivista i dettagli. Abbiamo cercato di rispondere alle esigenze dei nostri Soci nelle proposte presentate; se desiderate proporre qualche altra iniziativa saremo ben lieti di accoglierla.
Per gli aggiornamenti sulle attività SISM vi invito a consultare il nostro sito web (http://www.sism.it/).
Sono ancora pochi i Soci in regola con il pagamento delle quote associative, vi ricordo che i Soci morosi da oltre due anni sono considerati decaduti dalla Società e questo comporta la cancellazione dall'elenco dei Soci SISM e dall'elenco dei Soci EMS, vi prego quindi di mettervi in regola al più presto per continuare ad essere parte attiva della SISM.
Le iniziative della SISM del 2011 si sono concluse con successo, ringraziamo le numerose ditte che hanno sponsorizzato i nostri eventi ed hanno collaborato attivamente con noi.
A nome del Consiglio Direttivo – Elisabetta Falcieri, Roberto Balboni, Manuela Malatesta, Cristiano Albonetti, Rita Musetti ed Andrea Tombesi, – desidero ringraziarvi per la fiducia che ci avete accordato; lavoreremo al meglio in questi due anni per la nostra Società.
Per continuare a far crescere la SISM è indispensabile che ogni Socio sia attivo; con piacere riceviamo suggerimenti per nuove iniziative scientifiche, per patrocini ad eventi di alto livello scientifico, per migliorare il nostro sito e la nostra rivista; grazie a tutti i numerosi Soci che ci hanno contattato e che hanno permesso di migliorare la SISM!
Buon lavoro e buona lettura!

Amelia Montone

Editoriale

Cari Soci,

per prima cosa, un doveroso ringraziamento a Voi tutti, per la fiducia nuovamente accordatami nelle ultime votazioni per il Consiglio Direttivo della Società, ed ai Consiglieri per avermi nuovamente affidato la Direzione della nostra Rivista. Un impegno, quest'ultimo, che assumo nella consapevolezza delle obiettive difficoltà che tutti noi ci troveremo ad affrontare, nel prossimo futuro, nella nostra attività di ricerca, e che potrebbero riflettersi anche nella sezione scientifica di Microscopie.
A fronte di una ricca offerta di attività didattico-formative, che troverete dettagliate all'interno di questo numero e che dimostrano il costante impegno di Direttivo e Soci nell'organizzazione di Scuole e Corsi, fa riscontro un limitato numero di articoli: sono, infatti, presenti solamente i due interessanti lavori scientifici a firma di Alessandro Gambardella e Marzia Giagnacovo, vincitori dei Premi intitolati a Carla Milanesi, rispettivamente per il settore di Scienza dei Materiali e Scienze Biomediche.
La SISM è una Società certamente viva ed in sviluppo, come dimostrano le continue domande di associazione da parte di giovani ricercatori desiderosi, evidentemente, di entrare appieno nel mondo della microscopia. Purtroppo, già dallo scorso anno, è emersa una diminuzione nel numero di manoscritti sottoposti per la pubblicazione alla Redazione di Microscopie.
Probabilmente, anche sotto la spinta emotiva di sbandierati controlli di produttività cui tutti dovremmo essere, in futuro, sottoposti, ciascuno di noi (giovani in testa) concentra i propri sforzi creativi verso la pubblicazione in affermati giornali di settore. Ciò è indubitabilmente positivo, ma desidero ricordare l'importanza e l'utilità della nostra rivista come palestra per i giovani per imparare a scrivere e sottomettere un manoscritto come primi autori in un ambito meno complesso e competitivo delle riviste internazionali, avvalendosi dei consigli e suggerimenti del Consiglio Direttivo come revisori. Ricordo che uno degli obiettivi che Microscopie, come organo ufficiale della SISM, si prefigge è la diffusione, prima di tutto tra i Soci, dell'informazione sulle attività di ricerca e studio alle quali, in special modo, le giovani leve si stanno dedicando.
Microscopie deve riconquistare pienamente questa dimensione informativa, proponendosi nel contempo come un utile *forum* di discussione e confronto scientifico.
Siamo tutti consapevoli delle difficoltà, essenzialmente di ordine economico, che le nostre Istituzioni stanno attraversando, ma proprio per questo è necessario rinnovare l'impegno a sostenere sempre di più tutte quelle attività che, senza alcun fine di lucro, la SISM porta avanti da tanti anni.
È in questo spirito che ho accettato di buon grado il mandato di Direttore per un ulteriore biennio: mio primo obiettivo sarà incrementare sensibilmente la sezione scientifica di Microscopie sin dal prossimo numero e, per raggiungere questo risultato, chiedo a tutti i Soci di unirsi all'impegno del Consiglio Direttivo attraverso tutte le forme di pubblicazione (lavori originali, note tecniche, presentazione di laboratori e attività di servizio, recensioni di volumi) che coprano, finalmente, tutto il ventaglio di competenze della Società.
Dopo questo auspicio, Vi lascio alla meditata lettura di questo fascicolo.
Con viva cordialità,

Manuela Malatesta

Consiglio direttivo della SISM

Verbale della riunione del 5 settembre 2011

Campus Scientifico Sogesta, Urbino

Il giorno 5 settembre 2011, alle ore 13:00, presso il Campus Scientifico Sogesta (Aula N) di Urbino, in occasione del MCM 2011, è convocata una riunione del Consiglio Direttivo SISM, per discutere il seguente OdG:

1. Approvazione del verbale della riunione precedente.
2. Approvazione della Relazione del CD sulla gestione scientifica ed economica della SISM nel biennio 2010-2011.
3. Situazione economica della Società.
4. Approvazione della Relazione del Direttore di "Microscopie" sulla gestione scientifica della rivista.
5. Valutazione candidature per MCM 2013.
6. Stato organizzativo attività SISM 2011 e valutazioni preliminari attività 2012.
7. Aggiornamenti rivista Microscopie e sito web.
8. Definizione delle modalità di voto per il rinnovo delle cariche sociali.
9. Proposta di Soci Onorari.
10. Approvazione ammissione nuovi Soci.
11. Contributi di partecipazione al MCM 2011 e Premi Carla Milanesi.
12. Varie ed eventuali.

Sono presenti: *Roberto Balboni*, *Elisabetta Falcieri*, *Manuela Malatesta*, *Amelia Montone*, *Mario Raspanti e Andrea Tombesi*
Assenti giustificati: *Fabio Biscarini*.
Presiede *Amelia Montone*; svolge le funzioni di segretario verbalizzante *Roberto Balboni*.

1. Il verbale della riunione del Direttivo del 14 giugno 2011 viene approvato all'unanimità.
2. Il Presidente dà lettura della Relazione. La Relazione è approvata all'unanimità e viene allegata al verbale dell'Assemblea.
3. Viene posto in visione ai consiglieri il bilancio per l'anno 2010; il bilancio è approvato per la presentazione all'Assemblea dei Soci per l'approvazione definitiva (allegato al verbale dell'Assemblea). Viene altresì presentata la situazione economica provvisoria per l'anno in corso.
4. La relazione del responsabile della rivista Manuela Malatesta è approvata dai consiglieri per la presentazione all'Assemblea dei Soci (allegata al verbale dell'Assemblea).

5. Il Presidente illustra ai consiglieri il risultato delle consultazioni avute finora con i rappresentanti delle altre società facenti capo al MCM. Sarà presentata una proposta ungherese di organizzare il MCM 2013 e la proposta di associarsi al Dreiländertagung 2013 che si terrà a Regensburg. Pur desiderando favorire un congresso che mantenga la peculiarità del MCM, si decide di attendere le due presentazioni durante il board MCM prima di assumere una decisione definitiva.
   Il Presidente informa altresì che è pervenuta una richiesta da parte della società turca di microscopia di partecipare come ospite all'organizzazione del prossimo MCM. Anche questa richiesta verrà portata al board MCM.

6. È confermata la *Scuola teorico-pratica di Microscopia Elettronica a Scansione in Scienza dei Materiali* organizzata da Amelia Montone, prevista dal 4 al 6 Ottobre 2011.
   È confermata la *Scuola Avanzata di Microscopia a Scansione di Sonda* organizzata da Fabio Biscarini e Cristiano Albonetti, prevista dal 28 novembre al 3 dicembre 2011.
   Per l'anno 2012 vengono formulate le seguenti ipotesi di attività:
   - La *Scuola base per l'utilizzo del microscopio elettronico a trasmissione in area biomedica e materiali* organizzata da Andrea Tombesi a Modena associandola ad una scuola di microscopia confocale già prevista
   - La *Scuola TEM in Scienza dei Materiali* a Bologna a cura del gruppo di Microscopia Elettronica del CNR-IMM Bologna
   Per questi eventi, si chiede ai proponenti di formulare una proposta definitiva per il prossimo Consiglio Direttivo.

7. Non risultano novità di rilievo rispetto a quanto già discusso nelle precedenti riunioni.

8. A norma del regolamento elettorale, si decide che le votazioni per l'elezione del prossimo Direttivo della Società saranno effettuate via posta ordinaria.

9. Il Consiglio Direttivo delibera all'unanimità di proporre all'Assemblea dei Soci la nomina di Pier Luigi Fabbri e Daniela Quaglino a soci onorari della Società.

10. Il Consiglio Direttivo approva l'ammissione dei soci:
    Dr. Marino Battagliarin
    Dr. Manuel Scimeca
    Dr.ssa Maria Condello
    Dr.ssa Giulia Foschi
    Dr.ssa Marianna Barbalinardo

11. Dopo aver ricevuto comunicazione che la Dr.ssa Maria Condello non potrà essere presente al Congresso, è stato deliberato di assegnare il contributo di partecipazione al MCM 2011 alla Dr.ssa Giuseppina Bozzuto, prima in graduatoria dopo i vincitori.

12. Nulla da deliberare.

Alle ore 14:15, null'altro essendovi da deliberare, il Presidente dichiara chiusa la seduta.

Amelia Montone
Roberto Balboni
Elisabetta Falcieri
Manuela Malatesta
Mario Raspanti
Andrea Tombesi

Bando per l'assegnazione del **Premio SISM 2012**

In occasione del **15th EMC** (European Microscopy Congress) che si svolgerà a Manchester, UK, 16-21 settembre 2012, al fine di dare visibilità alla microscopia italiana, favorendo e premiando la partecipazione di giovani e valenti microscopisti, la Società Italiana Scienze Microscopiche (SISM) bandisce un Premio riservato a due **giovani ricercatori**, di età non superiore a 35 anni (al momento della scadenza del bando), che presentino un contributo scientifico al prossimo Congresso Europeo. Il Premio verrà assegnato sulla base dell'insindacabile giudizio del Consiglio Direttivo SISM che, nello stilare le graduatorie di merito, terrà conto dei seguenti elementi di giudizio:

- Interesse ed originalità del contributo inviato al Congresso
- Curriculum vitae, completo di elenco delle pubblicazioni e di una breve descrizione delle principali tematiche di ricerca che evidenzi l'importanza dell'impiego delle tecniche microscopiche nel contesto delle indagini affrontate dal candidato
- Qualità e numero delle pubblicazioni scientifiche inerenti alle tematiche di microscopia
- Iscrizione alla SISM (a parità di giudizio, l'iscrizione costituirà titolo preferenziale)

I due premi, dell'ammontare di **€ 1000,00** ciascuno, uno per l'**area biologica** ed uno per l'**area di scienza dei materiali**, verranno assegnati ai vincitori, che dovranno partecipare e presentare un contributo al prossimo EMC e preparare un articolo rappresentativo della loro attività di ricerca da pubblicare sulla rivista "Microscopie".

Ai primi 5 classificati della graduatoria del settore biologico e di quella del settore di scienza dei materiali verrà offerta l'iscrizione gratuita alla SISM per due anni, in riconoscimento della pertinenza e dell'eccellenza del curriculum scientifico.

Chi desidera partecipare dovrà indicare il settore (biologico o di scienza dei materiali) che ritiene più affine alla propria ricerca, inviare copia del contributo inviato al 15th EMC e quanto ritenga utile ai fini della valutazione. Tutta la documentazione deve essere inviata esclusivamente per e-mail al Presidente SISM all'indirizzo:

amelia.montone@enea.it

Al ricevimento della documentazione verrà data e-mail di conferma dell'avvenuta ricezione.

La data di scadenza del presente bando coincide con la data di scadenza della presentazione degli Abstracts al 15th EMC.

Elenco delle attività promosse dalla SISM nel 2012

1. Giornate di studio su Le Microscopie e i beni culturali: tecniche, applicazioni e prospettive
Parco scientifico e tecnologico della Sardegna, giugno 2012

L'incontro, organizzato dal Laboratorio di Telemicroscopia di Sardegna Ricerche in collaborazione con la Società Italiana Scienze Microscopiche e l'Università degli Studi di Cagliari, della durata di due giorni, tratterà i principi della microscopia elettronica a scansione e trasmissione e le loro applicazioni nel campo della conservazione e restauro del Patrimonio Artistico. Le giornate di studio sono rivolte a tutti coloro che, in forme diverse, si interessano alla tutela del patrimonio culturale, sia dal punto di vista storico-artistico che da quello più strettamente tecnico-metodologico e in particolare a ricercatori, studenti e tecnici interessati alle specifiche tecniche di indagine. Ai partecipanti verrà fornito un quadro generale di base sulle applicazioni della microscopia applicata alla conservazione dei beni culturali e verranno presentati diversi casi applicativi in vari settori come il lapideo, la caratterizzazione di manufatti metallici, l' archeo-botanica e la caratterizzazione di pigmenti e i loro leganti. Sarà prevista anche una visita al sito archeologico di Nora (CA).
Per informazioni: Simona Podda (poddas@crs4.it)

2. Corso Base integrato di microscopia confocale e microscopia elettronica a trasmissione
Modena, C.I.G.S. (Universitá degli Studi di Modena e Reggio Emilia), settembre 2012

La Scuola, organizzata dalla Società Italiana di Immunobiologia comparata e dello Sviluppo (SIICS) e dalla Società Italiana di Scienze Microscopiche (SISM) in collaborazione con il Centro Interdipartimentale Grandi Strumenti (CIGS), ha come obiettivo quello di fornire principi e tecniche di base per l'utilizzo del microscopio confocale e del microscopio elettronico a trasmissione.
La Scuola è rivolta a ricercatori, tecnici e studenti interessati alle applicazioni di microscopia confocale ed elettronica a trasmissione in ambito biomedico.
La Scuola sarà organizzata sia con lezioni teoriche che con sessioni pratiche presso le aule e i laboratori del CIGS e comprenderà anche esercitazioni individuali o in coppia di analisi di immagini in un laboratorio di informatica.
Per informazioni: Dr. Davide Malagoli (davide.malagoli@unimore.it) - Microscopia confocale
Dr. Andrea Tombesi (andrea.tombesi@unimore.it) - Microscopia elettronica a trasmissione

3. Scuola teorico-pratica "Pier Giorgio Merli" di Microscopia Elettronica in Trasmissione in Scienza dei Materiali
Istituto CNR-IMM Bologna, novembre 2012 - febbraio 2013

La scuola, organizzata congiuntamente dalla SISM e dal CNR-IMM di Bologna, si rivolge a ricercatori e microscopisti che desiderano acquisire una qualificata introduzione alle tecniche di microscopia elettronica in trasmissione applicata alla Scienza dei Materiali. Oltre ai principi di funzionamento dello strumento, ai partecipanti verrà fornito un quadro teorico di base della disciplina ed una descrizione delle principali applicazioni nell'indagine strutturale ed analitica. Gli argomenti trattati comprendono: ottica e diffrazione elettronica, teoria del contrasto, risoluzione atomica con tecniche di imaging coerenti (HREM) e incoerenti (STEM con rivelatore HAADF), olografia elettronica, tecnica CBED, metodi analitici (EDX e EELS). La scuola sarà strutturata in una parte teorica, durante la prima settimana (prevista per novembre 2012), ed una parte pratica la seconda settimana (febbraio 2013). Durante la parte pratica i partecipanti avranno la possibilità di operare direttamente allo strumento utilizzando le metodologie trattate teoricamente; nella parte pratica è anche prevista una sezione dedicata alla preparazione dei campioni.
Sarà possibile la partecipazione all'intero corso, o alla sola parte teorica.
Per informazioni: Dr. Roberto Balboni (balboni@bo.imm.cnr.it),
Dr. Andrea Parisini (parisini@bo.imm.cnr.it)

4. Workshop teorico-pratico "La microscopia confocale nello studio del citoscheletro"
Campus E. Mattei, Urbino, 13-14 dicembre 2012

L'evento, organizzato dalla SISM, con il supporto del Dipartimento di Scienze della Terra, della Vita e dell'Ambiente dell'Università degli Studi di Urbino "Carlo Bo", si svolgerà il 13 e il 14 dicembre 2012 presso il campus E. Mattei di Urbino.
Il citoscheletro, come è noto, è un argomento di carattere trasversale e di ampio interesse, che riveste una sempre maggiore importanza sia nella ricerca biomedica di base che in numerosi ambiti più specifici. La presenza, inoltre, in commercio, di un numero sempre più alto di validissimi anticorpi monoclonali, oltrechè di una grande varietà di fluorocromi, ne permette una crescente caratterizzazione in microscopia confocale. Il Workshop si articolerà in una parte pratica, dedicata ai metodi di preparazione per la microscopia confocale, alle caratteristiche dei vari fluorocromi, all'analisi e all'elaborazione dell'immagine nonchè all'osservazione di campioni dedicati. Inoltre, relatori di indiscussa autorevolezza illustreranno, nell'Aula Magna del Campus, i loro dati più recenti sulle più note componenti citoscheletriche. Il Workshop è dedicato a ricercatori di varia provenienza e di interesse biomedico, con particolare attenzione al ruolo del citoscheletro. La SISM si riserva di proporre quote di iscrizione molto basse e differenziate, oltrechè comprensive del pernottamento/prima colazione nelle stanze delle residenze universitarie.
Per informazioni: Prof. Elisabetta Falcieri (elisabetta.falcieri@uniurb.it)

Resoconto della scuola SISM

Scuola teorico-pratica di Microscopia Elettronica a Scansione in Scienza dei Materiali

4-6 ottobre 2011
ENEA, Centro Ricerche Casaccia, Roma

Direzione scientifica: Amelia Montone (CR ENEA Casaccia)

Nel corso delle lezioni della scuola, organizzata dalla SISM e realizzata in collaborazione con l'ENEA, sono stati affrontati i principi che sono alla base della Microscopia Elettronica a Scansione (SEM) nonché le sue applicazioni con una particolare attenzione al campo della Scienza dei Materiali. La scuola ha visto la partecipazione di oltre 20 persone tra tecnici, ricercatori e studenti i quali hanno potuto acquisire i principi base della microscopia elettronica attraverso le lezioni teoriche ma anche iniziare ad utilizzare il microscopio elettronico attraverso le lezioni pratiche. Le lezioni teoriche, in particolare, sono state molto apprezzate dai partecipanti perché si è riusciti a spiegare concetti scientifici complicati in maniera chiara, senza tuttavia banalizzarli.
Elenco di seguito gli argomenti affrontati con i relative relatori:
Struttura e funzionamento del Microscopio Elettronico a Scansione (A. Tombesi);
Elementi di ottica elettronica, interazione elettrone-materia (D. Mirabile Gattia);
Rivelatori e segnali nel SEM (A. Falqui);
SEM in remoto sul web (A. Montone);
L'infrastruttura ICT dei laboratori virtuali ENEA a supporto della microscopia elettronica (S. Migliori);
La microanalisi a raggi X (A. Aurora);
La preparazione dei campioni per l'osservazione SEM (L. Pilloni);
Requisiti strumentali e operativi per ottimizzare la risoluzione SEM (M. Vittori Antisari);
Photometric Stereo: una via per il 3D al SEM (S. Podda).

Quest'anno, in particolare, si è voluto arricchire il contenuto della scuola dedicando alcune lezioni alla descrizione delle potenzialità della gestione remota del microscopio elettronico e ad illustrare alcuni esempi di elaborazione delle immagini (*image processing*) per la realizzazione di immagini 3D.
Si ringraziano le società Assing Spa, Bruker AXS Srl, FEI Italia, Gambetti, Jeol Italia, Microcontrol n.t. e 2M Strumenti per il supporto che hanno fornito a questa iniziativa attraverso la partecipazione attiva al Corso mettendo a disposizione strumentazione, materiale illustrativo e presentando le ultime novità sul SEM.
Si ringraziano, per l'ottima organizzazione del corso, Patrizia Francesconi, Fabrizio Pierdominici e Daniele Mirabile Gattia (CR ENEA Casaccia).

Annalisa Aurora

Resoconto della scuola SISM

Scuola Avanzata teorico-pratica di Microscopia a Scansione di Sonda

28 novembre – 2 dicembre 2011
CNR – Area della Ricerca, Bologna

Responsabili: Cristiano Albonetti e Fabio Biscarini

La scuola, organizzata dalla SISM in collaborazione con l'Istituto per lo Studio dei Materiali Nanostrutturati (ISMN), l'Istituto per la Sintesi Organica e la Fotoreattività (ISOF) del CNR e patrocinata dell'Area della Ricerca di Bologna e dal Dipartimento di Progettazione Molecolare, ha raggiunto l'obiettivo didattico di fornire gli strumenti teorici e sperimentali per utilizzare le tecniche più avanzate di Microscopia a Scansione di Sonda (SPM): dalle spettroscopie realizzate con il Microscopio ad effetto Tunnel in Scansione (STM, Gambardella – ISMN) fino alla Microscopia a Forza Magnetica (MFM, Tallarida – IMM Milano). Ai partecipanti era richiesta una preparazione scientifica di base ed una conoscenza diretta e pratica della microscopia SPM. Le 40 ore totali della scuola sono state divise in due unità didattiche: una teorica (20 ore) ed una sperimentale (20 ore). A chiosa della parte teorica è stata organizzata una sessione plenaria aperta al pubblico e dedicata all'uso delle microscopie SPM nell'ambito di studi molecolari e biologici. Alla lezione sull'organizzazione molecolare presentata dal Prof. Biscarini (ISMN), sono seguite le lezioni del Prof. Alessandrini (Fisica – UniMoRe) e della Dott.ssa Casalis (Elettra – Nanostructure Lab – Trieste) sull'organizzazione bio-molecolare.
Grazie all'intervento di relatori esterni, gli argomenti trattati nella parte teorica (a cui hanno partecipato 27 studenti) hanno spaziato dall'interpretazione della fase nella tecnica del contatto intermittente (Albonetti – ISMN), alla Microscopia a scansione di Forza con eccitazione ad Ultrasuoni (UFM, Dinelli – INO Pisa), passando per le tecniche di caratterizzazione elettrica ed ottica utilizzando la microscopia Kelvin Probe (KPFM, Liscio – ISOF) e la Microscopia a Scansione in Campo Prossimo (SNOM, Fuso – INO Pisa). Due lezioni di fabbricazione nanolitografica (Cavallini – ISMN) e manipolazione biologica sulla scala nanometrica (Valle – ISMN) hanno completato l'unità didattica teorica. La parte teorica è stata volutamente differenziata ed ampia per indirizzare gli studenti ad un uso completo della microscopia SPM.
Per chi lo desiderasse, il materiale didattico della scuola è disponibile *on-line* alla pagina *http://www.bo.ismn.cnr.it/boAspm/*. Per scaricarlo è necessario inviare una e-mail a Cristiano Albonetti (*c.albonetti@bo.ismn.cnr.it*) richiedendo user name e password.
La parte sperimentale (a cui hanno partecipato 18 studenti di cui 4 studenti stranieri) mirava a far utilizzare i microscopi direttamente ai partecipanti. A questo scopo le 20 ore a disposizione sono state divise in 5 tranches da 4 ore ciascuna (mattina e pomeriggio), mentre i partecipanti sono stati divisi in gruppi da 2 o 3 (8 gruppi in tutto). Ruotando ciclicamente, essi hanno provato tutte le tecniche a disposizione: STM in Ultra-Alto Vuoto (ISMN), KPFM (ISOF), AFM in aria (ISMN) e AFM in liquido (ISMN). Per ampliare l'offerta sperimentale della scuola, gli sponsors si sono resi disponibili a realizzare un "laboratorio ambulante" fruibile dai partecipanti. A tal proposito desideriamo ringraziare Pra.Ma., NT-MDT, 2M-Strumenti, Veeco, Agilent e Gambetti per la pazienza, lo sforzo didattico e lo sforzo economico a sostegno della scuola. Ringraziamo inoltre Assing, Bruker, Jeol e FEI per il sostegno economico dato.
Alla conclusione della scuola, i partecipanti e i relatori hanno ricevuto un attestato di partecipazione. Per valutare la qualità didattica ed organizzativa della scuola, è stato consegnato un questionario di valutazione, sia ai partecipanti della sola parte teorica che a quelli dell'intera scuola, composto di undici

domande ed uno spazio per i commenti liberi (ad ogni domanda era possibile rispondere con Insufficiente, Sufficiente, Buono e Ottimo corrispondenti a 1, 2, 3 e 4 punti). La valutazione didattica complessiva, calcolata come valutazione media delle cinque domande inerenti la didattica, è stata più che buona (3.44 punti su 4) e il livello di soddisfazione complessiva degli studenti più che soddisfacente (3.64 punti su 4). Grazie all'esperienza maturata nella scuola introduttiva organizzata nel 2010 ed ai commenti e suggerimenti degli studenti, la scuola avanzata ha ottenuto una valutazione più alta rispetto a quella introduttiva nonostante le già alte valutazioni registrate.

In chiusura vorremmo ringraziare coloro che hanno contribuito all'organizzazione logistica e tecnica della scuola, Patrizia Fulle e Alessandro Tugnoli: anche grazie a loro è stato possibile raggiungere un'ottima organizzazione della scuola (3.93 punti su 4).

Eventi nazionali

2012

Simposio per il 50mo anniversario dell'Istituto di Genetica e Biofisica "Adriano Buzzati-Traverso", CNR
Napoli, 1 marzo 2012

Corso di approfondimento sulle tecniche analitiche, macro e microscopiche, finalizzate al riconoscimento delle specie fungine causa di intossicazione da funghi Corso Teorico - Pratico
5 – 9 marzo 2012
7 – 11 maggio 2012
10 – 14 dicembre 2012
Scuola Umbra di Amministrazione PubblicaVilla Umbra, Pila, Perugia
Programmazione e docenza Prof.ssa Paola Follesa
http://www.scribd.com/doc/82802254/Presentazione-Corsi-Di-Microscopia

Convegni dell'Associazione di Biologia Cellulare e del Differenziamento (ABCD): Mechanisms of Signal Transduction
Firenze, 16-17 marzo 2012
http://mst2012.azuleon.org/

Corso di specializzazione in microscopia dei funghi "cortinarioidi" Corso Teorico – Pratico
19-23 marzo 2012
Scuola Umbra di Amministrazione Pubblica Villa Umbra – Pila, PERUGIA
Programmazione e docenza Fontenla Roberto e Para Roberto
http://www.spesap.it/2012/02/02/787/

Membrane Trafficking and Organelle Biogenesis meeting (MTOB)
Bertinoro (FC), 20-21 aprile 2012
http://mtob2012.azuleon.org/

Cell Stress: Survival and Apoptosis (CSSA)
Città del Mare (PA), 18-19 maggio 2012
http://cssa2012.azuleon.org/

58° convegno del Gruppo Embriologico Italiano (GEI)
Torino, 13-15 giugno 2012
http://www.gruppo-embriologico.it/
Per informazioni: congresso.gei2012@unito.it

66° Congresso Nazionale della Società Italiana di Anatomia e Istologia (S.I.A.I.).
Pistoia, 20-23 settembre 2012

73° Congresso dell'Unione Zoologica Italiana (U.Z.I.)
Firenze, 24-27 settembre 2012
http://www.uzionlus.it/

XXX Conferenza Nazionale di Citometria
GIC – Società Italiana di Citometria
Urbino, 25-28 settembre 2012
http://biotec.casaccia.enea.it/GIC/

Corso teorico-metodologico "Applicazione delle microscopie allo studio delle colture cellulari"
Istituto Superiore di Sanità
Roma, 8-9 ottobre 2012

Institute of
Genetics and Biophysics
Adriano Buzzati-Traverso

50th ANNIVERSARY SYMPOSIUM

March 1st 2012

CNR Conference Room
Via Pietro Castellino, 111
Naples

The Institute of Genetics and Biophysics Adriano Buzzati-Traverso of the National Research Council (CNR) started its activities on March 1st 1962, under the name of the International Laboratory of Genetics and Biophysics. Adriano Buzzati-Traverso, its first Director, conceived the new Laboratory based upon a vision of a then nascent, exciting new discipline, Molecular Genetics. The Laboratory was funded through a 5-year agreement between the CNR, the National Committee for Nuclear Research and the European Atomic Energy Community. Soon after, the Laboratory became one of the first Institutes of the CNR. Faithful to the original vision, today the IGB is committed to face the challenges of frontier biology.

To celebrate its 50th anniversary, the IGB is proud to offer to the scientific community a symposium contributed by internationally recognized leaders in the fields of Genetics, Developmental biology, Stem cell biology and Cancer biology.

Organizing Committee:
Alfredo Ciccodicola, Elia Di Schiavi, Maurizio Iaccarino, Gabriella Minchiotti, Antonio Simeone, Matilde Valeria Ursini

Organizing Secretariat:
Anna Maria Aliperti, Carmela Desideri, Donatella Jesu, Federica Staempfli

CNR - IGB "ABT"
Via Pietro Castellino n. 111 - 80131 Naples - Italy
Tel.+39 081 6132111 - Fax +39 081 6132706
info@igb.cnr.it - www.igb.cnr.it

Programme

Thursday March 1st

10.00 - 10.30 *Welcome Address*
Antonio Baldini - *IGB Director*
Authorities

10.30 - 11.30
Walter Gehring - *University of Basel, Switzerland*
(introduced by Giuseppina Barsacchi)
New perspectives on the evolution of vision

11.30 - 12.30
Claudio Stern - *University College London, U.K.*
(introduced by Giulio Cossu)
From cells to embryo: the magic of gastrulation

13.00 *Lunch*

15.00 - 16.00
Anders Björklund - *Lund University, Sweden*
(introduced by Daniela Toniolo)
Use of stem cells for cell replacement in Parkinson´s disease

16.00 - 17.00
Pier Paolo Pandolfi - *Beth Israel Deaconess Cancer Center, Boston, USA*
(introduced by Lucio Luzzatto)
The ceRNA hypothesis and the non-coding revolution in cancer research and therapy

17.00 *Closing Ceremony*

Corsi con il patrocinio della SISM

Corso teorico-metodologico

Applicazione delle microscopie allo studio delle colture cellulari

Roma, 8-9 ottobre 2012
Istituto Superiore di Sanità

L'Associazione Italiana di Colture Cellulari (AICC) e l'Istituto Superiore di Sanità (ISS) stanno organizzando congiuntamente il corso teorico-metodologico "Applicazione delle microscopie allo studio delle colture cellulari". Il corso, la cui direzione è stata affidata alla Dott.ssa Stefania Meschini, si svolgerà a Roma presso l'ISS nei giorni 8 e 9 ottobre 2012 e sarà articolato in lezioni e seminari sui principi delle più importanti tecniche di microscopia ottica ed elettronica e sulle loro potenzialità applicative per lo studio delle cellule in coltura.
Il programma preliminare del corso prevede lezioni, svolte da docenti interni ed esterni all'ISS, sui seguenti argomenti:

- Principi di microscopia ottica e tecniche di osservazione
- Tecniche di preparazione delle cellule in coltura per la loro osservazione al microscopio ottico
- Caratterizzazione ed analisi critica delle colture cellulari
- Microscopia a fluorescenza
- *Live cell imaging* - tecniche di microscopia *time lapse*
- La microscopia confocale a scansione laser
- Seminario: Applicazione della microscopia confocale allo studio dei meccanismi di farmacoresistenza delle cellule tumorali
- Il microscopio elettronico a trasmissione (TEM)
- Osservazione al microscopio elettronico a trasmissione dei componenti cellulari
- Il microscopio elettronico a scansione (SEM)
- Microscopia a scansione ad alta risoluzione
- Osservazione al microscopio elettronico a scansione delle cellule in coltura
- La citochimica ultrastrutturale al TEM e al SEM
- Seminario: Impiego combinato di varie tecniche microscopiche in ricerche di nanomedicina
- Presentazione delle novità strumentali da parte delle ditte

Per informazioni: Dott.ssa Stefania Meschini (stefania.meschini@iss.it)

Eventi internazionali

2012

SSOM 3D-Symposium 2012
March 5-8, 2012
Les Diablerets, Switzerland
Organization: Swiss Society for Optics and Microscopy (SSOM)

Cool Runnings - Cryo Course
A Course in Cryo-techniques for Electron Microscopy
March 18-23, 2012
Rothamsted Research, Harpenden, UK

Electron Back Scatter Diffraction Conference (EBSD) 2012
March 26-28, 2012
National Physical Laboratory (NPL), Teddington, UK
Organization: Royal Microscopical Society (RMS)

RMS Spring School in Electron Microscopy
March 26-30, 2012
University of Leeds, UK
Organization: Royal Microscopical Society (RMS)

Focus on Microscopy 2012
April 1-4, 2012
Singapore

"Quantitative Microscopy of Energy Materials" (Symposium X) session at E-MRS Spring meeting 2012
EMS sponsored event
May 14-18, 2012
Strassbourg, France
Organization: European Materials Research Society (E-MRS)

39th Annual Meeting of SCUR 2012
May 24-25, 2012
Lyon, France
Organization: Society for Cutaneous Ultrastructure Research (SCUR)
Practical EMBO Course on Electron Microscopy and Stereology in Cell Biology
June 12-22, 2012
Ceske Budejovice, Czech Republic
Main organizer: Jana Nebesarova

Electron Crystallography School - new methods and applications
June 17-20, 2012
Department of Materials and Environmental Chemistry, Stockholm University, Stockholm, Sweden

Workshop on EELS in Materials Science
June 18-20, 2012
Uppsala University, Sweden

EMBO practical course on Electron Tomography in Life Science
EMS sponsored event
June 18-23, 2012
LUMC in Leiden, The Netherlands
Organization: EMBO

International Symposium on Electron Crystallography and X-ray diffraction - from Materials Sciences to Structural Biology
June 20-22, 2012
Department of Materials and Environmental Chemistry, Stockholm University, Stockholm, Sweden

International Conference on Extended Defects in Semiconductors, EDS 2012
June 24-29, 2012
Thessaloniki, Greece

Optics Within Life Sciences (OWLS)
July 4-6, 2012
Genoa, Italy
Organization: Italian Institute of Technology

Seeing at the Nanoscale 2012
July 09-11, 2012
Wills Memorial Building, University of Bristol, UK
Organization: Bruker

Inter/Micro: 63rd Annual Applied Microscopy Conference
July 9-13, 2012
Chicago, IL, USA

EMBO practical course on Correlative Light Electron Microscopy
July 15-20, 2012
University of Bristol, UK
Main organiser: Paul Verkade

Microscopy & Microanalysis 2012 Meeting
July 29 - August 2, 2012
Phoenix Convention Center, Phoenix, AZ, USA
Organization: Microscopy Society of America (MSA), Microanalysis Society (MAS)

UltraPath XVI
Conference on Diagnostic Electron Microscopy, Basic Research & Oncology
August 6-10, 2012
University Medical Center Regensburg, Germany
Organization: Society for Ultrastructural Pathology

14th International Congress of Histochemistry and Cytochemistry (ICHC 2012)
August 26-29, 2012
Kyoto, Japan
Organization: International Federation of Societies for Histochemistry and Cytochemistry

54th Symposium of the Society for Histochemistry
September 5-8, 2012
Campus of the University of Vienna, Austria
Organization: Society for Histochemistry

15th European Microscopy Congress, emc2012
September 16-21, 2012
Manchester Central Convention Complex, Manchester, UK
Organization: EMS, RMS, EMAG

SPMonSPM - The International Conference on Scanning Probe Microscopy on Soft and Polymeric Materials
September 23-26, 2012
Rolduc Abbey, Kerkrade, The Netherlands

2013

40th Annual Meeting of SCUR 2013
May 12-14, 2013
Salzburg, Austria
Organization: Society for Cutaneous Ultrastructure Research (SCUR)

MC2013
August 25-30, 2013
Regensburg, Germany

Eventi internazionali

Website of Focus on Microscopy

FOM 2012

Focus on Microscopy 2012
Singapore
April 1 - April 4, 2012

Images courtesy Singapore tourist board

Dear colleagues,

The next Focus on Microscopy FOM 2012 Singapore meeting is close. It will take place in Singapore from Sunday April 1 to Wednesday April 4, 2012.

To see the program of the upcoming conference program just, click on program in the column on the left.

Tutorial workshops will be available before the start of the conference on Sunday 1 April afternoon from 14:00 to 16:45. Subjects and speakers are:

- Fundamentals of fluorescence imaging (G.C. Cox, University of Sydney, Australia)
- Fluorescence correlation spectroscopy (T. Wohland, National University of Singapore)
- Förster Resonance Energy Transfer (FRET) in cellular imaging (F.S. Wouters, University Medicine, Göttingen, Germany)
- Time resolved multi-tag single molecule tracking (F.M. Margadant, National University of Singapore)

Attendance is free for registered participants. See for details the program.

The conference will start around 5 o'clock in the afternoon on Sunday the 1st of April with a plenary opening session followed by a welcome reception. After the close of the conference on April 4th around 15:00h, a conference excursion/dinner is planned for the afternoon/evening.

The conference will take place at the Suntec Singapore International Convention & Exhibition centre, in the heart of Singapore and is supported by the National University of Singapore (NUS), the Nanyang Technological University (NTU), the Centre of Bioimaging Sciences (CBIS), and the Mechanobiology Institute (MBI). Details regarding registration, abstract submission, deadlines, etc. are now available on this website. If you wish to be kept informed please leave your email address here.

Singapore city is a beautiful city-state off the southern tip of the Malay Peninsula, 137 kilometers north of the equator. First settled in the 2nd century AD it has known a rich history as part of various empires, British colonial rule and finally independence in 1963. It possesses its own international airport with a direct Metro connection to the city center.

Focus on Microscopy 2012 is the continuation of a yearly conference series presenting the latest innovations in optical microscopy and their application in biology, medicine and the material sciences. Key subjects for the conference series are the theory and practice of 3D optical imaging, related 3D image processing, and reporting especially on developments in resolution and imaging modalities. The conference series is covers also the rapidly advancing fluorescence labeling techniques for the confocal and multi-photon 3D imaging of -live- biological specimens.

The FOM2012 Singapore conference is dedicated to the memory of Mats Gustafsson who after a long illness died on Sunday April 17, 2011. He pioneered super-resolution via structured illumination microscopy. He regularly attended the FOM meetings, many times as invited speaker.

Typical topics of the upcoming FOM conference will include:

• Theory and practice of confocal and multiphoton-excitation microscopys • 3D and 4D live cell and tissue imaging • Super-resolution, nanoscopy imaging: from PSF engineering (4pi, SIM, STED), fluorescent activation/quenching, stochastic/centroid to TIRF • Time-resolved fluorescence: FRET, FRAP, FLIM, FCS • Coherent non-linear microscopies: SHG, THG, SFG, CARS. • Multi-dimensional fluorescence and Raman spectroscopy imaging • Correlative Light/Electron microscopy • Laser manipulation and tracking, photo-activation • Bio- and nanomaterials, biosensors • OCT, endoscopy • Fast acquisition, automated and high-throughput microscopy techniques • 3D image processing and visualization for multidimensional data

A technical exhibition will be an integral part of the Singapore FOM2012 conference.

The programs of the previous FOM conferences from 2004 onwards together with the one page abstracts of contributions can be viewed in PDF format on this website by clicking the History button on the left and selecting the conference year.

Welcoming you to the Singapore FOM2012 conference and exhibition,
On behalf of the FocusOnMicroscopy society,

- Colin Sheppard, National University of Singapore, Singapore
- Thorsten Wohland, National University of Singapore, Singapore
- Fred Brakenhoff, University of Amsterdam, The Netherlands

The FOM2012 conference incorporates the

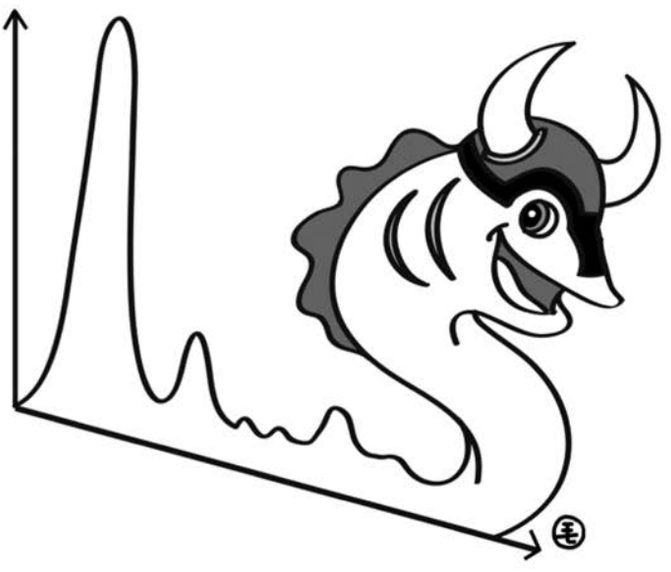
- 25th International Conference on 3D Image Processing in Microscopy
- 24th International Conference on Confocal Microscopy

Main sponsors of Focus on Microscopy 2012:

ZEISS NUS National University of Singapore

Eventi internazionali

EELS IN MATERIALS SCIENCES



The workshop on ***EELS in materials sciences*** will be held in June 18th-20th 2012 at the Ångström Laboratory in Uppsala, Sweden. The workshop addresses all microscopists that want to learn EELS, or who have made the first steps in EELS or EFTEM as well as those who are experts. The topics of the meeting will include a general introduction to EELS/EFTEM, expert presentations as well as applications of EELS and EFTEM to materials science. In special sessions topics of EELS Magnetic Circular/Linear Dichroism, challenges in resolution (spatial and energy), and complementary spectroscopies (XAS, XPS) will be addressed.
The workshop consists of two days of lectures and an additional half day of laboratory demonstrations. Renowned scientists from Scandinavia, Austria, France, Germany, US and other countries will present their work.

Seize the opportunity to learn what EELS can do for your research and how it can help you unravel the inner working mechanisms of materials.

The registration fee is 800 SEK for students and 1300 SEK for regular participants. Travel grants for students may be available, depending on the number of participants.

Deadline for registration is May 25th and for abstract submission is May 3rd.

More information can be found here:
http://personal.teknik.uu.se/Teknikvetenskaper/elmin/eels.php

Eventi internazionali

OWLS 12 - Genoa, 4-6 July 2012

MENU
REGISTRATION
ABSTRACT
ACCOMMODATION
CONFERENCE TOPICS
BURSARIES
INVITED LECTURES
SCIENTIFIC PROGRAMME
ORGANISING COMMITTEE
PROGRAMME COMMITTEE
CONGRESS DINNER
LOCATION
SPONSORS & EXHIBITORS
SOCIETIES LINKS
LINKS
CONTACTS
CLICK & LINK!

Welcome to the website for the OWLS 2012 conference July, 4th-6th 2012 Genoa, Italy.

Below you will find the link to some resources.

- Invitation letter [PDF]
- Overview Status [PDF]
- Sponsor Package [PDF]

SCIENTIFIC PROGRAM (to be updated)

SCIENTIFIC SESSIONS: 8.30am-1pm and 3.30pm-7.30pm

POSTER SESSIONS: 1pm – 3pm

INAUGURAL CEREMONY – ICO BUREAU TRIBUTE

SCOTT E. FRASER, CALTECH, CA, USA
Sala del Maggior Consiglio, Palazzo Ducale
July 3 2012 7p.m.
Genova, Italy
www.palazzoducale.genova.it

OPENING LECTURE
JULY 4 2012 8.30am.
Magazzini del Cotone **Porto Antico Congress Center**
KARSTEN KONIG, SAARBRUCKEN UNIVERSITY, GERMANY

CLOSING LECTURE AND POSTER PRIZES
JULY 6 2012 5.30pm
Magazzini del Cotone **Porto Antico Congress Center**
TO BE ANNOUNCED

OWLS EVENTS

OWLS EXEC MEETING
JULY 4 2012 1.30pm-2.30pm
Magazzini del Cotone **Porto Antico Congress Center**

OWLS GENERAL ASSEMBLY
JULY 5 2012 6pm-7.30pm
Magazzini del Cotone **Porto Antico Congress Center**

SOCIAL EVENTS

SOCIAL DINNER
JULY 5 2012 8.30pm
Villa Io Zerbino, **Genova**

CITY LIGHTS
JULY 6 2012 8.30pm
Piazza De Ferrari, Genova (De Ferrari Square)

CINQUE TERRE TOUR
JULY 7 2012 FULL DAY

Congress dates

Online registration opens	February 22th 2012
Deadline for regular registration	May 30th 2012
Onsite registration days	July 3-4-5-6 2012 View info about the venue
Online abstract submission opens	February 22th 2012
Deadline for abstract submission	May 20th 2012
Abstract acceptance communication	within 1 week after submission
Late Abstracts deadline	June 20th 2012

REGISTRATION FEE	PARTICIPANT	STUDENT	IIT MEMBERS
REGULAR (until May 30 2012)	€ 420 (incl.VAT)	€ 280 (incl.VAT)	€ 390 (incl.VAT)
LATE / ON-SITE (after May 30 2012)	€ 500 (incl.VAT)	€ 350 (incl.VAT)	€ 470 (incl.VAT)

Diamond Sponsor

Leica MICROSYSTEMS

Conference Sponsor

Nikon

TILL Photonics an FEI Company

PI

International Commission for Optics / Commission Internationale d'Optique

OWLS Society Optics within the Life Sciences

lambs

iit Istituto Italiano di Tecnologia

Società Italiana di Fisica

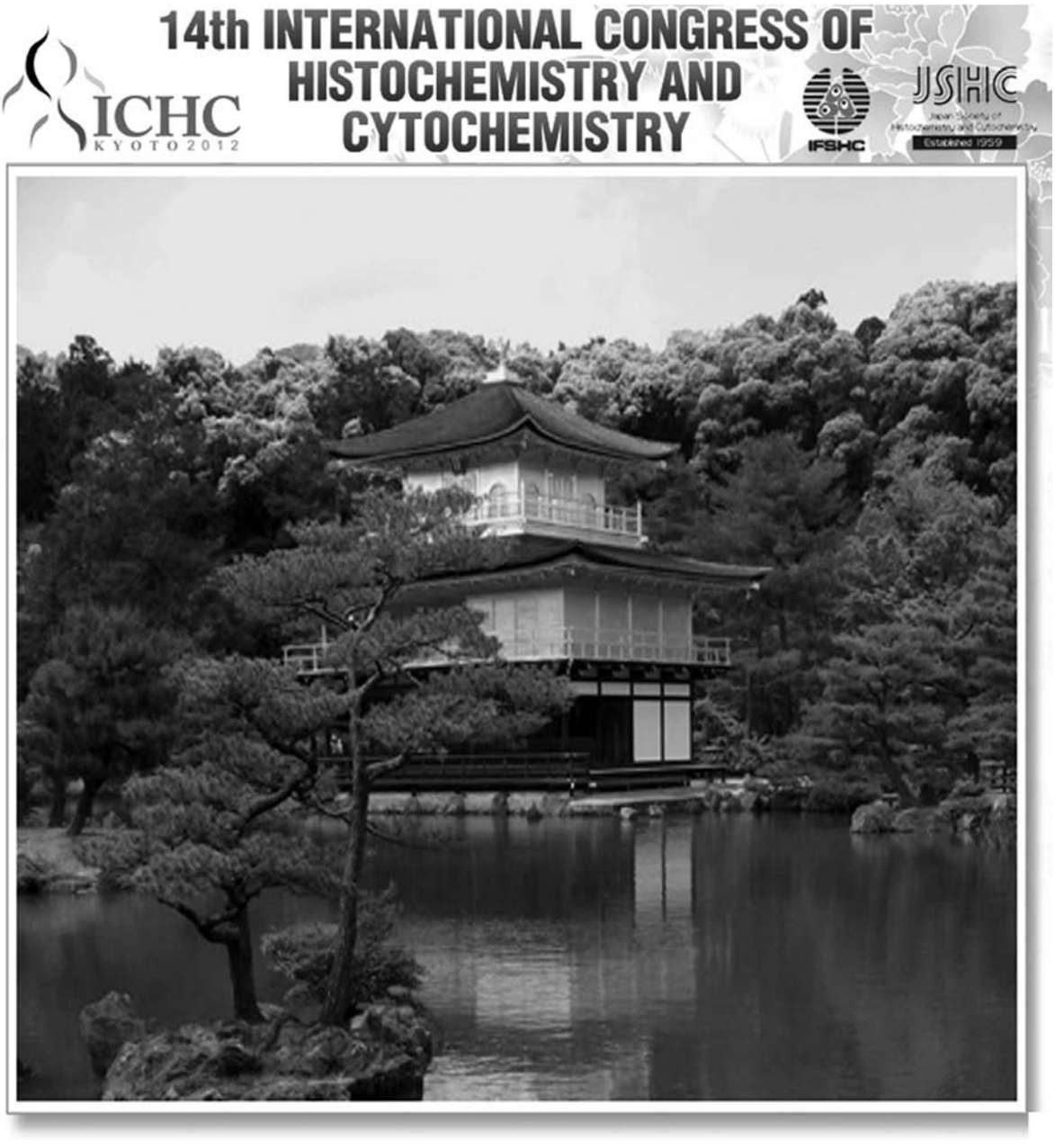
SIOF Società Italiana di Ottica e Fotonica

Optical Nanoscopy a SpringerOpen Journal

Springer

Università degli Studi di Genova

Eventi internazionali



News & Updates	03-08-2012	On-line Registration and On-line Hotel and Excursion Application is available.
	02-28-2012	On-line Abstract Submission is available.
	01-30-2012	Instructions for Abstract Submission

Outline of the Congress

Date August 26 (Sun) - 29 (Wed), 2012

Place Kyoto International Conference Center (ICC Kyoto)
Takaragaike, Sakyo-ku, Kyoto 606-0001, Japan
Tel: +81-75-705-1234, Fax: +81-75-705-1100
URL: http://www.icckyoto.or.jp/en/

Congress Theme
'Beyond the Limit of Histochemistry'

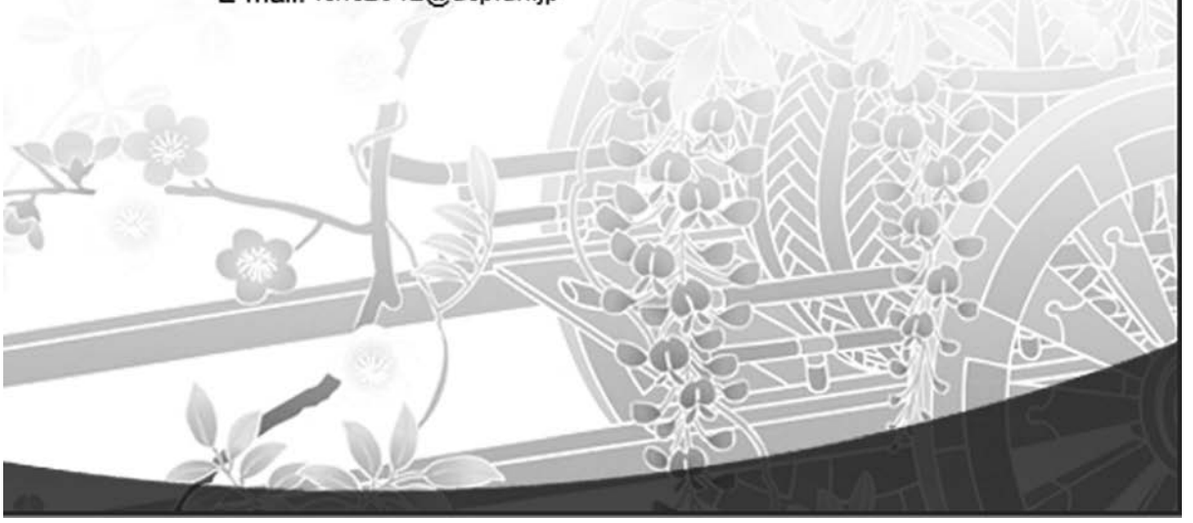
President Tetsuro Takamatsu, M.D., Ph.D.
Professor, Kyoto Prefectural University of Medicine

URL http://www.acplan.jp/ichc2012/
General information and the program (available in PDF file format in early July 2012) will be announced here.

Important Dates

Submission deadline for abstracts	April 30, 2012
Notification of abstract acceptance	Mid-May, 2012
Discount registration deadline	May 31, 2012
Hotel application deadline	August 17, 2012

Organizing Secretariat
c/o AC Planning
406 Murakami-cho, Fushimi-ku, Kyoto 612-8369, Japan
Tel: +81-75-611-2008, Fax: +81-75-603-3816
E-mail: ichc2012@acplan.jp



Eventi internazionali

Conference Overview

We are pleased to announce **Seeing at the Nanoscale 2012**, the tenth annual scientific conference focusing on nanostructural imaging, characterization, and technique development in Biology, Energy, and Material Science Applications using scanning probe microscopy (SPM) and related techniques.

The event will be held from **July 09th-11th**, 2012, at the **Wills Memorial Building, University of Bristol** in the United Kingdom.


Wills Memorial Building

The conference is jointly organized by Bruker, the **University of Bristol**, the **Bristol Centre for Nanoscience and Quantum Information**, and promises to build on the **biological and physical sciences** interdisciplinary strengths of each organization.

The event includes **2 ½ days of technical presentations and posters**, with ample **networking opportunities** to interact with leading SPM scientists. The conference acts as a forum to discuss and solve problems through brainstorming and hands-on experience. In conjunction with the conference, Bruker will host a **half day training course** covering a variety of atomic force microscopy (AFM) techniques.

The conference chairman **Prof. Mervyn Miles** and co-chairman **Prof. Heinrich Hörber**, as well as the conference organizers are delighted that **Toshio Ando** has accepted our invitation to be the conference keynote and that the following speakers have accepted invitations to give plenary talks (for full details, go to the **Session and Invited Speakers page**): **Yves Dufrêne** (Université Catholique de Louvain, Belgium), **Simon Scheuring** (INSERM/University of Marseille, France), **Jean-Luc Pellequer** (CEA Marcoule, France), Evangelos Eleftheriou (IBM Research, Switzerland), **David Fermin** (University of Bristol, UK), **Markus Raschke** (University of Colorado, USA), **Franz J. Giessibl** (University of Regensburg, Germany), Rainer Hillenbrand (CIC nanoGUNE, Spain), **Georg Schitter** (Vienna University of Technology, Austria), **Julius Vancso** (University of Twente, NL), **Jamie Hobbs** (University of Sheffield, UK), **Thilo Glatzel** (University of Basel, Switzerland).

Join the leaders of the field to explore the future of nanotechnology using SPM and related techniques: **BOOK THE DATE: 09th-11th July, Bristol, UK.**

Conference Links

- **Dates and Location**
- **Conference Agenda**
- **Sessions and Invited Speakers**
- **Pre-Conference AFM Tutorial Sessions**
- **Call for Papers**
- **Submit Your Abstract**
- **Conference Fees and Registration**
- **Accommodation**
- **Travel and Points of Interest**
- **Contact**

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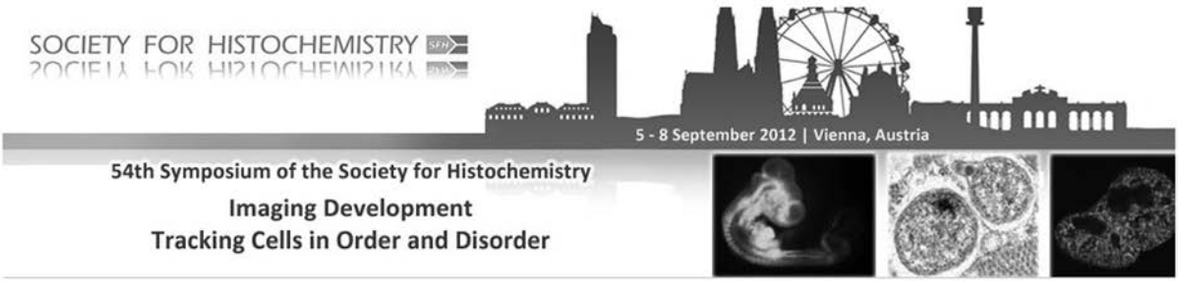
Eventi internazionali



Dear Colleagues,

On behalf of the Society for Histochemistry and on behalf of the Organizing Committee we cordially invite you to the **54th Symposium of the Society for Histochemistry** which will take place in Vienna from September 5th to September 8th, 2012. The Symposium will be a forum for discussion where experts, young scientists and students working in the field of cell biology, developmental biology, experimental pathology and those involved in the development of high end technologies and methodologies are encouraged to exchange their knowledge.

The topic of the conference is "Imaging development – tracking cells in order and disorder". Focus will be laid on regular and aberrant differentiation of cells, tissues and developing organisms as well as on the methods of making these processes visible.

The workshops will highlight the following topics:

IMAGING
- Imaging developing organisms and organ systems
- High resolution imaging
- MALDI imaging
- Image analysis

DIFFERENTIATION AND DEVELOPMENT
- Differentiation at the nuclear level
- Differentiation at the cellular level
- Genetic and epigenetic networks
- Differentiation and stem cells

CELLS in ORDER and DISORDER
- Insights in cellular structure and dynamics
  - 3D light microscopy and live cell imaging
  - 3D electron microscopy
- Aberrant differentiation and dedifferentiation

For contributions beyond this scope there will be a free topics communication session.

The scientific programme will comprise invited talks, oral presentations and posters as well as workshops by companies presenting the latest technical developments of their products.

The conference will start with the Robert Feulgen Lecture in the evening of Sept. 5th. We are pleased to announce that this lecture will be held by Marianne Bronner, a leading scientist in the field of developmental biology.

Conference venue will be the Campus of the University of Vienna, the Poster session and industry exhibition will take place next to the lecture hall. The spacious courtyards in between the University buildings will provide a pleasant surrounding for the exchange of knowledge after the workshops.

The city centre of Vienna with its historical buildings, museums and exhibitions is within walking distance of the conference site.

We are expecting an interesting and highly motivating meeting and would be happy if you participated in this symposium.

We are looking forward to seeing you in Vienna!

Klara Weipoltshammer Christian Schöfer

Organizers of the
54th Symposium of the Society for Histochemistry

Further information about the Society for Histochemistry can be found on following link: Society for Histochemistry.

The Journal Histochemistry and Cell Biology is the official Journal of the Society for Histochemistry.

Eventi internazionali

The European Microscopy Society presents

The 15th European Microscopy Congress
Manchester Central, United Kingdom
16th - 21st September 2012

emc2012 manchester
european microscopy congress

Submit an abstract

Scientific Programme

Bursaries and Awards

Call for Papers

"Our aim is to make the 15th European Microscopy Congress the most inclusive event yet in the history of the series."

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Follow us on Twitter or sign up to our emc2012 enewsletter by clicking here.

Welcome to emc2012

The UK microscopy community looks forward to welcoming you to Manchester in September 2012. With an international conference of the highest quality sitting alongside Europe's largest exhibition dedicated to microscopy, it promises to be a truly memorable event.

Added to this will be great training opportunities, a programme of technical workshops, and a full social programme. Put the date in your diary and start looking forward to a true festival of microscopy in one of the UK's most exciting and vibrant cities.

Abstract submission is now open! Click here to submit an abstract.

Deadline date 16th March 2012

IFSM
International Federation of Societies for Microscopy

The 15th European Microscopy Congress is organised by the Royal Microscopical Society in co-operation with the European Microscopy Society, under the auspices of the International Federation of Societies for Microscopy.

emc2012 is organised by the Royal Microscopical Society

RMS

EUROPEAN MICROSCOPY SOCIETY

Dear EMS member,

During the recent EMS Executive Board meeting it was decided to provide an extended number of EMS scholarships for participation of early stage career researchers (typically PhD students and early post-doctoral researchers) to the 15th European Microscopy Congress, emc2012, which takes place in Manchester from 16 till 21 September of this year. To highlight the European dimension, the EMS scholarships will be granted to research results showing trans-European collaboration.

General criteria to receive an EMS scholarship for emc2012 include:

- applicants must be EMS member at the time of the application, be registered at the meeting and submit at least one abstract;
- scholarships will be awarded based on the quality of the abstract submitted;
- the submitted abstract must be the original work of the author and **show trans-European collaboration**; a statement highlighting the latter has to be included in the application
- successful applicants are expected to attend and participate in the entire meeting and present their abstract(s) personally at the meeting.
- after the meeting applicants need to provide EMS with a short written report including a photograph of their personal presentation (oral or poster) for possible inclusion in the 2012 EMS Yearbook

Successful applicants will receive a scholarship covering an early stage career registration fee (€ 195) plus a contribution to travel expenses dependent on travel distance (≤300km/300-2000km/>2000km = € 100/175/250).

Application deadline is the same deadline as the ORIGINAL abstract submission deadline, i.e. March 16, 2012. Copy of abstract(s), registration details, proof of student or early stage researcher and short CV have to be added to the application. The application should be sent to the EMS Secretary including the completed attached application form (see below), also available at http://www.eurmicsoc.org/scholarships.htm.

We look forward to your applications,

Sincerely,

P.A. Midgley

Paul Midgley, EMS President

Nick Schryvers, EMS Secretary

	President EMS	**Secretary EMS**	**Treasurer EMS**
	Paul Midgley	Dominique Schryvers	Christian Schöfer
	University of Cambridge	UA – EMAT	Medical University of Vienna
	Cambridge, UK	Antwerp, Belgium	Vienna, Austria
tel.-fax :	+44/122/ 3334561-3334567	+32/3/2653247-2653318	+43/14/ 27761338 - 2779613
e-mail :	pam33@cam.ac.uk	nick.schryvers@ua.ac.be	christian.schoefer@meduniwien.ac.at

EUROPEAN MICROSCOPY SOCIETY

Last name _____

First name_____

Affiliation_____

I declare that I'm a

PhD student ○ post-doctoral researcher ○

other (specify) _____

What is the distance between your laboratory and the conference site (ATCF)? _____km

Abstract title_____

_____

_____

Trans-European collaboration statement

_____

_____

_____

_____

_____

Did you request a scholarship/bursary from other sources (RMS, IFSM, other society, …)

yes ○ no ○
if so, which society and what is the amount requested

_____

From which (type of) budget will your remaining costs be paid

_____

Signed by Applicant

Date
Academic Supervisor

	President EMS	Secretary EMS	Treasurer EMS
	Paul Midgley	Dominique Schryvers	Christian Schöfer
	University of Cambridge	UA – EMAT	Medical University of Vienna
	Cambridge, UK	Antwerp, Belgium	Vienna, Austria
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e-mail :	pam33@cam.ac.uk	nick.schryvers@ua.ac.be	christian.schoefer@meduniwien.ac.at

EUROPEAN MICROSCOPY SOCIETY

Antwerp, January 20, 2012

Dear EMS member,

With the European Microscopy Congress *emc2012* coming up in Manchester from September 16 to 21, we would like to remind you that in each year of a Congress two quadrennial European Microscopy Awards are offered by FEI Company, one for the life sciences, the other for the physical/materials sciences and optics. The value of each prize is €5000. The winners of the award will be announced at the European Microscopy Congress. (see also http://www.eurmicsoc.org/fei-ema.html)

Candidates for the prize can be proposed by a Microscopy Society in Europe, a group of scientists, or an individual scientist.

Candidates must be i) European, or ii) of European origin, or iii) non-European scientists who work or have worked in Europe for more than one year.

A candidate needs to be a member of a Microscopy Society in Europe.

Applications should contain seven identical hard copies of: i) a resumé (CV), ii) a list of publications, iii) reprints of five publications that best support the candidature; the candidate should be the leading author of these publications, iv) an appraisal and justification written by the proposer.

Proposals should be received by normal mail at the address of the Secretary of the European Microscopy Society (EMS), before **April 1st** of 2012. Email applications will be disregarded. For the exact address see below.

Candidates will be evaluated by a jury of six members, selected by the Executive Board of EMS. The Executive Board of EMS is responsible for the scientific competence of the jury and the jury is responsible for a balanced evaluation of the applications, based on their scientific quality. The physical/optics/materials sciences and the life sciences will be represented in equal numbers in the jury. The President of EMS is the non-voting chairman of the jury. It is left to the discretion of the chairman of the jury to balance and process the evaluations of the individual jury members in the light of their different fields of expertise. The names of the members of the jury will be made public at the EMC.

The prize will be awarded on the basis of the quality and originality of scientific achievements in any field of microscopy, obtained during the five years preceding the application. All modes of microscopy are included. The successful candidates and all proposers will be informed about the decision of the jury by June 1st of the same year.

	President EMS	**Secretary EMS**	**Treasurer EMS**
	Paul Midgley	Dominique Schryvers	Christian Schöfer
	University of Cambridge	UA – EMAT	Medical University of Vienna
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EUROPEAN MICROSCOPY SOCIETY

Each successful candidate is required to register as a participant of the EMC and to deliver a keynote lecture during a plenary session. The full texts of these presentations will be printed in the 2012 EMS Yearbook.

An additional objective, but not a condition, of the FEI-EMA is to support scientists at a stage of their career at which the award will have a maximal impact on their future career. Proposers should indicate in their written appraisal and justification the extent to which the award would help to support the professional opportunities of the applicant. The quality of the scientific work remains the principal criterion for the award.

Microscopy Societies in Europe are requested to make every effort to inform their membership about the prize.

We look forward to receiving many excellent nominations.

Sincerely,

P.A. Midgley

Paul Midgley
EMS President

Nick Schryvers
EMS Secretary

Postal address:

Prof. Dr. D. Schryvers, Ph.D.
Electron Microscopy for Materials Science (EMAT)
University of Antwerp, CGB
Groenenborgerlaan 171
B-2020 Antwerp
Belgium

	President EMS	Secretary EMS	Treasurer EMS
	Paul Midgley	Dominique Schryvers	Christian Schöfer
	University of Cambridge	UA – EMAT	Medical University of Vienna
	Cambridge, UK	Antwerp, Belgium	Vienna, Austria
tel.-fax :	+44/122/ 3334561-3334567	+32/3/2653247-2653318	+43/14/ 27761338 - 2779613
e-mail :	pam33@cam.ac.uk	nick.schryvers@ua.ac.be	christian.schoefer@meduniwien.ac.at

Eventi internazionali

DGE DEUTSCHE GESELLSCHAFT FÜR ELEKTRONENMIKROSKOPIE

Deutsche Gesellschaft für Elektronenmikroskopie e.V.

(German Society for Electron Microscopy)

announces the

ERNST RUSKA PRIZE 2013

for outstanding achievements in the field of electron microscopy.

The Deutsche Gesellschaft für Elektronenmikroskopie invites to propose candidates for the Ernst-Ruska-Prize. The prize is awarded for work carried out by younger scientists pioneering new capabilities of electron microscopy as a scientific technique through innovative instrumentation or novel methods of basic and general interest. Work carried out by pure application of existing techniques will not be considered. The eligible work should not date back more than 7 years. It must be published or it must be accepted for publication at the time of submission of the proposal.

The decision will be made by an independent committee. The Ernst-Ruska-Prize consists of a certificate, a financial award, as well as the honor of giving an *Ernst-Ruska Distinguished Lecture* at the Ceremony of Award. If a group of authors receives the award, they will be awarded jointly. The ceremony will take place at the Microscopy Conference 2013 in Regensburg, Germany, Aug. 25th- Aug. 30th, 2013.

Proposals including appraisal of the achievement, reprints or preprints, and short CV including list of publications of the authors should be received (on paper and CD) not later than November 30th, 2012, addressed to

President of DGE
Prof. Dr. Josef Zweck
Fakultät für Physik
Universität Regensburg
90340 Regensburg
GERMANY
E-mail: josef.zweck (at) physik.uni-regensburg.de

Eventi internazionali

NOMINATE A COLLEAGUE TODAY!

Nomination Deadline - april 1, 2012

VON HIPPEL AWARD

The Materials Research Society's highest honor, this award recognizes those qualities most prized by materials scientists and engineers - **brilliance and originality of intellect, combined with vision that transcends the boundaries of conventional scientific disciplines.**

For more information on the Von Hippel Award, including nomination guidelines and process, visit www.mrs.org/vonhippel.

DAVID TURNBULL LECTURESHIP

The David Turnbull Lectureship honors the career of a scientist who has made **outstanding contributions to understanding materials phenomena and properties through research, writing and lecturing, as exemplified by the life work of David Turnbull.**

For more information on the David Turnbull Lectureship, or to submit a nomination online, visit www.mrs.org/turnbull.

MRS MEDAL

The MRS Medal awards **an exceptional recent achievement in materials research which is expected to have a major impact on the progress of any materials-related field.**

For more information on the MRS Medal, including nomination guidelines and process, visit www.mrs.org/medal.

MATERIALS THEORY AWARD

This award recognizes **exceptional advances made by materials theory to the fundamental understanding of the structure and behavior of materials.** This award is intended to honor both those who have pioneered the development of a new theoretical approach and those who have used existing approaches to provide significant new insight into materials behavior.

For more information on the Materials Theory Award, including nomination guidelines and process, visit www.mrs.org/mta.

Atomic contrast on ultrathin $La_{0.7}Sr_{0.3}MnO_3$ films by Scanning Tunnelling Microscopy

A. Gambardella,* P. Graziosi, I. Bergenti, M. Prezioso, F. Biscarini, V. Dediu

Consiglio Nazionale delle Ricerche - Istituto per lo Studio dei Materiali Nanostrutturati (CNR-ISMN), Bologna, Italy

Vincitore del Premio Carla Milanesi 2011

Corresponding author: Alessando Gambardella
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Tel. +39.051.639.85.17 - Fax +39.051.639.85.40
E-mail: a.gambardella@bo.ismn.cnr.it

Summary
In this work we map tunnel conductance curves and topographies with nanometric and sub-nanometric spatial resolution of fully insulating $La_{0.7}Sr_{0.3}MnO_3$ ultrathin films at room temperature. While spectroscopy shows the lack of spatial patterns, suggesting no strong correlation between topographic and spectroscopic features at room temperature, we obtained for the first time clear atomic contrast at only some surface locations. We justify our results by suggesting the presence of local intrinsic inhomogeneities, that would act on a surface with overall homogeneous electronic states as charge density reliever, by allowing atomic contrast by a tunnelling measurement. Furthermore, our findings suggest that the effect of strain is to induce a transition from weak- to strong-electron-phonon coupling regimes, making fully-strained films as interesting model-systems to investigate the nature of the electron correlation directly at nanoscale lengths.

Key words: manganites, STM, ultrathin films, highly correlated systems, atomic resolution.

Introduction

Perovskite manganites, having general formula $Re_{1-x}A_xMnO_3$ (where Re = Rare Earth, A = Divalent metal) have been often studied by Scanning Tunnelling Microscopy and Spectroscopy (STM-STS) techniques. Indeed, investigation of surface states with nanoscale resolution is strongly desirable on such highly-correlated systems, whose exotic properties arise from the coexistence of microscopic effects (Dagotto *et al.*, 2001). According to the definition given by Postorino (Postorino *et al.*, 2003) and based on the classification made by Millis (Millis *et al.*, 1996), perovskite manganites can be ordered according to three classes depending on the strength of the electron-phonon coupling. Manganites belonging to *weak* and *intermediate coupling* exhibit ferromagnetic (FM) to paramagnetic (PM) phase transition at the temperature T_c; above T_c the transport is believed to be governed by polarons due to strong phonon-electron coupling, mediated by Jahn-Teller distortion around the trivalent Mn^{3+} ion. Below T_c the ground state is metallic ($d\rho/dT>0$). The transition from the activated PM state to the metallic FM state is referred to as the Metal-Insulator-Transition (MIT). *Strong coupled* manganites do not exhibit MIT and are insulating over the whole range of temperature, although PM-FM transitions occur at temperatures depending on doping and/or composition. The study of the variation around the MIT of the density of states at the Fermi level $N_S(E_F)$ has constituted the main topic of investigation for many STM-STS experiments. Early works on thin films (Fath *et al.*, 1999; Becker *et al.*, 2002) were focused on the features of coexistence of carrier-rich FM metallic and carrier-deficient non-FM insulating regions up to the mesoscopic scale. Such phenomenon is known as electronic phase-separation (PS). The topographic contrast was used to distinguish between occupied and unoccupied states on epitaxial 120 nm thick film of $La_{5/8-0.3}Pr_{0.3}Ca_{5/8}MnO_3$ (Ma *et al.*, 2005) and $Bi_{0.24}Ca_{0.76}MnO_3$ single crystals (Renner *et al.*, 2002). Then, atomic contrast was proposed as marker for polaron confinement at the surface in layered rock-salt type manganites (RØnnow *et*

al., 2006; Bryat *et al.*, 2011), as well as in cubic $Pr_{0.68}Pb_{0.32}MnO_3$ (Rößler *et al.*, 2010). It is noteworthy that atomic contrast was obtained on manganese perovskite compounds belonging to the strong coupling class only, with the exception of the $Pr_{0.68}Pb_{0.32}MnO_3$ which comes from the intermediate coupling class. On the other hand, robust STS measurements on epitaxial $La_{0.7}Ca_{0.3}Mn_{O3}$ (LCMO) (Seiro *et al.*, 2010; Mitra *et al.*, 2005) or $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) thin films (Singh *et al.*, 2008) found an homogeneous spectroscopic behaviour which suggested that no polarons are confined on both sides of the MIT (Seiro *et al.*, 2008). Nonetheless, scanning tunnelling experiments on such systems are useful to investigate the nature of the charge localization effect at the surface, still controversial to date. In bulky manganites, despite the low – if compared to metals – density of carriers ($\sim 10^{21}$ cm^{-3}), charge screening was indicated as a strong limiting factor on the maximum lateral resolution obtainable by STM (RØnnow *et al.*, 2006); anyway, by reviewing the works presented so far, it is not clear whether polarons, lattice inhomogeneities having a purely morphological origin, as well as intrinsic point defects, can be treated separately. Attempting to address these controversial aspects, we performed for the first time an extensive STM characterization on ultrathin manganite films. The striking difference between bulks and films arises from the film thickness; when it is reduced under a critical value (t_c), they show the lack of the MIT and fully-insulating behaviour regardless the temperature (Huijben *et al.*, 2008; Jin *et al.*, 2007). Surprisingly, scanning probe investigations on ultrathin manganite films (few unit cells thick) are rare (Rana *et al.*, 2010), despite of the interest into ultrathin epitaxial films (2D) where small changes in structure or composition affect significantly the electronic structure and therefore the macroscopic properties (Huijben *et al.*, 2008; Bergenti *et al.*, 2007). Transport and and magneto-optical measurements performed on ultrathin manganite films (Aruta *et al.*, 2009; Orgiani *et al.*, 2007) have remarked the role played by chemical or structural inhomogeneities, such as point defects and/or intrinsic lattice deformations. In this topic, fully-strained manganite films represent an interesting model-system for high-resolution STM analysis either for the electronic contrast mechanism or the direct investigation of inhomogeneities, since charge screening is expected to be naturally reduced *a priori* by the poor surface conductivity, similarly to what happens in semiconductors where resolution of individual atoms is related to the presence of localized electronic states on the surface around E_F, which contribute as local variations in the probing tunnel current.

Materials and Methods

Here we present an STM characterization of two doped $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) films -5 and -9 unit cells thick, respectively deposited on cubic (a = 3.90Å) $SrTiO_3$ (STO) substrates. This compound shows Colossal Magneto Resistance (CMR) effect at high temperatures and was successfully employed in the form of epitaxial films in the fabrication of spin-transport-based devices (Preziosi *et al.*, 2011; Barraud *et al.*, 2010). LSMO films were grown by Channel Spark Ablation technique, already used to produce epitaxial films as described elsewhere (Bergenti *et al.*, 2007; Dediu *et al.*, 1999). Film thicknesses were evaluated by X-Ray Reflectivity (XRR) measurements. Bulk $La_{0.7}Sr_{0.3}MnO_3$ is rhombohedral at room temperature, having pseudocubic parameter a=3.873Å and a distorted pseudocubic angle α= 90.26°(Trukhanov *et al.*, 2007). The STM-STS measurements were carried out at 298K and Ultra High Vacuum (UHV) conditions by using a commercial instrument. After being transferred into UHV chamber, samples were heated in-situ at 120°C for a few hours, and successively left to cool for many hours before the measurements. Cut PtIr wires tips were used and the surfaces imaged mainly in the topographic mode with an applied tip-biased voltage of ~1V. Setpoint current of 100-120 pA was required to achieve atomic contrast on both samples. The measurement parameters were adjusted repeatedly in order to reduce artefacts due to the scan operation and thermal drift distortion. DC Transport measurements were performed by a cryogenic apparatus with four-probe method. As shown in Figure 1d, our ultrathin films experience the lack of the MIT as expected for fully strained samples, on the whole temperature range. Despite of the high spatial resolution (up to 1 nm^2), the strong reproducibility and the good (40 meV) energy resolution of STS measurements, our I(V) curves should be taken an indication of the surface spec-

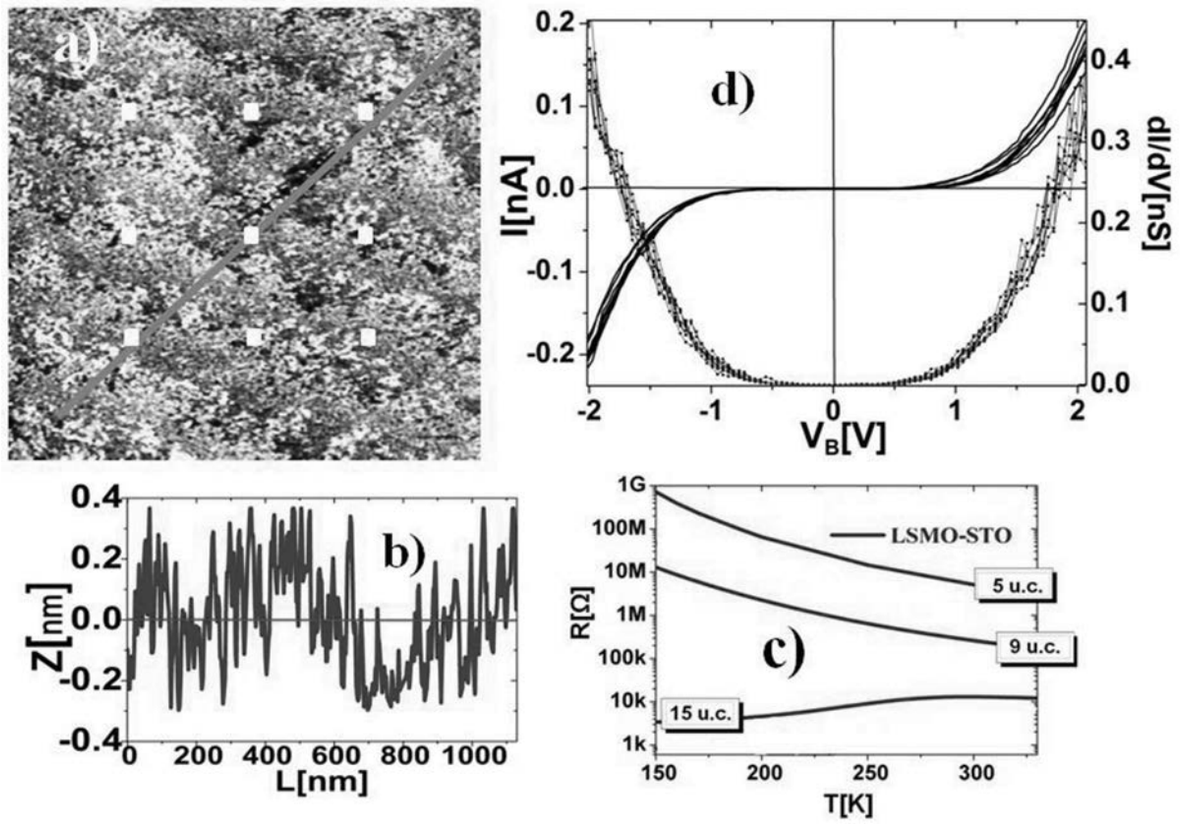

Figure 1. a) Constant current image of a 1 x 1 µ2 region taken on a 5 u.c. thick sample showing a largely terraced surface. b) Z-profile taken along the blue path on image a), showing that peak-to-peak roughness variations are within ± 1 u.c. (~ 0.4 nm). c) Resistance *vs* Temperature curves plotted for three different film of thicknesses, showing the lack of the MIT when thickness is under 6 nm, as samples under our investigation. d) Bare I(V) and corresponding dI/dV characteristics recorded over the surface in a) at RT; each curve is obtained by an average of 36 curves recorded within a single 60 x 60 nm2 large region, (the spectroscopy spatial resolution being 10×10 nm^2/spectrum), at the locations labelled by squares on image a). Topography and I(V) curves were measured at regulation conditions of 1V and 0.1 nA.

troscopy, rather than a direct estimation of the local Density of States (DOS). It is known that the tunnelling relation

$$\frac{dI}{dV} \approx \frac{e^2}{\hbar^2} \rho_S(eV)\rho_T(0)T(e,V,z),$$

where ρ_s (eV) is the sample DOS, ρ_t (0) is the tip DOS and $T(e,V,z)$ is the tunnelling coefficient within the barrier, is valid at low ($eV<<\phi$) biases, with ϕ= work function, whereas $T(e,V,z)$ does not depends on the energy (Tersoff and Hamann 1983). Moreover, it should be noted that curve representation as logarithmic derivative dlnI/dlnV would be more appropriate in this case (Stroscio *et al.*), but it requires higher energy resolution, which is normally associated to criogenic measurements.

Results

A typical topography showing a 1×1 µm^2 large sample region is presented in Fig. 1a. It reveals growth terraces roughly 100-200 nm wide, having steps of height about 1 unit cell (Figure 1b). Moreover we observed the absence of outgrowth up to 5×5 µm^2 large areas. Note that on these scales it

is not possible to indicate a unique terminating plane in the whole surface. The measurements show the Root Mean Square (RMS) roughness on both 5 and 9 u.c. thick samples being about one half of unit cell (~ 0.2 nm). Figure 1d shows the averaged tunnelling spectroscopy curves performed at 9 positions above the surface; curves were acquired simultaneously with imaging, and the exact locations are shown in the topographic image in a). Even near to terrace steps, local I(V) curves show the lack of spatial patterns in the energy range investigated, suggesting no strong correlation between topographic and spectroscopic features at room temperature. The surface is constituted by grains having a slightly mounded shape, 10-20 nm wide and a few cells high, as shown in Figure 2a, whose presence was already recognized among manganites grown by Pulsed Laser Deposition technique (Seiro *et al.*, 2008). Note that the dimensions of these mounds tend to slightly increase with the film thickness, although we observed no significant changes of morphology from the insulating toward the semi-metallic thickness regime (Singh *et al.*, 2008). Figure 2 shows the averaged I(V) and dI/dV curves taken on a 30×30 nm^2 regions, where mounds are clearly visible. Note that the increased spatial resolution reveals some differences between the curves acquired among different image locations, especially for negative biases. This discrepancies were observed before on a 5 nm thick LSMO film on larger scales, and ascribed to local stress of topographic steps that distort the lattice and disperse the electronic states (Rana *et al.*, 2010). We obtained clear atomic contrast at room temperature on both 5 and 9 u.c. thick samples, by visualizing the unit cell, as shown in the Figures 3 and 4. Nevertheless, we observed that the atomic contrast is limited to only few small (a few square nanometers) regions upon the samples surface.

Discussion and Conclusions

Among the scales investigated in this work, previous reports have already shown the absence of nanoscale modulation around the MIT on LSMO (Singh *et al.*, 2008; Seiro *et al.*, 2007; Seiro *et al.*, 2008) or only small variations (Rana *et al.*, 2010). The absence of an extrinsic phase separation lead to consider the spatial average of I(V) curves as representative of the whole sample surface. Findings of atomic contrast in Figure 3a,b and c, related to the 5 cell thick sample seems to suggest that a localised impurity or defect whose field locally may relieve the charge screening upon a length of some or tens of nm allows atomic resolution on such a region. This picture is supported

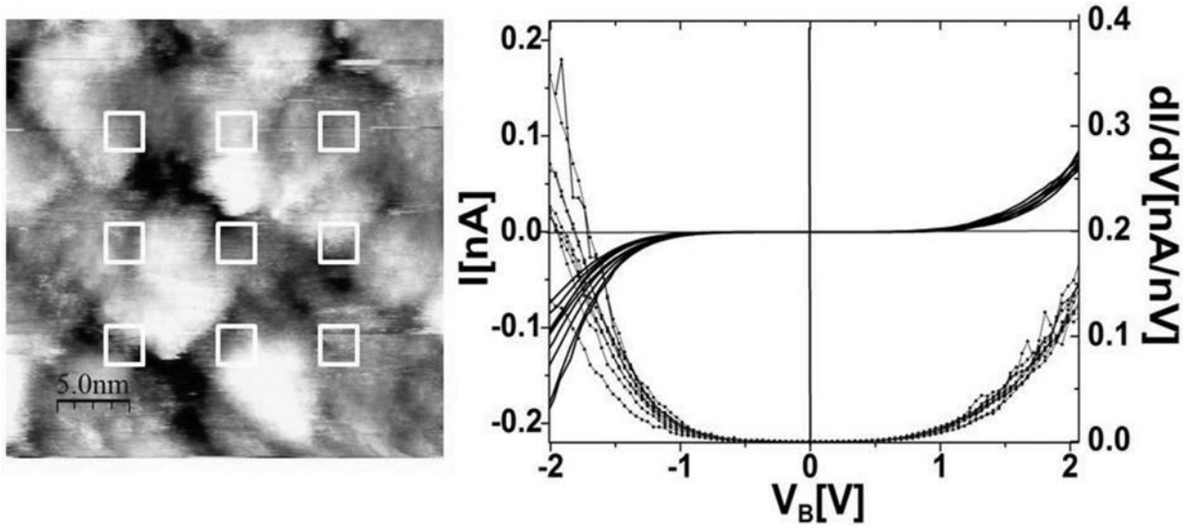

Figure 2. Averaged I(V) and corresponding dI/dV curves taken on the region 30 × 30 nm^2 in the inset at the 9 indicated positions. This region was taken within the region in Figure 1a. The surface granular structure is clearly visible but no direct evidence of correlation between spectra and topographic features is found, although spectra show quite different behaviour at negative biases.

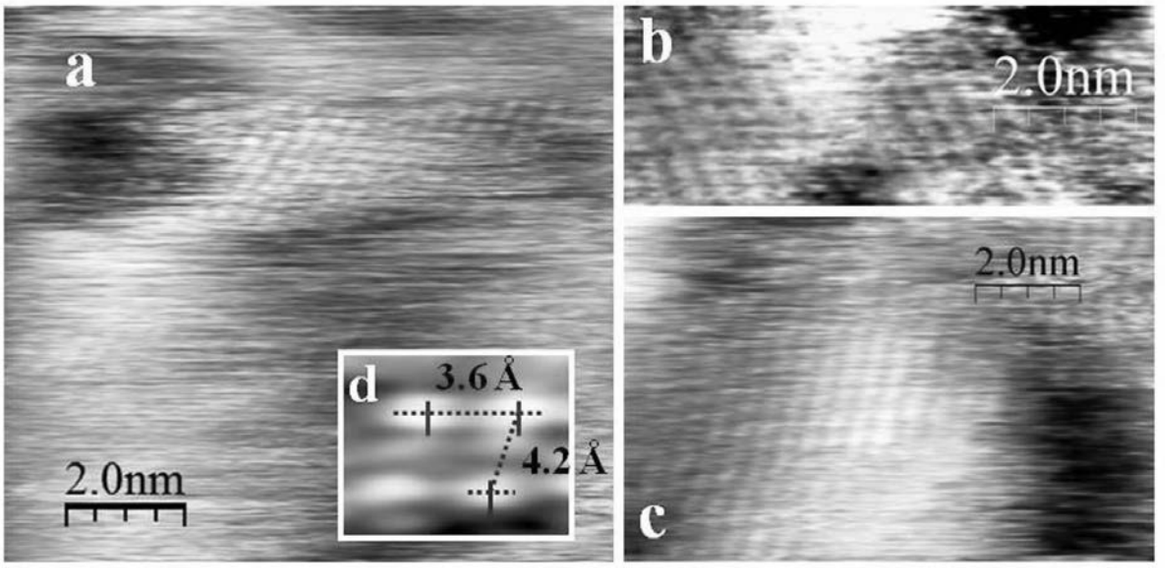

Figure 3. a), b), c), d) Atomically resolved images on a 5 cells-thick LSMO/STO sample. Different orientations of the atomic layers are found on three different regions located at about 5-10 nm of distance each others. Note the presence of defects (more darker or brighter regions) having maximum step heights of about 0.4 nm. In d) an image of a typical unit cell having distorted shape is shown, taken on a fourth region (not reported here entirely). Topographies were recorded at V_{bias} = 1.2V, I =120 pA.

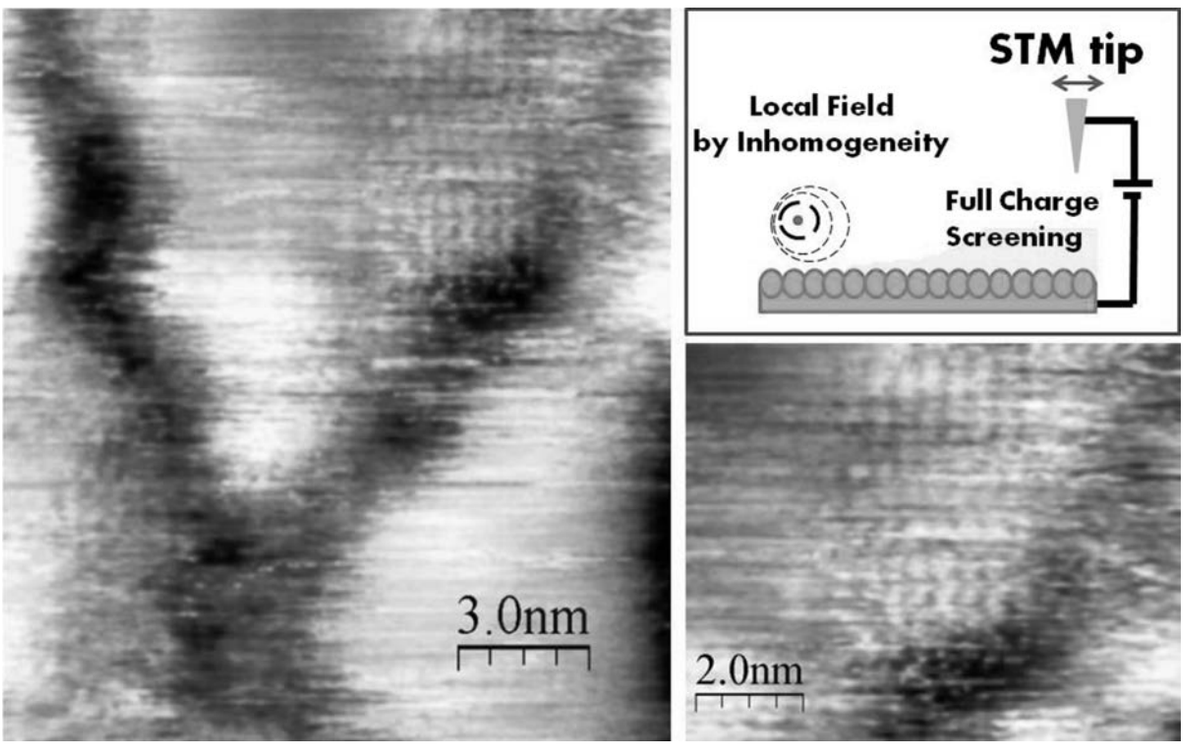

Figure 4. a) 12×12 nm^2 topography over the 9 u.c. thick sample. Atomic contrast is more clearly visible near to the terraces boundaries and over more internal regions located close to "huge" defects as in b) were a detail of a) is shown. c) The proposed mechanism for the charge relieving.

by our findings on the 9 cell thick sample, and shown in Figure 4, on a 13×13 nm^2 area. Atomic contrast is obtained especially close to topographic steps or mounds boundary, -the latter is expected to be a source of mismatch defects-, that may act as local scattering centres and locally favour the atomic resolution, even on an atomically flat surface and in presence of quite *homogeneous surface conduction*, as supported by our I(V) characteristics. We therefore suggest that surface inhomogeneities may locally increase the charge localization, by allowing or participating to the atomic contrast in a tunnelling measurements. One may infer that among bulks, inhomogeneities act *ipso facto* as the counterpart of the metallicity in surface state localization. As a further consideration, we often observed a strongly distorted cell, as clearly visible from the Figure 3 and 4, whose interatomic distances appear often quite different with respect to the picture of a square cell, as commonly assumed in literature. These distortions are evident in some regions on the 5 u.c. thick sample, and seem to be linked to local surface features rather than to scan/thermal drift effects, that are controlled to any possible extent. Cell distortions might be explained by the presence of intrinsic Moiré patterns, due to a interference coupling between the topmost and the inner atomic layer. It is clear that this occurrence would indicates by itself the presence of lattice discontinuities; however, this hypothesis is hardly justifiable due to the unclearness of the relieving mechanism, especially out-of-plane. Otherwise, we observed that the growth mode favours at the top layer the formation on non-uniform and atomically-stepped regions where, the surface reconstruction is not complete. In other words, the film growth appears epitaxial and coherent unless the last few atomic layer near the surface, making the presence of local defects related only to surface reconstruction. It is possible that these defects may act as scattering centres for the charge relieving, in the sense described above, and occasionally cause local strong lattice distortions as those shown in Figure 3. In reason of this, we suggest that the observed cell distortions are originated by an incomplete surface reconstruction. In conclusion, it is remarkable that bulk LSMO belongs to the weak coupling class, i.e. a family of manganese perovskite where people never succeeded in obtaining STM atomic resolution. We are able to affirm, thus, that the substrate-induced strain induces a so higher *e-ph* coupling that the materials is thrown in another class of manganese perovskite compounds, the strong coupling one (or phase segregated), which does not feature MIT and allowed for STM atomic contrast for the reasons discussed previously. Fully strained manganite thin films reveal to be an excellent tool to manipulate the physical state of the manganese perovskites playing with *e-ph* coupling and MIT, offering optimal candidates for basic solid state physics. In our experience, no surface preparation was required to achieve these results that were obtained at basic environmental and experimental conditions.

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Disease progression in myotonic dystrophy type 2: histopathological and molecular parameters from muscle biopsies

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Summary
Myotonic dystrophy type 2 (DM2) is a dominantly inherited autosomal disease with multisystemic clinical features and is caused by expansion of a CCTG tetranucleotide repeat in the first intron of the zinc finger protein 9 (*ZNF9*) gene in 3q21. The expanded-CCUG-containing transcripts are retained in cell nuclei, as ribonuclear inclusions, which specifically sequester some splicing factors (as MBNL1), thus causing a general alteration of the pre-mRNA post-transcriptional pathway that is likely responsible for the DM2 multifactorial phenotype. DM2 is a disease of type 2 fibers and it is has been hypothesized that the symptom worsening that occurs with aging may be caused by the progressive accumulation of CCUG-expansion and the sequestration of protein factors. Thus, we carried out a morphometric analysis of ribonuclear inclusions and MBNL1 *foci* in muscle sections from three DM2 patients who underwent two successive biopsies, and we studied the evolution of the histopathological features. Increase in size and fluorescence intensity has been observed in MBNL1 *foci*, together with a worsening of muscle histopathological traits, such as type 2 fibers impairment.

Key words: myotonic dystrophy type 2-DM2, ribonuclear inclusions, MBNL1 *foci*, fluorescence microscopy, confocal microscopy.

Introduction

Myotonic dystrophies (DM) are genetically-based neuromuscular disorder characterized by muscle hyperexcitability (myotonia) and a wide spectrum of multisystemic traits (Meola *et al.*, 1999; Moxley *et al.*, 2002; Meola, 2000; Day *et al.*, 2003; Udd *et al.*, 2003), among which muscular dystrophy with increased number of clumped or centrally located nuclei in skeletal muscle fibers (Vihola *et al.*, 2003).

Two DM forms exist, i.e. the more severe DM1-Steinert's disease (OMIM 160900) and DM2 (OMIM 602688).

DM1 depends on the expansion of a (CTG)n nucleotide sequence in the 3' untranslated region of the Dystrophia Myotonic Protein Kinase (*DMPK*) gene (Brook *et al.*, 1992; Fu *et al.*, 1992; Mahadevan *et al.*, 1992).

DM2 exhibits a milder clinical phenotype and depends on the expansion of the tetranucleotidic repeat (CCTG)n in the first intron of the Zinc Finger Protein (*ZNF*)-9 gene (OMIM 116955) (Liquori *et al.*, 2001) on chromosome 3q21 (Ranum *et al.*, 1998). The expanded-CCUG containing transcripts are retained in the nucleus, in the form of mutant RNA *foci*, also called ribonuclear inclusions (Liquori *et al.*, 2001; Mankodi *et al.*, 2001, 2003), where essential splicing factors such as muscleblind-like (MBNL) proteins (Fardaei *et al.*, 2002; Cardani *et al.*, 2006; Pascual *et al.*, 2006), snRNPs and hnRNPs (Perdoni *et al.*, 2009 a,b) are sequestered. As a consequence of the nuclear depletion and loss of function of these regulators (Mankodi *et al.*, 2001), a general alteration of the pre-mRNA post-transcriptional pathway takes place, which could account for the multifactorial phenotype of DM2 patients (Wheeler and

Thornton, 2007; Ranum and Cooper, 2006).

DM2 has been defined as "a disease of type 2 fibers" since these myofibers are selectively affected by atrophy and central nucleation (Bassez *et al.*, 2008, Vihola *et al.*, 2003); consistently, muscles which mostly contain type 2 fibers (such as proximal skeletal muscles) are the most compromised ones. The presence of centrally located nuclei and pyknotic nuclear clumps (clusters of heterochromatic myonuclei considered the end product of atrophy due to denervation) are peculiar histopathological features of this disease (Schoser *et al.*, 2004).

For diagnosing DM2, it is crucial to detect the characteristic histopathological traits of type 2 muscle fibers (Meola *et al.*, 2011), although the most rapid, sensitive and decisive technique is the identification of the expanded RNAs in the nuclear *foci* by fluorescence in situ hybridization (FISH) or the immunolabeling of MBNL1 sequestered in the ribonuclear inclusions (Cardani *et al.*, 2004, 2006).

In DM2 (and more generally in DMs), the symptoms undergo worsening in aging patients, and it has been hypothesized that this may be caused, at the cellular level, by the progressive accumulation in the nucleus of expanded RNAs and the sequestration of protein factors involved in RNA processing and export to the cytoplasm: this would likely result in the presence of progressively larger intranuclear *foci* with increasing age.

To test this hypothesis, we performed a morphometric analysis of the nuclear *foci* in muscle sections of *biceps brachii* from three DM2 patients who underwent two successive biopsies; in parallel, the evolution of the muscle histopathological features was also considered. We chose this muscle because it is composed mostly of type 2 fibers, which are mainly compromised in DM2 disease.

Materials and Methods

Patients

Samples of *biceps brachii* were taken under sterile conditions from three clinically diagnosed DM2 patients, after informed consent, at two different times (age at the first biopsy: 54, 37, and 33; age at the second biopsy: 58, 47, and 38, respectively). The protocols were approved by the ethical committee of the IRCCS Policlinico San Donato, Milan, Italy. The muscle samples were frozen in isopentane and stored in liquid nitrogen until use. Serial cryostatic sections were used for all the procedures reported below.

Evaluation of some histopathological features in DM2 muscle sections and immunolabeling of fast, type 2 muscle fibers

To evaluate basic tissue and cell organization (fiber atrophy, morphological and structural alterations of muscle cells), some cryostatic sections were either conventionally stained with hematoxylin and eosin or processed for ATPase pH 10.0 staining or immunolabeled for the fast myosin heavy chain, to detect type 2 fibers, as follows.

Since muscle are composed by various fiber types, a myosin adenosine triphosphatase (ATPase) stain at pH 10.0 was performed to label type 2 fibers (Round *et al.*, 1980), mostly compromised in DM2. Cryostat sections (6 µm) were incubated with ATP incubation solution, pH 10.0, at 37°C for 45 min, then samples were washed in 1% calcium chloride solution, in 2% cobalt chloride solution, and in distilled water. Then, sections were incubated for 30 sec in 1% ammonium sulfide solution and washed in distilled and tap water. Nuclei were counterstained with haematoxylin, the samples were dehydrated in ethanol-xilene and finally mounted in Eukitt (Sigma-Aldrich, Buchs, Switzerland).

To immunolabel fast-myosin, six-µm-thick cryostat sections were air-dried at room temperature (RT), rehydrated in phosphate buffere-saline (PBS) and incubated for 20 min at RT with normal goat serum (NGS; DAKO, Glostrup, Denmark) diluted 1:20 in PBS containing 2% bovine serum albumin (BSA; Sigma-Aldrich) to block aspecific binding sites. The sections were then incubated for 1 hour at RT with a mouse monoclonal antibody recognizing fast myosin heavy chain isotype (Sigma-Aldrich) diluted 1:400 in PBS containing 2% BSA, washed in PBS and incubated with a goat anti-mouse biotinylated secondary antibody (Sigma-Aldrich) (1 hour incubation at RT, dilution 1:300 in PBS); the slides were finally incubated with peroxidase-conjugated streptavidin (Vectastain Elite ABC kit, Burlingame, Canada) revealed with 3-3' diaminobenzidine tetrahydrochloride (DAB; Sigma-Aldrich), counterstained with Mayer's haematoxylin (to visualize nuclei), dehydrated in ethanol-xilene and mounted in Eukitt (Sigma-Aldrich).

Control sections were processed as above, but

omitting incubation with the primary antibody.
Nuclear clumps and centralized nuclei were counted, by using the program ImageJ (Scion Corporation, USA), in cross-sections immunolabeled for fast myosin and the results were expressed as the number of nuclear clumps or centralized nuclei/mm^2. The relative atrophy and hypertrophy factors (increasing values indicate abnormal myofiber size distribution) were also estimated: the minor axis of 100 myofibers per sample were measured and, by using the program Microcal Origin (Microcal Software Inc., Northampton, MA), the histogram of axis length distribution and the curve according to Gauss equation were obtained. Then, according to Dubowitz *et al.*, (1985), the Gauss curves of our samples were compared with the standard distribution of myofiber size in male and female healthy populations.

Dual-labeling of nuclear *foci* by fluorescence in situ hybridization (FISH) and immunofluorescence

The FISH procedure was carried out on muscle sections as previously reported by Cardani *et al.*, (2004). In brief, 6 µm thick transverse cryostatic sections were air dried for 30 min and fixed with 2% paraformaldehyde for 30 min at 4°C. The sections were then washed in PBS and permeabilized in 2% acetone in PBS, pre-chilled at -20°C, for 5 min. After washing in PBS, sections were incubated in 40% formamide and 2x saline solution citrate (SSC) for 10 min at RT, and hybridized for 2 h at 37°C, with 1 ng/µL probe $(CAGG)_5$ Texas red labeled probes (IDT, Coralville, IA) in 30% formamide, 2xSSC, 0.02% BSA, 67 ng/µL yeast tRNA, 2 mM vanadyl ribonuclease complex (all these reagents were from Sigma-Aldrich). The sections were washed first in 40% formamide and 2x SSC at 45°C for 30 min, then in 1x SSC at 45°C for 15 min and another 1x SSC wash at RT.
The FISH-labeled sections were then processed for the immunofluorescence detection of MBNL1, as follows. The sections were pre-incubated for 20 min at RT with 5% NGS (Dako) in PBS containing 2% BSA (Sigma-Aldrich), and then incubated overnight at 4°C with a rabbit polyclonal antibody recognizing MBNL1 (kind gift of Prof. C.A. Thornton, University of Rochester, New York, USA); the primary antibody was diluted 1:1000 in PBS containing 2% BSA. The sections were washed in PBS and then incubated for 1 h at RT with a goat anti-rabbit Alexa488-labeled antibody (Molecular Probes; Invitrogen, Milan, Italy), diluted 1:200 in PBS; counterstained for DNA with Hoechst 33258 (1 µg/mL; Sigma-Aldrich), and mounted with Mowiol (Calbiochem, Milan, Italy). As controls, some slides were processed as described above but omitting the incubation with the primary antibody.

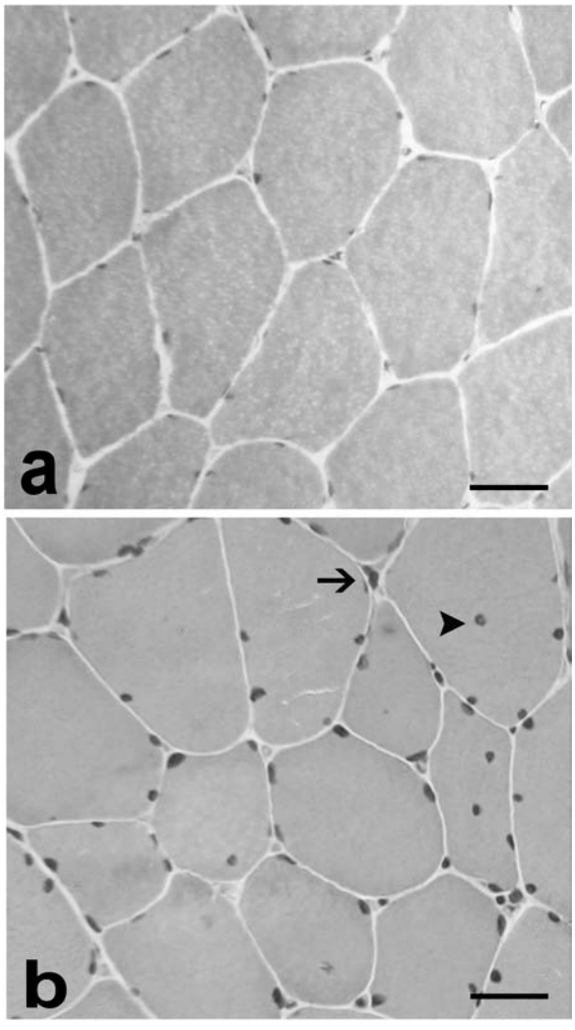

Figure 1. Haematoxylin and eosin staining of *biceps brachii* sections from healthy (a) and DM2 patients (b). In DM2 patients fiber size variation, centrally located nuclei (arrowhead) and pyknotic nuclear clumps (arrow) are apparent. Bars: 50 µm.

Morphometric evaluation of the ribonuclear inclusions and MBNL1-containing *foci*

Dual-labeled sections by FISH and MBNL1 were analyzed by confocal microscopy, using a Leica TCS SP2 AOBS system: for fluorescence excitation, an Ar/Vis laser at 488 nm for Alexa488, and He/Ne laser at 543 for Texas red; the laser intensity, pinhole opening, signal amplification and image spacing along the z axis were kept constant, and images were recorded in the 1024×1024 pixels format, using a 63x oil immersion objective. For each section, 60 ribonuclear inclusions and the corresponding MBNL1-containing *foci* were measured. Acquisitions were carried out at the Centro Interdipartimentale di Microscopia Avanzata (CIMA) of the University of Milan, Italy. The size and fluorescence intensity of the ribonuclear inclusions and MBNL1 *foci* were measured using the Leica Confocal Software. The mean values and standard errors were calculated; statistical analysis was made through ANOVA test.

Results

In Figure 1, examples of *biceps brachii* sections from a healthy and DM2 patient after hematoxylin and eosin staining are reported: apparently, in DM2 muscle the fiber size is more variable than in muscle from a healthy subject, and centrally located nuclei and pyknotic nuclear clumps are present. These histopathological features mostly occur in type 2 fibers (Figure 2a, b), and become

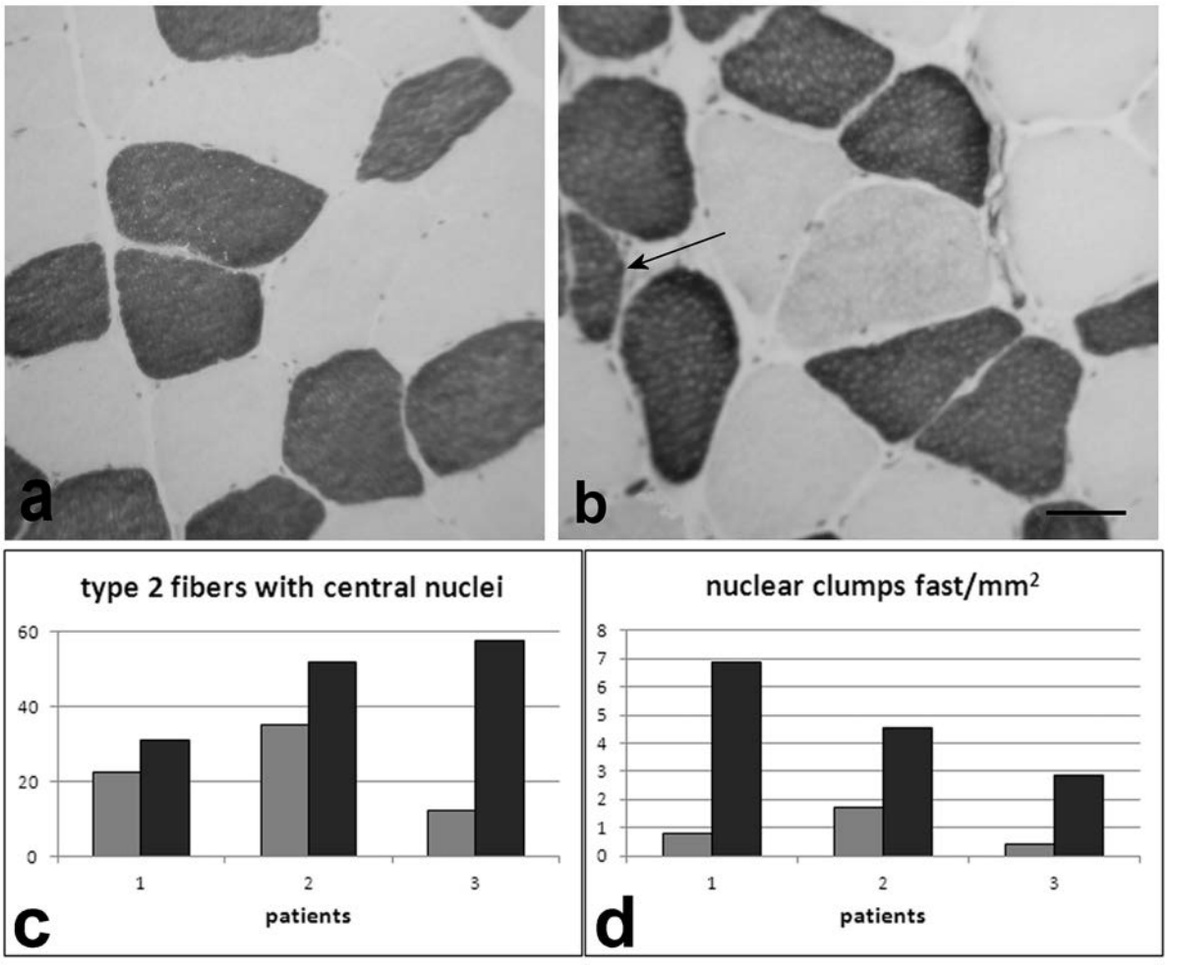

Figure 2. ATPase pH 10.0 reaction for type 2 fibers on *biceps brachii* sections from a healthy (a) and a DM2 (b) patient: fiber size variation and atrophic fibers (arrow) are shown. Bars: 50 µm. (c, d) Histograms showing the number of type 2 fibers with centralized nuclei and the number of nuclear clumps/mm^2 in fast myosin-positive fibers. Gray columns refer to the first biopsy, black ones to the second. In all patient the two parameters increased from the first to the second biopsy.

more frequent with increasing patient's age, as shown in Figure 2 (c, d), where these characteristics were quantitatively compared between the first and second biopsy of each patient. The relative atrophy and hypertrophy factors in type 2 fibers, as estimated by morphometric analysis, proved to increase in the second biopsy of all patients, with the only exception of the hypertrophy factor in patient 1 (Table 1).

Figure 3 shows the co-localization, in the nuclear *foci* of DM2 patients, of the FISH signal (Figure 3b) for expanded RNA and the immunopositivity for MBNL1 (Figure 3c). The areas of FISH or MBNL1 positivity, and the corresponding fluorescence intensities were measured in confocal images, considering muscle sections obtained from the two successive biopsies of each patient. In all patients, a significant increase was observed for both ribonuclear inclusions and MBNL1 *foci* in the second biopsy compared to the first one. As shown in Figure 4, the areas of FISH positive *foci* increased by about 37%, 29% and 20% in the second biopsy of patient no. 1, 2 and 3 respectively, while the areas of MBNL1 *foci* in the second biopsy were respectively larger by about 73%, 23% and 38%. Similar trends were found for the corresponding fluorescence intensities of FISH and MBNL1, which increased in the second biopsy by about 17% and 69% in patient 1, by about 16% and 20% in patient 2, and by about 22% and 38% in patient 3.

Table 1. Relative atrophy and hypertrophy factors in type 2 fibers of *biceps brachii* from the three patients considered in our study. Both factors increase in the second biopsy in all patients, with the only exception of the hypertrophy factor in patient 1.

	Relative atrophy factor		Relative hypertrophy factor	
	First biopsy	Second biopsy	First biopsy	Second biopsy
Patient 1	1.00	1.17	3.05	0.55
Patient 2	0.20	1.63	4.81	6.13
Patient 3	0.29	1.12	0.72	2.52

Discussion and Conclusions

The expansion of the CCTG repeat in first intron of *ZNF9* gene has been associated to the multisystemic pathological features of DM2 patients

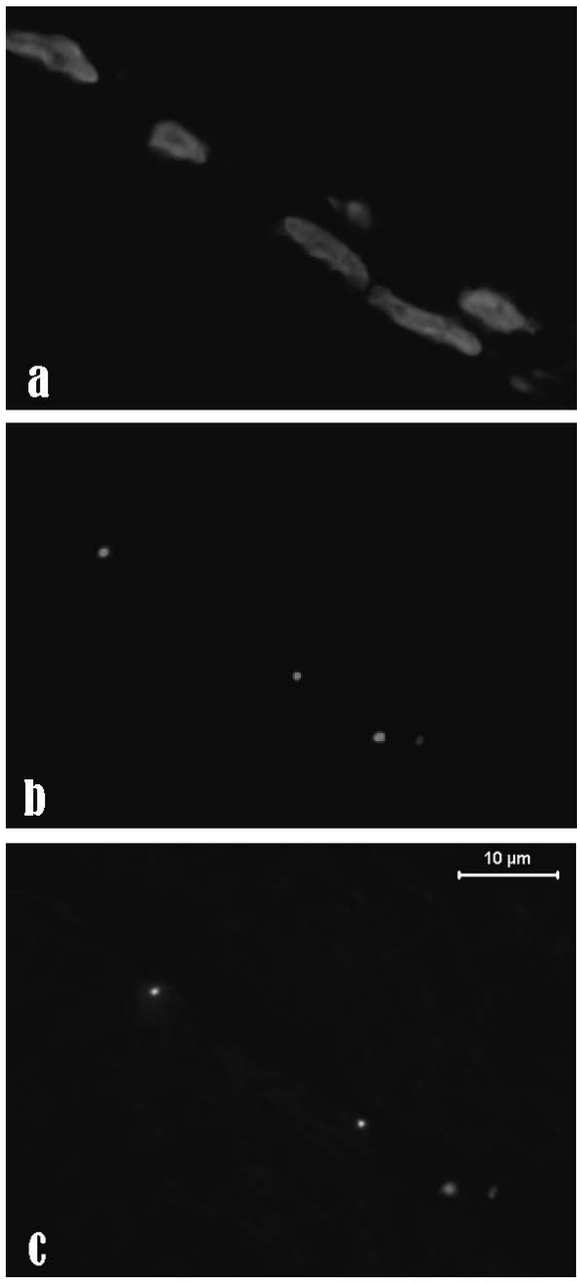

Figure 3. FISH for expanded RNA and immunofluorescence for MBNL1 on DM2 *biceps brachii* sections. (a) DNA was counterstained with Hoechst 33258; (b) ribonuclear inclusions and (c) MBNL1 *foci* colocalize. Bar: 10 µm.

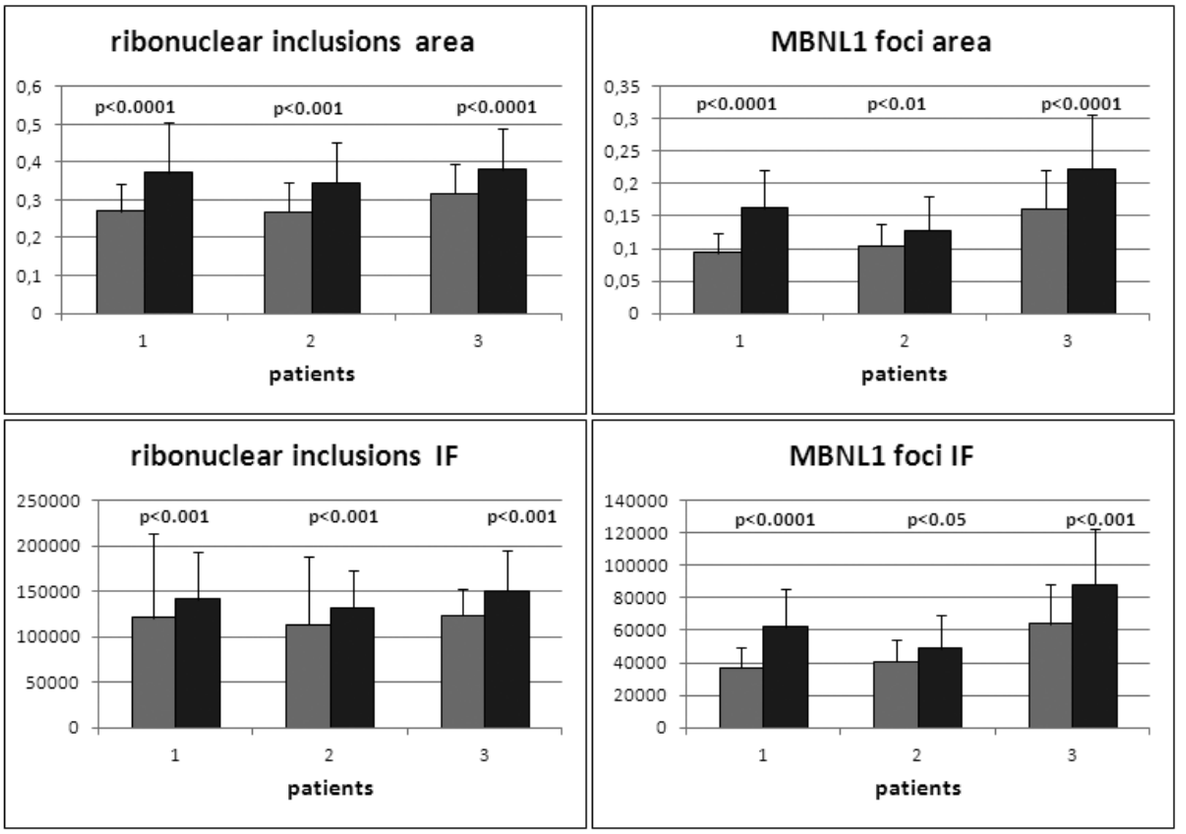

Figure 4. Quantitative mean ± standard errors of dimensions and fluorescence intensity (IF) of ribonuclear inclusions and MBNL1 *foci*. Histograms showing a statistically significant increase of dimensions and fluorescence intensity from first to second biopsy in all patients considered. Gray columns refer to the first biopsy, black ones to the second. In all patient the two parameters increased from the first to the second biopsy.

(Ranum *et al.*, 1998; Liquori *et al.*, 2001). The expanded-CCUG containing transcripts are retained and accumulate in the nucleus, in the form of ribonuclear inclusions (Liquori *et al.*, 2001; Mankodi *et al.*, 2001, 2003) where several splicing factors essential for mRNA processing are sequestered (Fardaei *et al.*, 2002; Cardani *et al.*, 2006; Pascual *et al.*, 2006; Perdoni *et al.*, 2009).

It has been observed that clinical symptoms such as proximal muscle weakness and myotonia undergo progressive worsening with increasing age in DM2 as well as in DM1 patients (Meola *et al.*, 2002), and that the expansion of DNA repeats increased by approximately 2 kb in the leukophocytes of a DM patient during the 3-year interval between two successive blood donations (Liquori *et al.*, 2001).

Our results demonstrate that, in the nuclei of skeletal muscle cells from *biceps brachii* of three different DM2 patients who underwent two successive biopsies (at intervals of 4 to 10 years), the intranuclear *foci* increased in size and in content of expanded RNA and MBNL1, as estimated from the area and fluorescence intensities of the final reaction products after FISH or immunolabeling procedures.

We have recently demonstrated, using primary fibroblast cultures from DM2 patients as a model system, that upon exit from the cell cycle fibroblasts accumulate increasing amounts of MBNL1 in their nuclei, with a concomitant increase in size of the RNP-containing *foci*; we have hypothesized that in non-dividing cells the continuous and progressive sequestration of factors needed for RNA processing would lead to the onset and the worsening with time of the cell pathological traits in DM2 patients. The results of the morphometric analyses performed on the skeletal muscle biopsies from the three DM2 patients of the present investigation are compatible with this view: in

adult skeletal muscle, non-renewing cells are mainly present in which a progressive sequestration of protein factors needed for the mRNA processing apparently takes place with increasing patient's age. In parallel, there is a progressive worsening of the histopathological traits, such as pyknotic nuclear clumps and centrally located nuclei, and an increase in the atrophy/hypertrophy factors in type 2 muscle fibers which are known to be especially affected in DM2.
The close relationship between the amount of the RNP-containing *foci* and the extent of the pathological cell phenotype has been confirmed by experiments *in vitro* (Warf *et al.*, 2009) and in vivo (Mulders *et al.*, 2009), aimed at decreasing the intranuclear accumulation of MBNL1: this resulted in the reduction in the number and size of nuclear *foci*, and the restoration of the normal splicing processes, with attenuation of the diseased phenotype of dystrophic (DM1) cells.
As a final remark, it is worth recalling that in DM patients not only skeletal muscle is affected, but also the central nervous system and heart, where non-renewing cells are mainly present.

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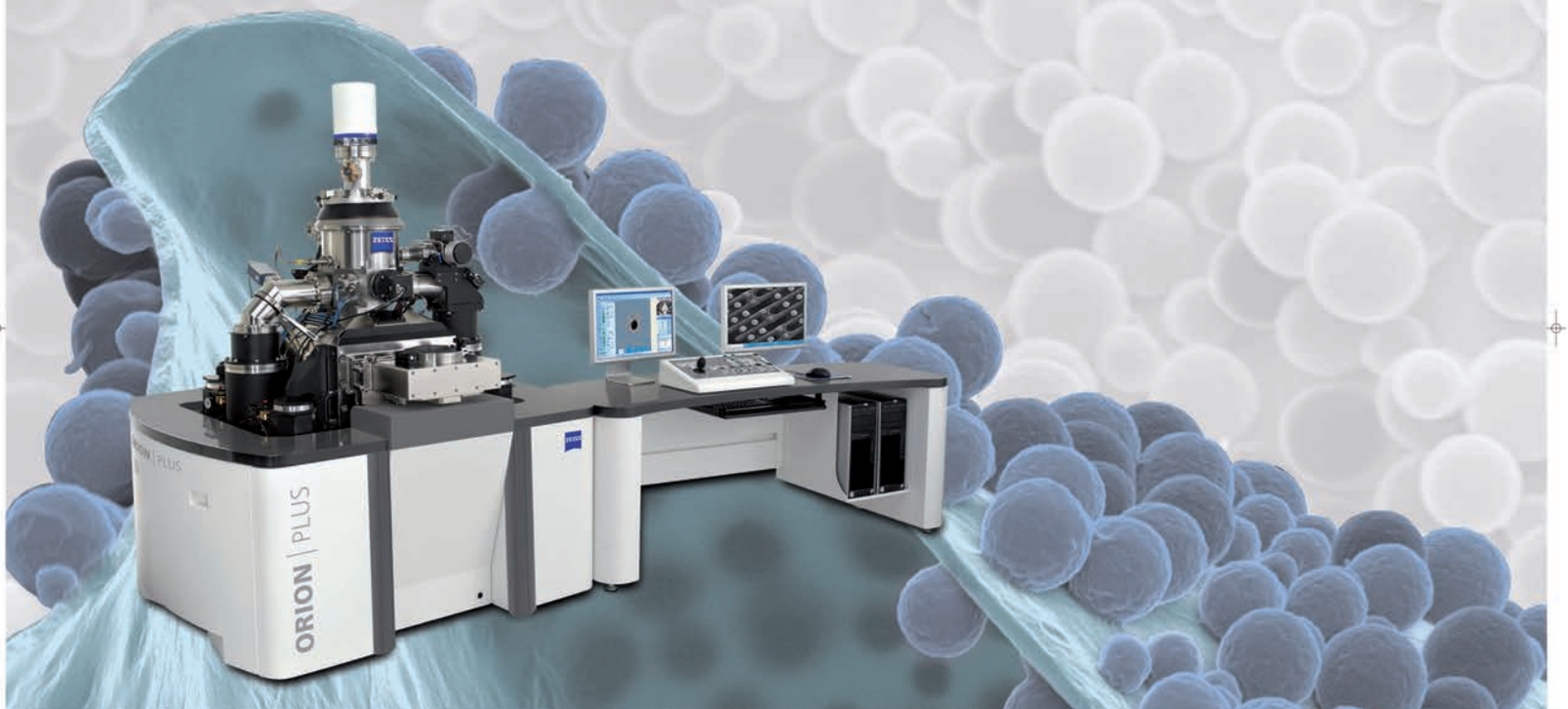

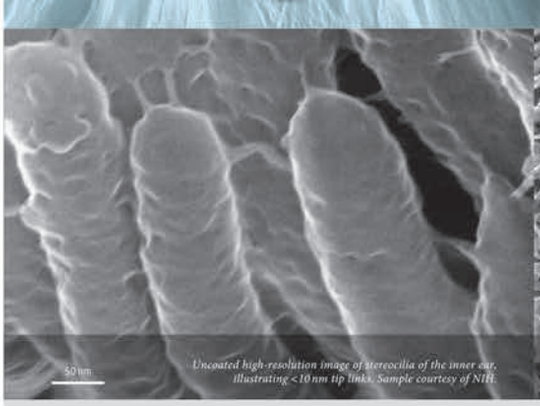

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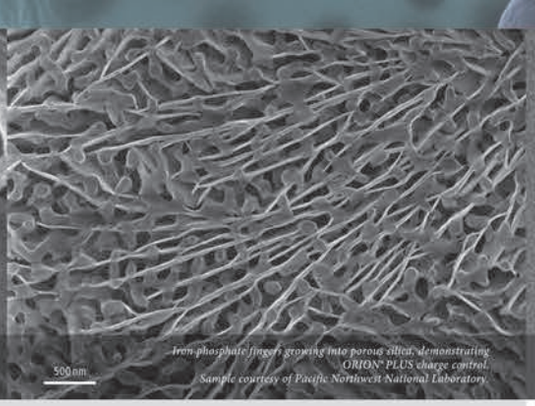

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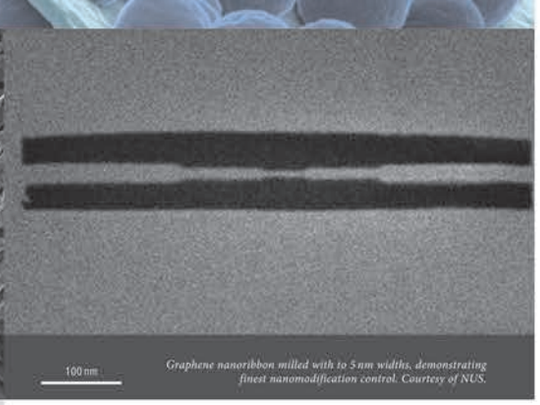

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