

# Co-Nanomet

Co-ordination of Nanometrology in Europe

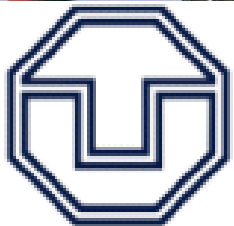
Co-Nanomet Workshop

28 - 29 April 2010

CCN Ost, Nuremberg, Germany

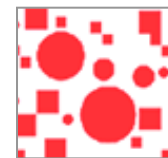
## Instruments, Standard Methods and Reference Materials for Traceable Nanoparticle Characterisation

CCN CongressCenter  
Nürnberg



# Introduction

<http://www.nanoparticle-metrology.de>



## Co-Nanomet

*Co-ordination of Nanometrology in Europe*

### Workshop

Introduction

Program

Registration



### Information

Press

Photo album

Downloads

## Objectives

Co-Nanomet is an EC-funded project aiming at developing European measurement capacity and know-how for the industrial exploitation of nanotechnology. This scientific workshop will bring together stakeholders involved in engineered nanoparticle (ENP) metrology, such as manufacturers of ENPs, (eco)toxicologists, developers of measurement techniques, representatives of standardisation bodies and authorities. After the workshop a report will be published with excerpts from all talks and the subsequent discussions:

**Topics:** assess the current metrology status with regard to

- relevant measurands (depending on the context of the measurement)
  - available measurement techniques, their limits and fields of application
  - the dissemination of such techniques in science, industry and public authorities
  - traceability and measurement uncertainty
  - standardisation
  - reference materials
- reveal current and future needs for ENP metrology

All speakers of the workshop are renowned experts on the field of particle characterisation. Most of them are engaged in the European Nanometrology action group of Engineered Nanoparticles or work within the ISO/TC 24/SC 4 committee.

## Co-Nanomet Workshop

28 - 29 April 2010 in Nuremberg, Germany

Instruments, standard methods and reference materials  
for traceable nanoparticle characterisation



### Partner Events



### Location & Route

Congress Center Nuremberg

CNN Ost

(in direct neighbourhood of  
POWTECH Hall 7),  
Level 3, Room "Shanghai",  
Messezentrum

90471 Nürnberg

# Scope of the Workshop



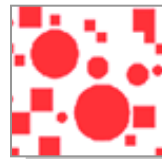
- ★ Co-Nanomet is an EC-funded project aiming at developing European measurement capacity and know-how for the industrial exploitation of nanotechnology.
- ★ This scientific workshop brings together stakeholders involved in engineered nanoparticle (ENP) metrology, such as manufacturers of ENPs, (eco)toxicologists, developers of measurement techniques, representatives of standardisation bodies and authorities.
- ★ The workshop aims to assess the status of metrology for ENPs and to reveal the current and future needs for ENP metrology.

# Programme

28 April 2010

Time	Event
8:30	<i>Start of Registration</i> The registration desk in the entrance hall of CNN East opens at 8:30 am Mrs. Simone Koch, Secretariat, <a href="mailto:info@nanoparticle-metrology.de">info@nanoparticle-metrology.de</a>
9:15	<b>Welcome</b> G. Roebben, M. Stintz, T. Burke, W. Witt
	<b>Session A – Fundamentals of ENP characterisation</b> Chairman: W. Witt (Sympatec GmbH, Germany)
09:30	<b>General aspects of particle sizing</b> M. Stintz (Technical University Dresden, DE)
10:00	<b>Terminology and standards for ENP characterisation</b> T. Thornton (Micromeritics, USA)
10:30	<b>Metrology for particle sizing</b> G. Roebben (JRC-IRMM, EU)
11:00	Coffee break
	<b>Session B – Objectives of ENP characterisation</b> Chairman: M. Stintz (Technical University Dresden, DE)
11:30	<b>Quality assurance and process control</b> B. Sachweh (BASF, DE)
12:00	<b>ENP characterization in view of health studies – the NANO-CARE project</b> T. Kuhlbusch (IUTA, DE)
12:30	<b>ENP sizing and concentration measurement for environmental risk assessment</b> M. Hassellöv (University Gothenburg, SE)
13:00	Lunch break

# Programme (2)



## **Session C1 – ENPs in liquid media: sizing**

*Chairman: B. Sachweh (BASF, DE)*

**14:30**      **Comparing methods for measurements in liquid**  
*P. Bowen (EPFL, CH)*

**15:00**      **Characterisation of NPs with DLS**  
*A. Rawle (Malvern, USA)*

**15:30**      **Sizing with on-line methods**  
*W. Witt (Sympatec, DE)*

**16:00**      *Coffee break*

## **Session C2 – ENPs in liquid media: interfacial properties**

*Chairman: Frank Babick (Technical University Dresden, DE)*

**16:15**      **Measuring interfacial properties using electroacoustics**  
*A. Dukhin (Dispersion Technology, USA)*

**16:45**      **Zeta-potential measurement**  
*R. Xu (Beckman Coulter, USA)*

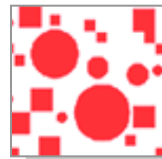
**17:15**      **Suspension stability**  
*D. Lerche (L.U.M., DE)*

**17:45**      **End of Part 1**

*starting from 19:00*      *Dinner at the "Heilig-Geist-Spital" in Nuremberg  
Spitalgasse 16  
90403 Nürnberg  
Tel. : 0911 221761*

# Programme (3)

29 April 2010



<i>Time</i>	<i>Event</i>
8:30	<i>Start of Registration</i> <i>Mrs. Simone Koch, Secretariat, <a href="mailto:info@nanoparticle-metrology.de">info@nanoparticle-metrology.de</a></i>
	<b><i>Session D – Characterisation of airborne particles</i></b> <i>Chairman: H. Sakurai (AIST, Japan)</i>
09:00	<b>Survey on aerosol measurement techniques</b> <i>G. Sem (TSI, USA)</i>
09:30	<b>Exposure assessment in settings relevant to nanotechnologies</b> <i>R. Aitken (IOM, UK)</i>
10:00	<i>Coffee break</i>
	<b><i>Session E – Reference materials</i></b> <i>Chairman: G. Roebben (JRC-IRMM, EU)</i>
10:30	<b>Reference materials: concepts, applications and examples</b> <i>A. Lamberty (JRC-IRMM, EU)</i>
11:00	<b>Experiences with ENP reference materials</b> <i>V. Hackley (NIST, USA)</i>
11:30	<b>Preparation of sub-micrometer particles for reference materials</b> <i>Y. Mori (Doshisha Uni, JP)</i>
12:00	<i>Lunch break</i>

# Programme (4)



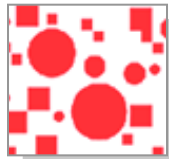
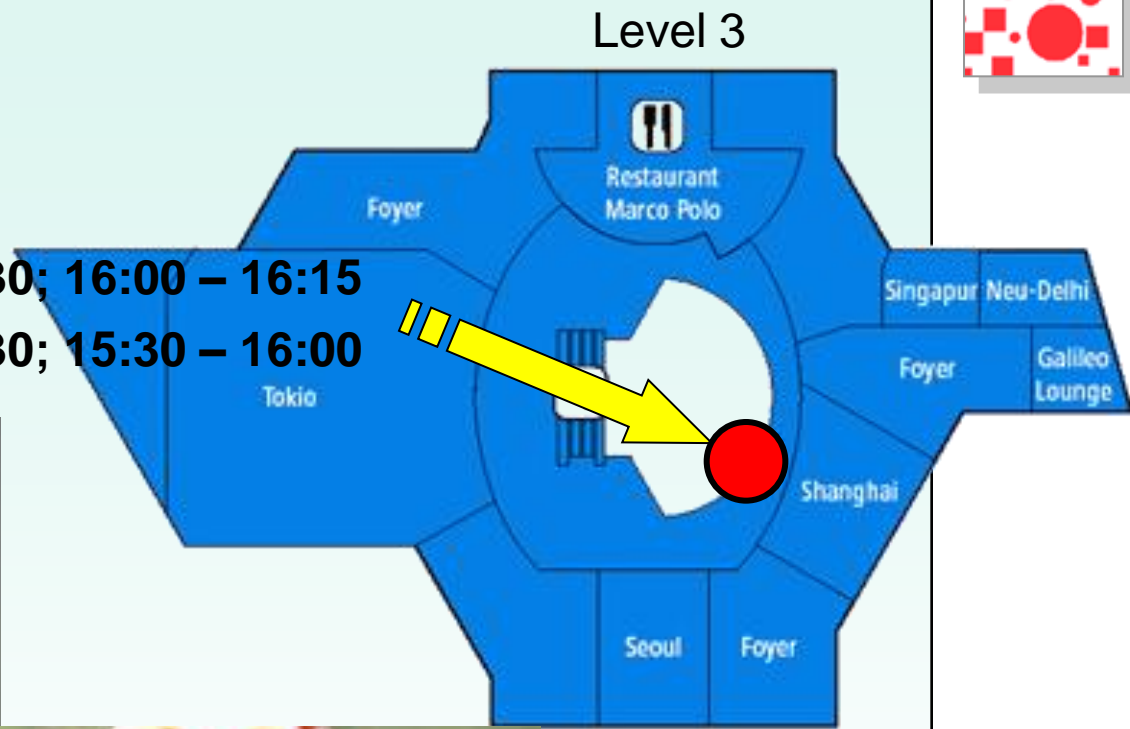
	<b>Session F – Sizing and material characterisation</b> <i>Chairman: A. Rawle (Malvern, USA)</i>
<b>13:30</b>	<b>Size determination of NPs with SAXS</b> <i>M. Krumrey (PTB, DE)</i>
	<b>Session G – Concluding discussion</b> <i>Chairman: G. Roebben (JRC-IRMM, EU), Frank Babick (Technical University Dresden, DE)</i>
<b>14:00</b>	<ul style="list-style-type: none"><li>- What exactly can be measured today?</li><li>- Need for standardisation</li><li>- Need for new / better methods</li><li>- Which developments can and can not be expected soon?</li></ul>
<b>15:30</b>	<b>Closing of the workshop</b>

# Coffee Breaks

## Level 3:

28 April 2010: 11:00 – 11:30; 16:00 – 16:15

29 April 2010: 10:00 – 10:30; 15:30 – 16:00

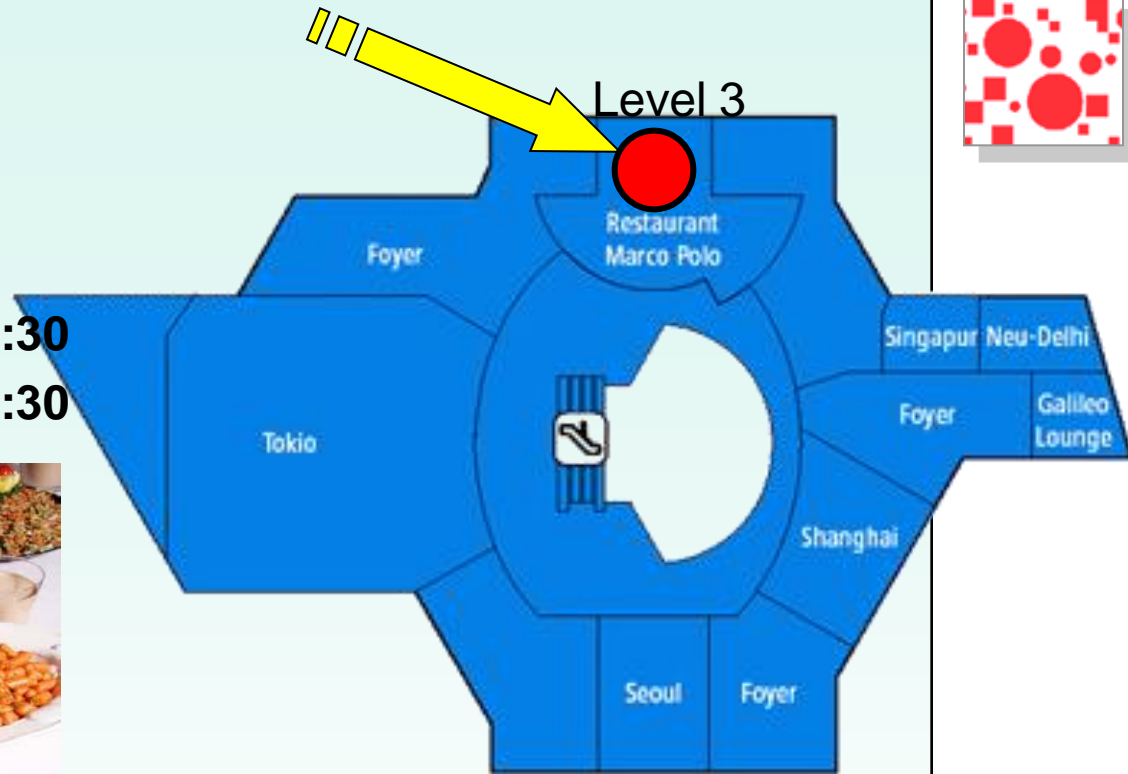


# Lunch Buffet

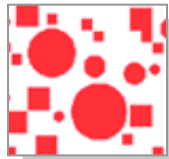
## Level 3:

28 April 2010: 13:00 – 14:30

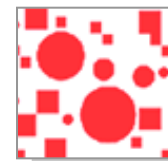
29 April 2010: 12:00 – 13:30



Restaurant „Marco Polo“



# Lecturers

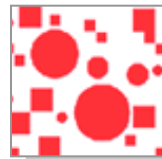


Lecturers

No.	Name	Title	Country	Institution	
1	Aitken	Rob	Dr.	GB	Institute of Occupational Medicine
2	Bowen	Paul	Dr.	CH	EPFL, Lausanne
3	Dukhin	Andrei	Dr.	US	Dispersion Technology Inc.
4	Hackley	Vince	Dr.	US	NIST, Materials Science and Engineering Laboratory
5	Hassellöv	Martin	Associate Prof.	SE	University of Gothenburg , Department of Chemistry
6	Krumrey	Michael	Dr.	DE	Physikalisch-Technische Bundesanstalt
7	Kuhlbusch	Thomas	Dr. rer. nat.	DE	Institut für Energie- und Umwelttechnik IUTA e.V.
8	Lamberty	Andrée	Dr.	BE	Institute for Reference Materials and Measurements, Joint Research Centre of the European Commission
9	Lerche	Dietmar	Prof. Dr.	DE	L.U.M. GmbH, Berlin
10	Mori	Yasushige	Prof. Dr.	JP	Doshisha University, Department of Chemical Engineering and Materials Science
11	Rawle	Alan	Dr.	US	Malvern Instruments Inc, Westborough
12	Roebben	Gert	Dr. ir.	BE	Institute for Reference Materials and Measurements, Joint Research Centre of the European Commission
13	Sachweh	Bernd	Prof. Dr.	DE	BASF AG, Ludwigshafen
14	Sem	Gil J.	Dr.	US	American Association for Aerosol Research
15	Stintz	Michael	PD Dr.-Ing. habil.	DE	TU Dresden, Institut für Verfahrenstechnik und Umwelttechnik
16	Thornton	Tony	Mr.	US	Micromeritics Instruments Corp., Norcross, USA
17	Witt	Wolfgang	Dr. rer. nat.	DE	Sympatec GmbH, Clausthal-Zellerfeld, Germany
18	Xu	Ren	Dr.	US	Beckmann Coulter

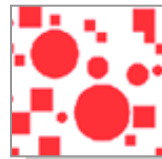
Name, date, title and institution reflect the information of the registration. The lecturers and participants are sorted by name.

# Participants (1)



No.	Name	Title	Country	Institution
19	Achete	Carlos Alberto	Dr.	BR Inmetro
20	Babick	Frank	Dr.	DE TU Dresden
21	Barth	Nina	Dipl.-Ing.	DE iPAT TU Braunschweig
22	Barthel	Herbert	Dr.	DE Wacker Chemie AG
23	Bekker	Cindy	BSc.	NL TNO Quality of life
24	Berger	Ulrich	Dipl.-Chem.	DE LGC Standards GmbH
25	Bitterlich	André	Dipl.-Ing.	DE iPAT TU Braunschweig
26	Boydens	Eddy	Mr.	BE Umicore
27	Braun	Adelina	Dr.	BE Institute for Reference Materials and Measurements, Joint Research Centre of the European Commission
28	Bru	Pascal	Mr.	FR Formulacion
29	Buhr	Egbert	Dr.	DE Physikalisch-Technische Bundesanstalt
30	Daschner de Tercero	Maren	M.Sc.	DE Fraunhofer Institut für Chemische Technologie
31	Debayle	Johan		FR Ecole des Mines
32	Dirscherl	Kai	Dr.	DK Danish Fundamental Metrology
33	Erdinger	Lothar	Priv.-Doz. Dr.	DE Universität Heidelberg
34	Fernández Rosas	Elisabet	Ms	SP LEITAT, Technological Center
35	Franks	Katrin		BE Institute for Reference Materials and Measurements, Joint Research Centre of the European Commission
36	Garnaes	Joergen	Dr.	DK Danish Fundamental Metrology
37	Geers	Helmut	Dipl.-Ing.	DE Sympatec GmbH
38	Gellermann	Carsten	Dr.	DE Fraunhofer Institut für Silicatforschung
39	Gemeinert	Marion	Dr.	DE BAM Bundesanstalt für Materialforschung und -prüfung
40	Gleber	Gudrun	Dipl.-Phys.	DE Physikalisch-Technische Bundesanstalt
41	Gomez	Maria Pilar	Mrs.	SP Instituto de Tecnologia Ceramica Aice
42	Holdich	Richard	Mr.	GB Loughborough University
43	Hole	Patrick	Dr.	GB NanoSight
44	Horn	Hans-Georg	Dr.	DE TSI GmbH
45	Iliev	Hristo	Dr.	BG Sofia University
46	Jacob	David	Dr.	FR Cordouane
47	Jämting	Asa	Dr.	AU National Measurement Institute

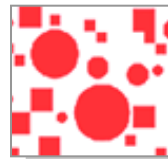
# Participants (2)



No	Name	Title	Country	Institution	
48	Joergen	Garnaes	Dr.	DK	Danish Fundamental Metrology
49	Jordan	Jens	Dipl.-Ing.	DE	Sympatec GmbH
50	Jordan-Gerkens	Anke	Dr.	DE	Physikalisch-Technische Bundesanstalt
51	Kestens	Vikram	Ing.	BE	Institute for Reference Materials and Measurements, Joint Research Centre of the European Commission
52	Klein	Tobias	Dipl.-Phys.	DE	Physikalisch-Technische Bundesanstalt
53	Klobes	Peter	Dr.	DE	BAM Bundesanstalt für Materialforschung und -prüfung
54	Külz	Uwe	Dipl.-Phys. Ing.	DE	HWL Scientific Instruments GmbH
55	Kurjo McNeill	Sabine	Mrs.	GB	3D Metrics
56	Kurz	Jochen	Dipl.-Chem.	DE	Universitätsklinikum Heidelberg
57	Mahl	Dirk	Dipl.-Chem.	DE	Universität Duisburg-Essen
58	Marchet	Nicolas	Dr.	FR	CILAS
59	Masuda	Hiroaki	Prof. Dr.	JP	Kyoto University
60	Mayer	Erwin-Peter	Dr.	DE	Wacker Chemie AG
61	Menzel	Michael	Dr.	DE	BAM Bundesanstalt für Materialforschung und -prüfung
62	Meunier	Gerard	Mr.	FR	Formulation
63	Nutsch	Andreas	Dr.	DE	Fraunhofer IISB
64	Otto	Michael	Dr.	DE	Fraunhofer IISB
65	Paciejewska	Karina	Dipl.-Ing.	DE	TU Dresden
66	Pétry	Jasmine	Dr. Ir.	BE	SMD - Belgium
67	Potthoff	Annegret	Dr.	DE	Fraunhofer IKTS Dresden
68	Prieto	Emilio	Dr.	SP	Centro Espanol de Metrologia
69	Rauscher	Hubert	Dr.	IT	European Commission Joint Research Centre
70	Roesslein	Matthias	Dr.	CH	Empa
71	Roethele	Stephan	Dr.	DE	Sympatec GmbH
72	Sakurai	Hiromu	Dr.	JP	AIST
73	Schlich	Karsten	Dipl.-Ing.	DE	Fraunhofer Institute for Molecular Biology and Applied Ecology
74	Schmitt	Michael	Dr.	DE	DIN Deutsches Institut für Normung e.V.
75	Schröder-Heber	Annemarie	Dr.-Ing.	DE	Fraunhofer IISB
76	Seeger	Stefan	Dr.	DE	BAM AG IV.24



# Vouchers



**Co-Nanomet**  
Co-ordination of Nanometrology in Europe

**Co-Nanomet Workshop**  
28 April 2010  
CCN Ost, Nuremberg, Germany

**Lunch Buffet Voucher 25 €** ✧  
**Buffet-Gutschein im Wert von 25 €**

The price includes 19% of VAT ✧ Der Preis enthält 19% MwSt.

This voucher entitles one person to participate at the lunch buffet on 28 April 2010 at 13.00 in the restaurant Marco Polo ✧  
Dieser Gutschein berechtigt eine Person zur Teilnahme am Lunch Buffet am 28. April 2010 um 13.00 Uhr im Restaurant Marco Polo.

CCN Ost, Nuremberg, Germany



Sympatec GmbH  
System-Partikel-Technik  
38678 Clausthal-Zellerfeld, Germany

## Lunch Buffet Voucher (as an option 25€/day)

- ★ the lunch buffet voucher is available at the registration desk for registered participants

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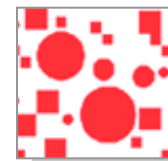
CCN Ost, Nuremberg, Germany



Sympatec GmbH  
System-Partikel-Technik  
38678 Clausthal-Zellerfeld, Germany

Amtsgericht Braunschweig HRB 110809  
Geschäftsführer Dr.-Ing. E.N. Stephan Röttele

# Feedback



## Basis: 17 Returns

	yes		mainly		no		
	1	2	3	4	5		Avr.
<b>Scope &amp; Structure</b>							
★ Does the scope and the structure of the workshop meet your expectations ?	6	6	4				<b>1,88</b>
★ Is the date parallel to WCPT6/POWTECH/TechnoPharm ok for you?	7	4	4	2			<b>2,06</b>
	very good		ok		bad		
	1	2	3	4	5		Avr.
<b>Quality of Presentations</b>							
★ Session A, B, C1, C2	5	8	3				<b>1,88</b>
★ Session D, E, F, G	7	7	2				<b>1,68</b>
	very good		ok		bad		
	1	2	3	4	5		Avr.
<b>Organisation</b>							
★ Location of the workshop and the quality of the conference room?	14	3					<b>1,17</b>
★ Presentation technique (audio, beamer etc.)?	14	3					<b>1,17</b>
★ Quality of the lunch buffet	10	2	2				<b>1,42</b>
★ Location of the lunch buffet	12	3					<b>1,2</b>
★ Quality of the organisation	12	3	1				<b>1,31</b>
★ What would be your maximum price limit for this workshop (please mark)?	500 €	200 €	150 €	100 €	50 €		<b>160€</b>
	1	3	2	7			
	very good		ok		bad		
	1	2	3	4	5		Avr.
<b>Results</b>							
★ How would you classify the workshop in total ?	10	5	2				<b>1,52</b>
★ Would you like to attend a similar event on particle characterisation at the next POWTECH in 2013 ?	8	5	3				<b>1,68</b>

\* A combination with POWTECH/PARTEC2010 is our preference.

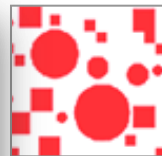
# Feedback (2)



## Basis: 17 Returns

### Comments & Recommendations

- ★ really interesting workshop
- ★ more posters with discussions about practical needs could be helpful to understand the challenges & pitfalls
- ★ good focus
- ★ Too much commercial input, not enough ENP presence
- ★ As a specialist in modelling & simulation I cannot assess on the quality of the scope and the structure of the workshop. I can only judge from indirect observations that it is very good.
- ★ Very good talk, but too broad. Not enough technical content and discussion
- ★ No talk on AFM while a ref. at NMI for NP size determination
- ★ Coffee and tea before first session would have been nice
- ★ Very fruitful workshop
- ★ It would be great if it was held more often. Maybe on other fields of nanotechnology. Maybe over metrology for nanophotonics, electronics etc.
- ★ Lunch included in the fee
- ★ Better local information to find the conference room
- ★ No information that posters can be presented like in the flyer mentioned
- ★ One day before or after POWTECH/PARTEC



- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>1 Handwerkerhof Nürnberg / Craftsmen's Courtyard</li> <li>2 Kunsthause / Nuremberg Art Gallery</li> <li>3 Neues Museum / State Museum for Art and Design</li> <li>4 St. Marthakirche / St. Martha's Church</li> <li>5 St. Klara-Kirche / St. Clare's Church</li> <li>6 Mauthalle / Former Customs House</li> <li>7 St. Lorenz/Bibel-Erlebnis-Haus / St. Lawrence/Bible Discovery House</li> <li>8 Tugendbrunnen / Fountain of Virtues</li> <li>9 Nasseauer Haus / Nasseau House</li> <li>10 Heilig-Geist-Spital / Hospital of the Holy Spirit</li> <li>11 Frauenkirche / Church of Our Lady</li> <li>12 Schöner Brunnen / Beautiful Fountain</li> <li>13 Gänsesmännchenbrunnen / Gooseman Fountain</li> <li>14 Rathaus/Lochgefängnisse / Town Hall/Dungeons</li> <li>15 Stadtmuseum Fembohaus / Fembo House City Museum</li> <li>16 Kaiserstallung mit DJH / Former Imperial Stables/Youth Hostel</li> <li>17 Kaiserburg / Imperial Castle</li> </ul> | <ul style="list-style-type: none"> <li>18 Platz am Tiergärtnerort / Square at Tiergärtnerort</li> <li>19 Treffpunkt: Bergstr. 19 am Brauereileiden für / Meeting point: Bergstr. 19, brewery shop for: Käsematten mit Lochwasserleitung / Casemates and Water Supply Conduits</li> <li>20 Historischer Kunstbunker / Historic Art Bunker</li> <li>21 Nürnberger Felsengänge / Underground Cellars of Nuremberg</li> <li>22 Albrecht-Dürer-Haus / Albrecht Dürer House Museum</li> <li>23 St. Sebald / St. Sebaldus</li> <li>24 Spielzeugmuseum / Toy Museum</li> <li>25 Museum Henkerhaus, Weinstadel / Hangman's House, Former Wine Depot</li> <li>26 Turm der Sinne / Tower of the Senses</li> <li>27 Ehekaruseell / Marriage Merry-Go-Round Fountain</li> <li>28 St. Elisabethkirche / St. Elisabeth's Church</li> <li>29 St. Jakobskirche / St. James' Church</li> <li>30 Feuerwehrmuseum / Fire Brigade Museum</li> <li>31 Zirkelschmiedegasse / Zirkelschmiedegasse</li> </ul> | <ul style="list-style-type: none"> <li>32 Germanisches Nationalmuseum / Germanisches Nationalmuseum</li> <li>33 DB Museum und Museum für Kommunikation im Verkehrsmuseum / Transport Museum includes Railway Museum and Communications Museum</li> <li>34 Staatstheater Nürnberg / Nuremberg Theaters</li> <li>35 Kunsthalle Nürnberg / Gallery of Contemporary Art</li> <li>36 Uhrenmuseum / Horological Museum</li> <li>37 CineCittà mit IMAX Kino / CineCittà with IMAX Cinema</li> <li>38 Naturhistorisches Museum / Natural History Museum</li> <li>39 Ruine der Katharinenkirche / Ruins of St. Catherine's Church</li> <li>40 Hut-Museum Brönne / Hat Museum</li> <li>41 St. Egidienkirche / Church of St. Giles</li> <li>42 Museum Tuchererschloss / Tucher Residence Museum</li> <li>43 Kreuzwegstationen / Stations of the Cross</li> <li>44 Barockgärten / Baroque gardens</li> <li>45 Heesperidengärten / Gardens of the Hesperides</li> <li>46 St.-Johannis-Friedhof / St. John's Cemetery</li> <li>47 Planetarium / Planetarium</li> </ul> |
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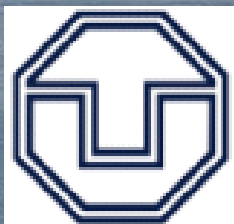
# Co-Nanomet

Co-ordination of Nanometrology in Europe

## Co-Nanomet Workshop

28 - 29 April 2010  
CCN Ost, Nuremberg, Germany

We wish you an interesting and enjoyable workshop



### Organisation / Imprint:

PD Dr.-Ing. habil. Michael Stintz, TU Dresden,  
Institut für Verfahrenstechnik und Umwelttechnik,  
Arbeitsgruppe Mechanische Verfahrenstechnik,  
01062 Dresden, Germany

Dr. ir. Gert Roebben, Dr. Andrée Lamberty  
Institute for Reference Materials and  
Measurements,  
Joint Research Centre of the EC

Dr. Wolfgang Witt, Sympatec GmbH,  
System-Partikel-Technik, Am Pulverhaus 1,  
D-38678 Clausthal-Zellerfeld, Germany

Phone: +49 (351) 463 35176  
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