



# TC for Metrology in Chemistry: Highlights and challenges

**Michela Segal, TC-MC Chair**  
**INRIM, Italy**

**6<sup>th</sup> EURAMET General Assembly**  
**Kongens Lyngby, Denmark, 22 to 24 May 2012**

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## Outline

- TC-MC meetings
- CMCs
- EMRP activities
- Project example
- Technical roadmapping

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## Meetings

### General TC-MC meeting & meeting of all 4 Sub-Committees in **Biarritz, France 31<sup>st</sup> January – 3<sup>rd</sup> February 2012**

- largest meeting so far, 90 participants from NMIs/DIs of 24 Countries + BIPM, EU, CIPM
- Discussion of Cycle XIII CMCs
- Discussion on EMRP projects within and in addition to the SC meetings (30<sup>th</sup> January: extra day for periodic meeting)
- Presentation of feedbacks from ended iMERA plus projects
- Discussion on future EURAMET and EMRP projects (TPs “SI Broader Scope”, “Industry”, “Open Excellence”)
- Gas Analysis Sub-Committee: Hugo Ent (VSL, the Netherlands) takes over the convenorship from Rob Wessel (VSL)

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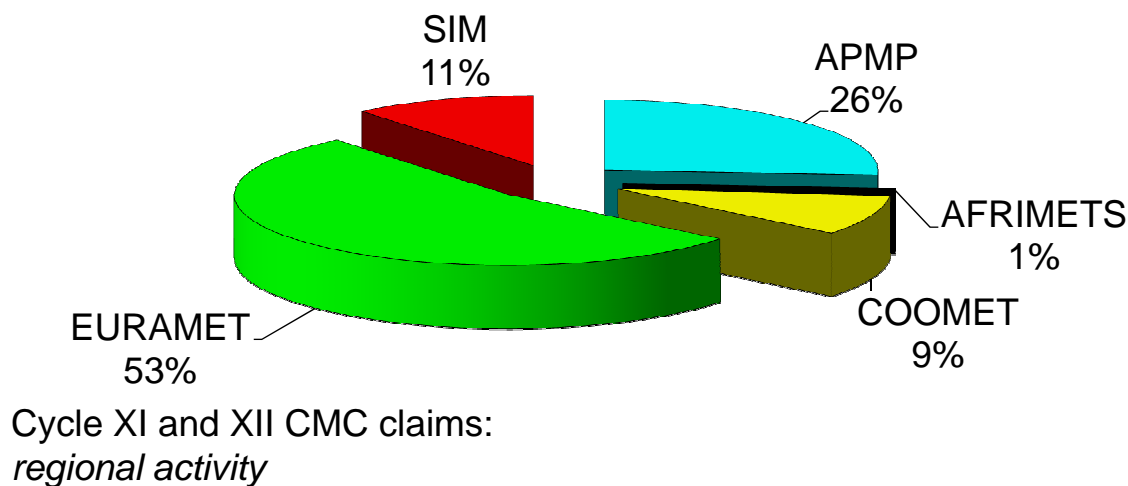
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## CMCs: Cycle XI (NFT) + XII (*published Dec. 11-Mar. 12*)



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## CMC Cycle XII

**New** CCQM CMC claims in cycle XII 106

### Re-Review

- Cat. 1 (High purity metals) 10
  - Cat. 8 (Metal alloys) 270
- 280

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## EMRP WORKSHOP in preparation of call 2012, Biarritz, 2nd February 2012

### aim of the workshop:

- address chemical aspects related to the upcoming EMRP calls
- establish common areas of interest in the chemistry-related field of metrology across the EURAMET/EMRP countries
- trigger discussion among possible partners for further discussion  
- also including partners from outside the TC-MC community
- initiate preliminary interest groups which might become active in the EMRP process

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## EMRP WORKSHOP in preparation of call 2012, Biarritz, 2<sup>nd</sup> February 2012

- LGC: Potential bio/chem PRTs for SI Broader Scope and Metrology for Industry  
2012 EMRP Call

*Helen Parkes, LGC*

- Open Excellence: Metrology for innovative and incoming water quality  
monitoring tools

*Sophie Lardy-Fontan, LNE*

- Possible ideas for PRTs by the Gas Sub-Committee

*Hugo Ent, VSL*

- Possible ideas for PRTs by the Organic Sub-Committee

*Gavin O'Connor, LGC*

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## PARTICIPATION IN EMRP TPs (call 2011)

- Coordination/participation in successful projects in all the TPs  
“**Health**”, “**SI Broader Scope**”, “**New Technologies**”

- Metrology for metalloproteins
- Metrology for biomolecular origin of disease
- Metrology for the characterisation of biomolecular interfaces for diagnostic devices
- Primary standards for challenging elements
- Metrology for Raman Spectroscopy
- Chemical and optical characterisation of nanomaterials in biological systems

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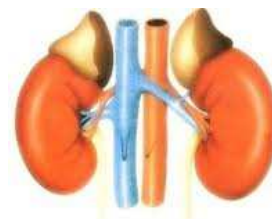
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## EURAMET Project n. 1176 – EURAMET.QM-K12

### Determination of Creatinine in freeze dried serum

- Small problematic clinical bio-marker
- Used to determine renal function
  - by product of creatine breakdown
- Determined by a wide number of different techniques
  - colorimetric & enzymatic methods favoured
  - interference from creatine
- Has been the subject of many interlaboratory comparisons (e.g. IMEP 17) and was one of the first clinically relevant measurands studied by the OAWG of CCQM.
- Need for subsequent study driven by a number of EURAMET NMIs wishing to establish clinical programs in their laboratories



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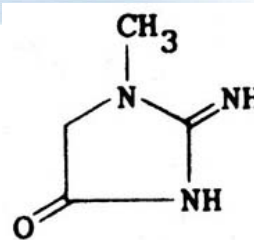




## STUDY MATERIAL

- Two lyophilised serum materials provided as part of the 2010/2011 IFCC RELA ring trial for the determination of creatinine in lyophilised serum (sample A and B).
- No approximate target value was provided for each material.
- Although the expected levels are not known right now, it was expected
  - one material having a creatinine level in the normal range for adults or children
  - the other having a level representative of an elevated concentration in adults.

Therefore the two materials should cover a **large range of concentration and be representative of both physiological and pathological creatinine concentrations.**



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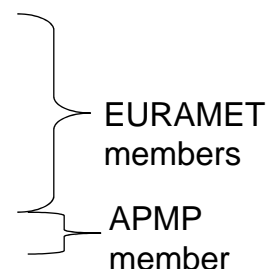
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## Participants

- Co-ordinating Laboratories
  - LGC (UK)
  - PTB (Germany)
- Key comparison participants
  - LGC (UK)
  - PTB (Germany)
  - LNE (France)
  - EXHM/ General State Chemical Laboratory (Greece)
  - Health Sciences Authority (Singapore)
- Pilot study participants
  - PTB (Germany) using a new method currently under development.



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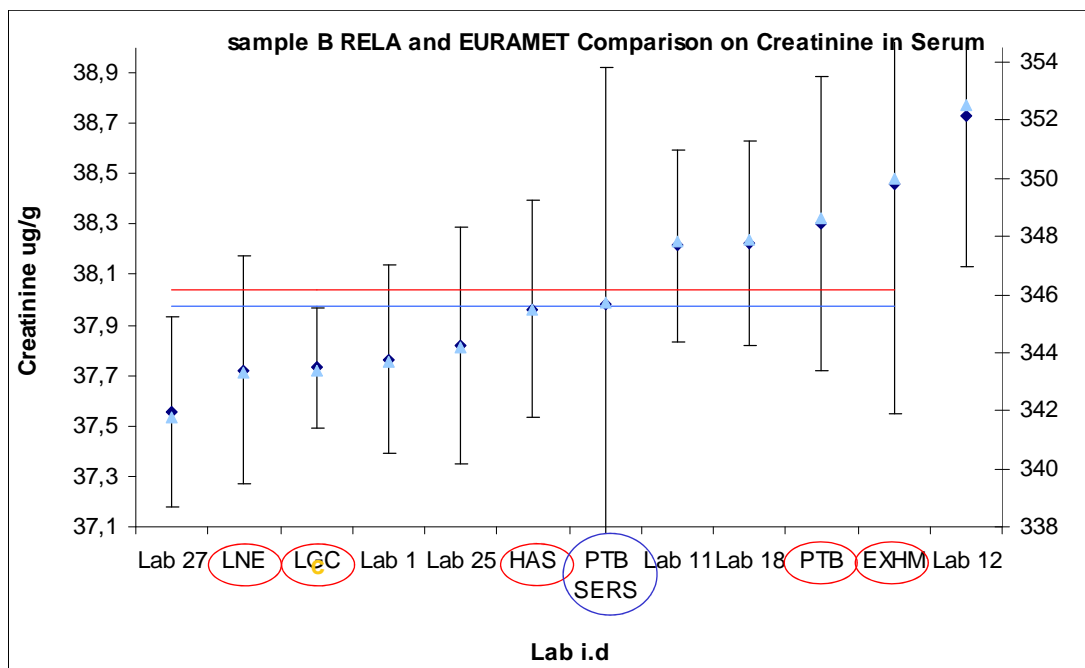
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## Sample B RELA



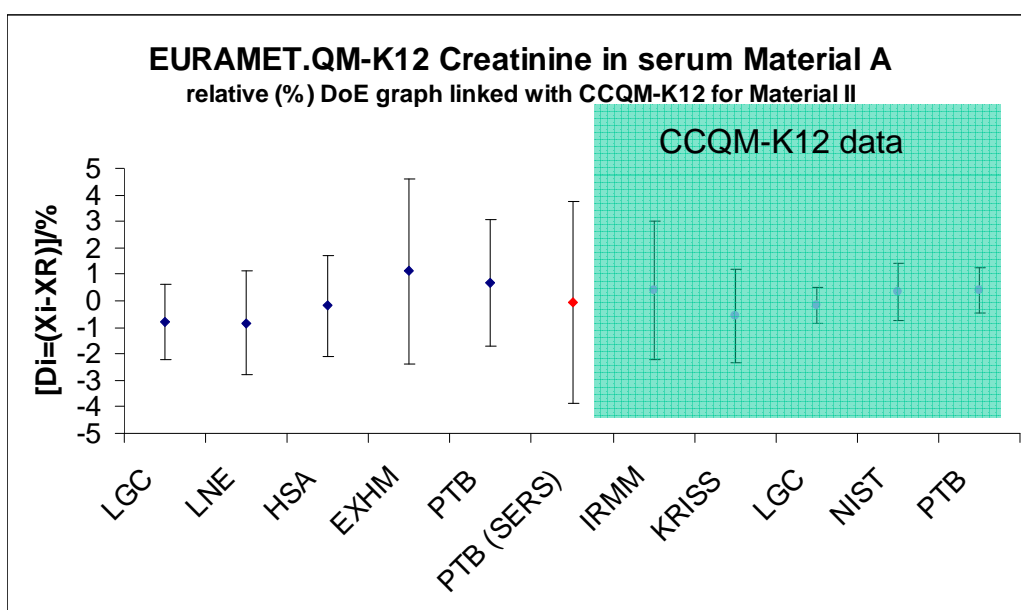
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## Linking CCQM-K12 to EURAMET.QM-K12



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trigger

### Basic Science for Metrology in Chemistry

targets

- fundamental metrological needs (higher order & primary standards, traceability) for priority analytical tasks in the "grand challenges": Health, environmental protection (emerging pollutants in air, water, soil and climate change), energy, and also addressing the industrial needs for innovation
- concepts for metrology in interrelated new fields of challenge with emerging metrological needs such as: food safety (e.g. residues, toxins, bacteria), new diagnostics and therapies (e.g. antiviral drugs, gene therapy), surface- & micro/nanotechnologies, nanoparticles
- traceability for the end user in challenging and new application fields: point-of-care testing, monitoring, electromotive industries (e.g. battery lifetime),
- fundamental requirements of metrology in chemistry (e.g., pure and matrix reference materials as general reference points)
- supporting the SI system (e.g., measurements in support of the determination of fundamental constants)

examples of products

- systems for SI-traceable chemical measurements
- traceable, high quality methods and certified reference materials (CRMs) for analysis
- internationally comparable analytical measurements of a higher quality
- traceability for faster and lower cost analytical measurements
- traceable monitoring: in-vivo health care & environmental monitoring, system monitoring
- Industrial appl.: traceable real-time in-line, on-line analysis

measurement requirements

- developing new reference methods and tools
- precision measurements e.g., ID MC-ICP MS, new approaches
- trace measurements e.g., ID spectroscopies, laser spectroscopy, new approaches
- measurements of complex compounds e.g., ID spectroscopies (mass, optical), activity measurements, new approaches
- multi-parametric measurements e.g., multiplexed measurements, sum parameters, new approaches

underpinning metrology activity

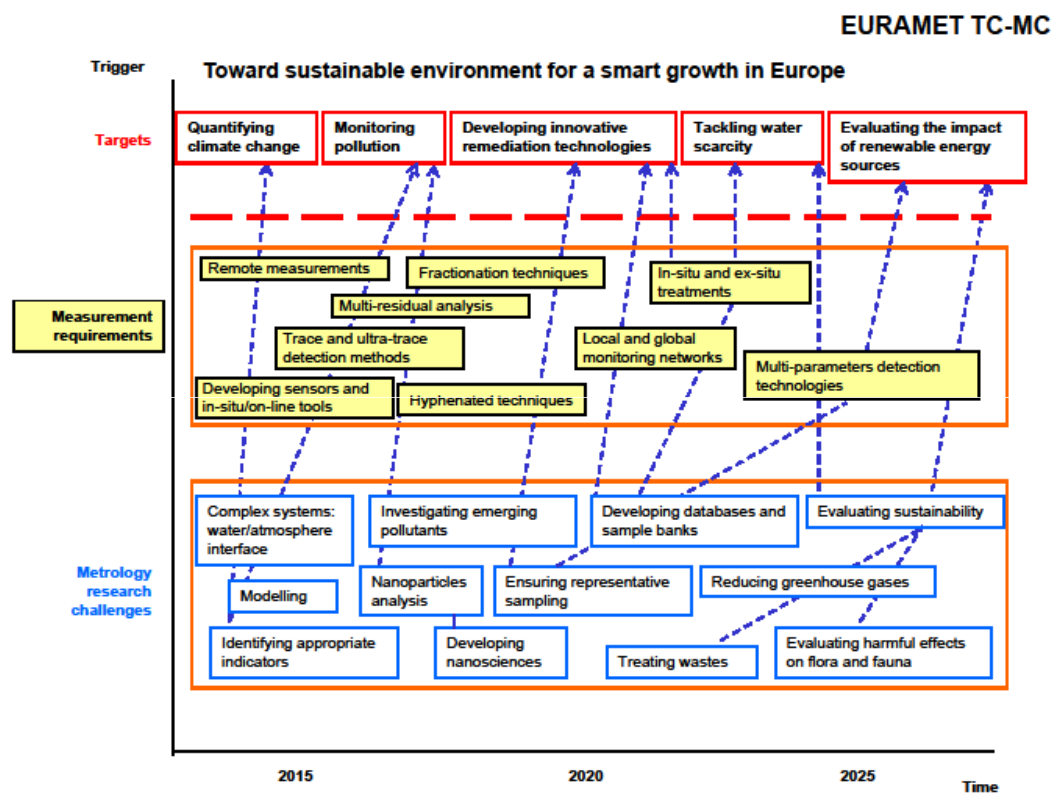
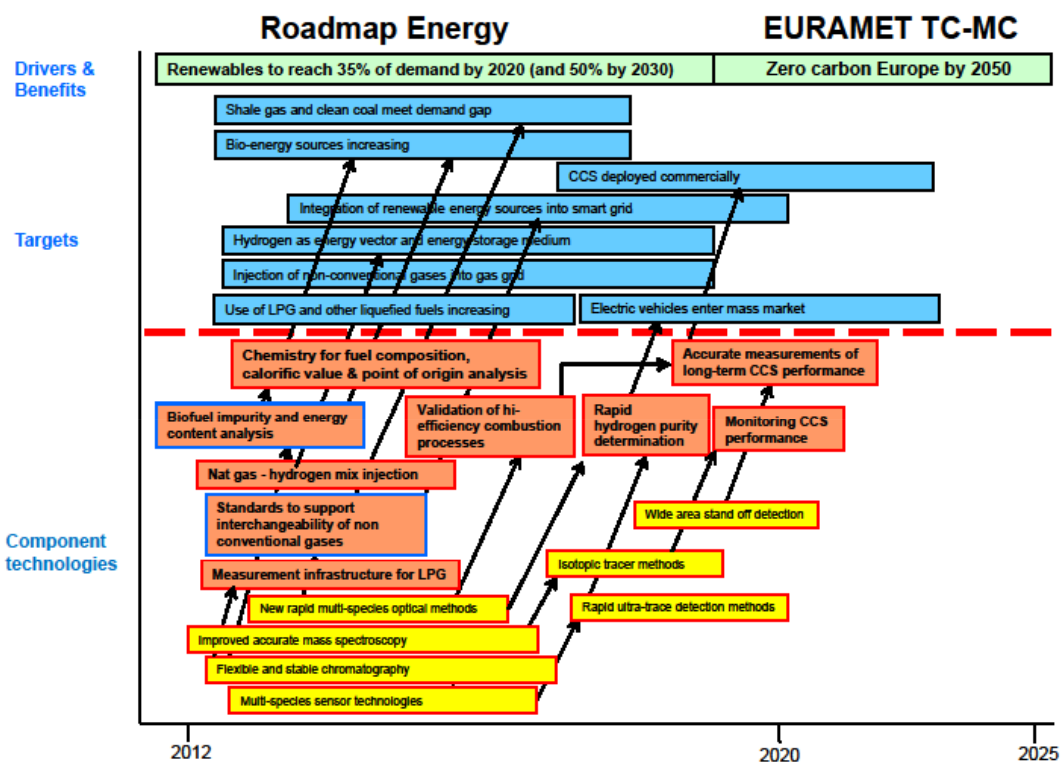
- demonstrating traceability for new analytical challenges
- Methods: for trace-, species & protein analysis; concepts in areas of challenge e.g. food safety, surface-, micro/nanoanalysis, nanoparticles, drugs, gene therapy
- Structures: new, integrated infrastructures for traceability in point-of-care testing (health care), environmental monitoring, process monitoring (e.g. in/on-line measurements, automotive systems, integrated & miniaturized sensors/devices, remote sensing)
- developing metrological methods & concepts
- new primary and higher order methods for complex & emerging analytes for the "grand challenges"
- new traceability concepts (e.g. glucose, battery lifetime)
- new concepts for higher order methods in new fields of challenge (e.g. food safety, new diagnostics & therapy)
- new scientific concepts & tools for traceability in new fields of challenge

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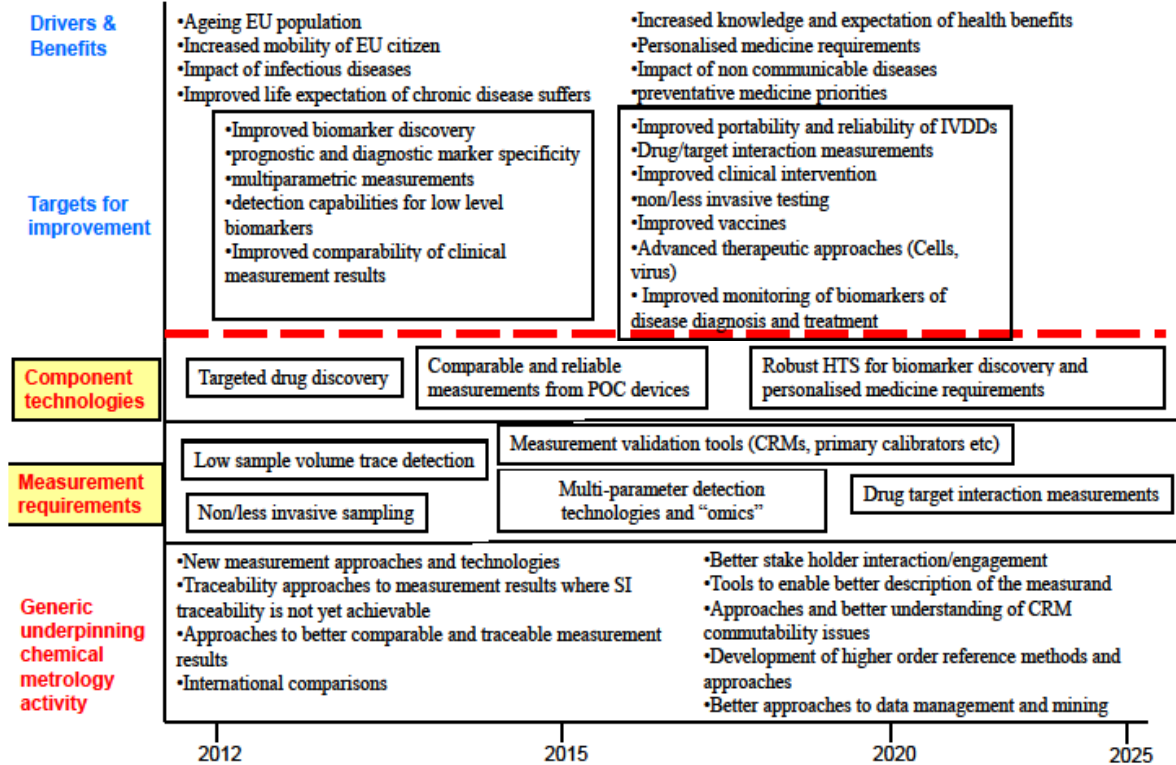
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TIME

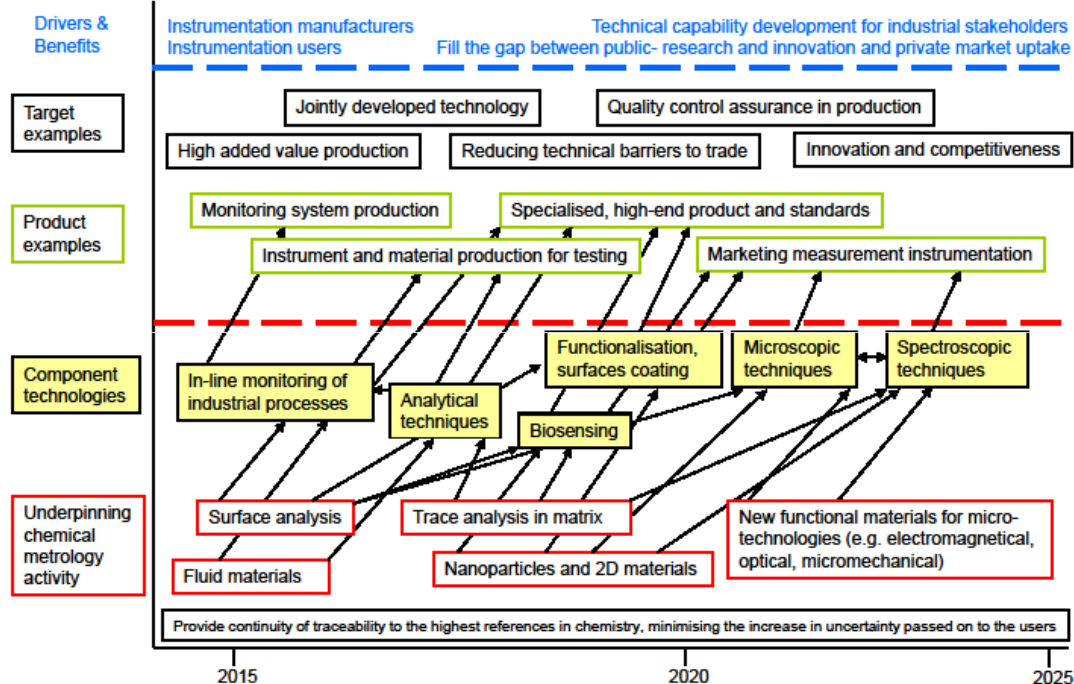
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## EURAMET TC-MC Metrology Innovation and Research for Healthcare



## EURAMET TC-MC Industrial needs for innovation





## A special thank to

- the “Task Force” for roadmaps  
Bernd Guettler (PTB), Gavin O’Connor (LGC), Hugo Ent (VSL), Paola Fisicaro (LNE), Francesca Durbiano (INRIM), Martin Milton (NPL), Sophie Vasline-Reimann (LNE), Richard Brown (NPL)
- Gavin O’Connor (LGC)  
Convenor of the TC-MC Sub-Committee for Organic Analysis

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# Thank you for your attention!

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