



Science For Diplomats at CSP-20

Chemical Forensics

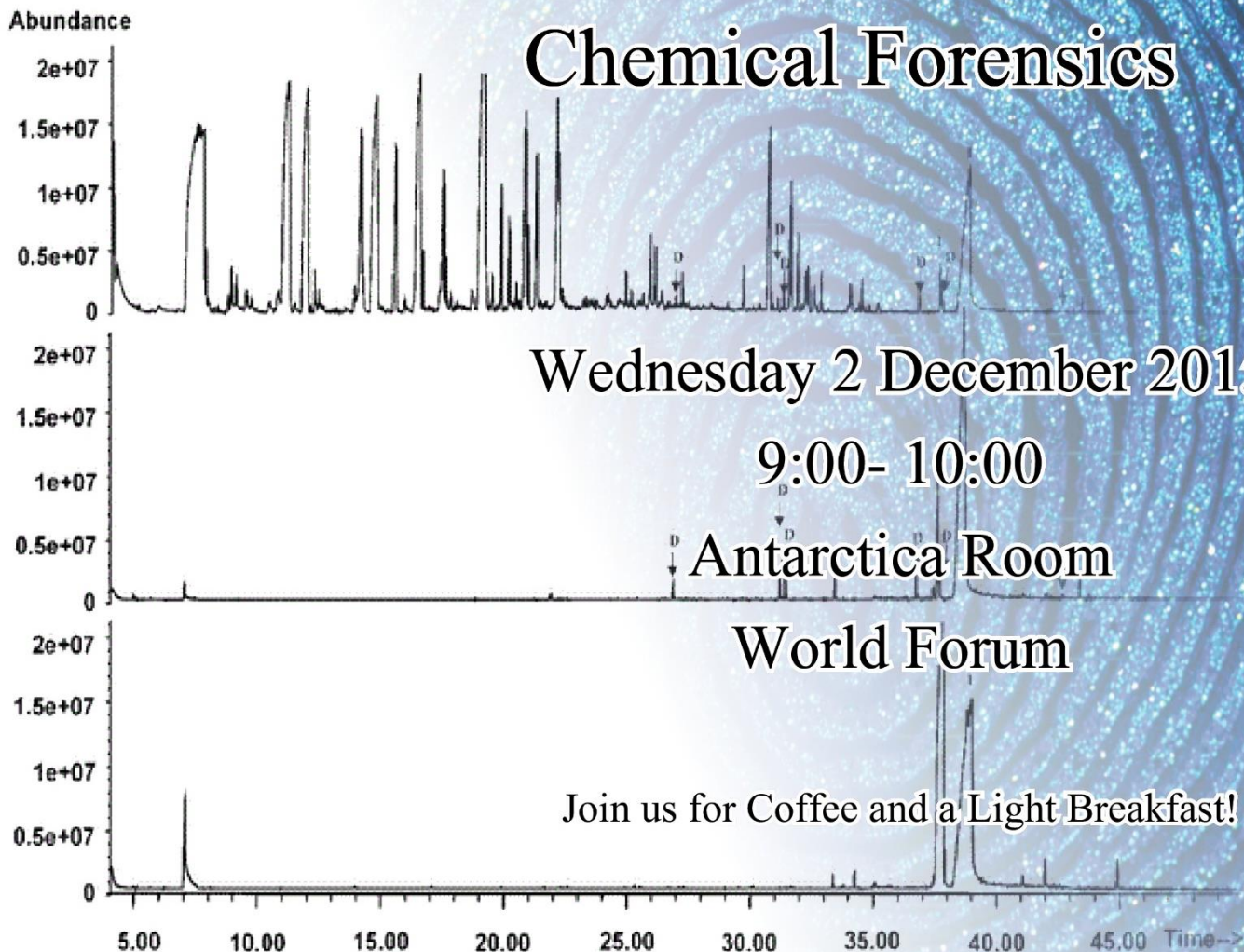
Wednesday 2 December 2015

9:00- 10:00

Antarctica Room

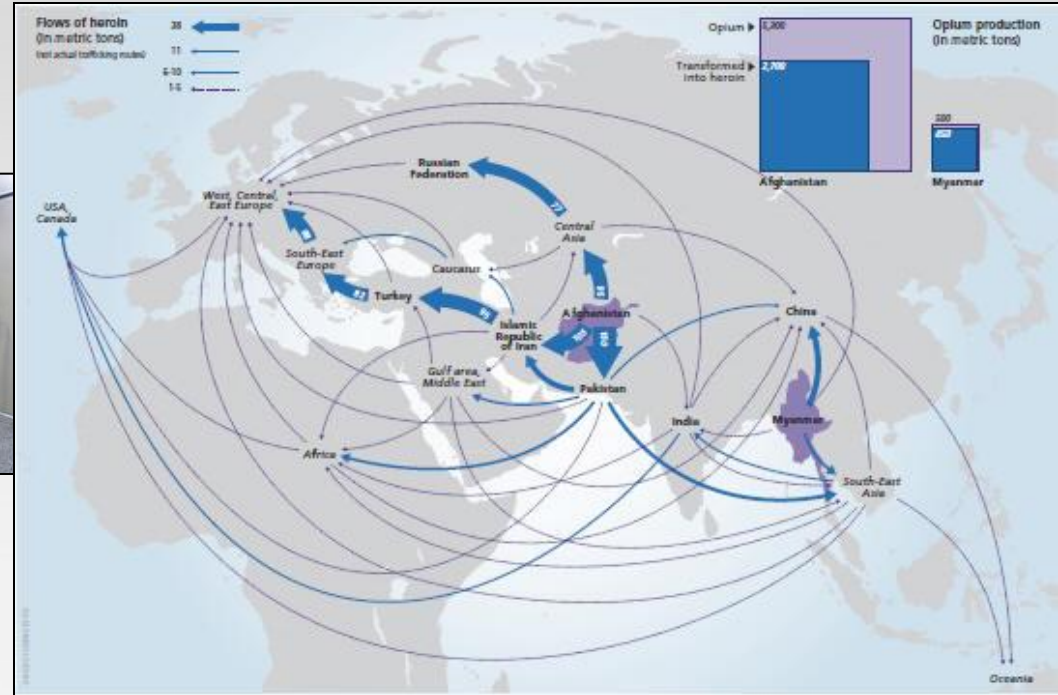
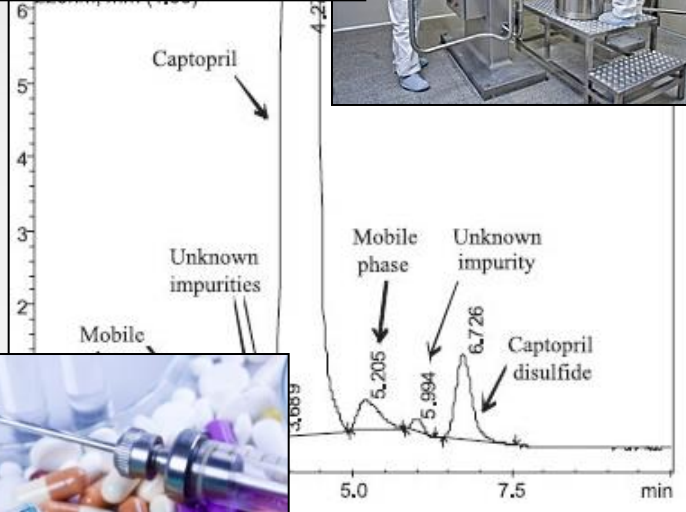
World Forum

Join us for Coffee and a Light Breakfast!





Chemical Fingerprinting



Stable isotopes: geographic origins, age

Impurities:
manufacturing processes
process/handling conditions
precursor batches



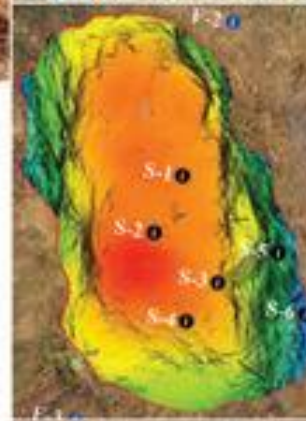
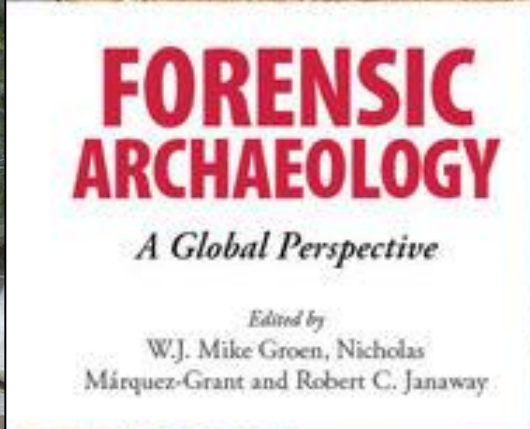
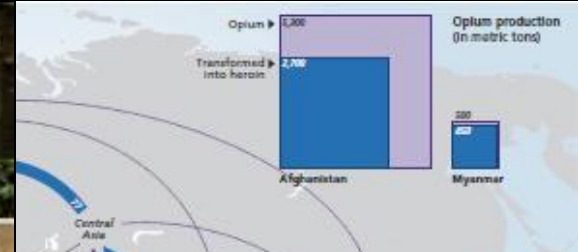
Chemical Fingerprinting



manufacturing processes
process/handling conditions
precursor batches



Chemical Fingerprinting



WILEY Blackwell



Treaty Implementation

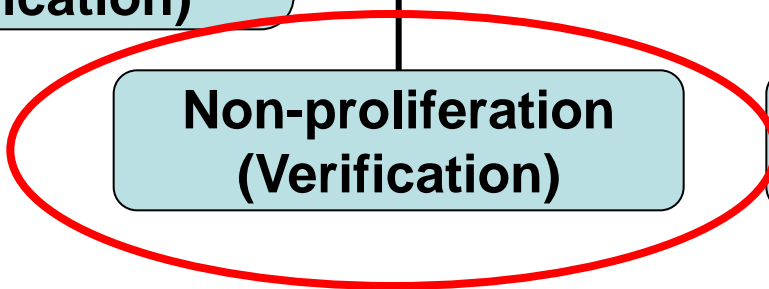
The Chemical Weapons Convention

Disarmament
(Destruction and
Verification)

Non-proliferation
(Verification)

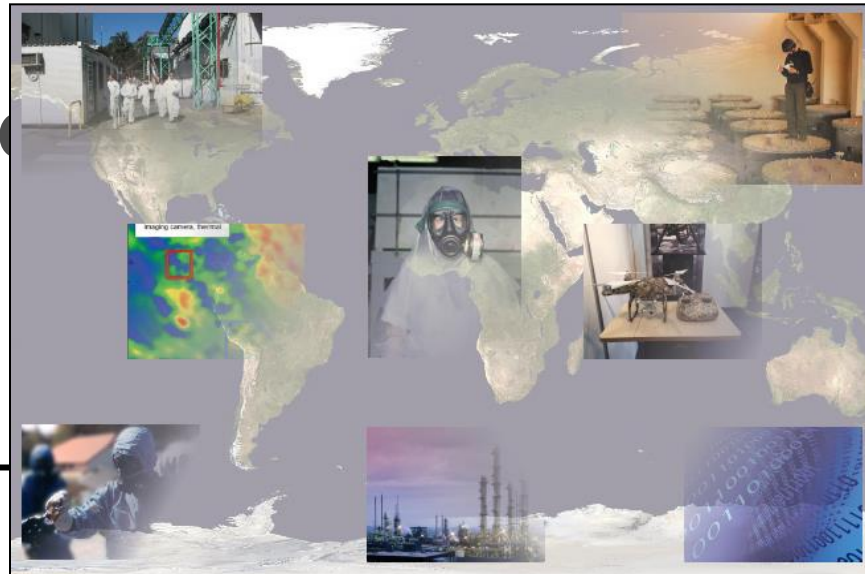
Assistance and
Protection against CWs

International
Cooperation





Treaty Impleme



**Disarmament
(Destruction and
Verification)**

**International
Cooperation**

**Non-p
(Ve**

**and
st CWs**

VERIFICATION

REPORT OF THE SCIENTIFIC ADVISORY
BOARD'S TEMPORARY WORKING GROUP

June 2015





Recommendations from the OPCW Scientific Advisory Board Temporary Working Group on Verification

Recommendation 1

The Secretariat should consider adopting a comprehensive, more analytical approach to verification utilising all available and verifiable information.



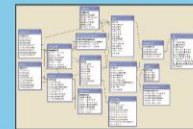
Recommendation 2

The Secretariat should acquire the capability to use open-source information on a routine basis.



Recommendation 3

The Secretariat should put in place an information management structure that can provide the support required for the verification process.



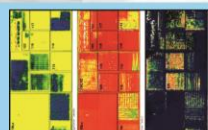
Recommendation 4

Remote/automated monitoring technologies should be added to the list of approved inspection equipment.



Recommendation 5

The Secretariat should look into the option of using satellite imagery for the planning of non-routine missions, in particular for IAU and CI.



Recommendation 6

The Secretariat should visit the National Authorities to obtain assurance on the accuracy and completeness of declarations. The outcome of such visits may impact on the inspection frequency.



Recommendation 7

The Secretariat must commission an independent review of all activities pertaining to the missions carried out in the Syrian Arab Republic.



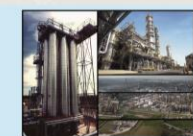
Recommendation 8

The list of declarable OCPFs submitted by States Parties should include all facilities which fall under the definition/requirement of paragraph 1 of Part IX of the Verification Annex, regardless of the purity level of a DOC or DOC mixtures produced.



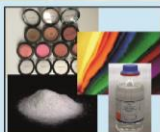
Recommendation 9

Not all facilities that fall under Part IX of the Verification Annex should be considered of the same relevance to the object and purpose of the Convention. The TWG recommends a practical approach for enhancing the utilisation of verification resources for OCPF declaration and on-site inspection processes.



Recommendation 10

The verification thresholds for OCPFs producing highly relevant chemicals, and the possibility of revision of the product group codes, should be addressed by the SAB as well as the industry cluster.



Recommendation 11

The OPCW should increase the staff of the OPCW Laboratory to cope with various aspects of IAU, biomedical samples, trace environmental analysis, toxins, and on-site analysis. Establishing a network of DLs for biomedical sample analysis should be a high priority.



Recommendation 12

Lessons on chemical sampling and analysis from the OPCW's support to the 2013 United Nations Mission to Investigate the Use of Chemical Weapons in the Syrian Arab Republic, and all subsequent OPCW activities in relation to the Syrian Arab Republic must be identified and implemented.



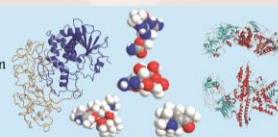
Recommendation 13

PTs should incorporate a broader range of chemicals, and at a wider range of concentrations, to prepare laboratories for IAU-type scenarios.



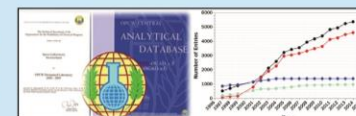
Recommendation 14

The Secretariat should expedite toxin identification exercises.



Recommendation 15

Continuous additions to the OPCW Central Analytical Database (OCAD) are recommended to allow the OPCW to meet all its mandated inspection aims, including IAU.



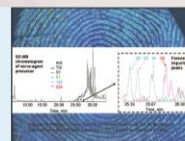
Recommendation 16

Developments in analytical instrument portability, miniaturisation and disposable biosensors should be periodically reviewed by the Secretariat and the SAB for potential applicability to on-site analysis.



Recommendation 17

The Secretariat should monitor developments in attribution analysis/chemical forensics.



Recommendation 18

The Secretariat should augment its capability to monitor and forecast developments in science and technology of relevance to the Convention and its verification regime.



<https://www.opcw.org/special-sections/science-technology/science-technology-monitor/>



@opcw
@opcw_st



/opcwonline



/opcwonline



/company/opcw



Recommendations from the OPCW Scientific Advisory Board Temporary Working Group on Verification

Recommendation 1

The Secretariat should consider adopting a comprehensive, more analytical approach to verification utilising all available and verifiable information.



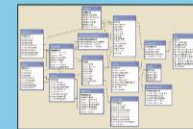
Recommendation 2

The Secretariat should acquire the capability to use open-source information on a routine basis.



Recommendation 3

The Secretariat should put in place an information management structure that can provide the support required for the verification process.



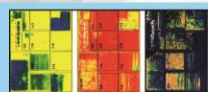
Recommendation 4

Remote/automated monitoring technologies should be added to the list of approved inspection equipment.



Recommendation 5

The Secretariat should look into the option of using satellite imagery for the planning of non-routine missions, in particular for IAU and CI.



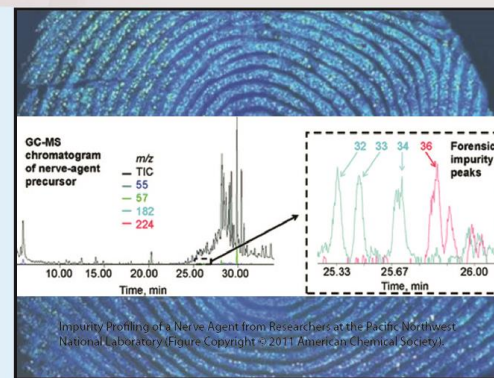
Recommendation 6

The Secretariat should visit the National Authorities to obtain assurance on the accuracy and completeness of declarations. The outcome of such visits may impact on



Recommendation 17

The Secretariat should monitor developments in attribution analysis/chemical forensics.

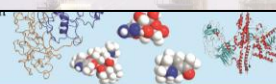


Reco
The Se
review
carried

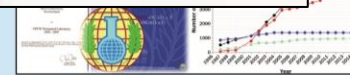
Reco
The veri
evant ch
uct grou
the indu

Reco
PTs sho
and at a
wider range
of concentrations,
to prepare
laboratories
for IAU-type
scenarios.

The Secretariat should explore toxin identification exercises.



Central Analytical Database (OCAD) are recommended to allow the OPCW to meet all its mandated inspection aims, including IAU.



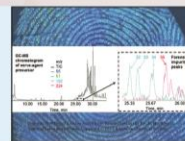
Recommendation 16

Developments in analytical instrument portability, miniaturisation and disposable biosensors should be periodically reviewed by the Secretariat and the SAB for potential applicability to on-site analysis.



Recommendation 17

The Secretariat should monitor developments in attribution analysis/chemical forensics.



Recommendation 18

The Secretariat should augment its capability to monitor and forecast developments in science and technology of relevance to the Convention and its verification regime.



<https://www.opcw.org/special-sections/science-technology/science-technology-monitor/>



@opcw
@opcw_st



/opcwonline



/opcwonline



/company/opcw



Recommendations from the OPCW Scientific Advisory Board Temporary Working Group on Verification

Recommendation 1

The Secretariat should consider adopting a comprehensive, more analytical approach to verification utilising all available and verifiable information.



Recommendation 2

The Secretariat should acquire the capability to use open-source information on a routine basis.

Recommendation 4

Remote/automated monitoring technologies should be added to the list of approved inspection equipment.



Recommendation 5

The Secretariat should look into the option of using satellite imagery for the planning of non-routine missions, in particular for IAU and CI.

Recommendation 6

The Secretariat should review the current state of the art in chemical analysis.

Recommendation 7

The Secretariat should verify the effectiveness of the current state of the art in chemical analysis.

Recommendation 8

The Secretariat should develop and test methods for the detection of chemical weapons at a wider range of concentrations, to prepare laboratories for IAU-type scenarios.



The Secretariat should explore the use of chemical analysis exercises.

Recommendation 16

Developments in analytical instrument portability, miniaturisation and disposable biosensors should be periodically reviewed by the Secretariat and the SAB for potential applicability to on-site analysis.



Recommendation 17

The Secretariat should monitor developments in attribution analysis/chemical forensics.

Recommendation 17

The Secretariat should monitor developments in attribution analysis/chemical forensics.



VOLUME 2 NUMBER 7

The OPCW Science & Technology Monitor

A sampling of Science & Technology Relevant to the Chemical Weapons Convention

1 June 2015

In This Issue

Medical Countermeasures

Chemical Forensics

OPCW Research Projects Support Programme

Featured content

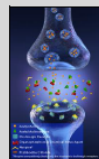
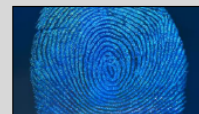


Image from [DucDate](#)®
Medical countermeasures at work in a synapse.



Fingerprinting chemicals.

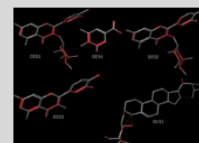


Image from [FloZ One, 2013 Nov, 8\(11\)](#)

Drug discovery research in OPCW Supported Research Projects

Welcome

Welcome to the *OPCW Science and Technology Monitor*, an occasional bulletin to provide updates on developments in science and technology across a broad spectrum of topics relevant to the CWC. Past issues are available from the [Science and Technology section of the OPCW website](#).

Thanks to all of you who have taken our survey. For those who have not yet responded, the survey is still open ([click here](#)). There are only six questions, all easier than the puzzle (we promise) and all responses are anonymous. Your feedback is highly appreciated!

Today marks the 25th anniversary of the [signing of the 1990 Chemical Weapons Accord by the United States of America and the Soviet Union](#). This agreement, which pre-dated the CWC, marks one of many steps taken in the journey toward a world free of chemical weapons. Steps taken in chemical disarmament have been supported by the science of chemistry itself; a scientific field that provides opportunities for international collaborations and brings forth new developments with peaceful economic and technological benefits. [As we move into the future, we look forward to a wealth of new discoveries from this evolving scientific field.](#)

The S&T Puzzle

We once again congratulate our colleagues at the [CTBTO](#), whose entry correctly recognized four of the top five spoken words of the Director-General in the eight statements delivered [from 22 January to 29 April 2015](#) (in case you were wondering, they missed "States"). The prize for best visualisation of the words of the Director-General, however, goes unclaimed as no submissions (except our own, below) were received. Puzzle statistics now stand at: VER 4, OSP 2, OCS 1, INS 1 and CTBTO 3.



For this edition of the puzzle, we look at the multiple uses of a cup of coffee. Can you tell us the identity and LD₅₀ (that's right, the median lethal dose) of the most abundant chemical in the cup; the [molarity \(M\)](#) of caffeine (molecule above); and the LD₅₀ of coffee itself? To keep this simple, assume this coffee is made with [Arabica beans](#) and brewed by a certified procedure (for



@opcw
@opcw_st



/opcwonline



EC-80/DG.7 (28 August 2015)

Action to implement the recommendations made by the SAB in its report on Verification

https://www.opcw.org/fileadmin/OPCW/SAB/en/ec80dg07_e_.pdf

Recommendation from the SAB	Implementation	Expected outcomes/results
<p>Recommendation 17: The Secretariat should monitor developments in chemical forensics.</p>	<ul style="list-style-type: none">• <u>Secretariat</u>: Continue to monitor developments in chemical forensics, together with Designated Laboratories. Explore collaboration with the industry and States Parties to develop methodology tailored to the needs of the OPCW. Develop the capability of the OPCW Laboratory for chemical forensics.• <u>Scientific Advisory Board</u>: Assess development in an expert workshop in 2016 and in the Board's report to the Fourth Review Conference.	<ul style="list-style-type: none">• Effective investigations of alleged use and other non-routine situations.• Adaptation of the verification regime in line with scientific and technological developments.

■ SAB Workshop planned for June 2016 at Verifin



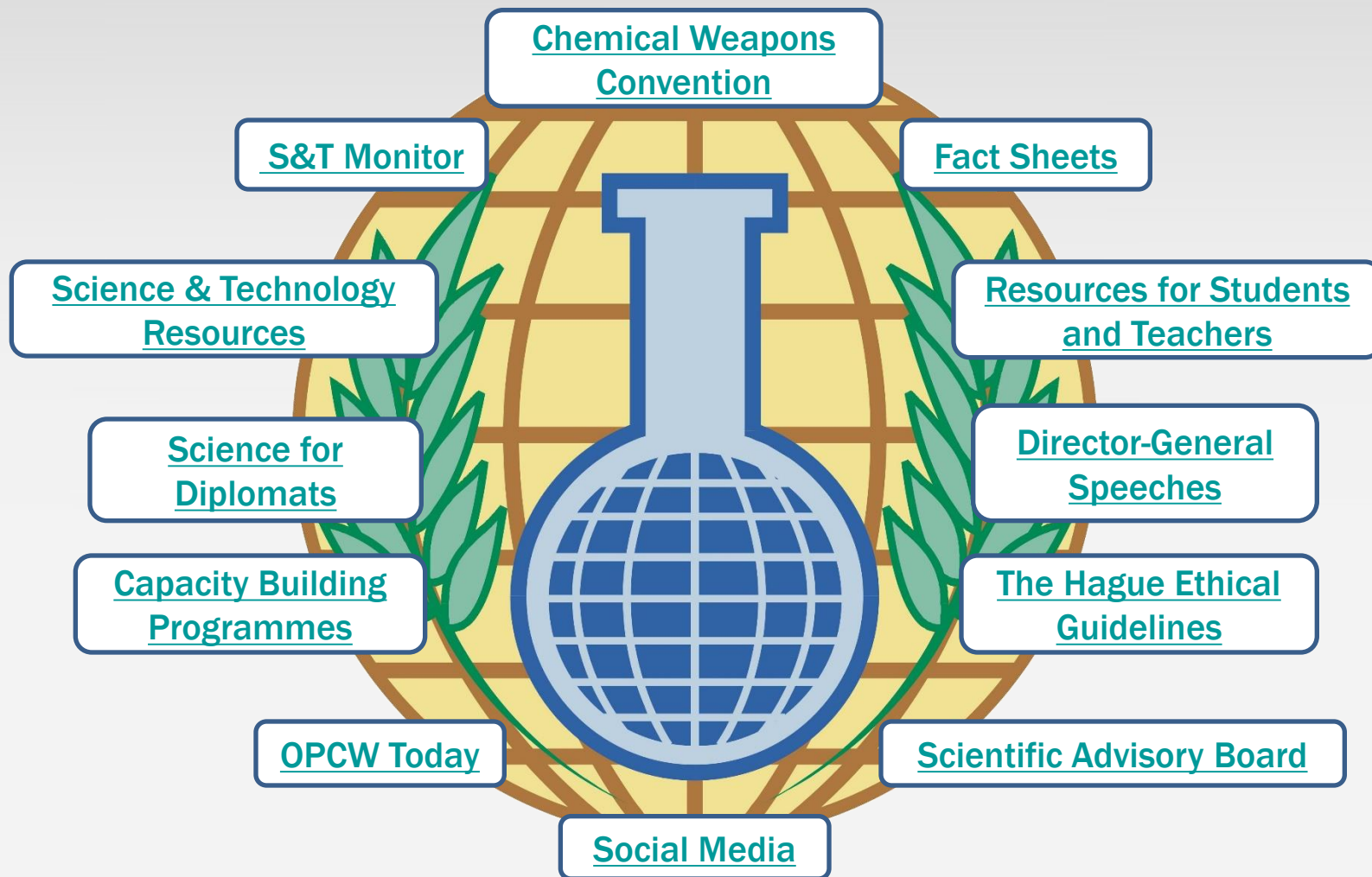
Presentation by Professor Paula Vanninen





OPCW Science and Technology Related Resources

<https://www.opcw.org/special-sections/science-technology/science-technology-resources/>





Science and Technology For Diplomats Upcoming Events

- March 2016 (On the margins of EC-81, to be confirmed)
 - **S&T for Diplomats (8): Sensors and Biosensors**
- July 2016 (On the margins of EC-82, to be confirmed)
 - **S&T for Diplomats (9): Briefing on SAB Chemical Forensics Workshop**
- **For more information on S&T from OPCW**

SciTech@OPCW.org (email)

@OPCW_ST (Twitter)

www.opcw.org/special-sections/science-technology/

