出國報告（出國類別：國際會議）

參加 2017 年環境測量研討會報告

服務機關：行政院環境保護署環境檢驗所

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派赴國家：美國

出國期間：**106** 年 **8** 月 **5** 日至 **8** 月 **14** 日

報告日期：**106** 年 **10** 月 **30** 日

摘要

為瞭解國際上環境監測議題，本所派員參加本（106）年於美國華盛頓特區舉辦之 2017 年環境監測研討會(2017 Environmental measurement symposium)，蒐集國際間環境污染監測與鑑識之最新訊息及發展技術， 除了發表論文一篇分享工作成果外，亦期望由此研討會汲取先進國家於環境檢測的技術及經驗，使本所技術發展能與國際接軌，期於未來對環境污染物監測與環境鑑識及追蹤更精確。

環境監測研討會為美國國家環境保護局(United States Environmental Protection Agency, US EPA)贊助之研討會，討論內容廣泛，包含各種環境化合物的監測方式、採樣設備、前處理方式、分析儀器、甚至是檢測所得科學訊息傳遞之重要性及注意事項等，近年較熱門的討論包括新興污染物檢測、非目標物分析、環境鑑識應用探討，以及數據傳導之訊息等議題亦在會議中被提出。此外環境監測研討會同時包含美國國家環境實驗室認證機構組織舉辦之委員會，會議中進行雙向討論，提供檢討環境檢測認證相關問題與相關檢測方法的平台。

本次研討會上收穫良多，除瞭解其他國家目前重視的監測與檢測內容及方法之外，在環境法醫鑑識中也看到實際案例說明，可用於本所未來進行環境鑑識案件之執行；另一方面也瞭解國外對於環境議題重視的方向，藉由他山之石提供本所業務一個新的思維方向。

目　次

壹、目的

環境監測是環境保護重要的一環，環境監測是檢測影響人類及環境的各種物質的含量，來了解變化，以確保環境品質，可視為環境管理相關工作的基礎。以前的環境監測多以分析化學為主，主要是污染源監測，之後也著重環境背景監測，目前則已進入自動化監測；環境監測與環境檢測息息相關，有效應用各種檢測技術才能達到監測目的，而隨著檢測技術發展，高感度的儀器持續發展，許多原來未被檢測出的高度風險污染物因而陸續被檢出，即所謂的新興污染物(Emerging Contaminants, ECs)，與不易分解的持久性有機污染物(Persistent Organic Pollutants, POPs，如戴奧辛、有機氯殺蟲劑、全氟化合物等)、各式環境荷爾蒙(屬內分泌干擾物質 Endocrine disrupting chemicals, EDCs，如鄰苯二甲酸酯類、壬基酚等)、藥物及個人保健用品(Pharmaceuticals and Personal Care Products, PPCPs)如抗生素、類固醇、抗菌消毒劑、清潔劑等。大部分新興污染物及持久性有機污染物會對人類健康或環境生態具潛在危害或構成威脅，如以水為例，因全球對水資源的需求及使用量增加，水回收再利用已因應成為潮流，對於水資源再利用的水質要求相對提高，但是目前的污水處理設施及自來水廠之淨水處理單元幾乎無法有效去除新興污染物，導致近數年來由新興污染物造成之環境及人體健康等危害問題也逐漸受到國際科學界的重視。

此外，環保意識抬頭，環境污染案件層出不窮，為了釐清責任歸屬，環境鑑識技術近年來漸受關注，環境鑑識包含前期資料收集、採樣規畫、儀器檢測及後續數據處理以及結果呈現，與傳統單一或多個環境污染物濃度檢測相較，環境鑑識需要更多方面結合，以確認有足夠證據釐清相關責任。

本次參加2017年環境監測研討會，主題除了新興污染物的分析檢測與環境鑑識案例分享外，更進一步探討科學實驗數據呈現，期望能達到將科學的結果進行有效溝通之目的。其在會議中經由各專家學者所發表的最新論文，瞭解各國於環境監測與污染鑑識之技術發展，以作為國內相關議題之參考，並蒐集相關議題技術，期望所得資訊可助於本所前瞻性檢測技術與環境鑑識技術之提升。

貳、過程

一、行程紀要

2017 年環境監測國際研討會於美國華盛頓特區 (Washington, DC)舉行，會議舉行時間為我國時間 106 年 8 月 7 日至 8 月 11 日共計 5 日(如表一所示)。

表一　行程紀要表

日　　期	地　　點	工作說明
106 年 8 月 5-6 日	桃園國際機場至美國華盛頓特區	啟程
106 年 8 月 7-11 日	美國華盛頓特區	出席 2017 年環境監測國際研討會
106 年 8 月 12-14 日	美國華盛頓特區至桃園國際機場	返程

二、會議紀要

本年度環境測量研討會(Environmental measurement symposium)會議包含兩部分，一為 2017 National Environmental Monitoring Conference(NEMC 2017)主要是提供各種環境監測技術議題如新穎監測儀器的經驗討論、新興污染物檢測分享、環境鑑識案件探討、未知物鑑定與分析等訊息分享，會議內容包含主題演講 (Keynote Address) 、學術報告會 (Concurrent Sessions)、壁報論文報告 (Poster Session)、廠商儀器展示 (Innovative New Technology Showcase) 、午餐研討會(Lunch Seminar)等方式進行技術分享，演講者背景多以學校專家學者、廠商以及政府部門人員為主，進行方式以投影片簡報，隨後進行討論問與答。另一為 TNI (The NELAC Institute)委員會會議，TNI 為非營利組織，接受美國環保署委託，為負責國家環境實驗室認證之機構，NEMC 2017 研討會期間同時舉行 TNI 組織委員會，報名研討會者可參加委員會。

圖二 研討會舉辦場地-華盛頓特區君悅飯店(Grand Hyatt Washington)

(一) 主題演講：本次研討會主題演講共由 9 位講者發表分享，主題如下

1. Reflections on 40 Years of Saying Yes (and the Occasional No)

   (40 年來的思考)

2. Dispelling Myths of Citizen Science

   (消除公眾科學的神話)

3. Communicating Science with Data Visualization

   (將數據視覺化以進行科學溝通)

4. Science Communication 101: Message, Jargon and Delivering the Perfect Elevator Pitch

   (科學溝通：訊息，行話和提供完美的概略介紹)

5. Forms and Functions of Storytelling in Science Communication

   (科學溝通時使用說故事的形式及其帶來的功能)

6. Lessons from creating an online outreach empire

   (建立網路線上推廣科學的注意事項)

7. Detecting the unintended consequences of energy and water conservation on water quality at the tap

   (節約能源與節約用水導致的意想不到的後果)

8. Historical Review of Data Qualifiers and QC Formulation

   (數據資料和 QC 制定的歷史回顧)

9. Helping contaminants emerge: The application of high-resolution mass spectrometry to non-targeted analysis of organic pollutants

   (幫助污染物現形：應用高解析質譜儀分析有機污染物中的非目標物)

研討會期間每天會有 1~3 篇主題演講，每次時間約為 40~60 分鐘，主題演講配合今年會議主題有多場次演講講述溝通科學訊息的相關方法與注意事項。另外也闡述為了節約能源可能產生的一些意想不到的影響，並對近年來受重視的未知物篩選也有一場主題演講。

(二) 學術報告會：研討會期間每天都有不同主題學術報告，同時段會有 3-4 個不同主題一起進行，五天內共有 25 個口頭報告，各項議題主題如下：

1. Academic Research Topics in Environmental Measurement and Monitoring
2. Method Update Rule
3. Overcoming Interferences in Optical ICP Analyses
4. Topics in Drinking Water
5. Changing the Paradigm for Water Pollution Monitoring
6. LIMS in the Modern Laboratory
7. Advances in Sample Preparation and Clean-up
8. Characterization of Polyfluoroalkyl Substances in the Environment
9. Citizen Science
10. Reinventing Method Validation for Environmental Monitoring
11. Effectively Communicating Scientific Information
12. Data Management and Review

13. Collaborative Efforts to Improve Environmental Monitoring
14. Harnessing the Challenges in Reinventing California's Laboratory Accreditation Program
15. Ambient Air Measurements
16. Premise Microbial Testing
17. Topics in Shale Gas Exploration and Production
18. Advanced Topics in Organic Chemistry
19. Best Practices in Indoor and Outdoor Air Monitoring
20. Data Quality
21. Field Sampling, Measurement and Sensor Technology
22. Overcoming Legacy Obstacles with Innovative Approaches
23. Forensic Chemistry
24. Metals and Metal Speciation Analysis in Environmental Samples
25. Non-Targeted Compound Screening

演講者背景多以專家學者、廠商以及政府部門人員為主，進行方式以投影片簡報 20~30 分鐘，隨後進行約 5 分鐘問與答。

(三) 壁報論文報告 (Posters)

壁報展覽共有 39 篇，分別於不同日期進行展覽，壁報作者以專家學者及儀器廠商為主，其中 4 篇為學術單位研究發表，19 篇為儀器廠商發表，其他 15 篇則以公部門單位人員較多，下面列出數篇與有機物檢測較相關的論文：

1. Data Quality of Modern vs. Conventional Extract Concentration for Triazine Pesticides
2. LC/MS/MS analysis of glyphosate in food matrices without the use of derivatization

3. Gas chromatography coupled to ICP-MS/MS for quantification of organophosphate pesticides in honey bee products after miniaturized QuEChERS extraction

4. Multiresidue Analysis of Pesticides in Cannabis-Infused Oil by QuEChERS extraction and Enhanced Matrix Removal-Lipid Cleanup

5. Determination of pesticides and persistent organic pollutants in honey by accelerated solvent extraction and GC-MS/MS

6. Determination of Perfluoralkyl Substances (PFAS) in Marine and Freshwater Sediments using QuEChERS Extraction and LC-MS/MS

7. Evaluation of Online SPE sorbents for the Analysis of Perfluorinated Compounds in Aqueous Matrices

8. Determination of Persistent Organic Pollutants in Fish Tissues by Accelerated Solvent Extraction and GC-MS/MS

9. Development of a Low-Resolution GC/MS Method for PCB Congeners in Support of the Clean Water Act

10. Examining the potential for using unfrozen sediments in trace-level analysis of organic pollutants in the Santa Monica Bay

11. Making a case for regenerating and recycling gas chromatography liners in industrial wastewater screening for organic pollutants

12. Screening for Pollutants in Water with GC/MSD and MassHunter SureTarget mass spectral deconvolution workflow

13. A comparison of Purge & Trap, Headspace and SPME for EPA Method 624 and 8260 Compounds

14. An integrated GC-MS workflow solution for the determination of (semi-)volatiles in drinking water and solid waste according to the U.S. EPA guidelines

15. Polycyclic Aromatic Hydrocarbon (PAH) Analysis in Fatty and Complicated Food Matrices using Triple Quadrupole Gas Chromatograph Mass Spectrometry (GC/MS/MS)

16. Optimization of 1,4-Dioxane and Ethanol Detection Using USEPA Method 8260

17. Streamlined Method for EPA 1694: Pharmaceuticals and Personal Care Products in Water

18. Analysis of Alternative Plasticizers to Phthalate Esters in Canadian House Dust

總觀這 18 篇論文，第 1 至 5 篇為各種前處理及分析儀器對不同基質中農藥檢測的探討；第 6 至 7 篇為發展全氟烷基化合物分析檢測技術；第 8 至 12 篇為包括持久性污染物的其他有機污染物檢測技術發展；第 13 至 14 篇為(半)揮發性有機物分析評估；第 15 篇為脂肪及複雜食品基質中多環芳香烴化合物分析技術探討；第 16 篇為 1,4-二氧環己烷(1,4-Dioxane)與乙醇分析檢測技術評估；第 17 篇說明水中藥品和個人護理產品檢測；第 18 篇敘述由加拿大室內灰塵中檢測塑化劑替代化合物的結果。另筆者以壁報論文發表者方式參與本次研討會，發表論文題目為「Do Mass Transformation Processes not Cause Isotope Fractionation Effect on Chlorinated Solvents?」，另財團法人工業技術研究院許心蘭博士團隊發表「A case study of using isotopic signatures of multiple contaminants to identify source relevance」皆為以同位素比值分析應用於環境鑑識相關議題。

(四)廠商儀器展示(Exhibits)

本次大會邀請了 66 家廠商參展，以檢測前處理儀器商、分析儀器商、化學品及試劑販賣商等為主，參展廠商名單如圖一。

EXHIBITORS

A2LA
Absolute Standards, Inc.
Accelerated Technology Laboratories
Advanced Analytical Solutions
Agilent Technologies, Inc.
ANAB
Biotage
Calibrate
Cambridge Isotope Laboratories, Inc.
Camsco
CDS Analytical
CEM Corporation
ChemService, Inc.
ChemWare, LLC
CSRA, Inc.
Dexsil Corporation
Elemental Scientific
Elementar Americas
Entech Instruments
Environmental Express
ERA, A Waters Company
ESS
EST Analytical, Inc.
Ethosoft, Inc.
FIAlab Instruments, Inc.
Fluid Management Systems, Inc.
Hanby PetroAnalysis
High Purity Standards
Horizon Technology, Inc.
IDEXX Laboratories
Inorganic Ventures
International Accreditation Service, Inc.
Khemia Software
KISTERS North America, Inc.
Lab Tech, Inc.
Lachat Instruments (A Hach Company Brand)
LECO Corp
MACHEREY-NAGEL, Inc.
Markes International
Meinhard
Metrohm USA
MilliporeSigma
MOCON-Baseline, Inc.
NSI Lab Solutions
PerkinElmer, Inc.
Perry Johnson Laboratory Accreditation, Inc.
Phenova, A Phenomenex Company
PRōMIUM
Providence Photonics, LLC
QEC, Inc.
Qualtrax
Quartzy, Inc.
Restek Corporation
SampleServe.com
SCIEX
SCP SCIENCE
SEAL Analytical, Inc.
Shimadzu Scientific Instruments, Inc.
Skalar, Inc.
Spectro Analytical Instruments
TECTA-PDS
Thermo Fisher Scientific
TSI, Inc.
UCT, Inc.
Waters Corporation
XOS

Exhibition

Independence Ballroom

Meet with instrument manufacturers, laboratory suppliers, LIMS providers, and other laboratory service providers. See the latest innovations in measurement technology, proficiency testing, sample preparation, and laboratory automation.

Exhibit Hours
Monday 5:30 pm to 7:00 pm
Tuesday 7:30 am to 5:00 pm
Wednesday 7:30 am to 3:30 pm

圖一 研討會參展廠商名錄

參、心得

本次筆者參加於美國華盛頓特區舉辦的環境測量研討會(Environmental Measurement Symposium)，該研討會同時舉行 NEMC 與 TNI 委員會，整個研討會由 TNI 與 US EPA 達成的合作協議共同贊助，研討會期間除了 NEMC 的專題演講、科技論壇與廠商展示外，同時間也舉行 TNI 環境認證論壇，該論壇會議主要討論認證政策及影響實驗室認證的技術問題，主要由 TNI 幹事與美國各級環保單位代表進行討論。NEMC 研討會開幕儀式於第一天晚上 5 點半舉行，同時間亦有廠商展示會；每天早上都以約 60 分鐘的主題演講作為開頭，第三天更以一整個早上的時間邀請三位講者進行科學訊息傳遞方面的演講，同日下午 3 點半則進行廠商展示說明會；專題演講後 9 點開始會有 4 個不同議題演講同時舉行，下午 1 時開始第二個時段接續 3~5 個分類議題演講同時舉行；海報展覽講解則分為兩組，分別於第一、四天與第二、三天進行展示，整個大會行程緊湊且內容豐富。

圖二 研討會報到處

詳細參與研討會心得將依會議內容逐項分享:

一、 主題演講 (Keynote Address)

1. 40 年來的思考(Reflections on 40 Years of Saying Yes (and the Occasional No))：講者說明本週將會聽到很多優秀的科學論文，決定不介紹一下關於科學的演講而是聊天式的介紹一些關於自己的歷史，以及在工作和其他地方擔任志願服務的重要性。

2. 消除公眾科學的神話(Dispelling Myths of Citizen Science)：公眾科學是指公眾參與的科學研究, 包括非職業的科學家、科學愛好者和志願者參與的科研活動, 範圍涵蓋科學問題探索、新技術發展、數據收集與分析等。從形式上看，公眾科學已被定義為「系統地收集和分析數據;開發技術;對自然現象的測試，公眾科學的散發由主要基於業餘愛好的研究者。科學企業在解決社會問題的同時，無法有效地解決問題。補救辦法是將科學從其隔離開始轉移，並將其在社會主流中的發展作為公共和專業人士之間的持續合作。。公民科學提供了發展集體解決問題的參與和參與製度的機會，但也因為公民科學可能因跨學科產生複雜性，而使公眾科學討論結果常見誤解。

3. 將數據視覺化來進行科學溝通(Communicating Science with Data Visualization)：數據視覺化提供科學家向民眾傳達科學觀念與成果的新機會，以視覺化的方式來說故事或作為設計觀念，不僅可以讓觀眾進一步瞭解內容，也可以促進參與科學。

4. 科學溝通(Science Communication 101: Message, Jargon and Delivering the Perfect Elevator Pitch, Jory Weintraub, Duke University)：講者認為有效率的科學溝通應該要具備各條件，如(1)確定要表達的訊息，應該具有容易瞭解、難以忘記、是關注的焦點或是與聽眾有關係的等特質，(2)確認接受訊息者的背景，是教育者、家人或朋友、一般大眾或是政策制定者?建議對不同的對象所表達的內容應有程度分別，(3)進行陳述時避免使用「行話」，陳述時應該使用一般大眾聽得懂的語詞，網路工具 De-Jargonizer(http://scienceandpublic.com/)可知道哪些詞彙對非該領域的人而言是行話。

5. 科學溝通時使用說故事的形式及其帶來的功能(Forms and Functions of Storytelling in Science Communication)：講故事是公眾參與中最受歡迎的方式之一，畢竟故事通常比以證據為重點的溝通更有趣，更可理解，更令人信服並難忘。講者認為科學家應該使用這些優勢，認真對待溝通對象，以智慧的誠實和道德的關懷進行訊息傳遞。演講中探討關於講故事和說服力的研究，突顯科學訊息中個人的價值，並認真建議研究人員應該強化「敘事能力」這一項技巧。

6. 建立網路線上推廣科學的注意事項(Lessons from creating an online outreach empire)：講者提出近十年，因為社會型態的轉型各種類型的線上工具越來越受歡迎且快速擴張，越來越多的科學家想要利用這些網絡資源，但許多人仍然有疑慮。講者為使研究人員更熟悉既有的網路資源，於演講中討論相關問題，讓研究人員明瞭如何利用線上資源。講者 Craig McClain 目前擔任路易斯安那州立大學海洋協會(Louisiana Universities Marine Consortium)執行董事，他個人就有三個網站如圖三。

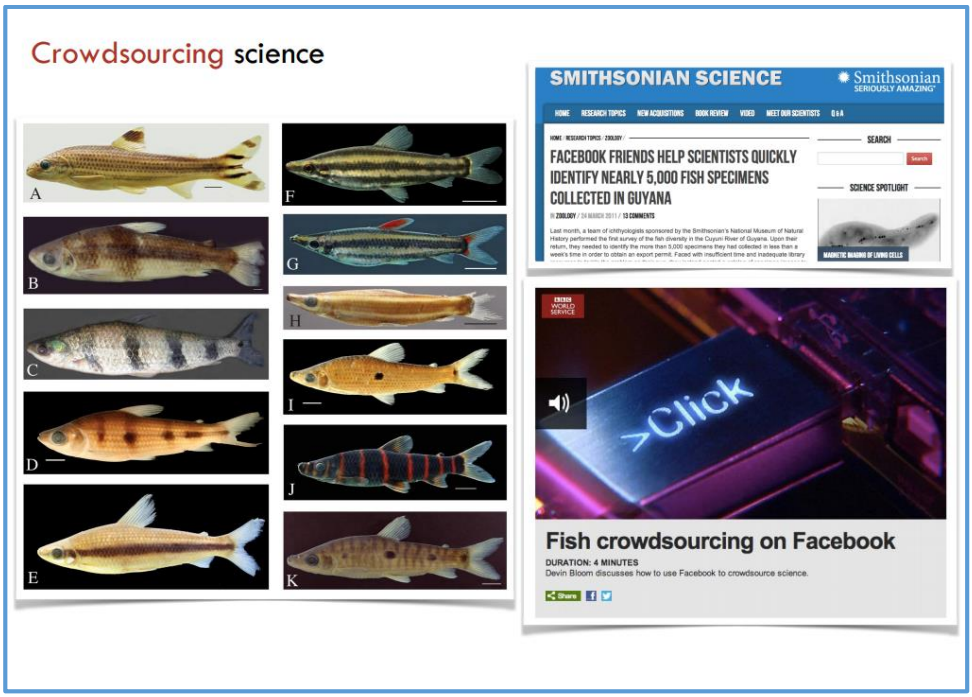
圖三 Craig McClain 的個人相關網站

講者指出社交媒體很重要，因為目前有一半以上的人類是 30 歲下，而且這些人並未經歷過沒有網路的生活，而且根據統計 2008 年美 4 個美國人就有 3 個人使用社交軟體，科技的進步將以往掌握在編輯、發行者、

創辦者手中的權力轉移到每個可能的人身上，如果社交軟體臉書(facebook)是一個國家的話，臉書可能是人口最稠密的國家，(臉書有 14 億 9 千萬個註冊帳號，中國人口有 13 億 6 千萬，印度人口有 12 億 5 千萬，而美國人口是 3 億 2 千萬)。網路訊息量多且傳遞速度快，臉書每分鐘有 2 百萬 5 千則貼文，推特(Twitter)每分鐘有 30 萬次推文，Instagram 每分鐘發表將近 22 萬張照片，YouTube 每分鐘上傳 72 小時的影片，甚至有研究顯示 18 至 34 歲的女性起床第一件事就是查看臉書而不是上廁所!這些數據再再顯示社交軟體的廣用性。講者提出社交軟體正逐漸改變科學的領域，他舉例洛杉磯時報運動版曾報導棒球名人 Jose Canseco 在推特上發表他贊同自由科學作家 Brain Switek 的論點，認為遠古時代的地球重力可能比現代的地球重力小，所以超大型的膝腳類恐龍才能在地球上行走，通常這種科學論點應該是在相關的新聞平台、雜誌、研討會才會出現，但經由社交軟體讓原先只關注運動的人也經由社交軟體得到科學訊息，意即科學觀念經由各種管道讓各領域的人都能接收相關訊息；

圖四 洛杉磯時報運動版報導 Jose Canseco 在推特上發表他的論點

甚至文獻研究(The role of Twitter in the life cycle of a scientific publication, Ideas in Ecology and Evolution 6: 32–43, 2013.)指出 Twitter 是一個有用的社交媒體工具，可以為 21 世紀的科學出版提供寶貴的貢獻，例如推特使用者發文時會提到他們正參與某個科學相關研討會，其親友間接會得知研討會相關科學訊息， 而且推特作為知識的來源和援助，將自己的發現或疑問發表之後自然會有人回應。Crowdsouring science(群眾外包科學)是另一個例子，Crowdsouring 是一種特定的取得資源的模式，這種模式下，個人或組織可以利用大量的網路用戶來取得需要的服務和想法，如曾有報導指出由史密斯尼亞國家自然史博物館贊助的一群魚類學家在南美洲的國家(圭亞那共合國)捕獲將近 5000 種不同種類的魚，為了得到出口許可，須明確說明魚的種類，科學家利用臉書上的朋友快速在一天之內完成這項驚人的任務。

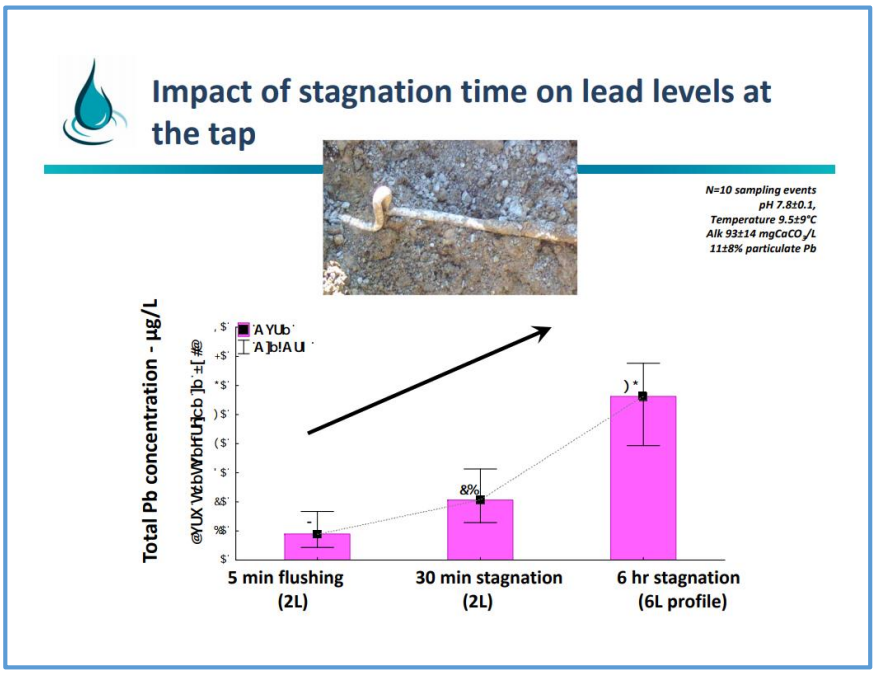


圖五 藉由網路快速鑑別 5000 種魚的種類

講者提醒社交軟體只是一種工具，就像水能載舟亦能覆舟，社交軟體本身是很好的，但與其他事物結合在一起就可能會發生變化，讓社交軟體從聯繫工具演變為商業行為，政治行為或銷售行為。記著使用社交軟體進行科學推廣要有策略也須經規劃，如同開發研究計劃和項目

時，為確保成功會使用相當多的時間去思考，使用社交媒體線上推廣應該一樣謹慎。使用線上軟體可以關注相關人士得到訊息進行學習，可以與他人對話交流討論資訊，新聞媒體或企業可以告知他人有什麼新聞或產品、服務等，可以收集數據，如前述收集魚種類相關訊息，若時間剛好則可以發布即時訊息，可以連結某個故事或某個主題來進行心靈饗宴分享。

7. 節能省水對自來水產生意想不到的結果(Detecting the unintended consequences of energy and water conservation on water quality at the tap)：講者說明自來水管路複雜，前端管路可能有微生物及重金屬等污染物，微生物方面的污染物常見的有退伍軍人菌(*Legionella pneumophila*)、 綠膿桿菌(*Pseudomonas aeruginosa*) 、 麴菌屬 （*Aspergillus* spp.）等，這些都是醫院內感染的重要來源。水中的重金屬污染則屬鉛最常見，鉛對身體的危害是多器官的，兒童血液中鉛濃度(blood lead levels, BLLs)一直是關注的議題，影響兒童中樞神經的發育。那麼水中的這些污染物是從哪來的?水輸送的主管道或是最終點管道?水庫?水龍頭?是原來地點就有或是因為輸送過程的材質產生?自來水水質目標又是什麼?健康的自來水?保護敏感族群?講者提到所謂的大型節能建築物，所使用的節能方法包括節約用水，如在水龍頭末端裝上充氣器來限流、使用低流量裝置即降低到排水管的流量等等，但水在管道間停滯的時間可能會影響自來水中鉛的含量，隨著水在管道中停滯時間越長鉛的濃度也越高，



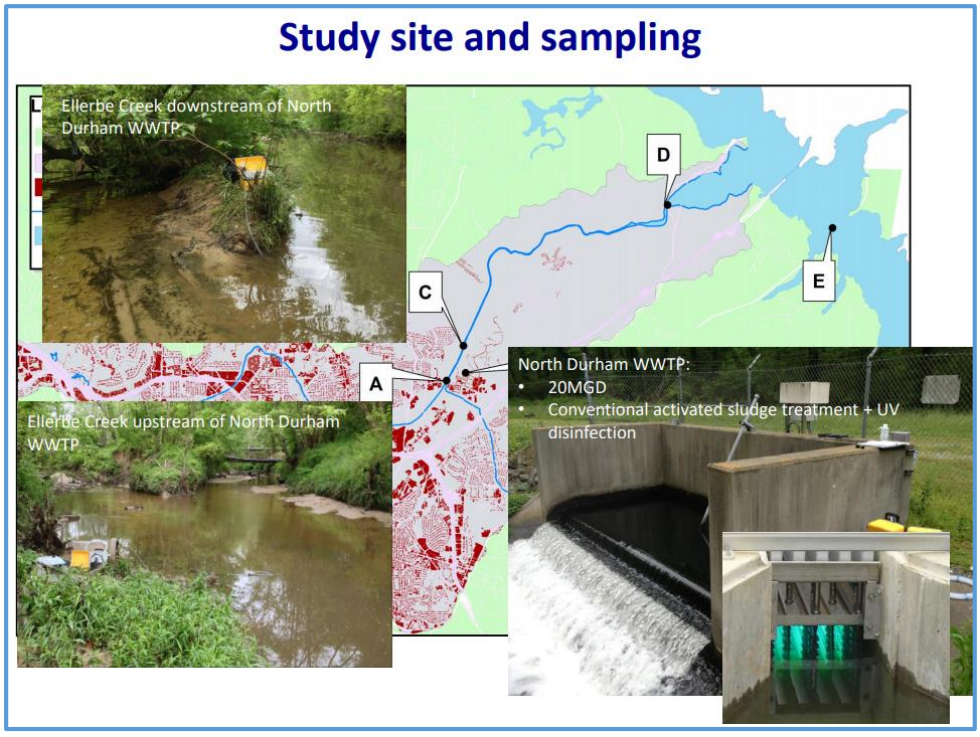
圖六 自來水中鉛含量，水在管道中停滯時間對鉛的濃度的影響

另外為了節能也多降低熱水設定溫度或使用熱交換機來進行節能，但一旦熱水設定溫度下降，可能使退伍軍人菌生長受限降低而使菌量提升，講者認為所謂的綠建築可能須注意水的品質，特別是重金屬與病原菌這方面，也提出水管應使用無毒金屬且不具生物穩定性的材質，另外講者也提醒在醫院或照護中心等感染風險較高的地方需注意水中生物膜引起的問題。

8. 數據的選擇與品管制訂的歷史回顧(Historical Review of Data Qualifiers and QC Formulation)：講者講述其建立美國 EPA 合同實驗室及 SW-846 第 3 版建立時制定的品管術語和品管要求的歷史回顧。

9. 應用高解析質譜儀分析有機污染物中的非目標物以助污染物現形(Helping contaminants emerge: The application of high-resolution mass spectrometry to non-targeted analysis of organic pollutants)：講者認為水中新興污染物的分析之前受限於大多是進行有標準品的化合物分析，而近期則發展出以高解析質譜儀分析複雜環境基質中的新興污染物，講者利用 Orbitrap 高解析質譜儀及串聯質譜儀進行分析後結合程式工具（如數據處理、圖譜資料庫搜尋、文獻比對）而不使用既定的分子資

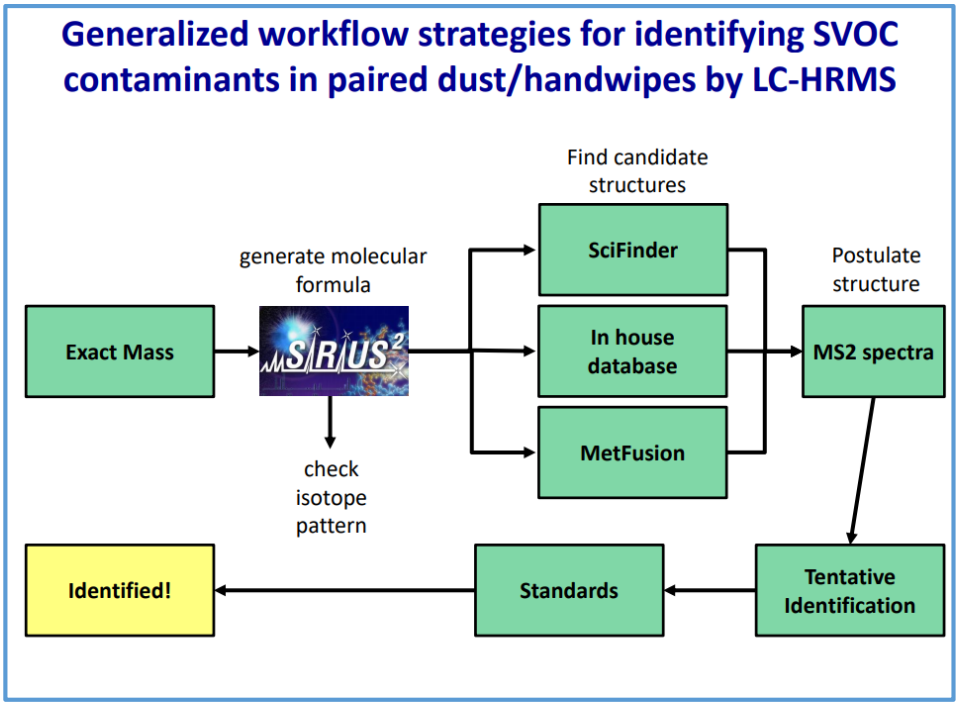
料庫來鑑別環境樣品中的新興環境污染物。講者認為廢水處理過程會影響微量污染物的命運，而微量污染物的結構明顯會影響期移除效率，應該要有方法可以整體評估廢水處理的微量污染物，所以建立了一套流程，分析廢水與表水。水質樣品來自美國北卡羅萊納州(North Carolina)內埃勒貝溪(Ellerbe Creek)及瀑布湖(Falls Lake)共五個點如圖七，每天採樣共進行 4 天，每天皆採三重複，水樣稀釋五倍後加入同位素標準品再以 SPE 淨化，之後通過 UPLC 再以高解析質譜儀分析，得到的數據再利用各種軟體進行測得化合物結構解析。



圖七 水質樣品取樣點

檢測結果顯示同位素標準品回收率良好，且經由分析水中非目標化合物的差異可發現新興污染物，經由數據篩選可知廢水處理過程中特徵化合物的總重會隨著改變。研究中經由解析檢測結果發現的化合物有 Dextrorphan 及 Valsartan 等 78 種化合物，其中 20 種已購置標準品進行確認符合，另有 1,101 種化學物質應為聚乙氧基化的表面活性劑。講者認為使用 LC-HRMS 加上優化的非目標篩選工作流程，可為環境中有機污染物進行定性分析；使用差異分析結合疑似篩選可做為用於確定污

水處理過程中污染物特異性特徵的有利工具；整體分析顯示污水微量污染物在處理過程中會有定性和定量的變化，可利用上述方法研擬未來廢水處理過程的設計。另外講者也分享利用高解析質譜儀測定室內環境中半揮發性有機物(SVOC)檢測的結果，因為一些 SVOC 是潛在的內分泌干擾物，如雙酚 A 結構類似雌性激素在人體內會干擾性荷爾蒙，造成其功能混亂。講者利用分析灰塵與擦手紙的非目標物分析來評估人類在室內暴露於 SVOCs 的情形，樣品為 10 組實驗組與一組空白，樣品置於正己烷/二氯甲烷(1:1)後超音波萃取，最後置換為 10%乙腈溶液，之後分別以 LC/高解析質譜儀及 2D LC/高解析質譜儀 進行分析，分析結果經由圖八流程進行污染物鑑定，



圖八 鑑別化合物流程圖

最後檢出 34 種化合物，包含 8 種有機磷化合物、8 種介面活性劑、10 種具合物添加劑、5 種農藥及 3 種其他化合物，34 種化合物中有 10 種化合物已購得標準品確認符合。解者認為 2D LC-HRAM 是該實驗的有效工具，且室內環境中非目標物分析較目標物分析更能整體展現污染物暴露的情況，灰塵及擦手紙得到的 567 種化合物中共有 213 種暫時或已經確認種類，灰塵及擦手紙中最多的化合物為非離子型的介面活性劑

如非苯酚乙氧基化物(Nonylphenol Ethoxylate)及酒精乙酸酯(Alcohol ethoxylates)。

二、 學術報告會 (Concurrent Sessions)

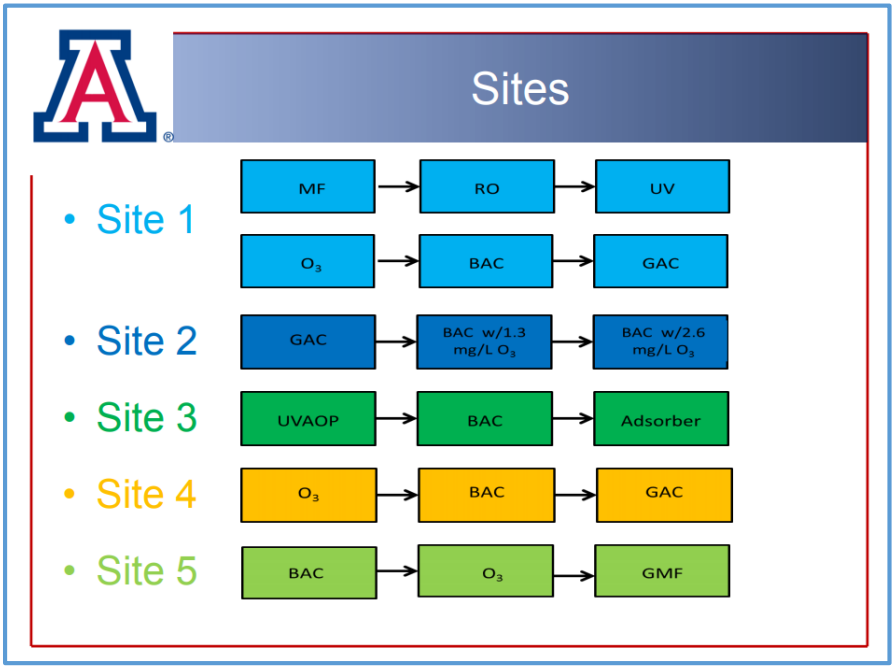
學術報告會五天內有 28 個主題，議題涵蓋範圍廣泛，包含 EPA 方法變更規則、方法驗證相關訊息、環境監控時樣品製備與淨化等前處理過程、檢測所用分析儀器探討、空氣監測、微生物檢測、現場採樣與檢測、環境鑑識、非目標化合物篩選等等，以下為數個演講內容與心得分享：

(一) Assessment of Chemical and Biological Techniques to Evaluate the Quality of Water from Pilot Scale Direct Potable Reuse Treatment Facilities

演講者為亞利桑那大學的 Kevin Daniels，演講有關利用化學及生物方法評估經過再利用處理系統處理後飲用水的水質，講者預估至 2025 年會有約 18 億人面臨缺水的狀況，目前最常用的節水方法為海水淡化和水資源再利用，前者較為昂貴，後者常用的連續式廢水處理主要分為兩段，生水經過過篩、粉碎、砂礫持沉澱、第一級澄清之後進入第案階段的曝氣池、第二級澄清、添加消毒劑後排放到水庫或式進入第三級處理。講者提出新興污染物持續出現，且進入污水處理場機率大，不太可能個別檢測各種污染物，而且是在不考慮混合效應之下。講者想要確認該監測項目且找出最有效的污水處理流程，將進行大量有機檢測(包含總有機碳、有機碳分佈、紫外線吸收、螢光、激發光-螢光矩陣光譜) 、目標物分析、生物測定、非目標分析等檢測。

有機檢測方面進行 1.使用總有機碳分析儀測定總有機碳 2.使用分子篩選層析(Size exclusion chromatography,SEC)串聯有機碳檢測器(Organic carbon detector, OCD) 確定天然有機物的大小分佈 3.使用可見光檢測芳香族有機成分並使用螢光檢測人為有機化合物 4.利用激發光-螢光矩陣光譜(Excitation Emission Matrix, EEM)檢測溶解性有機物質(Dissolved organic matter, DOM)、天然有機物質 (Natural organic matter, NOM)及出流有機物(Effluent organic matter, EfOM)。目標物分析時採

用水樣過濾後直接進樣或過濾後以線上前濃縮萃取後進樣，使用 LC-QQ 進行個人保健產品、商用或家用化學品、藥物、全氟化物、農藥、X 射線對比介質(X-ray Contrast Media)等化合物檢測。體外生物測定則檢測所有用於生物系統中的已知或未知污染物所具有之總毒性，所進行之檢測有雌激素受體(ER)、糖皮質激素受體(GR)、芳烴受體(AhR)、p53 途徑、HepG2(細胞毒性)等。非目標物檢測可提供變相產物形成訊息及未知污染物產生的信息，之後利用主成分分析(PCA)，熱點(Heat Maps)和集群分析(Cluster Analysis)來比對出感興趣的化合物。在污水處理過程方面的研究，則比較了臭氧化(Ozonation)、生物活性炭(Biologically Activated Carbon)、顆粒活性炭(Granular Activated Carbon)、微濾(Microfiltration)、逆滲透(Reverse Osmosis)、紫外線技術(UV based technologies)等處理過後之結果。講者設計 5 種組合，如圖九



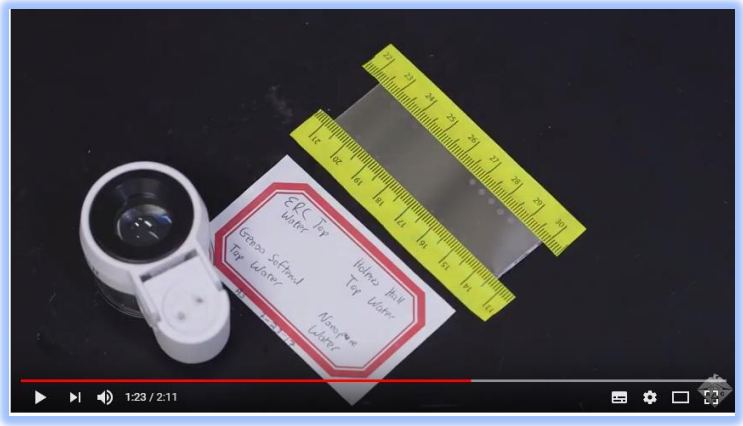
圖九 模擬污水處理過程

結果發現總有機碳檢測(包含總有機碳分析儀、分子篩選層析串聯有機碳檢測器、紫外線、螢光、激發光-螢光矩陣光譜的檢測結果)、目標化合物檢測結果、生化試驗結果(僅 GR 及 ER，所有樣品皆未測得細胞毒性、也沒有 p53 交互作用，AhR 則仍在進行中)、非目標物檢測結果皆顯示 Site 1 結果最佳。對 Site 1 而言，針對一開始即建立的

採樣流程，MF-RO-UV 的處理過程可有效去除 TOC 及芳香族雙鍵化合物。另外設計的 5 種前處理組合流程皆可使化合物減少，而總有機碳檢測所用的 5 種方法可能適合來作為直接飲用水的水質監控項目。

(二) Is open-access tap water monitoring possible using the coffee-ring effect?

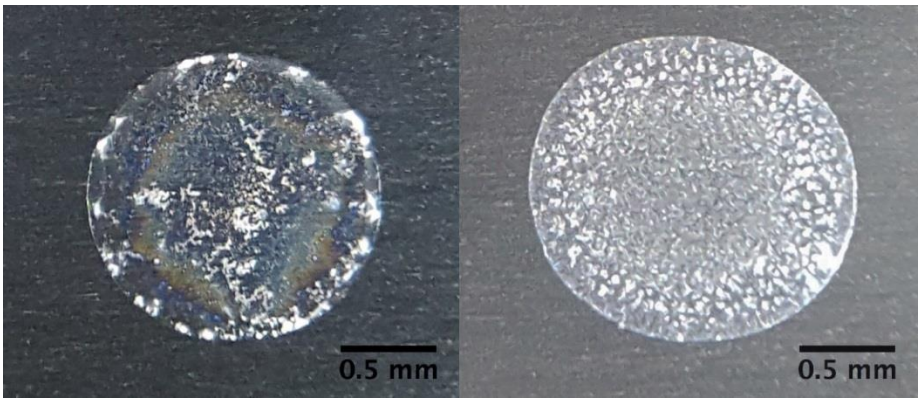
演講者為密西根州立大學土木與環境工程系的助理教授 Rebecca Lahr, 主要內容探討利用咖啡環效應監控自來水品質的可行性。講者使用常用且可重複使用的材料(鋁板、滴管、珠寶商使用的放大鏡和手機相機，如圖十）來進行水質測試，



圖十 利用咖啡環效應監控水品質所用儀器

原理為利用水滴中可溶質顆粒在固體基質上的咖啡環效應產生的奈米級刻度色譜。每個水樣在水蒸發後留下具區分性質的指紋殘留圖案，可代表水份離開液滴後，水樣中的溶質顆粒的溶解度和尺寸。各種自來水樣品和合成自來水的液滴在鋁板上乾燥，用珠寶商使用的放大鏡結合手機相機來拍攝殘留物的照片 。講者分析密西根南部的自來水可得到具單一性及重複性的光譜，而合成的自來水模擬社區自來水，配製成具有不同硬度、鹼度、鈉、氯化物、硫酸鹽、總溶解固體、鐵和銅的水。分析上述自來水來獲得不同濃度時的殘留物光譜圖，並使用顯微鏡拍攝及進行化合物來確定殘留物。另外進行咖啡環測試前也結合 SPE 來濃縮水樣中重金屬。採用三組訓練

有素的學生進行測試，並評估未受訓練的操作者使用該方法得到的數據。講者認為該咖啡環效應可成為實驗室或一般大眾進行水分析的工具。

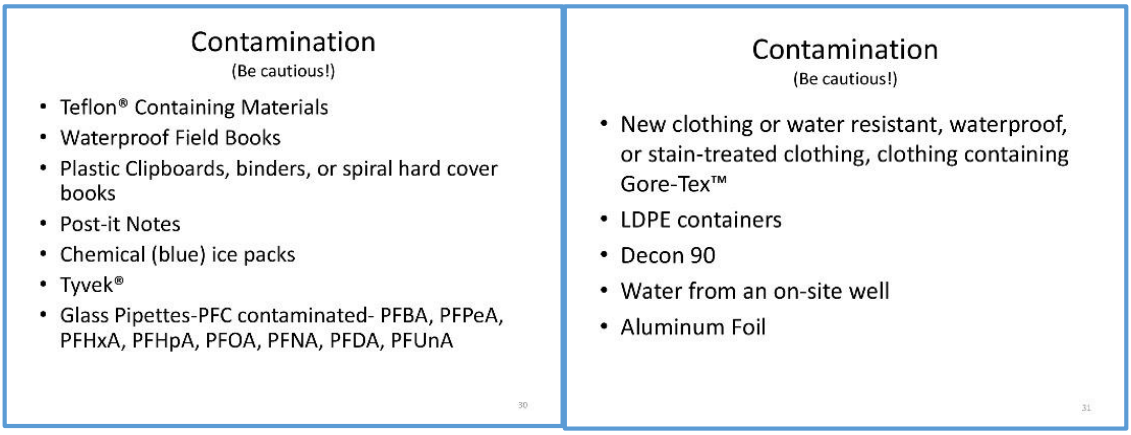


圖十一 從密歇根州立大學校園的兩座建築物中抽出水滴，留下不同的咖啡形態，左側顯示硬水，右側顯示用軟化劑處理的水

(三) Region 5 CRL Methods for the Analysis of Polyfluorinated Compounds (PFCs) Using a Quick Sample Extraction/Preparation Followed by UPLC/MS/MS Analysis Water Quality Signatures for CCR Management Sites

演講者 Lawrence B. Zintek 為加美國環保署第五區芝加哥地區實驗室(US EPA Region 5 Chicago Regional Laboratory, CRL)的高級檢驗員(Senior Chemist)，講者認為採樣時許多分析物會粘附在取樣容器的表面上，為得到較精確的數據須額外處理採樣容器上的分析物。為了簡化過程，講者的團隊想開發使用較少量樣品結合較先進質譜儀 UPLC/MS/MS 的方式，來開發固體和非飲用水的水的取樣方案和分析方法，這與美國 EPA Method 537(Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), 2009)有多處不同，包括 1.可適用於固體及非飲用水的水中全氟化物的檢測，EPA 537 僅針對飲用水中全氟化合物 2.除 PFBA, PFPeA 及 PFOSA 之外，其他全氟化物同時監控兩對離子，且兩對離子的 ion ration 須符合規範，較 EPA 537 僅監控一對離子更能確定化合物存在

3.同時監控 24 種全氟化物，使用外部標準法定量，並使用 14~19 種擬似標準品，而 EPA 37 監測 14 種全氟化合物，以 3 種內部標準品進行定量且僅使用 3 種擬似標準品。講者團隊所建立的方法已經由多個單一實驗室進行驗證，水的方法步驟為取 5 mL 水樣至聚丙烯管，加入化合物、5 mL MeOH，震盪 30 秒，再以聚丙烯膜過濾後加入 10 uL 醋酸後即可分析；污泥的方法步驟取 5 g 樣品至 PP 管，加入化合物、5 mL MeOH、20 mL NH4OH,震盪後確認 pH 為 9-10，靜置 2 分鐘取出液體以聚丙烯膜過濾後加入 50 uL 醋酸後即可分析，土壤樣品則取 2g 樣品至 PP 管，加入化合物、10mL MeOH/H_2O(1/1)震盪 2 分鐘後確認 pH 為 9-10，震盪 1 小時後離心，取出液體以聚丙烯膜過濾後加入 50 uL 醋酸後即可分析。過程中使用各種不同的環境基質進行不同的單一實驗室驗證，水的檢測方面包含試劑水、芝加哥河水、地下水及污水處理廠內各階段的水，平均回收率為 99.2%標準差為 ±6.08%；土壤則使用渥太華沙、ASTM 土壤、 沙、粘土及淤泥，平均回收率為 90.3%標準差為±15.8%。另外針對停留時間的研究，分析添加化合物的樣品貯存在不同材質容器中 27 天後的濃度變化，且分為只取部分樣品與全樣的分析結果，發現取用全量分析之回收率較佳。作者提出可能的全氟化合物污染來源如圖十二，也預計之後將放入 SW-846 中，且已經更新於 ASTM D7979(水及污泥)及 D7968(土)。



圖十二 全氟化合物可能的污染來源

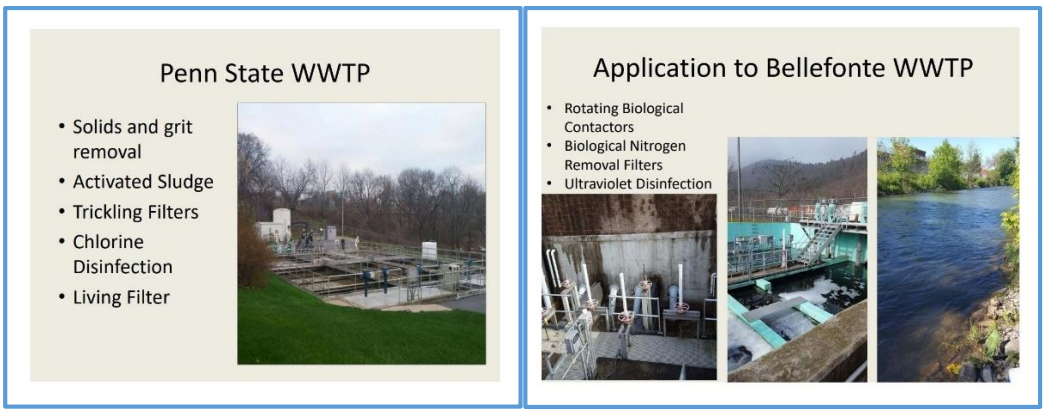
(四) Expanding environmental monitoring campaigns: Contaminants of emerging concern are also present in “unimpacted” watersheds

講者探討美國馬里蘭州 Gwynns Falls 流域的新興關注的污染物（Contaminants of emerging concern, CEC）。講者團隊在 2016 年夏季和冬季各自完成 10 週採樣進行 45 種抗生素、5 種化學性防曬劑和 3 種雌激素類激素分析，分析方法使用固相萃取液相串聯質譜儀進行定量。夏季時抗生素檢出 36%紅黴素(Erythromycin)，28%環孢黴素(Meclocycline)和 23%磺胺甲噁唑(Sulfamethoxazole)，其中紅黴素是 EPA 認為的污染物名單之一。四環素類抗生素(Tetracycline)、強力黴素(Doxycycline)和環孢素(Meclocycline)則檢出濃度高於 100ng/L。另外每個樣品中至少檢測到 2 個化學性防曬劑其中 Oxybenzone 和 Octinoxate 的濃度由農村到城市有升高趨勢。Estrone 是最常測得的雌激素，濃度範圍為 1-10ng / L，另外底泥與生物樣品中檢出合成激素 17β-乙炔雌二醇(17β-ethinylestradiol)。一般來說下游地區的 CECs 檢出率與濃度較高。因乾旱天氣時廢水滲濾可能高達 10-20%，講者推測這些不同的 CECs 的來源可能源於洩漏的污水管道，講者認為監控 CECs 可得知水質品質外，還可以作為下水道洩漏的取證工具。

(五) Hunting Down Emerging Contaminants in Wastewater: Benzotriazole Derivatives in the Penn State Wastewater Treatment Plant and Surrounding Areas

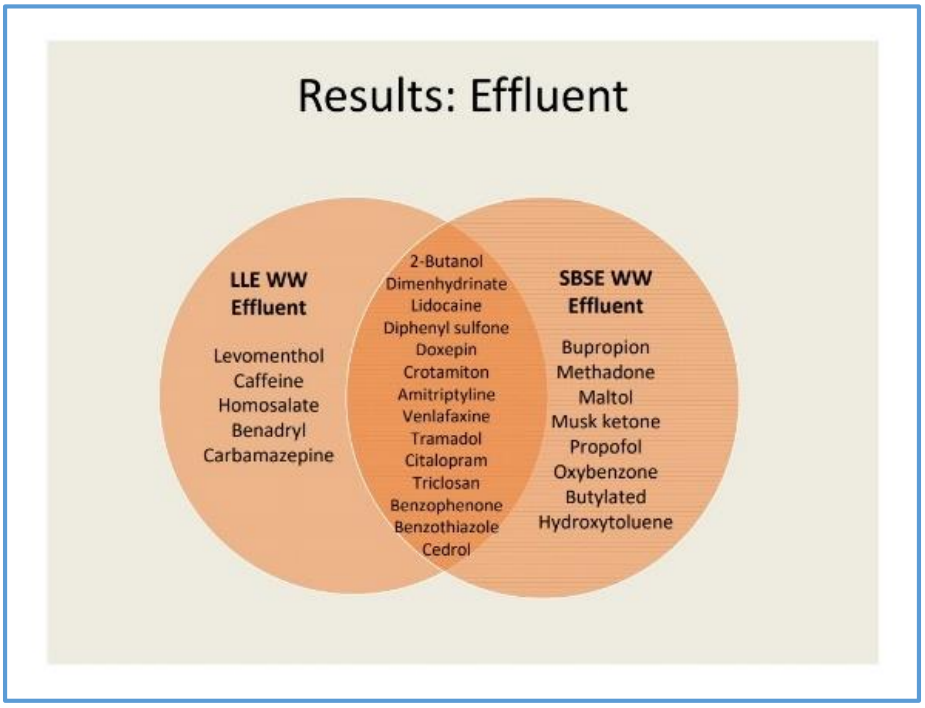
演講者為賓州州立大學(Penn State University)的 Kyra Murrell，研究在討論來自個人護理產品、工業過程和藥物的新興污染物。因美國賓州州立大學有自己的污水處理系統，處理後的污水用於農業和林地灌溉。取處理前、處理後及噴灑灌溉時的水進行檢測，使用液液萃取後以二維氣相層析飛行式質譜儀 GCxGC-TOFMS 分析，結果發現經處理後的水較處理前的水含較高濃度氯化苯並三唑(Chlorinated Benzotriazoles)，為確認其原因，講者進一步分析賓州廢水處理廠的水，該處理廠的廢水處理過程與賓州州立大學污水處理過程不同(如圖十三)；以攪拌子吸附萃取(Stir Bar Sorptive Extraction,

SBSE)水樣後進行分析，發現仍有苯並三唑，之後更進一步分析水源頭 Spring Creek 發現即含有苯並三唑。

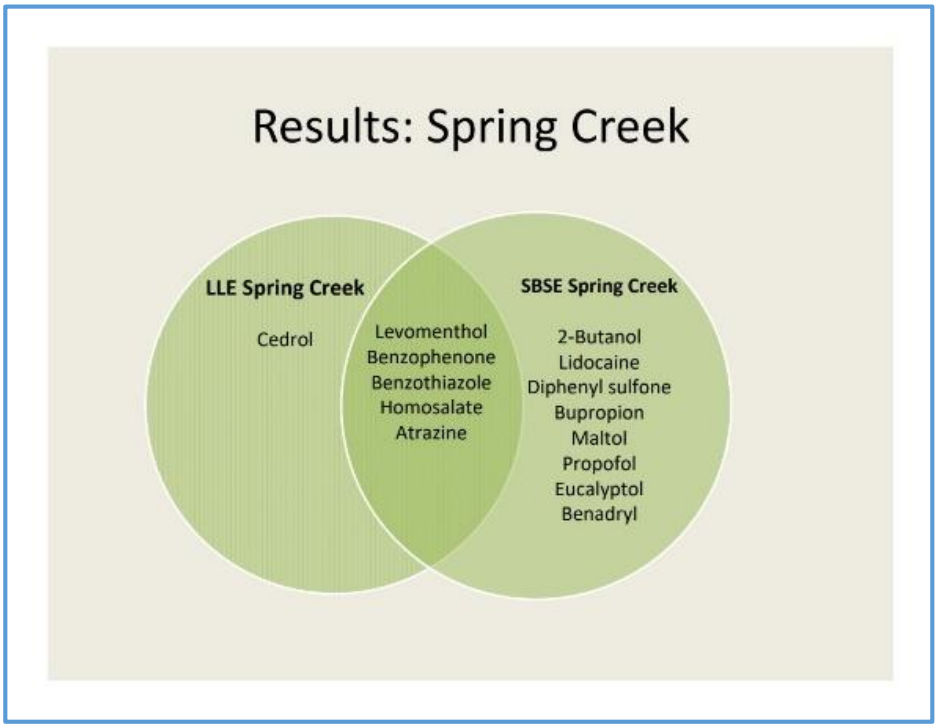


圖十三 賓州大學與賓州廢水處理廠採用的污水處理過程

另外講者發現 SBSE 萃取較傳統液液萃取所得化合物較多且種類不同，如圖十四及十五。



圖十四 廢水使用液液萃取與 SBSE 萃取測得之化合物



圖十五 Spring Creek 使用液液萃取與 SBSE 萃取測得之化合物

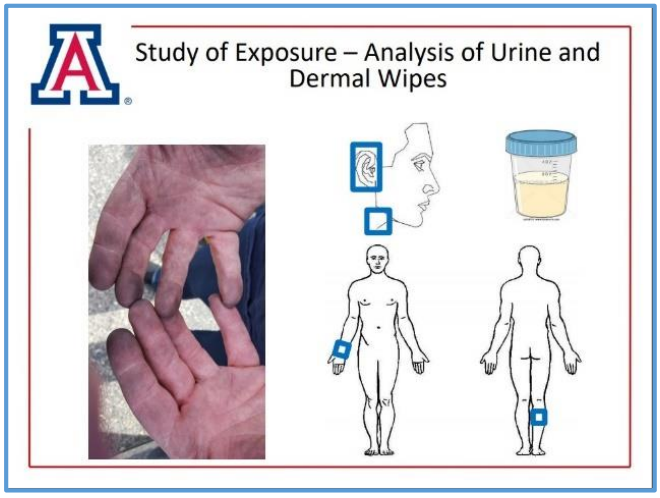
(六) Red Crabs As Sentinel Organisms of Deepwater Horizon Oil in Gulf of Mexico Sediments

演講者為 NewFields Environmental Forensics 的 Gregory Douglas，墨西哥灣漏油事件與大多數石油洩漏不同，漏油會與細菌黏液形成顆粒或分散於深底泥沉積物中或形成絮狀物。講者團隊在 2010 至 2014 年，採集深海底棲大型動物來探討漏油對生物影響。測量紅蟹肝胰臟、生殖腺、鰓及肌肉中多環芳香烴化合物和生物標誌物(triterpane 和 steranes)，以鑑定組織內存在的化學指紋。具體結果包括：(1)紅蟹肝胰臟樣品提供了最敏感和診斷的化學指紋(2)越接近洩漏井的螃蟹受到越多的影響，雖然是位於洩漏井西南方向 14 公里處(3)紅蟹組織檢測結果的空間分布圖與溢油影響的沉積物分佈一致。

圖十六 紅蟹做為墨西哥漏油事件的警戒生物

(七) Analysis of combustion byproducts on firefighter protection equipment and in firefighter urine using novel high resolution GC/Q-TOF and bioassays

演講者為亞利桑那大學(University of Arizona)的 Christiane Hoppe-Jones，說明消防員常見罹患肺癌，可能因火災期間暴露於煙霧和阻燃劑等有機化學物質以及其燃燒的副產物之中所造成。利用高解析質譜儀及生化檢測評估消防員執行任務時暴露於致癌物的情形，測量致癌成分含量，以便作為個人防護裝備及後續的政策和程序的參考。取消防員頭盔、身體擦拭物和尿樣進行檢測，如圖十七，

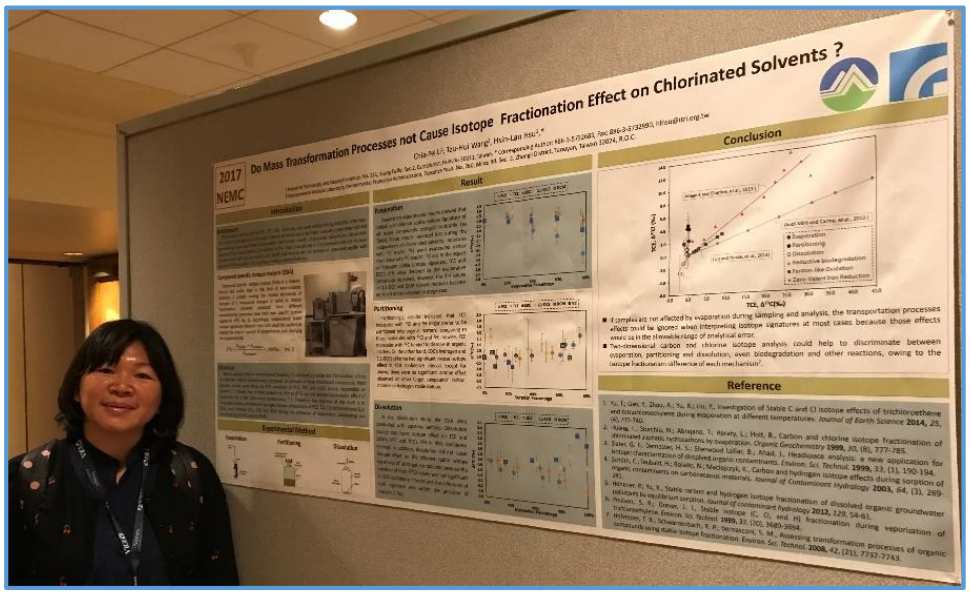


圖十七 檢測採樣位置

尿液的檢測數據顯示，執行救火後萘酚(Naphthols)，芴醇(Fluorenols)和菲醌(Phenanthrols)等羥基化多環芳香烴化合物濃度升高。而擦拭物則檢測出多種 PAHs 和多溴二苯醚(PBDEs)，講者團隊將繼續調查生物測定結果和與羥基化 PAH 結果的相關性。

三、 壁報論文報告 (Posters)

研討會本次壁報共 39 篇，有 19 篇在星期一、四(8 月 7 日與 8 月 11 日)展出，有 20 篇在星期三、五(8 月 9 日與 8 月 10 日)展出。筆者本次投稿論文為與工研院綠能所許心蘭博士合作共同發表「 Do Mass Transformation Processes not Cause Isotope Fractionation Effect on Chlorinated Solvents? 」，主要是以氣相層析質譜儀與氣相層析同位素比值質譜儀研究蒸發、分配和溶解過程中六種氯化合物的碳，氯和氫同位素組成。結果顯示蒸發時，所有目標化合物的碳和氯穩定同位素特徵相反變化，隨著蒸發越多 TCE 和 EDC 的氫穩定同位素特徵降低，而 1,1-DCE 和 DCM 溶劑殘留的氫穩定同位素特徵變濃。分配時只對 PCE 的碳穩定同位素和 TCE 的氯穩定同位素產生了顯著的同位素效應，富集因子分別為-1.01±0.42 和-5.16±2.21，其他目標化合物的碳，氯或氫穩定同位素特徵沒有觀察到顯著的同位素效應。溶解對 PCE，TCE，DCM 的碳穩定同位素和 TCE 的氫穩定同位素均有顯著的同位素效應，但溶解對所有目標化合物的氯穩定同位素特徵沒有引起同位素效應。由於每種機制的同位素分餾差異，二維碳和氯同位素分析有助於區分蒸發，分配和溶解，甚至生物降解和其他反應。化合物特異性同位素分析(Compound specific isotope analysis, CSIA)在環境取證方面具有很大的潛力，特別是對於被氯化溶劑污染的場所。理解自然轉化過程對這些氯化化合物的分餾效應有利於解釋 CSIA 數據。

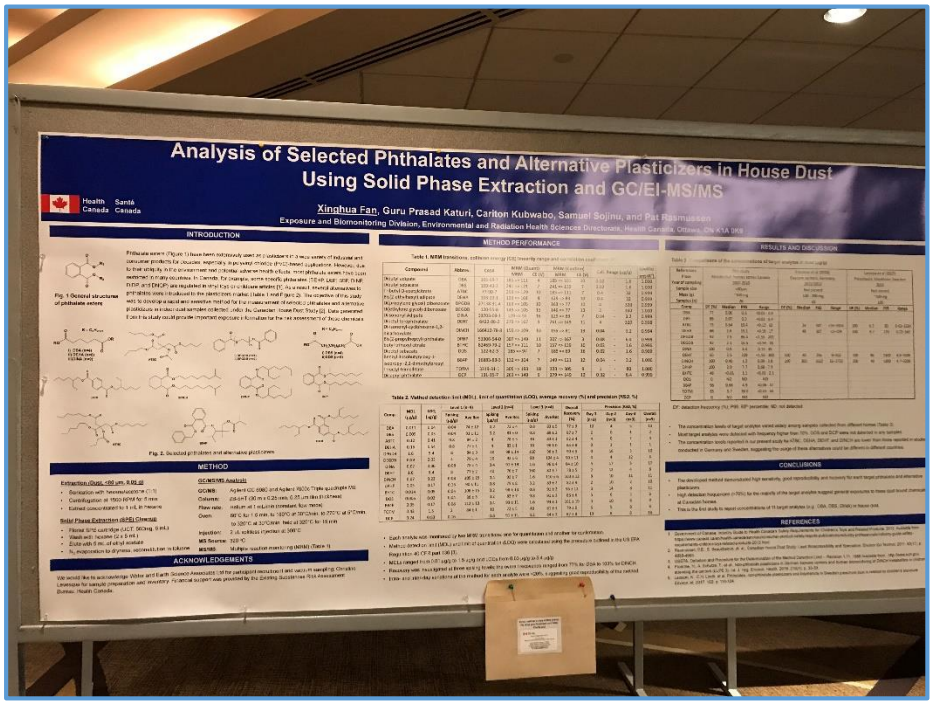


圖十八 筆者與本次發表之壁報

39 篇壁報中以環境監測研究為多數，其中分享 1 篇心得如下：

Analysis of Alternative Plasticizers to Phthalate Esters in Canadian House Dust

這篇是由加拿大健康中心的 Xinghua.Fan 發表，說明利用房屋灰塵來評估住宅環境中的目前未列管的鄰苯二甲酸酯類化合物替代物，許多鄰苯二甲酸酯類因為具有毒性受到嚴格的規定，因此廠商已經開發了許多鄰苯二甲酸酯的替代物，並廣泛使用於市場上，包括環己烷-1,2-二甲酸二異壬酯(DINCH)，鄰苯二甲酸二(丙基庚基)酯(DPHP)和偏苯三酸三辛酯(TOTM)。講者開發一種快速靈敏的方法，同時測定室內灰塵樣品中 15 種鄰苯二甲酸酯替代品。所用分析方法是以超音波萃取，利用固相萃取淨化樣品後以氣相層析串聯質譜(GC-MS / MS)進行檢測。結果該方法對所有目標化合物表現出良好的回收率和高靈敏度。分析 56 個樣品後初步結果發現 TOTM，DPHP 和 DINCH 檢測頻率高於 90%，平均濃度分別為 0.43 mg / g，2.6 mg / g 和 5.9 mg / g。之後將利用該方法分析更多具代表性的灰塵樣本，進行室內暴露數據統計，以便對新出現塑化劑替代品進行風險評估和管理。



圖十九 Analysis of Alternative Plasticizers to Phthalate Esters in Canadian House Dust 壁報論文

四、 心得總結

1. 本次會議主題是「有效的科學溝通(Effectively Communicating Scientific Information)」，近年美國民眾願意參與科學新知比例逐漸提升，將正確科學訊息傳達給民眾是一門大學問，若以專業角度進行訊息傳遞可能會導致誤解，如臺灣一直存在的「零檢出」議題，每次有環境污染或食品安全問題發生時就很常會被提出，如何讓一般民眾瞭解零檢出並不是零濃度就需要良好的科學訊息溝通。
2. 新興污染物為本次研討會發表及討論的重點，尤其是多氟烷基物質(PFAS)，多著重於樣品前處理探討，另外除使用液相層析串聯質譜儀進行分析，亦有使用高解析質譜儀進行檢測之相關論文，相關資訊可做為後續檢測參考。
3. 未知物的分析則是將分析結果借由各種軟體進行結構解析來得到可能之化合物，若需確認仍需購置標準品進行檢測，而軟體之運用耗時較久且須經驗可多練習。

肆、建議

本次參加 2017 年環境監測國際研討會，見識許多環境監測結果說明及注意事項，並對國外在環境鑑識技術發展的想法及所採用儀器與方法探討上有更瞭解，日後將透過蒐集的資訊並與國內專家相互交流，以便實際應用於國內環境鑑識，下面為參加研討會後幾點建議：

1. 本次研討會中參觀美國對於制定管制項目與檢測技術的討論過程，發現學術界主要研究新科技如未知污染物鑑定技術，而業界則多進行既有方法相關前處理與分析技術，將檢測結果提供給官方作為後續方法修訂參考，此部分與本所目前已有方式相似，將新興檢測方法構想與學術單位進行溝通，以委託辦理的方式請受委託單位進行研究後，官方針對研究所所得初步結果進行審視討論進一步後續，可能經相關驗證後撰寫新方法或修訂原有方法，此種專業分工系統可持續進行。
2. 環境鑑識技術涵蓋範圍廣，須各領域配合，本所可向不同領域專家學者進行諮詢以完成鑑識案件，如化學分析、統計學、資訊科學、地質學、海洋學、大氣學、環境工程學、毒理學家等，先建立主要執行流程，撰寫完整採樣計畫，利用適當方法進行檢測，再以後端統計討論推估可能污染源。
3. 因環境議題廣泛，建議可持續派員參與環境檢測相關的不同研討會，瞭解目前國際上重視的相關議題，以便與國際接軌。

附件一 大會議程

MONDAY, AUGUST 7

8:00 Welcome

8:15 Presentation of the 2017 Charlie Carter Award

8:20 - 8:45 Keynote Address

9:00 - 12:00 Concurrent Sessions

- NEMC: Academic Research Topics in Environmental Measurement and Monitoring (Session 1)
- NEMC: Method Update Rule
- NEMC: Overcoming Interferences in Optical ICP Analyses
- NEMC: Topics in Drinking Water
- TNI: Laboratory Accreditation System Executive Committee (LASEC)
- TNI: National Environmental Laboratory Accreditation Program (NELAP) Accreditation Council
- TNI: Proficiency Testing Program Executive Committee

10:00 - 5:00 Academic Poster Session

12:00 - 1:00 Lunch Provided
Dispelling Myths of Citizen Science
Caren Cooper, North Carolina State University

1:00 - 5:00 Concurrent Sessions

- ELAB: Environmental Laboratory Advisory Board
- NEMC: Academic Research Topics in Environmental Measurement and Monitoring (Session 2)
- NEMC: Changing the Paradigm for Water Pollution Monitoring
- NEMC: LIMS in the Modern Laboratory
- TNI: Mentor Session: Regulatory Overview and Staff Training
- TNI: Microbiology Expert Committee
- TNI: Quality Systems Expert Committee
- TNI: Stationary Source Audit Sample (SSAS) Expert Committee

5:30 - 7:00 Opening Reception and Exposition

TUESDAY, AUGUST 8

8:00 - 5:00 Poster Session and Exposition

8:00 Welcome

8:15 - 8:45 Keynote Address: Communicating Science with Data Visualization
Dr. Lisa Leombruni, University of California, Santa Barbara

9:00 - 12:00 Concurrent Sessions

- NEMC: Advances in Sample Preparation and Clean-up
- NEMC: Characterization of Polyfluoroalkyl Substances in the Environment (Session 1)
- NEMC: Citizen Science
- NEMC: Reinventing Method Validation for Environmental Monitoring
- TNI: Mentor Session: Standard Implementation Issues (Continued)
- TNI: Chemistry Expert Committee

12:00 - 1:00 Lunch Provided

1:00 - 3:00 Concurrent Sessions

- NEMC: Characterization of Polyfluoroalkyl Substances in the Environment (Session 2)
- NEMC: Effectively Communicating Scientific Information
- NEMC: Panel Discussion - Method Development and Approval in the 21st Century
- TNI: Proficiency Testing Expert Committee
- TNI: Radiochemistry Expert Committee

3:30 - 5:30 Innovative New Technology Showcase and Reception

WEDNESDAY, AUGUST 9

8:00 - 5:00 Poster Session and Exposition

8: 15 Welcome

8:30 - 12:00 Plenary Session

8:30 - 9:15 Science Communication 101: Message, Jargon, and Delivering the Perfect Elevator Pitch
Jory Weintraub, Duke University

9:15 - 10:00 Forms and Functions of Storytelling in Science Communication
Liz Neeley, The Story Collider

10:00 - 13:00 BREAK

10:30 - 12:00 Lessons from Creating an Online Outreach Empire
Craig McClain, Louisiana Universities Marine Consortium

12:00 - 1:30 Lunch on Your Own, OR Attend a Free Lunch Seminar with:

Agilent Technologies: What's in Your Water? Trace Determination of Emerging Containments in Environmental Matrices
Craig Marvin and Tarun Anumol, Agilent Technologies

OR

Restek Corporation: A Web-Based Application for Modeling Gas Chromatographic Separations
Trent Sprenkle, Restek Corporation

OR

Waters Corporation: Analysis of Samples for Chemical Warfare Agents, Byproducts, Precursors, and other Compounds of Interest
Joy Ginter, The U.S. Army Edgewood Chemical Biological Center (ECBC)'s Forensic Analytical Center

1:30 - 5:00 Concurrent Sessions

- NEMC: Data Management and Review
- NEMC: Collaborative Efforts to Improve Environmental Monitoring
- NEMC: Harnessing the Challenges in Reinventing California's Laboratory Accreditation Program
- TNI: Consensus Standards Development Program Executive Committee
- TNI: Whole Effluent Toxicity Expert Committee

1:30 - 5:00 Optional Workshop: Science Communication 101

THURSDAY, AUGUST 10

8:00 - 5:00 Poster Session

8:00 Welcome

8:15 - 8:45 Keynote Address: Detecting the Unintended Consequences of Energy and Water Conservation on Water Quality at the Tap
Michele Prevost, Department of Civil, Geological, and Mining Engineering Polytechnique Montreal

9:00 - 12:00 Concurrent Sessions

- NEMC: Ambient Air Measurements
- NEMC: Premise Microbial Testing
- NEMC: Topics in Shale Gas Exploration and Production
- NEMC/TNI: NEMC Steering Committee and TNI Advocacy Committee
- TNI: Laboratory Accreditation Body Expert Committee
- TNI: Field Activities Committee
- TNI: National Environmental Field Activities Program Executive Committee

12:00 - 1:00 Lunch Provided
Historical Review of Data Qualifiers and QC Formulation
Gary Ward, G. Ward and Associates

1:00 - 5:00 Concurrent Sessions

- NEMC: Advanced Topics in Organic Chemistry
- NEMC: Best Practices in Indoor and Outdoor Air Monitoring
- NEMC: Data Quality
- NEMC: Field Sampling, Measurement and Sensor Technology
- NEMC: Overcoming Legacy Obstacles with Innovative Approaches
- TNI: Microbiology Expert Committee
- TNI: The New ISO/IEC Standards
- TNI: General Session: Committee and Program Reports

FRIDAY, AUGUST 11

8:00 Welcome

8:15 - 8:45 Keynote Address: Helping Contaminants Emerge: The Application of High-Resolution Mass Spectrometry to Non-Targeted Analysis of Organic Pollutants
Dr. P. Lee Ferguson, Duke University

9:00 - 12:00 Concurrent Sessions

- NEMC: Forensic Chemistry
- NEMC: Metals and Metal Speciation Analysis in Environmental Samples
- NEMC: Non-Targeted Compound Screening
- TNI: Advocacy Committee

附件二　投稿論文摘要

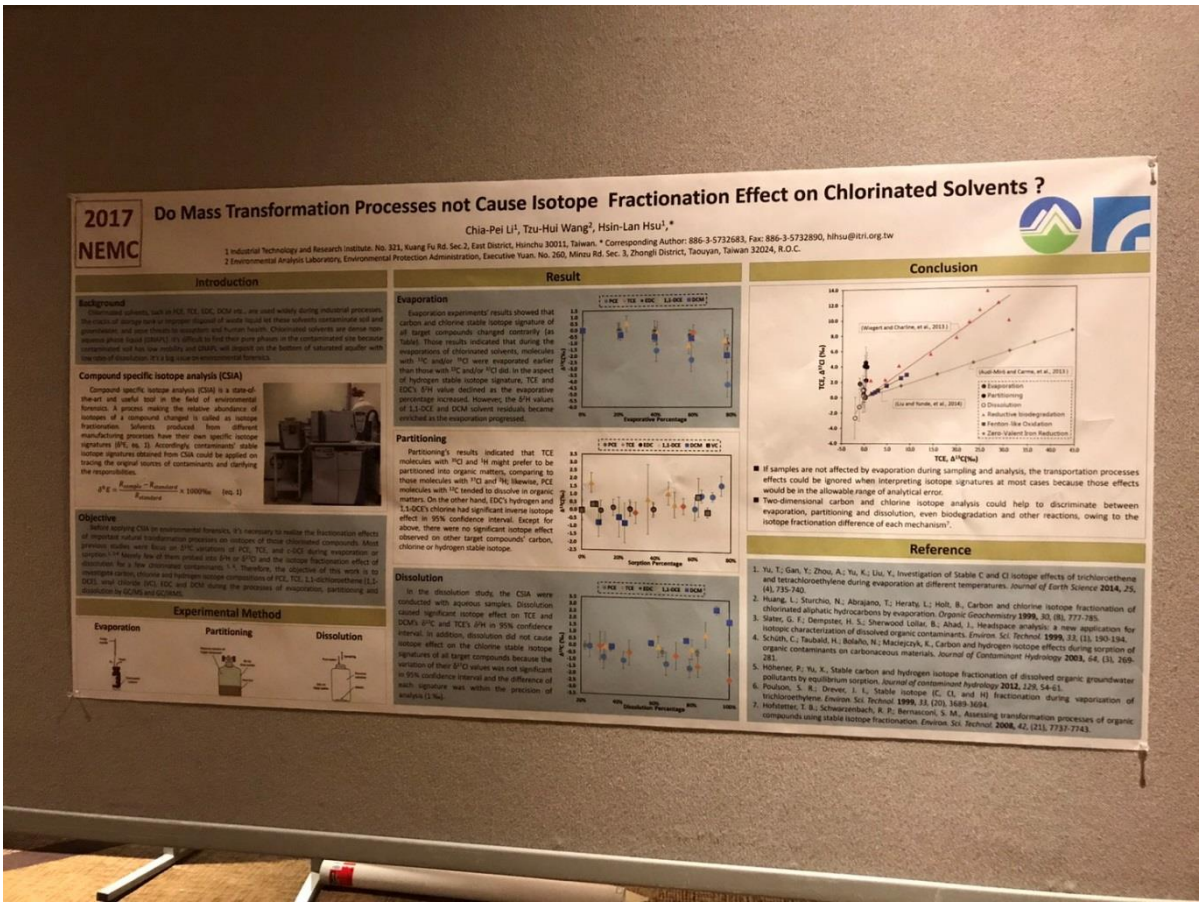
Do Mass Transformation Processes not Cause Isotope Fractionation Effect on Chlorinated Solvents?

Chia-Pei Li[1], Tzu-Hui Wang[2], Hsin-Lan Hsu[1]

[1] Industrial Technology and Research Institute. No. 321, Kuang Fu Rd. Sec.2, East District, Hsinchu 30011, Taiwan.
[2] Environmental Analysis Laboratory, Environmental Protection Administration, Executive Yuan. No. 260, Minzu Rd. Sec. 3, Zhongli District, Taouyan, Taiwan 32024, R.O.C.

Compound specific isotope analysis (CSIA) has a great potential on environmental forensics, especially for sites contaminated by chlorinated solvents. Understanding the fractionation effects of natural transformation processes on those chlorinated compounds is beneficial to interpret CSIA data. The objective of this work is to investigate carbon, chlorine and hydrogen isotope compositions of six chlorinated compounds during the processes of evaporation, partitioning and dissolution by GC/MS and GC/IRMS. Evaporative results showed that carbon and chlorine stable isotope signature of all target compounds changed contrarily. TCE and EDC's δ^2H value declined as the evaporative percentage increased and the δ^2H values of 1,1-DCE and DCM solvent residuals became enriched as the evaporation progressed with an enrichment factor of -13.15±3.99 and -12.41±9.98 ‰, respectively. Results of partitioning experiments showed that partitioning only caused significant isotope effect on PCE's $\delta^{13}C$ and TCE's $\delta^{37}Cl$ with an enrichment factor of -1.01±0.42 and -5.16±2.21, respectively, and there were no significant isotope effect observed on other target compounds' carbon, chlorine or hydrogen stable isotope signatures. In the dissolution study, dissolution caused significant isotope effect on PCE, TCE, DCM's $\delta^{13}C$ and TCE's δ^2H. In addition, dissolution did not cause isotope effect on the chlorine stable isotope signatures of all target compounds because the variation of their $\delta^{37}Cl$ values was not significant in 95% confidence interval and the difference of each signature was within the precision of analysis (1 ‰).Two-dimensional carbon and chlorine isotope analysis could help to discriminate between evaporation, partitioning and dissolution, even biodegradation and other reactions, owing to the isotope fractionation difference of each mechanism. Noted that the isotope effects caused by transportation processes were smaller than those caused by biological and chemical reactions. Therefore, transportation processes effects could be ignored when interpreting isotope signatures at most cases.

附件三　投稿論文壁報


2017 NEMC
Do Mass Transformation Processes not Cause Isotope Fractionation Effect on Chlorinated Solvents ?
Chia-Pei Li[1], Tzu-Hui Wang[2], Hsin-Lan Hsu[1,*]
1 Industrial Technology and Research Institute. No. 321, Kuang Fu Rd. Sec.2, East District, Hsinchu 30011, Taiwan. * Corresponding Author: 886-3-5732683, Fax: 886-3-5732890, hlhsu@itri.org.tw
2 Environmental Analysis Laboratory, Environmental Protection Administration, Executive Yuan. No. 260, Minzu Rd. Sec. 3, Zhongli District, Taoyuan, Taiwan 32024, R.O.C.
Introduction
Background
Compound specific isotope analysis (CSIA)
Objective
Experimental Method
Evaporation
Partitioning
Dissolution
Result
Evaporation
Partitioning
Dissolution
Conclusion
Reference

附件四　大會手冊


Environmental Impacts
Public Feedback
Collaboration
Data Management
Communicating Risk
Citizen Science
Uncertainty
Economic Impacts
Policies
Exposure
Technology Developments
Health Effects
Human Health
Public Concern
Unknowns
Risk Management
Regulation
Water Quality
Emerging Contaminants
Method Development
New Technology
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Washington, DC
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EXHIBITORS

A2LA
Absolute Standards, Inc.
Accelerated Technology Laboratories
Advanced Analytical Solutions
Agilent Technologies, Inc.
ANAB
Biotage
Calibrate
Cambridge Isotope Laboratories, Inc.
Cameo
CDS Analytical
CEM Corporation
ChemService, Inc.
ChemWare, LLC
CSRA, Inc.
Dexsil Corporation
Elemental Scientific
Elementar Americas
Envitech Instruments
Environmental Express
ERA, A Waters Company
FSS
FST Analytical, Inc.
Ethosoft, Inc.
FIAlab Instruments, Inc.
Fluid Management Systems, Inc.
Hanby Petro Analysis
High Purity Standards
Horiba Technology, Inc.
IDEXX Laboratories
Inorganic Ventures
International Accreditation Service, Inc.
Khemia Software
KISTLER North America, Inc.
Lab Tech, Inc.
Lachat Instruments (A Hach Company Brand)
LECO Corp
MACHEREY-NAGEL, Inc.
Markes International
Meinhard
Metrohm USA
Millipore Sigma
MOCON-Baseline, Inc.
NSI Lab Solutions
PerkinElmer, Inc.
Perry Johnson Laboratory Accreditation, Inc.
Phenova, A Phenomenex Company
PRAIUM
Providence Photonics, LLC
QEC, Inc.
Qualtrax
Quartzy, Inc.
Restek Corporation
SampleServe.com
SCIEX
SCP SCIENCE
SEAL Analytical, Inc.
Shimadzu Scientific Instruments, Inc.
Skalar, Inc.
Spectro Analytical Instruments
TRCTA-POS
Thermo Fisher Scientific
TSI, Inc.
UCT, Inc.
Waters Corporation
XOS

Exhibition

Independence Ballroom

Meet with instrument manufacturers, laboratory suppliers, LIMS providers, and other laboratory service providers. See the latest innovations in measurement technology, proficiency testing, sample preparation, and laboratory automation.

Exhibit Hours
Monday 5:30 pm to 7:00 pm
Tuesday 7:30 am to 5:00 pm
Wednesday 7:30 am to 3:30 pm

Welcome to the Environmental Measurement Symposium

The 2017 Environmental Measurement Symposium is the combined meeting of The NELAC Institute's (TNI) Forum on Environmental Accreditation and the National Environmental Monitoring Conference (NEMC), a technical conference managed by TNI under a cooperative agreement with the US Environmental Protection Agency (USEPA). Your attendance and participation are key elements to the Symposium's success. Look forward to a week of shared expert knowledge; energetic discussions of current issues and concerns affecting environmental monitoring and laboratories; exploration of products and services to support your endeavours; and invaluable networking with peers.

If this is your first time attending the Symposium, we hope you find it stimulating and beneficial. Our registration staff and technical help desk staff are available to assist you with any questions or to locate individuals you want to meet. Please let us know how we can help make your participation in the Symposium a success.

Have a great week!

Symposium Technical Help Desk

Do you have an idea for a session or want to submit a paper for NEMC 2018? Do you want to know more about or get involved in TNI's activities? Is there someone at the Symposium you would like to meet? The staff at the Symposium Technical Help Desk adjacent to the registration area are ready to assist you. From 7:30 am to 3:30 pm, Monday through Thursday, NEMC session chairs, TNI committee chairs, Environmental Laboratory Advisory Board (ELAB) members, and other volunteers will be staffing the Help Desk to answer your questions.

Meals and Breaks

Continental breakfast is served daily from 7:30 – 8:00.

Mid–morning and mid–afternoon breaks are provided daily.

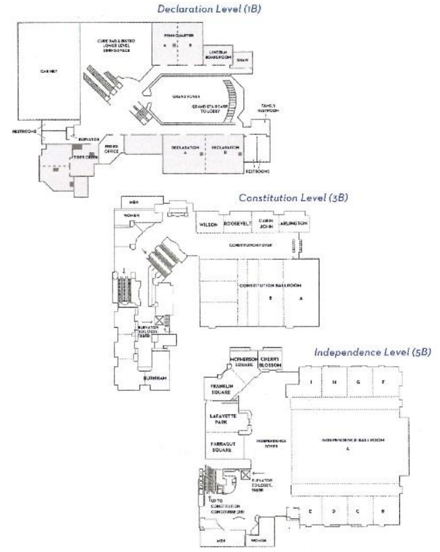
Lunch is provided Monday, Tuesday, and Thursday. Wednesday's lunch is on your own, or you may attend a vendor sponsored lunch (pre–registration required). Refer to the detailed agenda on Wednesday for more information.

If you have special dietary needs, inform the registration staff.

@nemcus # NEMC2017

https://www.facebook.com/groups/NEMCmail/

Welcome



TNI Mobile

For up–to–the–minute information about the Symposium, visit nelac–institute.org/mobile

- Daily Technical Program for the Environmental Measurement Symposium;
- List of Exhibitors;
- An Area Map; and
- TNI News and General Information.

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Keynote Address
Independence BCDE

8:00 Welcome
Lara Phelps, USEPA Office of the Science Advisor

8:15 The Charlie W. Carter Award

8:20 Reflections on 40 Years of Saying Yes (and the Occasional No)
Dr. Andy Eaton, Eurofins Eaton Analytical

NEMC Academic Research Topics in Environmental Measurement and Monitoring (Session 1)
9:00 – 12:00
Penn Quarter A

Session Chairs: Tarun Anumol, Agilent Technologies, Inc. and Bob Wyeth, Independent Consultant

9:00 Assessment of Chemical and Biological Techniques to Evaluate the Quality of Water from Pilot Scale Direct Potable Reuse Treatment Facilities
Kevin Daniels, University of Arizona

9:30 Automated Characterization of Consumer-Grade Sensor Accuracy from Supporting Data in Heterogeneous Air Quality Monitoring Networks
David Ramsay, MIT Media Lab

10:00 BREAK

10:30 Barnyard Dust Composition and Implications for Asthma in Children
Mauricius Marques dos Santos, University of Arizona

10:55 Optical Spectroscopy to Gain Further Insights on the Chemical Structure of Humic Substances (HS) and Chromophoric Dissolved Organic Matter (CDOM)
Rossana Del Vecchio, ESSIC-University of Maryland

11:20 Coupling Mass Spectrometry with Optical Spectroscopy and Chemical Tests to Evaluate and Monitor Dissolved Organic Matter in Natural Waters ESI – FT- ICR-MS
Maria Bianca, Department Chemistry and Biochemistry, University of Maryland, College Park

11:45 Is Open-Access Tap Water Monitoring Possible Using the Coffee-Ring Effect?
Rebecca Lahr, Michigan State University

NEMC Method Update Rule
9:00 – 12:00
Lafayette / Farragut

Session Chairs: Jerry Parr, The NELAC Institute and Lem Walker, USEPA Office of Water

9:00 EPA Finalizes Changes to Part 136 Affecting Laboratories that Perform Water Testing
Jerry Parr, The NELAC Institute

9:30 2017 CWA Methods Update Rule - MDL Procedure
Richard Burrows, TestAmerica Laboratories, Inc.

10:00 BREAK

10:30 A Summary of Changes in EPA Method 608.3
Adrian Hanley, USEPA Office of Water

11:00 EPA Method 624.1 - A Summary of the Changes in the Newly Promulgated GC/MS Method for Volatile Organics in Wastewater
Harry McCarty, CSRA

11:30 EPA Method 625.1 - A Summary of the Changes in the Newly Promulgated GC/MS Method for Semi-Volatile Organics in Wastewater
William Lipps, Shimadzu Scientific Instruments, Inc.

Monday Technical Sessions

NEMC Overcoming Interferences in Optical ICP Analyses
9:00 – 12:00
Wilson / Roosevelt

Session Chairs: Mike Shepherd, Shepherd Technical Services and Tom Widera, ERA, A Waters Company

9:00 An In-Depth Look at Trace Metallic Impurity Determination by ICP-OES
Thomas Kozikowski, Inorganic Ventures

9:30 Re-visiting Spectral Correction in ICP-OES
Richard Mealy, Wisconsin DNR

10:00 BREAK

10:30 Kick Interference to the Curb: Tackle ICP-OES Applications with Ease
Maura Rury, Thermo Fisher Scientific

11:00 Modern Spectral and Physical Interference Correction in Inductively Coupled Plasma Optical Spectroscopy
Christine Rivera, Agilent Technologies, Inc.

11:30 The Investigation of Correction Techniques for Common Interferences in the Analyses of Environmental Samples by ICP-OES
Daniel Jones, PerkinElmer Life and Analytical Sciences

NEMC Topics in Drinking Water
9:00 – 12:00
Declaration AB

Session Chairs: Andy Eaton, Eurofins Eaton Analytical and Joe Romano, Waters Corporation

9:00 Ongoing Quality Assurance for Cryptosporidium Analysis
Leah Villegas, CB&I

9:25 Towards an Automated Untargeted Method for Microcystins Analysis Using 2D-LC and Ion Mobility Quadrupole Time of Flight Mass Spectrometry
Kenneth Rosnack, Waters Corporation

10:00 BREAK

10:30 Determination of Algae Compounds in Drinking Water
Anne Jurek, EST Analytical, Inc.

10:55 Inter-laboratory Validation Study for the Analysis of Nitrosamines in Drinking Water Using GC-MS/MS
Diana Wong, Agilent Technologies, Inc.

11:20 Is There Cyanide in My Drinking Water?
Michael Delaney, Massachusetts Water Resources Authority (MWRA)

11:45 Trace Level Determination of Perchlorate in Various Waters by Tandem Suppressed Conductivity and Mass Spectroscopy
Jay Gandhi, Metrohm USA

Monday Technical Sessions

TNI Laboratory Accreditation System Executive Committee (LASEC)

9:00 – 10:00
Independence FGHI

Committee Chair: Judy Morgan, Pace Analytical

The purpose of this Committee is to manage TNI's efforts supporting a national program for accreditation of environmental laboratories.

- Update on Committee Activities
- Discussion of Lessons Learned from Standards Review for Suitability

TNI NELAP Accreditation Council

10:30 – 12:00
Independence FGHI

Council Chair: Aaren Alger, Pennsylvania DEP

The NELAP Accreditation Council has authority for implementation of the program for the accreditation of environmental laboratories.

- Update on Evaluations and the Evaluation Process
- Status of the 2016 Standard
- Laboratory Accreditation Management System Usage
- Possible Shifting of Evaluation Schedules for Steady Workload, Possible Annual Certificate Issuance
- Ongoing Standard Interpretation Request Issues
- Creating the Method Selection Policy to Include Documenting Assessment of Prep Methods

TNI Proficiency Testing Program Executive Committee

9:00 – 12:00
Penn Quarter B

Committee Chair: Maria Friedman, California Environmental Laboratory Accreditation Program

The mission of the Performance Testing Program Executive Committee (PTPEC) is to establish and maintain certain elements of a national PT Program to support TNI's Accreditation Programs and other TNI activities. Those elements include: (1) Fields of Proficiency Testing (FoPT), consisting of analytes, concentrations, matrices, and acceptance limits, that are appropriate for the scope of environmental monitoring performed in the United States; (2) a listing of PT Provider Accreditors (PTPAs) that are TNI recognized; and (3) a listing of organizations that are accredited by PTPAs as competent to provide PT samples to laboratories.

- Approval of Minutes
- Chair Update
- PTPA Updates
- Committee Business

10:00 BREAK

- Subcommittee Updates
- Old Business
- Open Discussion / New Business

Lunch Provided

12:00 – 1:00
Independence BCDE

Lunch Address: Dispelling Myths of Citizen Science
Caren Cooper, North Carolina State University

Monday Technical Sessions

Environmental Laboratory Advisory Board (ELAB)

1:00 – 5:00
Lafayette / Farragut

Session Chairs: Lara Phelps, USEPA Office of the Science Advisor, Designated Federal Official and Henry Leibovitz, Rhode Island State Health Laboratories, Chair

The Environmental Laboratory Advisory Board (ELAB) is managed in compliance with the Federal Advisory Committee Act (FACA) to solicit consensus advice on issues such as enhancing EPA's measurement programs; and facilitating the operation and expansion of a national environmental accreditation program.

All ELAB meetings are open to the public.

Opening Remarks, Roll Call, Mission Statement, and Overview of Board Goals
- Discussion / Approval of July 2017 Minutes
- Updates from the Designated Federal Official (DFO)

Charter Highlights

Updates on Current Topics

3:00 BREAK

Updates on Current Topics (continued)

New Topics for Consideration
- Open Discussion / New Issues for ELAB
- Review Action Items / Closing Remarks / Adjourn

NEMC Academic Research Topics in Environmental Measurement and Monitoring (Session 2)

1:00 – 5:00
Penn Quarter A

Session Chairs: Tarun Anumol, Agilent Technologies, Inc. and Bob Wyeth, Independent Consultant

1:00 Expanding Environmental Monitoring Campaigns: Contaminants of Emerging Concern are also Present in "Unimpacted" Watersheds
Lee Blaney, University of Maryland Baltimore County
1:30 Identification of Halogenated Disinfection Byproducts of Nonylphenol in Chlorinated Wastewater Effluent Using Novel High Resolution GC/Q-TOF
Christiane Hoppe-Jones, University of Arizona
2:00 Simultaneous Determination of UV-filters and Estrogens in Aquatic Invertebrates by Modified QuEChERS Extraction and Liquid Chromatography Tandem Mass Spectrometry
Ke He, University of Maryland Baltimore County
2:30 Spectrophotometric Titrations to Characterize and Monitor Chromophoric Dissolved Organic Matter (CDOM) in Natural Waters
Carmen Cartisano, Department of Chemistry & Biochemistry, University of Maryland, College Park

3:00 BREAK

3:30 Determination of HgS Nanoparticles in Produced Water by Single Particle Inductively Coupled Plasma Spectroscopy (sp-ICP-MS)
Jenny Nelson, Department of Viticulture and Enology, University of California, Davis
4:00 Environmental Implications of Copper Nanohybrids in Natural Waters
Adeyemi Adeleye, University of California Center for Environmental Implications of Nanotechnology
4:30 Identifying Consumer Product Ingredients and Their Degradates with Endocrine Activity
Gabrielle Pecora, University of California, Davis

Monday Technical Sessions

NEMC Changing the Paradigm for Water Pollution Monitoring

1:00 – 5:00
Declaration AB

Session Chairs: Earl Hansen, The NELAC Institute and David Kennedy, Phenomenex, Inc.

1:00 Analysis of 58 Volatile Organic Compounds in the Water Intake of the Panama Canal Using a Tandem GC System
Dara Salley, Inficon
1:30 Effect of Holding Time on E.coli in Wastewater Samples
Nichole Schafer, Northeast Ohio Regional Sewer District
2:00 Binding Affinity and Toxicity of Thirteen Microcystin Congeners
Debmalya Bhattacharyya, Northeast Ohio Regional Sewer District
2:30 The Benefits and Pitfalls of Automation, Alternate Test Procedures, and Extensive Cross Training for Production Gains in a Municipal Wastewater Laboratory
Charles Lytle, City of Portland Water Pollution Control Laboratory

3:00 BREAK

3:15 Innovative Use of Mobile Technology for Environmental Field Data Collection
Ken Ochi, Accelerated Technology Laboratories
3:40 Orange County's Use of Continuous Monitors for the TMDL Program
Robert Sheridan, Orange County Environmental Protection Division
4:05 Total Kjeldahl Nitrogen Colorimetric Testing for Discrete and Segmented Flow Analyzers
Sarah Lebengarh, SEAL Analytical, Inc.
4:30 Validation of a New ASTM Method for the Determination of Total Nitrogen and Total Phosphate Using Alkaline Persulfate Digestion Followed by Ion Chromatography
Richard Jack, Thermo Fisher Scientific

NEMC LIMS in the Modern Laboratory

1:00 – 5:00
Wilson / Roosevelt

Session Chair: Robert Benz, Khemia Software

1:00 Your Next LIMS: SaaS or On-Premise?
Ken Ochi, Accelerated Technology Laboratories
1:30 LIMS Requirements for Correct Use of Significant Figures and Rounding for Regulatory Compliance
Edward Askew, Askew Scientific Consulting, LLC
2:00 Extending the LIMS System Beyond the Walls of the Laboratory
Russell Schindler, SampleServe.com
2:30 Five Key Trends Impacting the LIMS Industry
David Riese, PREMIUM

3:00 BREAK

3:30 Improving the Plasticity of LIMS Implementation: LIMS Extension through Microsoft Excel
Mark Culver, LJT & Associates, Inc.
4:00 Reducing Paper through LIMS
Bill Pingpank, Ethosoft, Inc.
4:30 An Introduction to Scribe and How the Environmental Response Team Maximizes this Software at Superfund Sites
Christopher Gallo, USEPA Office of Land and Emergency Management

Monday Afternoon Break Sponsored by elementar
EXCELLENCE IN ELEMENTS

Monday Technical Sessions

TNI Mentor Session: Regulatory Overview and Staff Training

1:00 – 5:00
Independence FGHI

Session Moderator: Dorothy Love, Eurofins Lancaster Laboratories

1:00 Regulatory Programs – Judy Morgan, Pace Analytical
1:45 Training Your Staff on Why We Do What We Do – Dorothy Love, Eurofins Lancaster Laboratories

2:15 Workgroup Session A – Compliance Samples, Sharing Best Practices
- Managing Regulatory Requirements in Your Lab
- Receiving Communication from the Client
- Tracking Compliance Samples in the Lab
- Ensuring Timelines are Met
- Addressing Qualified Data
- Reporting to the Client / Agency

3:00 BREAK

3:30 Workgroup Session B – Standards Implementation Issues
- Sections 4.1.6 and 4.2.4 – Staff Communication
- Section 4.1.7.1 (c) – QA Officer Impartiality
- Section 4.14.5 – Internal Audits – Covering the Scope of Tests

TNI Quality Systems Expert Committee

1:00 – 3:00
Penn Quarter B

Committee Chair: Paul Junio, Northern Lake Service

The mission of the Quality Systems Expert Committee is to maintain laboratory quality systems standards (TNI Volume 1, Module 2) based on public input and to provide technical assistance on issues related to adopted standards; and to develop tools that facilitate the implementation of the standard.

- Small Lab Handbook (Working Session)

TNI Microbiology Expert Committee

3:30 – 5:00
Penn Quarter B

Committee Chair: Robin Cook, City of Daytona Beach

The mission of Microbiology Expert Committee is to maintain the Microbiology Standard (TNI Volume 1, Module 5) based on input from stakeholder groups and the public; to provide technical assistance, support, and training on issues related to microbiology and the TNI standard; and to develop tools to facilitate the implementation of TNI Microbiology Standard.

- Presentation of 2016 Checklist
- 2016 Standard Implementation - Q&A / Feedback
- Open Discussion

Monday Technical Sessions

TNI Stationary Source Audit Sample (SSAS) Expert Committee
1:00 – 3:00
Franklin Square

Committee Chair: Tom Widers, ERA, A Waters Company

This committee is responsible for the development and implementation of TNI consensus standards that enable the externalization of the EPA's Stationary Source Audit Program (SSAP), that includes the following elements:
- Roles and responsibilities of program participants;
- Manufacture of audit samples;
- Oversight of audit sample providers;
- Management of audit sample results; and
- Acceptance criteria.

1:00 SSAS Results Discussion

1:30 SSAS Standard Revisions
- Volume 1 Module 1
- Volume 1 Module 3
- Volume 1 Module 2

Reception and Exhibition

Monday
5:30 pm to 7:00 pm
Independence Ballroom

Join us to network with peers
and see the latest innovations for environmental laboratories.

Tuesday Technical Sessions

Keynote Address
Independence BCDE

8:00 Welcome
Jerry Parr, The NELAC Institute

8:15 Communicating Science with Data Visualization
Dr. Lara Lesmeister, Bren School of Environmental Science & Management, University of California, Santa Barbara

NEMC Advances in Sample Preparation and Clean-up
9:00 – 12:00
Penn Quarter B

Session Chairs: Michael Flournoy, Eurofins Frontier Global Sciences, Inc. and Zoe Grosser, Horizon Technology, Inc.

9:00 Automated Extraction and Clean-Up of PCDFs Using a Green Low Solvent System
Ruud Addink, Toxic Report Laboratories

9:30 Complete Fractionation of Extractable Petroleum Hydrocarbons Using Newly Developed EPH SPE Cartridges
Alexandra Perkovich, Restek Corporation

10:00 BREAK

10:30 Evaluation and Application of SPME Arrows
Jason Herrington, Restek Corporation

11:00 Ultimate Clean Digestion Cups and Clean Lab Testing
Rebecca Pienta, Environmental Express

11:30 Development of a Complete Method Validation for the Use of Solid-phase Extraction with EPA 625.1
Tom Hall, Pace Management Systems, Inc.

NEMC Characterization of Polyfluoroalkyl Substances in the Environment (Session 1)
9:00 – 12:00
Declaration B

Session Chairs: Mark Bruce, TestAmerica Laboratories, Inc. and Charles Neslund, Eurofins Lancaster Laboratories

9:00 ASTM Standards for the Analysis of Polyfluorinated Compounds (PFCs) in Multiple Matrices by UPLC/MS/MS Analysis
Lawrence Zintek, USEPA Region 5

9:30 The Analysis of Polyfluorinated Alkyl Substances (PFAS) in Environmental Samples by Optimized ASTM Method 7968/7979
Brian Pinkas, Shimadzu Scientific Instruments, Inc.

10:00 BREAK

10:30 Optimizing Analytical Strategies for the Measurement of Several Classes of Poly- and Perfluoroalkyl Substances (PFAS) in Water
Tarun Anumol, Agilent Technologies, Inc.

11:00 Quantitative Comparison of Perfluorinated Organic Compounds in Drinking Water Between Tandem Triple Quadrupole MS/MS and High Resolution Mass Spectrometry Using Orbitrap Technology- Targeted, Non-Targeted, and Unknowns
Ali Hashem, Thermo Fisher Scientific

11:30 A Technique for Determining Total Oxidizable Precursors (TOP) of Perfluoroalkyl Compounds
Charles Neslund, Eurofins Lancaster Laboratories Environmental, LLC

Tuesday Technical Sessions

NEMC Citizen Science
9:00 – 12:00
Penn Quarter A

Session Chairs: Jay Benforado, USEPA Office of the Science Advisor and Leon Vinci, Drexel University

9:00 Crowds & Communities: Top-down & Bottom-up Citizen Science for Environmental Protection
Cuseo Cooper, North Carolina State University

9:20 Citizen Science Infrastructures: Technology Appropriation for Data Management and Sharing
Andrea Wiggins, University of Nebraska at Omaha

9:40 Mobilizing Public Participation in Science, Technology, and Policy — Understanding the Motivations of Citizen Science Volunteers
Anne Bowser, Woodrow Wilson International Center for Scholars

10:00 BREAK

10:30 Environmental Protection Belongs to the Public: A Vision for Citizen Science at EPA
Alison Parker, OSTR Fellow hosted by EPA

10:45 Democratizing Science to Address Environmental Problem Solving – Using Open-Source Tools to Expand Environmental Exploration and Investigation
Shannon Dosemagen, Public Lab

11:00 Panel Discussion: A More Systematic Approach to Citizen Science: Incorporating Community Efforts into the Existing Public Health/Government Infrastructure
Jay Benforado, USEPA Office of the Science Advisor

NEMC Reinventing Method Validation for Environmental Monitoring
9:00 – 12:00
Lafayette / Farragut

Session Chairs: Jerry Parr, The NELAC Institute and Lara Phelps, USEPA Office of the Science Advisor

9:00 Flexible Approaches to Environmental Measurement
Lara Phelps, USEPA Office of the Science Advisor

10:00 BREAK

10:30 Have Instrument, Make Method: How New Methods are Made and Validated
William Riggs, Shimadzu Scientific Instruments, Inc.

10:50 US EPA 625 Method Validation Study for Automated SPE Disk Application
Zoe Grosser, Horizon Technology, Inc.

11:10 The Standard Methods Validation Process – Responding to Requests for Including New Methods
Andy Eaton, Eurofins Eaton Analytical

11:30 Addition of Analytical Test Methods to Accreditation Programs
Marwan Khoury-Hanold, California Environmental Laboratory Accreditation Program

11:45 Basics of Method Development and Validation
Jerry Parr, The NELAC Institute

Tuesday Technical Sessions

TNI Mentor Session: Standard Implementation Issues (Continued)
9:00 – 12:00
Independence FGHI

Session Moderator: Dorothy Love, Eurofins Lancaster Laboratories

- Section 4.1(6) – Relevance of Activities
- Section 4.5 – Subcontracting

10:00 BREAK

- Sections 5.4.1, 5.4.3, 5.4.4, and 5.4.5 – Lab Developed Methods
- Section 5.8 – Sample Handling, Sample / Container Tracking
- Section 4.6 – Vendor / Supplier Approval

TNI Chemistry Expert Committee
9:00 – 12:00
Declaration A

Committee Chair: Valerie Slaven, Valerie Slaven Consulting Services

The mission of this committee is to improve the technical quality of environmental testing methodologies by providing tools (e.g., detection, quantitation, calibration) that assure the quality of data, which may be adopted by federal and state regulatory agencies.

9:00 Review of 2016 Checklist

10:00 BREAK

10:30 Review of Comments Received on the 2017 Standard

Lunch Provided
12:00 – 1:00
Independence BCDE and Franklin / McPherson Square

NEMC Characterization of Polyfluoroalkyl Substances in the Environment (Session 2)
1:00 – 3:00
Declaration B

Session Chairs: Mark Bruce, TestAmerica Laboratories, Inc. and Charles Neslund, Eurofins Lancaster Laboratories Environmental, LLC

1:00 Slippery When Wet: Analysis of PFCs in Aqueous Solutions by ASTM D7979
William Lipps, Shimadzu Scientific Instruments, Inc.

1:25 Applying Chemical Molecular Modeling to Predict Environmental Parameters
Joseph Golab, Environmental Standards, Inc.

1:50 The Analysis of Water for Perfluorinated Compounds Using Automated Solid Phase Extraction
Zoe Grosser, Horizon Technology, Inc.

2:15 Analysis of Perfluorinated Compounds in Water Using Automated Solid Phase Extraction
Ruud Addink, Pace Management Systems, Inc.

2:40 Evaluation of Online SPE Sorbents for the Analysis of Perfluorinated Compounds in Aqueous Matrices
David Schiavo, Babcock Laboratories, Inc.

Tuesday Technical Sessions

NEMC Effectively Communicating Scientific Information

1:00 – 3:00
Penn Quarter B

Session Chair: David Friedman, Friedman Consulting

1:00 Improving Scientific Literacy: Best Practices for Communicating Scientific Information
Alexandra Crystal, California State University Fullerton
1:30 Tools and Techniques for Effective Communication
Nina Friedman, California Environmental Laboratory Accreditation Program
2:00 A Conversation on Risk Management in Environmental Monitoring and Public Health Labs
Andrew Nelson, Sandia National Laboratories
✓ 2:30 Telling A Communication Gap: How California ELAP is Regaining Trust from its Stakeholder Communities
Carolyn McCarthy, California Environmental Laboratory Accreditation Program

NEMC Panel Discussion on Method Development and Approval in the 21st Century

1:00 – 3:00
Lafayette / Farragut

Panelists: Judy Morgan, Pace Analytical; Jerry Parr, The NELAC Institute; and Lara Phelps, USEPA Office of the Science Advisor

Historically, EPA program offices have had widely varying approaches to validating and approving test methods for regulatory data. Some have had a very prescriptive philosophy regarding test methods, only allowing methods developed by the Agency or, if developed by others, only approved after an extensive validation effort plus notice and comment in the Federal Register. Other EPA offices have published methods with little or no validation data to support the premise that the method is appropriate for its intended purpose. In virtually all cases, the current approaches have resulted in a slow and tedious process for introducing innovative new technologies for environmental monitoring.

ISO/IEC 17025 and the laboratory accreditation standard developed by The NELAC Institute focus on a laboratory's ability to provide data appropriate for its intended purpose and state that "methods published … in national standards shall preferably be used." EPA's Performance Based Measurement Systems (PBMS) approach had limited success, and much more flexibility now exists across all EPA programs through Flexible Approaches to Environmental Measurement. While in some cases new methods are approved rather quickly, much more can be done, especially since the current process is sometimes constrained by political realities.

The purpose of this session is to explore options for a new process to ensure that methods are appropriately validated before use and approved in a transparent and effective process.

TNI Proficiency Testing Expert Committee

1:00 – 3:00
Declaration A

Committee Chair: Nicole Cairns, New York State DOH

The mission of the Laboratory Proficiency Testing (PT) Committee is to develop standards for the development and testing of PT samples; evaluation of PT Providers; evaluation of PT Provider Oversight Organizations; and use of PT samples by laboratories and laboratory accrediting bodies.

- Committee Overview and Membership
- Status of 2016 / 2017 PT Standards and Implementation
- Highlights of Major Changes to PT Standards
- 2017 Accomplishments and Goals

Tuesday Afternoon Break Sponsored by

Tuesday Technical Sessions

TNI Radiochemistry Expert Committee

1:00 – 3:00
Penn Quarter A

Committee Chair: Robert Shannon, Quality Radioanalytical Support

The mission of this committee is to improve the technical quality of radiochemical testing by providing standards (e.g., detection, quantitation, calibration, quality control, method validation) that assure the quality of data, which may be adopted by federal and state regulatory agencies.

- Welcome
- Roll Call
- Approval of Minutes from Previous Meeting
- Recap Current Status on Standard
- Discuss Current Tools for Implementation of the Standard
  - Comparison of the TNI Standard Volume 1 Module 6 with Previous Versions (Draft)
  - Small Laboratory Handbook
  - Module 6 Assessment Checklist
- Understanding TNI Module 6 Changes
- Possible New Tools
  - Training for Laboratories and Assessors
  - Technical Guidance
- New Business

Innovative New Technology Showcase

Tuesday
3:30 – 5:00
Independence FGHI

The Innovative New Technology Showcase will feature a poster, small display, and a five minute oral presentation describing each new technology.

Agilent Technologies, Inc.
By combining intelligence, intuition, and innovation, Agilent Technologies has created Intuvo, the next generation of Gas Chromatography.

CRSci
The Light-Emitting Diode Distance and Ranging Environmental Monitoring System (LEMS) is a robust, low power, snow and river level monitoring sensor with embedded machine learning, object recognition, and near-field object discernment. The device provides snow depth at 16 points along a transect and is capable of maintaining millimeter accuracy during harsh alpine conditions where such near-field particulates induce significant error in ultrasonic distance and ranging devices.

Hanby PetroAnalysis
Through the use of our new, small lab in the field that fingerprints hydrocarbons, including crude oils, a baseline of what the groundwater looks like before, during, and after drilling and/or fracking provides for protection from the broad blame of ground water contamination in a particular geographic location.

Horizon Technology, Inc.
Solid phase extraction has been around for at least 50 years and disk SPE technology has matured and been accepted into EPA methodology for many methods. The automation of disk SPE has advanced and several new features incorporated into the SPE-DEX 5000 are new applications of the latest technology.

IDEXX Laboratories
Legionella pneumophila is a Gram-negative bacterium commonly found in potable and nonpotable water; it is the primary cause of Legionnaires' Disease, a severe, sometimes fatal, pneumonia. IDEXX's new Legiolert method dramatically simplifies detection of Legionella pneumophila in water with an easy, accurate, Colilert-like test platform.

KISTERS North America, Inc.
The United Nations Global Environmental Monitoring System (GEMS) Water Programme is dedicated to providing environmental water quality data (sample results and continuously measured data) of the highest quality, integrity, accessibility, and interoperability.

Innovative New Technology Showcase

Tuesday
3:30 – 5:00
Independence FGHI

Michigan State University
A new method was developed and evaluated for water testing that can be conducted using commonly available and reusable materials (aluminum sheet, dropper, 30x triplet jeweler's loupe [$18], and a cell phone camera). This method harnesses the coffee-ring effect to provide nano-scale chromatography of solute particles within an aqueous droplet on a solid substrate.

Planktos Instruments
HydroSphere an autonomous water quality monitoring robot for use in rivers, lakes, and harbors. The patent-pending device is the first of its kind to allow long-distance, multi-day, hands-free monitoring of river water quality. The innovation making this possible is the capability for submerged travel and a flotation feature that brings the device back to the surface for recovery.

NECi Superior Enzymes
NECi has been working hard to expand our line of recombinant "reagent grade" enzymes and easy to use kits.

SCIEX
The SCIEX SelectION™ technology adds another dimension of selectivity to a LC-MS/MS instrument that may be the difference between success or failure for an important project.

Thermo Fisher Scientific
The Thermo Scientific Dionex Integrion High Pressure Ion Chromatography (HPIC) system delivers confidence in water analysis with features previously available only on Dionex high-end systems, including high-pressure capability and optional electrochemical detection.

XOS
High Definition X-ray fluorescence uses high, medium, and low energy monochromatic beams in sequence to provide a broad range of elemental sensitivities and interference effects to be minimized. Recently, ASTM D8064-16 established a standard test method for elemental analysis of soil and solid waste for the determination of Pb, Hg, As, Cd, Ni, and Cr.

Ziltek Pty Ltd
RemScan is a handheld infrared device for the rapid infield measurement of petroleum hydrocarbon contaminants in soil. The device uses diffuse reflectance technology, where a mid-infrared beam hits the soil surface and reflects back to a detector, generating an onscreen measurement of TPH.

Wednesday Plenary Session

Effectively Communicating Scientific Information

8:00 – 12:00
Independence BCDE

8:00 Welcome
Earl Hansen, The NELAC Institute

8:15 Introduction to Session
Lara Phelps, USEPA Office of the Science Advisor

8:30 Science Communication 101: Message, Jargon, and Delivering the Perfect Elevator Pitch
Jory Weintraub, Duke University

9:30 BREAK

10:00 Forms and Functions of Storytelling in Science Communication
Liz Neeley, The Story Collider

11:00 Lessons from Creating an Online Outreach Empire
Craig McClain, Louisiana Universities Marine Consortium

Jory Weintraub

Science Communication Director and a Senior Lecturing Fellow with the Duke Initiative for Science & Society

Jory teaches undergraduate and graduate courses in science communication and runs science communication workshops for Duke faculty and postdocs. He is also the Director of the Duke Broader Impacts Resource Center, which he established to support the Duke University research community in its individual and collective efforts to develop, implement, assess, and disseminate broader impacts activities and initiatives. Prior to this, he served for over 10 years as the Assistant Director of Education and Outreach at NESCent (The National Evolutionary Synthesis Center), where he developed and ran programs in evolution education/outreach for K-12 students and teachers, undergraduates, and the general public. He also served on NESCent's management team. Before coming to NESCent, Jory taught undergraduate biology courses at UNC Chapel Hill and ran science outreach programs for underrepresented minority students. Jory received his BS in Biochemistry and Cell Biology from The University of California at San Diego, and his PhD in Immunology from The University of North Carolina at Chapel Hill. After completing his graduate studies, he received an NSF Postdoctoral Fellowship in STEM Education. He is a member of the Steering Committee of the National Alliance for Broader Impacts (NABI) and serves on the Board of Directors of Science Communicators of North Carolina (SCONC). He also serves on the Advisory Board for the Triangle Center for Evolutionary Medicine (TriCEM), is a member of the editorial board of the journal Evolution: Education and Outreach, and serves on the Education Committee of the Society for the Study of Evolution. His work focuses on minority outreach, science communication/education/outreach, and faculty development.

Wednesday Plenary Session

Liz Neeley

Executive Director of The Story Collider

Each week, The Story Collider releases a new podcast episode with true, personal stories about science recorded from their regular shows in New York, Boston, Washington DC, Los Angeles, London, and pop-up shows across the US. Liz has spent a decade helping researchers understand and pragmatically apply communications advice about public engagement. Her expertise includes the science of science communication, social media, and science journalism in the US and UK. She built her teaching career at COMPASS as the Assistant Director of Science Outreach, training hundreds of scientists of all career stages. Before that, she earned practical experience in coral reef conservation in Fiji and Papua New Guinea, and working on international trade policy for deep sea corals. Liz is a marine biologist by training. She studied the evolution of color patterns in tropical reef fishes, which introduced her to sensory biology and communication theory concepts that influence her to this day. She is a member of the advisory boards of the CommLab at MIT and Ensia magazine, and contributes to both peer-reviewed and popular work, such as Science Blogging: The Essential Guide (2016), Effective Risk Communication (2015), and Escape From the Ivory Tower (2010).

Craig McClain

Executive Director for the Louisiana Universities Marine Consortium

Craig served prior as the Deputy Director for the Triangle Center for Evolutionary Medicine and the Assistant Director for Science at the National Evolutionary Synthesis Center both at Duke University. He has conducted deep-sea research for over 20 years and published over 60 papers in the area. He has participated in and led dozens of oceanographic expeditions which have taken him to the Antarctic, and the most remote regions of the Pacific and Atlantic. Craig's research focuses on how energy and metabolism drives the biology of marine invertebrates from individuals to ecosystems, specifically, seeking to uncover how organisms are adapted to different levels of carbon availability, i.e. food, and how this determines the kinds and number of species in different parts of the oceans. As such, much of Craig's research focuses on how climate change impacts life in the ocean. Craig's research has been featured on National Public Radio, Discovery Channel, Fox News, National Geographic, and ABC News. In addition to his scientific research, Craig also advocates the need for scientists to connect with the public and is the founder and chief editor of the acclaimed Deep-Sea News (http://deepseanews.com/), a popular ocean-themed blog that has won numerous awards. His writing has been featured in Cosmos, Science Illustrated, American Scientist, Wired, Mental Floss, and the Open Lab: The Best Science Writing on the Web. His forthcoming book, Craig With Big Things, And Small Things explores his obsession with the diversity in sizes of life.

Wednesday Luncheons

LUNCH ON YOUR OWN

12:00 – 1:30

OR

ATTEND A SPONSORED LUNCHEON SEMINAR

You must have pre-registered for the luncheon seminars or acquire a ticket from the selected sponsor to attend.

Agilent Technologies, Inc.
Declaration AB

What's in Your Water? Trace Determination of Emerging Contaminants in Environmental Matrices
Craig Marvin and Tarun Anumol, Agilent Technologies, Inc.

Agilent Technologies

Restek Corporation
Independence HI

A Web-Based Application for Modeling Gas Chromatographic Separations
Trent Sprenkle, Restek Corporation

RESTEK
Pure Chromatography

Waters Corporation
Penn Quarter AB

Analysis of Samples for Chemical Warfare Agents, Byproducts, Precursors, and Other Compounds of Interest
Joy Ginter, The U.S. Army Edgewood Chemical Biological Center (ECBC)'s Forensic Analytical Center

Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

Wednesday Technical Sessions

NEMC Data Management and Review

1:30 – 5:00
Declaration AB

Session Chairs: Christina Hiegel, Trihydro Corporation and Jennifer Richardson, Dow Chemical

1:30 Panel Discussion: Setting the Standard: Developing and Communicating Best Practices for Environmental Data Management
Sarah Wright, ICEDM Best Management Practices; Brooke Ruether, ddms, Inc.; and Kristin Ward, ddms, Inc.

3:00 BREAK

3:30 Best Practices for Submitting Nutrient Data to the Water Quality eXchange (WQX)
Laura Skadsen, USEPA Office of Water

4:00 Electronic Data Exchange and Evaluation System (EXES)
Mary Perkins, CSRA

4:30 EPA's Interoperable Watersheds Network: A New Approach for Publishing Continuous Monitoring Data
Dwane Young, USEPA Office of Water

NEMC Collaborative Efforts to Improve Environmental Monitoring

1:30 – 5:00
Lafayette / Farragut

Session Sponsored by MilliporeSigma

MilliporeSigma

Session Chairs: William Lipps, Shimadzu Scientific Instruments, Inc. and Lem Walker, USEPA Office of Water

1:30 Total Cyanide May Not Always Be Free, But It Is Often Available: Cyanide Methods and Interferences Regurgitated
William Lipps, Shimadzu Scientific Instruments, Inc.

2:00 RCRA Methods, Current Activities, and Path Forward
Shan-Yi Yang, RPA Office of Land and Emergency Management

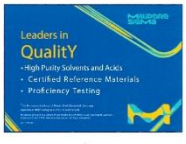
2:30 CWA Method Equivalency: What a Manufacturer Must Provide and What a Laboratory Must Have Onsite for the Auditor
Edward Askew, Askew Scientific Consulting, LLC

3:00 BREAK

3:30 The Role of Public Health and Governmental Laboratories in National Environmental Monitoring
Henry Leibovitz, Rhode Island State Health Laboratories

4:00 Updates and Current Activities, Clean Water Act Methods
Adrian Hanley, USEPA Office of Water

4:30 Updates and Current Activities, Safe Drinking Water Act Methods
Dan Harrison, USEPA Office of Water



Wednesday Technical Sessions

NEMC Harnessing the Challenges in Reinventing California's Environmental Laboratory Accreditation Program
1:30 – 5:00
Independence BCDE

Session Chairs: Chrisine Sotelo, California Environmental Laboratory Accreditation Program and David Speis, Retired

1:30 Assessment of Progress and Final Recommendations by the Expert Review Panel for the State of California's Environmental Laboratory Accreditation Program
Lara Phelps, USEPA Office of the Science Advisor

2:00 Reinventing California's Environmental Laboratory Accreditation Program
Christine Sotelo, California Environmental Laboratory Accreditation Program

2:30 Overcoming Hurdles to an Effective and Integrated Quality Management System
Scott Siders, PDC Laboratories, Inc.

3:00 BREAK

3:30 Challenges and Roadblocks Encountered When Adopting New Laboratory Accreditation Standards: The Orange County Sanitation District Experience
Ronald Coss, Orange County Sanitation District

4:00 TNI Standards in California and Small Utility Laboratories
Dan Jackson, City of Benicia

4:30 The Overhaul of California ELAP: The Laboratory Perspective
Andy Eaton, Eurofins Eaton Analytical

TNI Consensus Standards Development Program Executive Committee
1:30 – 5:00
Wilson / Roosevelt

Committee Chair: Bob Wyeth, Independent Consultant

The purpose of this program is to develop consensus standards for use by TNI's accreditation and proficiency test programs.

- Roll Call / Introductions
- Expert Committee Reports / Status of Current Activities
  - Asbestos
  - Chemistry
  - Field Activities
  - Laboratory Accreditation Body
  - Laboratory Quality Systems
  - Microbiology
  - Proficiency Testing
  - Radiochemistry
  - Stationary Source Audit Sample
  - Whole Effluent Toxicity

3:00 BREAK

- Review of Draft Glossary
  - Presentation
  - Discussion
  - Q&A

Wednesday Afternoon Break Sponsored by SPECTRO

Wednesday Technical Sessions

TNI Whole Effluent Toxicity Expert Committee
1:30 – 5:00
Penn Quarter AB

Committee Vice-Chair: Pete de Lisle, Coastal BioAnalysts

The mission of this committee to update and maintain the whole effluent toxicity testing Standard (TNI Volume 1, Module 7) based upon public comment, to provide technical assistance on issues related to whole effluent toxicity, to develop tools to aid implementation, and to facilitate the implementation of the Standard.

- Welcome and Introductions
- Brief Presentation of WET Testing and Committee Activities
- WET Request to PTPEC About PT Testing

3:00 BREAK

- Discuss Revision of the WET Module
  - Demonstration of Competency Concepts
  - Reasonable QC for Necessary Chemistry Tests Applicable to WET Methods

Workshop

Science Communication 101
Wednesday, August 9
1:30 – 5:00
Independence H1

Funding is scarce. Anti-science rhetoric is on the rise. Policymakers often fail to grasp the research necessary to make informed decisions in the best interests of their constituents. But empirical data suggest that good science communication both empowers citizens and benefits the careers of scientists. This half-day workshop helps scientists develop communication skills and put those skills into action by:

- Exploring the empirical benefits of communicating science
- Learning to answer difficult, controversial, and critical questions from the media
- Tweeting, blogging, writing op-eds, and presenting research to engage the lay public
- Preparing policy briefs
- Engaging with policymakers and funders

Instructor: Jory Weintraub, Duke Initiative for Science & Society

You must be pre-registered to attend.

Thursday Technical Sessions

Keynote Address
Independence A

8:00 Welcome
Alfredo Sotomayor, Milwaukee Metropolitan Sewerage District

8:10 Introduction
Zoe Grosser, Horizon Technology, Inc.

8:15 Keynote Address: Detecting the Unintended Consequences of Energy and Water Conservation on Water Quality at the Tap
Dr. Michele Prevost, Department of Civil, Geological, and Mining Engineering Polytechnique Montreal

NEMC Ambient Air Measurements
9:00 – 12:00
Penn Quarter AB

Session Chairs: Jason Herrington, Resick Corporation and Wayne Whipple, USEPA Region 5

9:00 Air Contamination Quantification by FTIR with Gas Cell
Jason Prenzlin, LJT & Associates, Inc.

9:30 The Importance of Quality Assured Field and Analysis Data Supporting the NADP Mercury Deposition Network for Policy Makers, Modelers, and Research Scientist and Other End Users
Robert Brunette, Excelsior Frontier Global Sciences, Inc.

10:00 BREAK

10:30 Impacts of Oil and Natural Gas Operations and Urban Emissions on Air Quality in Rocky Mountain National Park During FRAPPE
Bentley Sive, National Park Service

11:00 Characterization of Particulate Air Pollution in a Community Near the Port of Houston
Inkyu Han, UT Health School of Public Health

11:30 EPA Environmental Response Team's Viper Data Management System and Snapper Air Sampling Platform
Christopher Galka, USEPA Office of Land and Emergency Management

NEMC Premise Microbial Testing
9:00 – 12:00
Independence FG

Session Chairs: Patsy Root, IDEXX Laboratories and Debra Waller, New Jersey DEP

9:00 Basic IAQ Microbial Sampling Methods
Jason Dubinski, EMSL Analytical, Inc.

9:30 Advanced IAQ Microbial Sampling Methods
Jason Dubinski, EMSL Analytical, Inc.

10:00 BREAK

10:30 Optimizing Water Sampling in Large Building Premise Plumbing for the Detection of Opportunistic Pathogens
Emilie Bédard, Polytechnique Montréal

11:00 Approaches to Legionella Environmental Monitoring in Building Risk Assessments: Sampling Plans, Results Interpretation, and Remediation
Janet Stout, Special Pathogens Laboratory

11:30 Challenges and Advances in Laboratory Methods for the Detection of Legionella Pneumophila in On-premise Testing
Veronica Newport, IDEXX Laboratories

Thursday Technical Sessions

NEMC Topics in Shale Gas Exploration and Production
9:00 – 12:00
Independence H1

Session Chairs: Kesavulu Baguwandoss, TestAmerica Laboratories, Inc. and Dave Gratson, Environmental Standards, Inc.

9:00 Measuring Radioactivity Associated with Solid and Liquid Waste from Marcellus Shale
Andrew Nelson, University of Texas

9:30 Recommended Practices for Baseline Sampling of Dissolved Gases at Water Wells in Areas of Shale Oil & Gas Development
Stephen Richardson, GSI Environmental, Inc.

10:00 BREAK

10:30 Dissolved Methane Round Robin Study Results – Phase 2
David Gratson, Environmental Standards, Inc.

11:00 Update on Improvements to Dissolved Hydrocarbon Gases in Water Analysis
Mark Bruce, TestAmerica Laboratories, Inc.

11:30 Removal of Dissolved Gases in Crude Oil and Classification
Kesavulu Baguwandoss, TestAmerica Laboratories, Inc.

NEMC Steering Committee and TNI Advocacy Committee
9:00 – 12:00
Independence DE

Moderator: Jerry Parr, The NELAC Institute

The session is to plan the semi-annual meetings of TNI.

- 2018 Albuquerque Meeting
- Future Winter Meetings

10:00 BREAK

- 2017 Environmental Measurement Symposium Recap
- 2018 Environmental Measurement Symposium – New Orleans, LA

TNI Laboratory Accreditation Body Expert Committee
9:00 – 12:00
Independence BC

Committee Chair: Carl Kircher, Florida DOH

This committee develops the standard for operation of laboratory accreditation bodies.

- Welcome and Introductions
- Approval of Minutes
- Update on Committee Activities Since Houston

10:00 BREAK

- Discussion of the Revised Module V2M1
- New Business

Thursday Technical Sessions

TNI Field Activities Committee
9:00 – 10:00
Lafayette / Farragut

Committee Chair: Kevin Helbrooks, JBA

The mission of the TNI Field Activities Committee (FAC) is to develop standards for accrediting bodies and field sampling and measurement organizations. The FAC will engage experts to develop consensus-based standards with the goal of improving the consistency of field methods and the quality of environmental data.

- Committee Membership
- Standard Review Update
- Public Comments and Overview of Received Comments
- Review and Adjust Schedule for Standard Review
- Assign Committee Members Specific Sections of FSMO V2 to be Leads
- Other

TNI National Environmental Field Activities Program Executive Committee
10:30 – 12:00
Lafayette / Farragut

Committee Chair: Justin Brown, Environmental Monitoring and Technology

The mission of the National Environmental Field Activities Program Executive Committee (NEFAP EC) is to develop and oversee a national program for the accreditation of field sampling and measurement organizations (FSMO).

- Update on NEFAP Program Activities
- Roundtable Discussion on How to Improve and Grow the Program

Lunch Provided
12:00 – 1:00
Independence A

Lunch Address: Historical Review of Data Qualifiers and QC Formulation
Gary Ward, G. Ward and Associates

NEMC Session Chairs Working Lunch
12:00 – 1:30
Independence DE

NEMC Advanced Topics in Organic Chemistry
1:00 – 2:00
Independence BC

Session Chairs: Charles Appleby, USEPA Office of Land and Emergency Management and David Kennedy, Phenomenex, Inc.

1:00 Evaluation of Wipe Sampling Parameters and Surface Analysis of Organophosphorus Pesticide Environmental Samples by LC/MS
Simer Wilkson, USEPA Office of Research and Development

1:30 Trace Determination of Nitrosamines in Finished Drinking Water by Direct-Inject LC–MS/MS
Agustin Pienl, Waters Laboratories, Inc.

Thursday Technical Sessions

NEMC Best Practices in Indoor and Outdoor Air Monitoring
1:00 – 5:00
Penn Quarter AB

Session Chairs: Michael Flournoy, Eurofins Frontier Global Sciences, Inc. and Deborah Gaynor, Phoenix Chemistry Services

1:00 Update on the Optimization of US EPA Method TO 11A for the Measurement of Carbonyls in Ambient Air
Ian MacGregor, Battelle Memorial Institute

1:30 Silicon-Lined Canister Cleaning Practices and Blank VOC Concentrations
Jason Herrington, Restek Corporation

2:00 Storage Time Study of Passive Sampling Tubes Used for EPA Method 325
Jamie Brown, MilliporeSigma

2:30 Review and Validation of Hourly VOC Data Collected by PAMS AutoGC Systems
Carol Moyer, Ortec, LLC

3:00 BREAK

3:30 Vapor Intrusion: Improving Data Quality Using Today's Guidance and Best Practices
Taryn McKnight, TestAmerica Laboratories, Inc.

4:00 How to Meet the Analytical Requirements of NJ Low Level TO-15
Jason Herrington, Restek Corporation

NEMC Data Quality
1:00 – 5:00
Independence HI

Session Chairs: Polly Newbold, ddms, Inc. and Brooke Roecker, ddms, Inc.

1:00 Ensuring the Generation of Known and Documented Field Data
Marlene Moore, Advanced Systems, Inc.

1:30 Maintaining Data Quality Indicators Throughout the Life of a Project
Christina Hegel, Trihydro Corporation

2:00 Results of an Inter-Laboratory PFAS Study Based on Real World Samples
Michael Wilkes, The Dow Chemical Company

2:30 Solid Phase Extraction: The Good, The Bad, and The Ugly?
Polly Newbold, ddms, Inc.

3:00 BREAK

3:30 Extending Quality Assurance and Data Integrity Beyond Standard Practices and Regulatory Guidelines – From Laboratory to Decision Makers
Paul Bartlet, IDC

4:00 Relative Standard Error: A Statistical Approach to Validating a Calibration Curve
Annie Haack, HAch Instruments, Inc.

4:30 Investigating Improper Laboratory Practice: Investigative Tools from the Contract Laboratory Program
Charles Appleby, USEPA Office of Land and Emergency Management

Thursday Afternoon Break Sponsored by 

Thursday Technical Sessions

NEMC Field Sampling, Measurement, and Sensor Technology
1:00 – 5:00
Independence FG

Session Chairs: Reza Karimi, Battelle Memorial Institute and Kim Watson, Stone Environmental

1:00 Mobile Applications for the Collection of Field Data and Info-graphical Reporting
Russell Schindler, SimpleServe.com

1:30 A Field Analysis Technique for the Determination of PFAS Compounds
Charles Swihart, Paradox Lancaster Laboratories Environmental, LLC

2:00 QA Approaches for Water Passive Sampling Methods
Heather Lord, Maxxam Analytics

2:30 Analysis of TPHd in Soil by Portable GC-MS
Rachel Mohler, Chevron ETC

3:00 BREAK

3:15 An IR Based Field Analytical Method for Total Petroleum Hydrocarbon Measurement – Field Deployment and Performance Evaluation
Kitty Kong, Chevron Energy Technology Company

3:40 Use of Semi-Quantitative Field Screening Data in Hydrocarbon Investigation and Remediation
Soorick Saha, Haley Environmental

4:05 Data Quality Performance for Different Sampling Strategies for Residential Soil Lead (Pb)
Dena Gaudiello, USEPA Office of Land and Emergency Management

4:30 On site Heavy Metal Testing and Monitoring Using Monochromatic XRF Methods
Zewu Chen, XOS

NEMC Overcoming Legacy Obstacles with Innovative Approaches
2:00 – 5:00
Independence BC

Session Chair: David Thal, Environmental Standards, Inc.

2:00 Why Are We Doing What We Do? Does It Really Add Value?
Rusty Vitinic, TestAmerica Laboratories, Inc.

2:30 Lab and Field Practices that Seemed Like a Good Idea at the Time
Rick Vitale, Environmental Standards, Inc.

3:00 BREAK

3:30 Isotope Dilution – Where It Works. Where It Doesn't Work. Where We Should Expand Its Use.
David Thal, Environmental Standards, Inc.

4:00 Sub-Femtogram Detection of Dioxins and Furans Using Tandem Quadrupole Mass Spectrometer
Douglas Stevens, Waters Corporation

Thursday Technical Sessions

TNI The New ISO/IEC Standards
1:00 – 4:00
Lafayette / Farragut

Session Moderator: Bob Wyerh, Independent Consultant

1:00 ISO/IEC 17025
Warren Merkel, NIST

3:00 BREAK

3:15 ISO/IEC 17011
Marlene Moore, Advanced Systems, Inc.

3:40 ISO/IEC 17034
Shawn Kassner, Neptune and Company, Inc.

TNI General Session: Committee and Program Reports
4:00 – 5:00
Independence DE

TNI Board Chair: Alfredo Sotomayor, Milwaukee Metropolitan Sewerage District

- Consensus Standards Development Program
- National Environmental Field Activities Program
- National Environmental Laboratory Accreditation Program
- Proficiency Test Program
- Stationary Source Audit Sample Program
- General and Administrative Committees

Friday Technical Sessions

Keynote Address
Constitution AB

8:00 Welcome
Marie Russell, ASTPH Fellow, USEPA Office of the Science Advisor

8:15 Keynote Address: Helping Contaminants Emerge: The Application of High-Resolution Mass Spectrometry to Non-Targeted Analysis of Organic Pollutants
Dr. R. Lee Ferguson, Duke University

NEMC Forensic Chemistry
9:00 – 12:00
Declaration AB

Session Chair: Michelle Kett, USEPA Region 3 and Kitty Kong, Chevron Energy Technology Company

9:00 Hunting Down Emerging Contaminants in Wastewater: Benzotriazole Derivatives in the Penn State Wastewater Treatment Plant and Surrounding Areas
Kyra Morrell, Penn State University

9:30 High Resolution Site Characterization and Integration with Environmental Forensics
Ileana Rhodes, GSI Environmental

10:00 BREAK

10:30 Red Crabs as Sentinel Organisms of Deepwater Horizon Oil in Gulf of Mexico Sediments
Gregory Douglas, NewFields Environmental Forensics

11:00 Incorporation of Weathering in PAH Source Apportionment
Caroline Tuit, Geosyntec

11:30 Analysis of Chemical Warfare Agents: Processes for Unknown Environmental Samples
Jay Grice, The U.S. Army Edgewood Chemical Biological Center (ECBC)'s Forensic Analytical Center

NEMC Metals and Metal Speciation Analyses in Environmental Samples
9:00 – 12:00
Constitution B

Session Chair: Frank McFarland, Brooks Applied Labs

9:00 Matrix Interferences in ICP-MS: Causes, Effects, and Strategies to Reduce or Eliminate Them
Ruth Wolf, Perkin Elmer, Inc.

9:30 Application of Laser Induced Breakdown Spectroscopy to Quantify Beryllium Concentration in Soil
Kelsey Culbertson, High Purity Standards

10:00 BREAK

10:30 Fast Arsenic Speciation Analysis of Wine and Rice with LC-ICP-QQQ
Courtney Tarabe, Department of Viticulture and Enology, University of California, Davis

11:00 Improving Data Quality for Arsenic and Selenium Detection Using TQ ICP-MS in Environmental Laboratories
Maura Raty, Thermo Fisher Scientific

11:30 Modifications to EPA Method 3060A that Improve the Cr(VI) Extraction Efficiency from Chromium Ore Processing Residue-Contaminated Soils
Ruth Wolf, Perkin Elmer, Inc.

Friday Technical Sessions

NEMC Non-Targeted Compound Screening
9:00 – 12:00
Constitution A

Session Chair: David Kennedy, Phenomenex, Inc. and Craig Marvin, Agilent Technologies, Inc.

9:00 Analysis of Combustion Byproducts on Firefighter Protection Equipment and in Firefighter Urine Using Novel High Resolution GC/Q-TOF and Bioassays
Christine Hoppe-Jones, University of Arizona

9:30 Comprehensive Screening of Environmental Contaminants by Flow-Modulated GC×GC
Matthew Edwards, Separation Analytical

10:00 BREAK

10:30 Method Development of a 2D LC HRMS Extraction and Detection Method for Organophosphorus Flame Retardants in Environmental Water Samples
Kenneth Reimuth, Waters Corporation

11:00 Non-Targeted Suspect Screening Strategies Using Low Resolution LC-MS-MS
David Schiesel, Babcock Laboratories, Inc.

11:30 Workflows for Targeted Quantification, Suspect Screening, and Discovery of Unknown Organic Compounds in the Environment Using High-Resolution Mass Spectrometry
Tarun Anumol, Agilent Technologies, Inc.

TNI Advocacy Committee
9:00 – 12:00
Penn Quarter AB

Committee Chair: Steve Arms, Florida DOH (Retired)

- Highlights from the 2017 Symposium
- Newsletter Assignments
- Overview of 2017 Activities to Date and Future Plans

Poster Sessions

Monday and Thursday
Independence Foyer

A Case Study of Using Isotopic Signatures of Multiple Contaminants to Identify Source Relevance
Hsiao Hsu, Industrial Technology and Research Institute

Analysis of Alternative Plasticizers to Phthalate Esters in Canadian House Dust
Xinghua Fan, Health Canada

Assessing Mercury Accumulation in Alaskan Fishes Using Chemical Feeding Ecology
Andrew Cyr, University of Alaska Fairbanks

Biopsy Punches as a Cost Effective and Efficient Tool to Monitor Mercury in Fish Muscle
Chris Pet-Le, Industrial Technology and Research Institute

Combining a Rotating Drum and Cavity Ring Down Spectroscopy for Exploring Atmospheric Gas-particle Interfaces
Cecilia Smith, Virginia Tech Chemistry Department

Data Quality of Modern vs. Conventional Extract Concentration for Triazine Pesticides
Roberto Cabrera, Clinical Laboratory of San Bernardino

Detection of Sodium Fluoroacetate (Compound 1080) in Water by Direct Injection LC-MS/MS
Heidi Pitzy, USEPA Office of Research and Development

Determination of Perfluoroalkyl Substances (PFAS) in Marine and Freshwater Sediments Using QuEChERS Extraction and LC-MS/MS
Sylvain Bataf, Sanitation District of Los Angeles County

Do Mass Transformation Processes Not Cause Isotope Fractionation Effect on Chlorinated Solvents?
Chia-Pei Li, Industrial Technology and Research Institute

Evaluation of Online SPE Sorbents for the Analysis of Perfluorinated Compounds in Aqueous Matrices
David Schiesel, Babcock Laboratories, Inc.

Examining the Potential for Using Unfrozen Sediments in Trace-level Analysis of Organic Pollutants in the Santa Monica Bay
Ochan Otim, Environmental Monitoring Division, City of Los Angeles

Increasing Efficiency of Fecal Coliform Testing through EPA-Approved Alternate Method Colilert 18
Brian Cornwell, LJT & Associates, Inc.

Light Emitting Diode Distance & Ranging Environmental Monitoring System (LEMS)
Basil Pantazis, University of Lethbridge

Making a Case for Regenerating and Recycling Gas Chromatography Liners in Industrial Wastewater Screening for Organic Pollutants
Ochan Otim, Environmental Monitoring Division, City of Los Angeles

Microcystin ELISA: Comparison of the Manual Method vs. the Automated CAAS Method
Rosemarie Read, Northeast Ohio Regional Sewer District

SARA's Bacterial Source Tracking: How One Small Environmental Lab Developed an Impactful Molecular Biology Program
Hillary Haldeman, San Antonio River Authority

Single-Laboratory Validation of a PCB Congener Method by Low Resolution GC-MS
Ashita Hanley, USEPA Office of Water

Streamlined Lipids Analysis by Automated Solvent Extraction
Darryl Guenther, Environmental Monitoring Division, City of Los Angeles

SW - 846: Update for 2017
Christiaan Langlois-Miller, USEPA Office of Land and Emergency Management

Poster Sessions

Tuesday and Wednesday
Independence A

2017 EPA Method Update Rule and EPA Method 624.1
Cordula Ellsworth, OI Analytical

An Integrated GC-MS Workflow Solution for the Determination of Semivolatiles in Drinking Water and Solid Waste According to the U.S. EPA Guidelines
Barbara van Ginen, Thermo Fisher Scientific B.V.

Automated Sampling of Methanol Extractions
Anne Jurek, TST Analytical, Inc.

Comparative Performance of a New Method, Legiolert, vs. Standard Methods for the Quantification of Legionella Pneumophila in Potable and Non-potable Water Samples
Veronica Newport, IDEXX Laboratories

Determination of Persistent Organic Pollutants in Fish Tissues by Accelerated Solvent Extraction and GC-MS/MS
Aaron Kettle, Thermo Fisher Scientific

Determination of Pesticides and Persistent Organic Pollutants in Honey by Accelerated Solvent Extraction and GC-MS/MS
Aaron Kettle, Thermo Fisher Scientific

Determination of TKN by Subtraction Using ASTM D8085 and ASTM D7781
William Lipps, Shimadzu Scientific Instruments, Inc.

Gas Chromatography Coupled to ICP-MS/MS for Quantification of Organophosphate Pesticides in Honey Bee Products After Miniaturized QuEChERS Extraction
Jenny Nelson, Agilent Technologies, Inc.

High Definition X-ray fluorescence (HDXRF®)
Lisa Pfeiffer, XOS

Is the Vial Impacting Your Results?
Craig Douglas, Agilent Technologies, Inc.

LC/MS/MS Analysis of Glyphosate in Food Matrices Without the Use of Derivatization
Douglas Stearns, Waters Corporation

Multiresidue Analysis of Pesticides in Cannabis-Infused Oil by QuEChERS Extraction and Enhanced Matrix Removal-Lipid Cleanup
Joan Stevens, Agilent Technologies, Inc.

Optimization of 1,4-Dioxane and Ethanol Detection Using USEPA Method 8260
Anne Jurek, TST Analytical, Inc.

Polycyclic Aromatic Hydrocarbon (PAH) Analysis in Fatty and Complicated Food Matrices Using Triple Quadrupole Gas Chromatograph Mass Spectrometry (GC/MS/MS)
Joan Stevens, Agilent Technologies, Inc.

Practical Applications of Chemometrics in Flow Injection Analysis: Improved Measurement Accuracy and Lower Detection Limits Through Spectrometric Background Correction
Jonathan Wood, FIAlab Instruments, Inc.

Screening for Pollutants in Water with GC/MSD and MassHunter SureTarget Mass Spectral Deconvolution Workflow
Angela Flores, Agilent Technologies, Inc.

Strategies for Dealing with High Matrix Samples Using ICP-MS
Marcus Manecki, Thermo Fisher Scientific

Streamlined Method for EPA 1694: Pharmaceuticals and Personal Care Products in Water
Brian Kinsella, UCT, Inc.

TOC / TNb / TP Analyses: A Suite of Solutions from Elementar
Mark Larson, Elementar Americas

Why You Should Mind Your "Ps and Qs"
Kathy Kiefer, MilliporeSigma

THANK YOU

We appreciate the volunteers who donate their time to make the Symposium a success!

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The NELAC Institute (TNI) is a 501(c)(3) non-profit organization whose mission is to foster the generation of environmental data of known and documented quality through an open, inclusive, and transparent process that is responsive to the needs of the community. TNI's vision is a true national accreditation program, whereby all entities involved in the generation of environmental measurement data within the United States are accredited to one uniform, rigorous, and robust program that has been implemented consistently nationwide and focuses on the technical competence of the entity pursuing accreditation. TNI believes such a program will improve the quality and reliability of environmental data used by federal and state agencies.

http://www.nelac-institute.org

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The National Environmental Monitoring Conference co-sponsored by The NELAC Institute (TNI) under a cooperative agreement with the U.S. Environmental Protection Agency (US EPA). The technical program is organized by a committee of environmental experts from government, academia, and private industry to bring together a balance of technical and policy topics for each year's symposium that are of interest to all. The conference was initiated in 1985 as part of EPA's efforts to foster a partnership among the Agency, the regulated community, the public, state regulatory agencies, and the other members of the monitoring community.

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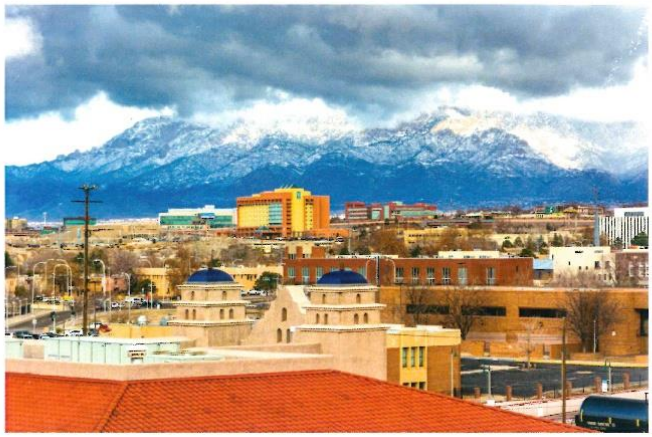
Future Meetings



Forum on Environmental Accreditation
Albuquerque, New Mexico
January 22 – 25, 2018

Environmental Measurement Symposium
New Orleans, Louisiana
August 6 – 10, 2018