

國立交通大學
National Chiao Tung University

出國報告（出國類別：國際會議、出訪）

參加 SciX 2013 會議、出訪加拿大國家研究院

服務機關：應用化學系

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摘要

這次出差的目的有兩個。其一是參加 SciX 2013 會議，進行題為“Stable isotope-labeled Raman microspectroscopy: shedding new light on cellular metabolism”之發表，此會議中有大量關於拉曼光譜的發表，我和世界各地的學者進行了許多相當充實的討論；其二為出訪加拿大國家研究院。我對於加拿大國家研究院及其他加拿大的大學如 University of Ottawa 等所擁有的研究水準印象相當深刻。

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本文

一、目的

1. To attend SciX 2013 and deliver an invited talk entitled “Stable isotope-labeled Raman microspectroscopy: shedding new light on cellular metabolism”

參加 Scix2013，並進行發表：“Stable isotope-labeled Raman microspectroscopy: shedding new light on cellular metabolism”

2. To visit the National Research Council (NRC) of Canada (host: Dr. Henry H. Mantsch, Professor Emeritus of NRC)

出訪加拿大國家研究院。(邀請人：Dr. Henry H. Mantsch)

二、過程

Sunday 9/29

I flew from Taipei to Chicago (O'Hare) via Tokyo, and then took Coach USA bus from the O'Hare International Airport to Milwaukee downtown.

9 月 29 日星期日

搭機前往芝加哥，而後搭巴士前往密爾瓦基。

Monday 9/30

After visiting the registration desk in the morning to collect my conference bag, I attended the afternoon session “Emerging Raman Techniques and Applications”, which broadly covered various applications of Raman spectroscopy. For instance, Richard Van Duyne of Northwestern University presented surface-enhanced Raman spectroscopy (SERS) in the femtosecond regime, whereas the next speaker, Katsumasa Fujita of Osaka University, talked about Raman imaging studies of cellular dynamics. Even a clinical application of Raman spectroscopy was reported by Chad Atkins of the University of British Columbia. He showed that the degradation of stored red blood cells can be rapidly monitored by Raman spectroscopy.

9 月 30 日星期一

上午我在報到櫃檯進行報到手續並領取資料，下午則參加了“Emerging Raman Techniques and Applications”議程，該議程廣泛地包含了拉曼光譜學的多種

應用。例如，Northwestern University 的 Richard Van Duyne 發表了飛秒狀態的表面增強拉曼光譜學(SERS)，而接下來的講者：大阪大學的 Katsumasa Fujita 的發表則是關於細胞動力學的拉曼成像研究。甚至 University of British Columbia 的 Chad Atkins 還發表了一個拉曼光譜學的臨床應用；他的研究表示儲藏紅血球的劣化可以立即地被拉曼光譜監控到。

Tuesday 10/1

First I attended the plenary lecture by Volker Deckert of the University of Jena, who won FACSS Charles Mann Award for Applied Raman Spectroscopy. He overviewed the history of development of tip-enhanced Raman spectroscopy (TERS) and presented his recent work of DNA sequencing achieved with TERS. During a coffee break that followed the plenary lecture, I had discussions with Prof. Fujita on technical issues in Raman imaging of the cell division of animal cells. I also talked with Dr. Norihiko Hayazawa of RIKEN.

I then went to hear presentations in the award honoring session for Volker Deckert (see above). Speakers in this session included Van Duyne, Jürgen Popp of the University of Jena, Duncan Graham of the University of Strathclyde, and Hiro-o Hamaguchi of NCTU.

I delivered an invited talk of 20 min in the session “A New Age of Raman Imaging” organized by Profs. Fujita and Graham, and the title of my talk was “Stable isotope-labeled Raman microspectroscopy: shedding new light on cellular metabolism”. I was the opening speaker of the session. The next speaker was Katherine Willets of University of Texas at Austin, who talked about super-resolution imaging by means of SERS. Ioan Nottingher of University of Nottingham presented more clinical application-oriented studies. Kathleen Gough of University of Manitoba showed SERS imaging of fungi. Finally, Popp talked about the potentials and limitations of Raman microscopy in clinics. Most of these speakers are relatively young and active in this field.

10 月 1 日星期二

這天我先去聽了耶拿大學的 Volker Deckert 的大會演講，他是 FACSS Charles Mann Award for Applied Raman Spectroscopy 的得獎者。他概述了針尖增強拉曼光譜學(TERS)的歷史發展，並發表了他最近使用 TERS 研究 DNA 定序的成果。在大會演講結束後的休息時間，我和 Fujita 教授討論動物細胞之細胞分裂拉曼成像的技術議題。我也和理化學研究所的 Dr. Norihiko Hayazawa 進行了討論。

在那之後我去聽了 Volker Deckert 的得獎榮譽議程內的發表(如前面所述)。此議程內的講者包含耶拿大學的 Van Duyne 及 Jürgen Popp, University of Strathclyde 的 Duncan Graham 以及國立交通大學的濱口宏夫等人。

在 Fujita 教授及 Graham 教授主持的“A New Age of Raman Imaging”議程中，我進行了 20 分鐘題為“Stable isotope-labeled Raman microspectroscopy: shedding

new light on cellular metabolism”的受邀發表。我是該議程的第一位講者，在我之後的講者是德州大學奧斯汀分校的 Katherine Willets，他的發表是關於 SERS 的超解析度成像。University of Nottingham 的 Ioan Notingher 則是發表了更多臨床應用導向研究。University of Manitoba 的 Kathleen Goug 展示了真菌的 SERS 成像。最後，Popp 則是講述拉曼光譜學臨床應用的潛力以及限制。這些講者大多數都相對地比較年輕且活躍於此領域中。

Wednesday 10/2

In the morning I was in the “Coherent Two-Dimensional Spectroscopy I” session, where I could hear a talk by one of the pioneers of nonlinear coherent vibrational spectroscopy, John Wright of University of Wisconsin-Madison.

The afternoon session I attended was “Terahertz Spectroscopy and Imaging”. I heard the presentations by Dr. Katsuhiro Ajito of NTT, Keisuke Tominaga of Kobe University, and others. This session was interesting to me because we are also studying the low-frequency region of Raman spectra, which is equivalent to the THz region.

I then attended FACSStoberfest held in the Regency Ball of Hyatt Hotel, that is, the banquet of SciX 2013. This night event was a very special Oktoberfest celebration. During the banquet, I chatted with Prof. Fujita, who invited me to give a talk in SciX. I also happened to see Prof. Koichi Iwata of Gakushuin University.

10 月 2 日星期三

這天早上我出席了“Coherent Two-Dimensional Spectroscopy I”議程，在此議程中我得以聽到非線性同調振動光譜學的其中一位先驅：University of Wisconsin-Madison 的 John Wright 的演講。

下午議程我出席了“Terahertz Spectroscopy and Imaging”議程。在這裡我聽取了 NTT 的 Dr. Katsuhiro Ajito、神戶大學的 Keisuke Tominaga 等人的演講。此議程對我來說相當有意思，因為我們也在進行和兆赫區同等的低頻區的拉曼光譜的研究。

之後我出席了在 Hyatt Hotel 的 Regency Ball 舉行的 FACSStoberfest，也就是 SciX 2013 的晚宴。這天晚上的活動是非常特別的慕尼黑啤酒節慶祝活動。在晚宴時，我和此次邀請我來演講的 Fujita 教授進行了談話。另外我也碰到了大學院大學的 Koichi Iwata 教授。

Thursday 10/3

I spent the whole day to move to Ottawa. Due to flight delay, I arrived at Henry Mantsch's home late in the evening.

10 月 3 日星期四

搭機移動至渥太華。由於班機延誤，我在當天晚上才抵達目的地。

Friday 10/4

Henry Mantsch, Emeritus Professor of National Research Council (NRC) of Canada, hosted my stay in Ottawa. He made all necessary arrangements for our visit to NRC. We went to NRC together and first met with Andrew Ridsdale, who is a senior scientist in the Molecular Spectroscopy Group led by Albert Stolow. Ridsdale showed us his coherent anti-Stokes Raman scattering (CARS) microscopic system, as well as other time-resolved spectroscopic apparatuses in his lab. Subsequently, we ran across a postdoctoral researcher working in the NRC-University of Ottawa Joint Attosecond Science Laboratory (JASLab). Mantsch asked him to give us a quick tour of the lab. After the lab tours, we had nice, short conversations with Prof. Paul Corkum, the head of JASLab, and Prof. Stolow. We then visited the office of the late Nobel laureate Prof. Gerhard Hertzberg. In this well-preserved room, I thought about the history of molecular spectroscopy that had been created there.

10月4日星期五

加拿大國家研究院的名譽教授 Henry Mantsch 即是這次邀請我前往渥太華的學者。他替我們這次出訪國家研究院做了所有必要的安排。我們一起前往國家研究院，首先見到的是 Andrew Ridsdale，一位由 Albert Stolow 所率領的分子光譜學團隊裡的資深科學家。Ridsdale 展示他的相干反斯托克斯拉曼散射(CARS)顯微系統，以及他實驗室裡的其他時間解析光譜儀器。後來我們遇到一位在 NRC-University of Ottawa Joint Attosecond Science Laboratory (JASLab)工作的博士後研究員。Mantsch 請他為我們做了個簡單的實驗室導覽。在那之後，我們和 Stolow 教授及 JASLab 的領導人 Paul Corkum 教授進行了短暫但充實的談話。我們接著去拜訪了諾貝爾獎得主 Gerhard Hertzberg 教授的辦公室。在那保存良好的房間裡，讓人不禁去回想在這裡被創造出來的分子光譜的歷史。

Saturday 10/5

Discussion with Henry Mantsch

10月5日星期六

和 Henry Mantsch 進行討論。

10月6日星期日

搭機返臺。

三、心得及建議

SciX 2013 is the 40th annual analytical chemistry meeting of FACSS (the Federation of Analytical Chemistry and Spectroscopy Societies). I attended this meeting for the first time but found it very exciting because a myriad of presentations are concerned with the development of novel Raman spectroscopic approaches and their applications. Among several sessions I attended, the session in which I gave a talk was of particular interest in the sense that it covered a wide spectrum of cutting-edge Raman studies. From those presentations, I felt that there still are many things that we can investigate with Raman spectroscopy. I was able to have fruitful discussions with Profs. Katsumasa Fujita and Ioan Notingher, who expressed their interest in our work. SciX 2014 will be held in Reno from September 28 through October 3, 2014.

Scix 2013 是 FACSS (the Federation of Analytical Chemistry and Spectroscopy Societies) 40 年度的分析化學會議。這是我第一次參加這個會議，但是我覺得非常興奮，因為有非常大量關於新拉曼光譜技術及其應用的發表。在我所參加的幾個議程之中，我所進行發表的那個議程的內容最讓我感興趣，因其廣泛涵蓋了最尖端的拉曼研究的光譜。這些發表讓我感受到拉曼光譜學這領域中還有許多東西可以讓我們去挖掘。這次我得以和兩位對我們的研究表示有興趣的 Katsumasa Fujita 教授及 Ioan Notingher 教授進行非常充實的討論。下一次的 Scix 2014 會於明年 9 月 28 日至 10 月 3 日在雷諾舉行。



At SciX 2013
於 SciX 會議會場

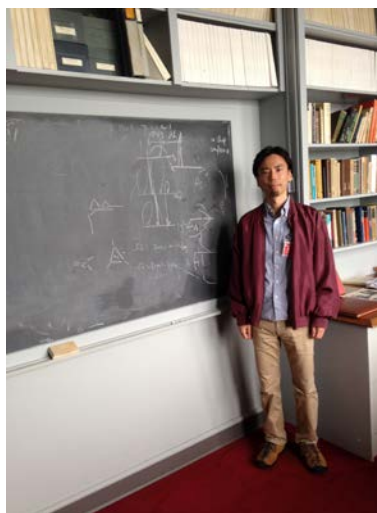
The visit to NRC was even more fruitful. The main building of NRC is much smaller than I expected as a research institute, but the laboratories that I visited this time are doing truly world-leading research. During the visit, I learned that there are interactions between NRC and some universities in Taiwan. For instance, Dr. Ridsdale,

who introduced his CARS setup to us, is collaborating with Prof. Fu-Jen Kao of National Yang-Ming University. It would be great if I could promote NRC-NCTU relationship through the personal connection that I made during this visit.

出訪加拿大國家研究院更是獲益眾多。以一個研究單位來說，國家研究院的主樓比我想像中的還要小，但是這次我所拜訪的幾個實驗室在進行的真的都是世界領導級的研究。在這次出訪中，我得知加拿大國家研究院和臺灣的一些大學有所交流。舉例來說，為我們介紹其 CARS 裝置的 Dr. Ridsdale 有和國立陽明大學的 Fu-Jen Kao 教授進行共同研究。我很希望可以藉這次出訪加深國家研究院和交通大學的關係和往後的交流。



The Building of NRC of Canada
加拿大國家研究院



In the Herzberg's office
於 Herzberg 的辦公室中

Needless to say, it was my great pleasure to see Henry Mantsch again. We met each other last year when I attended the SPEC 2012 meeting held in Chiang Mai, Thailand. He told me a lot of lively stories about the “good old days” of molecular

spectroscopy and encouraged me in many aspects.

不用說，能夠再見到 **Henry Mantsch** 是我的榮幸。我們是在去年在泰國清邁舉辦的 SPEC 2012 國際會議上認識的。他和我分享了很多分子光譜學”過去的好時光”，以及在各方面給予我很多鼓勵。

I did not see many participants from Taiwan in SciX 2013. Although the series of FACSS meetings have traditionally been organized by American societies, we should enhance our presence in this meeting. If I have a chance to get invited in a next SciX meeting, I will certainly take my students as well and let them present poster papers.

In my visit to Ottawa, I was impressed that NRC of Canada and other Canadian universities such as University of Ottawa, are doing very good science, both fundamental and applied. Therefore it will be beneficial for us to seek for collaborations with them.

我在 Scix 2013 會議上並沒有看到多少來自臺灣的參與者。雖然 FACSS 會議一向是由美國社群所組織的，但我覺得我們應該要增加臺灣於這個會議的參與度。如果我還有機會可以參加明年的 SciX 2014 的話，我一定會帶我的學生參加並讓他們進行壁報發表。

這次出訪渥太華，我對於加拿大國家研究院及其他加拿大的大學如 University of Ottawa 等所擁有的研究水準印象相當深刻，不論是基礎方面或是應用方面都是。因此我認為積極地和他們進行共同研究想必會相當有益處。