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Scientific Tracks & Abstracts

(Day 1)

Jaya Vejayan, J Anal Bioanal Tech 2016, 7:5(Suppl)
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The application of proteins from less likely studied samples from South East Asia

Jaya Vejayan
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Protein play multitude of roles in the body of an organism. Enormous effort been done over the years to study proteins either by the traditional chromatography techniques of isolating one at a time or by the later developed means of proteomics advances capable to study directly on a protein mixture. This paper provides some examples of studies done on either of the mentioned approaches on protein mixtures obtained from samples specifically found predominantly in South East Asia. Exposures on mapping the two dimensional electrophoresis gel of a number of venom from snakes found commonly in Malaysia and in its neighboring countries will be highlighted. The challenges of mapping protein of abundance, elimination of vertical streaks, lack of protein library, the use of cup loading spiking and 2DE guided purification techniques are some of the important findings. Additionally, the potential development of a protein marker capable to be used to authenticate herbal products incorporated with Tongkat Ali (the notoriously famous aphrodisiac plant) will be also introduced. To conclude the shift of attention from the traditional focus of investigating herbal constituents to that of bioactive protein in natural products rapidly emerging in South East Asia.

Biography

Jaya Vejayan has completed his PhD from University Malaya, Malaysia. During his Masters, he was involved in isolating bioactive compounds from the medicinal plant, Ipomea pes-caprae, known to be an antitoxin to jellyfish toxins. During his PhD, he used proteomics to study proteins in various snake venoms in Malaysia. Accordingly, he merged both of the knowledge together to derive the 2DE guided purification technique. He has number of publications mainly relevant to the field of toxinology and remained focused in furthering investigations in the use of snake venom for biotechnology purposes.

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Notes:

Yuhui Zhao, J Anal Bioanal Tech 2016, 7:5(Suppl)
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Increasing efficiency by using dual detector on VOC analysis with an agilent GC

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Monitoring volatile organic compounds (VOC) and Disinfection-by-Product such as Trihalomethanes (THM) in water samples, is one of the major tasks routinely carried out in our laboratory. Due to its low cost, simplicity, high sensitivity and wide linear range to non-chloronated organic compounds, gas chromatograph with a flame ionization detector (GC-FID) is always our first choice of instruments. However, FID has its own limitations. The low sensitivity of FID to multi-chlorinated VOCs may not satisfy the low detection limit requirement. In some cases, these compounds need to be analyzed on a more sensitive (but specific) detector, such as an Electron Capture Detector (ECD). Further, FID responds to any carbon-containing organic compounds, and cannot distinguish those co-eluted. Co-eluted compounds are often re-analyzed on a different instrument (or detector) for confirmation. A significant amount of time and effort was spent on these repeated analyses. To overcome these difficulties, we used a one-injector, one–column and dual-detector (FID and ECD) configuration. Sample injected through the inlet, separated by a capillary column, and the effluent is split into two streams. The major stream with over 95% of the flow directed to the FID, and the minor stream with less than 5% of flow directed to an ECD. Thus, with a single run, two sets of data are obtained simultaneously. A macro-program was developed in-house to do the data handling. The program compares the two sets of data and makes judgment on compound identification. Some of the wrongly identified compound results are automatically converted to the right value. This eliminated the necessity of using a second set of analytical instruments, or switching the column back and forth between detectors. With this practice, not only time and effort are saved, but also the certainty in data quality is significantly increased.

Biography

Yuhui Zhao has completed his PhD in Analytical Chemistry from the University of Alberta in 1995. He has been working in a few analytical laboratories for the past 20 years as a Senior Scientist. His research and development interests cover the areas of Inductively Coupled Plasma (ICP)-Optical Emission Spectroscopy, ICP-Mass Spectrometry, GC and GC-Mass Spectrometry. He is currently working as a QA Scientist at Epcor Water Service Inc., Edmonton, Alberta, Canada.

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Extractive electrospray ionization mass spectrometry for biosample analysis

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Mass spectrometry (MS) is one of the preferable analytical techniques for sensitive characterization of biological samples on the molecular levels. Technological innovations advance mass spectrometry for sophisticate applications in many fields including but not limited to chemistry, material sciences and life sciences. For trace analysis of a typical biological sample, classical MS techniques require multi-step sample pre-treatment (e.g., grinding, extraction, separation, pre-concentration, etc.) to obtain molecular information from the native biological samples, especially for detection of trace analytes distributed in the 3-dimensional volume of a bulk sample. Commonly associated with sample pre-treatment are biological degradation, chemical reactions, reagent contamination, and material losses. Apparently, tedious sample pretreatments strangle the breakthrough of high throughput in analytical mass spectrometry. By isolating the high electric filed required for ionization from any biological sample, extractive electrospray ionization (EESI) allows direct detection of small metabolites and/or large proteins distributed either on surfaces or inside bulk tissue by mass spectrometry, without any sample pretreatment. Experiments demonstrated that EESI-MS minimizes matrix effects during the ionization process, enabling real-time, *in vivo* analysis of biofluids, biosurfaces, aerosols and living objectives. Therein, the fundamental principle, instrumentation and typical applications of EESI-MS for biological analysis can be summarized, giving emphases on progresses in our lab for sensitive qualitative/quantitative detection of chemicals located inside a bulk tissue of whole-volume (≥20 mm_3), with neither mashing/grinding the sample nor matrixes clean-up. Furthermore, the emerging utilization of EESI-MS for sequentially acquiring metabolites, lipids, and proteins in a single tissue sample will be presented for the first time.

Biography

Huanwen Chen has completed his PhD from Jilin University and Postdoctoral studies from Aston Lab, Purdue University. He is the Director of Jiangxi Key Laboratory for Mass Spectrometry and Instrumentation. He has published more than 200 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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Faiz Ali et al., J Anal Bioanal Tech 2016, 7:5(Suppl)
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Separation of peptides and proteins in tryptic digest of cytochrome c by novel step elution approach in open tubular capillary electrochromatography

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[2]Department of Chemistry, Inha University, South Korea

A multi-monomer based copolymer layer was immobilized on the inner surface of a pretreated 1.1 m long silica capillary column (50 μm internal diameter and 1.02 m effective length) after the attachment of 4-(trifluoromethoxy)phenyl isocayanate and sodium diethyl dithiocarbamate initiator system. The attachment of initiator system to silanol functionalities on the inner capillary surface was assisted by dibutyl tin dichloride catalyst. The copolymer immobilized open tubular capillary column resulted in the separation of about 40 peaks out of tryptic digest of cytochrome C sample in capillary electrochromatography with high separation efficiency (Ca. 220,000 plates/column) for some of the peptide peaks. A novel step elution approach was also demonstrated for the separation of tryptic digest of cytochrome C where two mobile phases having different water content were used during the same run resulting in the separation of higher number of peptide peaks (Ca. above 50) out of tryptic digest of cytochrome C, with much improved peak capacity. The step elution approach in addition to the open tubular nature and increased column length could be a good strategy for proteomic analysis with enhanced peak capacity in capillary electro-chromatography.

Biography

Faiz Ali has completed his PhD at the age of 31 years from INHA University South Korea and postdoctoral studies from the same University. He is the Editorial board member for the UK Journalof Pharmaceutical and Biosciences (UKJPB)http://www.ukjpb.com/editorial_board.html. He has published about 12 papers in reputed SCI journals and has presented about 12 conference presentation in international reputed conferences.

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Characterization of honey in terms of physicochemical parameters and trace heavy metals, Amhara region

Esubalew Adugnaa and **Ariaya Hymetea**
Addis Ababa University, Ethiopia

The qualities of Ethiopian, Amhara region, multifloral honey samples were evaluated for moisture content, pH, free acidity, lactonic, total acidity and trace heavy metals. The values for quality parameters were in range of moisture content, 14.56-19.20%, pH, 4.50-4.80, free acidity, 33.33-42.60 meq Kg^{-1}, lactonic acidity, 8.43-10.86 meq Kg^{-1} and total acidity, 44.19-51.06 meq Kg^{-1}. The concentration of trace heavy metals (Cr, Cu, Mn, Ni, Pb and Zn) were also evaluated using flame atomic absorption spectrometer after wet digestion. The contents of trace metals in honey samples were in the range of 0.15-6.66 µg g^{-1}, 0.02-0.32 µg g^{-1}, 0.36-7.29 µg g-1, ND, ND-2.53 µg g^{-1} and 9.96-14.62 µg g-1 for Cr, Cu, Mn, Pb and Zn, respectively. The accuracy of the method was assessed by spiking honey samples with known amounts of standard metals, and examining recovery. The analytical data showed a significant difference in honey trace heavy metal concentrations and studied physicochemical parameters. The results obtained were in agreement with data reported in other literatures.

Biography

Esubalew Adugna has completed his master's at the age of 24 years from Addis Ababa University, School of Pharmacy. He is a lecturer now at the Department of Pharmaceutical Chemistry and Pharmacognosy. He has worked as a researcher focusing on analytical method validation, trace level environment contaminant determination, and quality evaluation of pharmaceutical product using simple analytical methods since 2012. In addition, he is a member and chairperson of Research, Publication, and Professional Development Committee of Ethiopian Pharmaceutical Association (EPA).

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The new photoelectric materials for analytical applications

Dongxue Han and **Li Niu**
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Photoelectrochemical technique has attracted tremendous attentions since it combined merits of both optical and electrochemical methods, which has been applied as efficient strategy to develop DNA sensor, cytosensing, enzymatic analysis, immunoassay and many other small molecules sensing etc. The mechanism of photoelectrochemical sensor is based on reductive property of photoelectron or oxidative capacity of photo-generated hole. Howbeit, efficient and stable photocatalyst that are capable of harvesting visible light for an optimized use of solar energy are still very prerequisite. In order to best facilitate the specific analytical system, in our group, through theoretical simulations with calculation of the binding energies, a variety of semiconductor and composite materials have been designed and optimized including silver halide series of composites (AgBr/g-C_3N_4/N-graphene, AgCl/Ag nanocrystles, Ag@AgCl/$BiVO_4$, AgX/graphene aerogels, AgClxBr1-x, Ag@AgBr/SO_3H-Graphene, etc.), series of doped & hybrid TiO_2 composites (ug-C_3N_4/TiO_2, GO/TiO_2, SO_3H-Graphene/TiO_2, Ce-S-TiO_2/SO_3H-graphene, polyaniline-graphene/TiO_2, etc.) and other semiconductors (V-doped $BiMoO_4$, Pd/SnO_2/graphene, etc.) It reveals that such photoelectrochemical technique is considered to be an ideal platform for water quality monitoring & purification, global antioxidant capacity assessment, o-diphenol discrimination, carbon dioxide reduction and other applications. It is anticipated that the photoelectrochemical technique will open up new insights into the architectural design of novel photocatalysts with high photoactivity and further utilizations in the environmental, food and energy field.

Biography

Dongxue Han is an Associate Professor of Changchun Institute of Applied Chemistry, Chinese Academy of Science, China. He has completed his Bachelor of Science from Northeast Normal University, Master of Science from Northeast Normal University, Doctor of Science from Changchun Institute of Applied Chemistry, Chinese Academy of Sciences and Post-doctoral studies at Abo Akademi University in Finland. His main research areas include photoelectrochemical materials, nano-structured composite materials and the electrode interface modification, electrochemical sensing applications and so on. He has published as the first or corresponding author, 37 scientific papers in SCI journals such as *Advanced Materials, Chemical Science, Analytical Chemistry, Chemical Communications, Nanoscale* and they have been cited for more than 3800 times. He has applied for 13 patents, out of which, 6 have been authorized.

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Notes:

Saroj Kumar et al., J Anal Bioanal Tech 2016, 7:5(Suppl)
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Infrared spectroscopy combined with imaging modalities is a new technique to understand the disease pathology

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[3]SOLEIL, France
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Development of modern infrared spectroscopy has a wide range of biological applications. Initially, it was extensively used for protein secondary structure analysis as well as nucleotides, lipids and carbohydrates. Now with time, it extended to biodiagnositic tools such as cells, tissues and bio-fluids. Infrared imaging can be used to discriminate between healthy and diseased one. IR microscope equipped with FPA (focal plane array) detector able to scan the larger area with quick time and that helps to measures the cells as well as tissue (histopathology). An IR synchrotron light source connected with IR microscope further enhances the spatial resolution at diffraction limit. The use of this method of infrared spectroscopy in disease pathology with two examples (breast cancer and multiple sclerosis) will be presented in this study. The spectroscopic imaging data on breast cancer and multiple sclerosis samples were acquired in transmission on deparaffined 3-5 µm thick tissue slices deposited on 40×26 mm^2 BaF2 slides. For cells, the fibroblasts were grown on CaF2 window and directly used for FTIR measurements. We used a hyperion imaging system (Bruker) equipped with a 64*64 MCT (Mercury-Cadmium-Telluride) FPA (Focal Plane Array) detector. FTIR imaging technique was used to discriminate healthy and diseased samples on the basis of chemical changes due to its potential to probe tissues and cells at the molecular level. Now with the application of advanced focal plane array detector, large area of samples in a short time can be scanned and investigated the specific changes that could be correlated with the pathology and different environmental stresses.

Biography

Saroj Kumar has completed his PhD from Stockholm University, Sweden and Postdoctoral studies from Universite Libre de Bruxelles, Belgium and Canadian Light Source, Canada. He is the Project Leader in Department of Engineering Science, Uppsala University, Sweden. He has published more than 22 papers in reputed journals and has been serving as a Reviewer in reputed journals.

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(Day 2)

Eamonn Reading, J Anal Bioanal Tech 2016, 7:5(Suppl)
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Elucidation of drug metabolite structural isomers using molecular modeling coupled with ion mobility mass spectrometry

Eamonn Reading
King's College London, UK

Ion mobility-mass spectrometry (IM-MS) in combination with molecular modeling offers the potential for small molecule structural isomer identification by measurement of their gas phase collision cross sections (CCSs). Successful application of this approach to drug metabolite identification would facilitate resource reduction, including animal usage, and may benefit other areas of pharmaceutical structural characterization including impurity profiling and degradation chemistry. However, the conformational behavior of drug molecules and their metabolites in the gas phase is poorly understood. We investigated the gas phase conformational space of drug and drug-like molecules as well as the influence of protonation and adduct formation on the conformations of drug metabolite structural isomers. The use of CCSs, measured from IM-MS and molecular modeling information, for the structural identification of drug metabolites has also been critically assessed. Detection of structural isomers of drug metabolites using IM-MS is demonstrated and, in addition, a molecular modeling approach has been developed offering rapid conformational searching and energy assessment of candidate structures which agree with experimental CCSs. Here, it is illustrated that isomers must possess markedly dissimilar CCS values for structural differentiation, the existence and extent of CCS differences being ionization state and molecule dependent. The results present that IM-MS and molecular modeling can inform on the identity of drug metabolites and highlight the limitations of this approach in differentiating structural isomers.

Biography

Eamonn Reading has completed his PhD from the University of Oxford and completed a year's Post-doctoral study at King's College London with Prof. Paula Booth before being awarded a BBSRC Future Leader Fellowship in 2016. His main research focus is on "Developing new analytical techniques and protocols for structural biology, particularly in the areas of membrane protein folding, function and drug and lipid interactions".

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Cynoprobe online, in process cyanide analyzer

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Mintek, South Africa

Mintek provides world class research and development expertise, test work and process optimization for the mining industry locally and internationally. Mintek's cynoprobe online in-process cyanide analyzer for gold leaching operations continues to enjoy success, with close to 100 installations on sites across the globe. The use of the amperometric method helps limit interferences from unwanted species, makes the instrument cost effective to run, facilitates rapid measurement cycles, and enables the measurement of both free and weak acid dissociable (WAD) cyanide in one instrument. One of the notable outputs from Mintek's 2015 research is a prototype hand-held version of Mintek's laboratory "lab" cynoprobe. The lab cynoprobe was developed several years ago to broaden the impact of Mintek's cyanide measurement technology, and facilitates the use and evaluation of this amperometric technique within a client's own laboratory to assist with International Cyanide Management Code (ICMC) compliance and to evaluate the measurement principle for wider online implementation of the cynoprobe v3 as part of a broader ICMC compliance strategy. Mintek has sold over 15 of these units in recent years, and has seen increased requests from industry for the instrument. The present version of the lab cynoprobe unit is ultimately a simplified version of the cynoprobe 3 instrument. The drawback of the existing lab cynoprobe unit is the high cost associated with manufacturing the instrument. As a consequence, a project was initiated to develop a portable handheld cynoprobe unit using embedded technology to replace the expensive lab cynoprobe. In 2015 a hand-held, battery operated prototype of the unit was tested and shown to produce excellent results. A cost comparison was performed and indicated an expected manufacturing cost reduction of greater than 70% between the old lab cynoprobe and new handheld cynoprobe.

Biography

Makhapa Makhafola is currently a General Manager at Mintek. He was the Lecturer in Analytical Chemistry at Technikon Northern Gauteng (Tshwane University of Technology) and University of Venda, South Africa. He was the Director in Quality Assurance at Border Technikon (Walter Sisulu University) and at the University of Venda until he joined University of Kwa-Zulu Natal as the Director Quality Promotion & Assurance in July 2010. He has served as Member of Umalusi Council and also as Chairperson of Lovedale FET College Audit Committee. He is currently the Chairperson of DST/MINTEK Nanotechnology Innovation Centre Steering Committee. He is serving as an Academic Committee Member of QS World Ranking Universities. He has completed his Post-doctoral training in Analytical Chemistry at Indiana University and presented his research work in more than 19 international conferences and published in credible journals.

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Shengxi Jin et al., J Anal Bioanal Tech 2016, 7:5(Suppl)
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A chemotaxonomic study of medicinal *Cannabis*

Shengxi Jin, Dan Jin, Yang Yu, Petya Koleva, Jie Chen and **Colin Lee**
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Research on medicinal cannabis has been hampered by its legal status as a narcotic. However, the recent legalization in North America regarding the use of medicinal cannabis necessitates standardized phytochemical composition for commercial products in the interest of consumer safety and medicinal efficacy. The first step towards utilizing medicinal cannabis as a reliable mainstream medicine is cannabis cultivar distinction based on two main groups of medicinal ingredients: cannabinoids and terpenes. We have recently developed and validated GC-MS and HPLC-UV methods for quantifying dozens of phytochemicals characteristic to commercially-available cannabis strains. We are applying these analytical methods to profile cannabinoids and terpenes in cannabis strains and, together with PCR, to correlate chemotaxonomic and genetic information. The results will contribute to the establishment of an industrial standard for phytochemicals in commercially-available cultivars in support of a continuously-growing market.

Biography

Shengxi Jin has completed his BSc in Chemical Engineering from the University of Alberta and MBA from Queen's University. He applies his academic knowledge and business experience to improve laboratory efficiency in industrial settings. His expertise includes LIMS development and computer process control.

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Understanding the transformation pathways of atmospheric aerosols: Some revelations from analytical chemistry techniques

Song Gao
Stetson University, USA

The detailed chemical composition of atmospheric aerosols plays a key role in understanding their impact on the climate system, yet this information is still poorly understood due to the complicated molecular identity and transformation pathways involved. In addition, aerosol chemistry involved in urban smog pollution also requires detailed analytical characterization. This talk discusses how some analytical techniques can yield insights on aerosol chemical composition. In the laboratory, reactions among carbonyls and amines, common pollutants in urban areas were carried out to verify the validity of the Mannich reaction in the urban atmosphere. Gas Chromatography-Mass Spectrometry analyses indicate that Mannich-type products form under common acidity and temperature conditions, consistent with ambient observations and proposed mechanisms. In a separate case involving long-range transport, size-resolved aerosol samples were collected in the Caribbean. Meteorological and chemical analyses, utilizing atomic absorption, show that these aerosols frequently had their origins in African desert and carried mineral elements to enrich the soil in the Caribbean. In addition, dust and black carbon were distributed in coarse and fine aerosol particles, respectively, due to their different sources and evolution pathways. Novel analytical techniques are needed to further unravel the unknown species in atmospheric aerosols and their roles in climate and pollution studies.

Biography

Song Gao is currently an Associate Professor of Chemistry at Stetson University in Florida, USA. He has received his PhD in Chemistry from the University of Washington and Postdoctoral training on Atmospheric Chemistry at California Institute of Technology (Caltech). He has received research grants from the US National Science Foundation (NSF) and Hong Kong Research Council. He has published peer-reviewed papers on the topics of aerosol chemistry and air pollution, ground water remediation and climate mitigation in reputed international journals. He has served on review panels at NSF and as Referees for many scientific journals and is currently an Associate Editor for the *Journal of Environmental Studies and Sciences* (Springer).

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Shobini Jayaraman, J Anal Bioanal Tech 2016, 7:5(Suppl)
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Comprehensive overview of biophysical studies of lipoprotein stability

Shobini Jayaraman
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Lipoproteins are nanoparticles comprised of proteins and lipids that provide vehicles for transport of fat and cholesterol in circulation. High levels of certain lipoproteins increase the risk of heart disease. Each lipoprotein is a non-covalent assembly of several proteins and several hundred lipids. The major challenge in the biophysical analysis of lipoproteins arises from their heterogeneity in size (7-100 nm), density (1.06-1.22 g/L), and protein and lipid composition. Moreover, lipoproteins are highly dynamic assemblies undergoing continuous remodeling via various enzymatic and non-enzymatic reactions. This provides a major challenge for detailed structural studies of lipoproteins. To overcome this challenge, we designed an integrated biophysical approach by combining far- and near-UV circular dichroism (CD) spectroscopy, turbidity, differential scanning calorimetry (DSC), fluorescence spectroscopy, transmission electron microscopy (EM), size-exclusion chromatography (SEC) and other methods to analyze the structure and remodeling of all major lipoprotein classes. This integrated approach was used to study thermal denaturation of human low- and high-density lipoproteins (LDL and HDL, or bad and good cholesterol). The results clearly showed that lipoprotein stability is controlled by kinetics barriers. Interestingly, heat-induced remodeling of all lipoproteins involves partial protein unfolding/dissociation and lipoprotein fusion and rupture. These structural transitions mimic key aspects of *in vivo* lipoprotein remodeling. These and other emerging approaches will allow one to study structural, dynamic and functional properties of larger more challenging systems. Ultimately, such integrated approaches are hoped to bridge the gap between the biophysical studies of isolated macromolecules or their complexes, and the complexity of cellular systems.

Biography

Shobini Jayaraman has completed her PhD from Indian Institute of Technology Madras, India and Post-doctoral studies from Weizmann Institute of Science, Israel. She was the recipient of Sir Charles Clore Fellowship at Weizmann Institute of Science. Currently, she is a Senior Research Scientist at Boston University School of Medicine. She serves as the liaison for academic and industrial contract research services at Boston University. She has published more than 25 papers in reputed journals. Her recent publication in *JBC* has been chosen as paper of the month in May-2014 by International Atherosclerosis Society.

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(Day 3)

Kent Peterson, J Anal Bioanal Tech 2016, 7:5(Suppl)
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Use of novel flow imaging particle analysis in biopharmaceutical formulation (FlowCam®)

Kent Peterson
Fluid Imaging Technologies, USA

Flow imaging particle analysis has shown great promise for analysis of sub-visible particulates in parenteral, especially for protein aggregates. The ability to detect transparent particles, along with the ability to differentiate them based upon shape parameters, yields significantly more detailed and accurate information than can be acquired using common laser diffraction and light obscuration techniques. The addition of color information, along with sophisticated statistical pattern recognition algorithms can also enable these systems to differentiate and quantify silicon oil droplets and air bubbles found in parenteral. This presentation will present the techniques used to accomplish this.

Biography

Kent Peterson serves as the President and CEO of Fluid Imaging Technologies, Inc., a Scarborough-based emerging growth technology firm providing image-based analysis of cells and particles in a fluid medium for numerous applications. He has been named as Mainebiz Leader of the Year in the small business category. Prior to FIT, he has served in a number of high-growth, high technology firms, as well as multinational organizations. He is an Honors Graduate from Boston University's Graduate School of Management and a Member of American Mensa Society.

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Satoru Michiyuki et al., J Anal Bioanal Tech 2016, 7:5(Suppl)
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The development of semi-quantitative loop-mediated isothermal amplification (LAMP) assay using multi-well chip

Satoru Michiyuki, Takaaki Ueda and **Yasuyoshi Mori**
Eiken Chemical Co., Japan

Nucleic acid amplification tests (NAATs) have become common tools for detecting pathogens in clinical samples. Among NAATs, loop-mediated isothermal amplification (LAMP) assay, which enables DNA amplification and detection at constant temperature, has the advantages of reaction simplicity, amplification efficiency and also inexpensiveness compared to PCR-based technologies. Quantitative analysis in NAATs have been performed by kinetic analysis of amplification reactions as in so-called "real-time PCR method" and this approach has found to be applicable to LAMP assay as well. However, these assays require sophisticated instruments and well-trained laboratory staffs to obtain accurate and reproducible results. This limitation has been a main obstacle to expand this type of quantitative LAMP assay to point of care tests in resource limiting facilities. In this study, we developed simple and rapid semi-quantitative LAMP assay based on multi-well dispensing method (multi-well qLAMP). In the presentation, we will demonstrate that our novel technology is sufficient to distinguish some criterion of DNA levels with high reproducibility and highly correlative to conventional quantitative LAMP assay. We expect that this technology can be applicable as point of care tests to help determination of treatment eligibility, especially in infectious diseases whose amount of pathogenic DNA is a crucial criterion of defining treatment strategy.

Biography

Satoru Michiyuki has completed his Master's degree from Kyushu University. He has worked as a Researcher focusing on the development of genetic clinical diagnosis in Eiken Chemical Co., since 2011.

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Electrochemical sensing based on modified interfaces and analytical instrument-integrated applications

Li Niu

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Electrochemistry technique is an important member in the whole family of the instrumental analysis. Especially, in coupling with other techniques, we can know much information about the interfacial interaction, structural features, reaction process, mass transfer, etc. during electrochemical running. Unfortunately, imported instruments & equipment occupies the leading position in China within the past decades, electrochemistry system is also still the world of imported products in China, such as Princeton, CHI, BAS, Gamry, Biologic, etc. Besides those electrochemical instruments, some typical and daily-used electrochemical sensors, such as blood glucose analysis, industrial control gas sensors, heavy metal ion monitoring, blood gas analysis, met the same problem in China. With great increase of human industrial production, water quality analysis is becoming more and more necessary. A few typical electrochemical devices and methods for water monitoring, such as DO, COD, heavy metals, etc. have been developed successfully. In addition, various methods and sensors for bioanalysis & food analysis have been explored too. Furthermore, series of electrochemical instruments have been completed, which ranged from basic model to advanced, from potentiostat to bipotentiostat, even to multichannel, from integrated spectrometers to electrochemical imaging & etching components, etc. Those developed instruments have been widely used in many institutes & universities in China.

Biography

Li Niu has completed his PhD from Changchun Institute of Applied Chemistry and Post-doctoral studies from Abo Akademi University, Finland. Presently, he is the Director of Engineering Laboratory for Modern Analytical Techniques, CIAC, CAS, and also is a RSC Fellow. He has published more than 200 papers (H-index 41) in reputed journals and has been serving as Editorial Board Member in several journals.

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Multiplexed, flexible and portable plasmonic biosensing on-chip

Jie He and **Laura Sagle**
University of Cincinnati, USA

Localized surface Plasmon resonance shows excellent promise as next generation biosensing materials, since they provide sensitive, label-free, rapid, colorimetric detection that is amenable to on-chip devices. We have recently incorporated uniform nanoparticle arrays into microfluidic and multiplexed devices through the combination of photolithography and colloidal lithography. This presentation will highlight two recent applications we have carried out using this technology. The first application involves the fabrication of 96-well glass/PDMS plates that fit into commercially available UV-Vis plate readers. With these plates, we have carried out drug screening aimed at disrupting the interaction between the human antigen R (HuR) protein and its RNA binding partner, which has recently been implicated in cardiac hypertrophy. In addition, these uniform nanoparticle arrays can be fabricated on other substrates including flexible polymers, which make the devices less expensive and more portable. The second application discussed is a rapid, point-of-care assay for pathogenic species associated with sexually transmitted disease. These assays involve portable, miniaturized spot plates in which small sample volumes can be used to test for pathogenic species in a multiplexed manner. Combining our technology with color analyzing software available on the I-Phone enables rapid read-out in low resource settings.

Biography

Jie He is currently a graduate student in the Sagle Group at the University of Cincinnati, USA. Her thesis involves the "development of plasmonic on-chip devices for rapid, portable, colorimetric assays". She has authored four peer-reviewed articles, in addition to a book chapter.

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Smartphones for sensing

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Smartphones for sensing: Simple, portable analytical devices are entering our daily lives for personal care, clinical analysis, allergen detection in food, and environmental monitoring. Smartphones, as the most popular state-of-art mobile device, have remarkable potential for sensing applications. A growing set of physicochemical sensors have been embedded; these include accelerometer, microphone, camera, gyroscope, and GPS units to access and perform data analysis. In this review, we discuss recent work focusing on smartphone sensing including representative electromagnetic, audio frequency, optical, and electrochemical sensors. The development of these capabilities will lead to more compact, lightweight, cost-effective, flexible, and durable devices in terms of their performances.

Biography

Yu Bao is a Doctor and Associate Researcher in Engineering Laboratory for Modern Analytical Techniques, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China.

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Eduard Rogatsky

Wardsworth Center, Albert Einstein College of Medicine, USA

LC/MS to UHPLC/MS method transfer: Tips and tricks

Method transfer from conventional LC/MS to UHPLC/MS seems to be straightforward and simple. Reality however, may be different. Hardware design of LC, UPLC and mass spectrometer, method throughput and assay ruggedness, - these factors may have a critical impact on method transfer. Certain case studies will be presented and critical aspects and typical issues of LC/MS to UHPLC/MS method transfer will be discussed.

Biography

Eduard Rogatsky has completed his MSc in Physical Chemistry at Belarus State University in 1990, PhD in Bioanalytical Chemistry from Bar-Ilan University, Israel in 1998. At the end of 1999, he started his Post-doctorate at Albert Einstein College of Medicine and became a Faculty Member in 2001 and was a Mass Spectrometry Director at the Biomarker Analytical Resource Core. He is a Supervisor of the Chemical Threat Laboratory in the Division of Environmental Health Sciences at Wadsworth Center, Albany NY, USA. He serves as the Editor-in-Chief for the *Journal of Chromatography and Separation Techniques* (OMICS publishing group). He has published over 30 scientific papers in per-reviewed journals (mostly as the first author) and has presented over 50 posters and lectures. Overall, he has made more than a 100 scientific presentations and publications.

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