



## **E-NEWSLETTER**

AUGUST 2012 ISSUE

# **THE SOCIETY OF ACOUSTICS SINGAPORE**

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Year of Registration: 1989

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## **I CONFERENCE NEWS**

Fellow members of the Society may like to take note of the following:

### **2013 International Congress on Ultrasonics**

Date: 1 to 4 May 2013

**Venue: Singapore**

Closing date for the 300 words abstract: 31<sup>st</sup> October 2012

Notification of Sceptance: 30<sup>th</sup> November 2012

Deadline for Early Bird Registration: 31<sup>st</sup> December 2012

For more information, please visit [www.icu2013.com](http://www.icu2013.com)

### **32nd International Symposium on Acoustical Imaging**

Date: 29 April to 1 May 2013

**Venue: Singapore**

Closing date for the 300 words abstract: 31<sup>st</sup> October 2012

Notification of Acceptance: 30 Nov 2012

Deadline for Early Bird Registration: 31st December 2012

Submission of Full-length Papers: 1 May 2013

### **20th International Congress on Sound and Vibration(ICSV20)**

Date: 7-11 July 2013

Venue: Bangkok, Thailand

Closing date for the abstracts: 1 Dec 2012

Notification of Acceptance: 28 February 2013

Deadline for Full-Length Paper: 1 April 2013

Deadline for Early Registration: 1 April 2013

For more information, please visit: [www.icsv20.org](http://www.icsv20.org)

**Please note that Society of Acoustics(Singapore) has the honour to be the cooperating society of ICSV20. Hence all members of the Society of Acoustics(Singapore) will be given a reduction of \$50 USD from the conference registration fee.**

## **21st International Congress on Acoustics**

Date: 2 – 7 June 2013

Venue: Montreal, Canada

Closing date for the abstracts: 15 Nov 2012

Deadline for Full-Length Paper: 15Feb 2013

Deadline for Early Registration : 15 Feb 2013

## **Technical talk organised by the IEEE OES local chapter**

**Title: The effect of nearby bubbles on hydrophone arrays.**

Venue: S2S meeting room, TMSI,12A Kent Ridge Road, NUS

Directions: <http://arl.nus.edu.sg/twiki/bin/view/ARL/Contact>

## **II. ANNOUNCEMENTS**

The Society of Acoustics will be sending out invoices to members with outstanding membership subscriptions. Members are encouraged to make payment in support of the Society.

The E-Newsletters will be made available to industrial contacts in an effort to promote the activities of the Society.

The Society is also exploring the possibility of organising talks and other professional events in collaboration with acoustic societies of other countries.

Membership Certificates will soon be made available to all members who had made full payments of membership dues

The Society aims to increase membership by inviting all persons, including those from the institution of higher learning, who are qualified in the various field of Acoustics to join our Society.

We are especially keen to invite students to join our society and we are establishing the Youth Chapter soon.

### III. MEMBERSHIP SUBSCRIPTION

Fellow	S\$70
Member	S\$50
Associate	S\$30
Student	S\$15
Corporate	S\$200

#### FEE BASED ON ANNUAL RATE

FOR MORE INFORMATION PLEASE CONTACT: Dr.Gan at  
email: [wsgan@acousticaltechnologies.com](mailto:wsgan@acousticaltechnologies.com)

Application form: ( ) Member ( ) Associate

1) Name: \_\_\_\_\_

2) Address: \_\_\_\_\_

Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

3) Degrees (Institutions and dates):

\_\_\_\_\_

4) Employment (with dates):

\_\_\_\_\_

5) Signature & Date: \_\_\_\_\_

### ARTICLES

#### Smart olfactory MEMS Sensor for Real-time Food Spoilage Detection

Yoon Yong Jin, Assistant Professor, School of Mechanical & Aerospace Engineering, NTU

Food spoilage is probably one of the biggest problems faced in the daily life. It will ill-affect from creating food shortage to increasing biological waste. Consumers generally follow guidelines on circulation period set by the food authorities. However, the expiration of "use by" or "best before" dates does not mean that the food is spoiled or objectionable for consumption. The solution is to enable the food can be fully

consumed before its spoilage. However, a safe, cost-effective and highly sensitive smart food spoilage detector has therefore not been effectively developed for commercialization purpose.

On this premise, Asst Prof Yoon Yong Jin from the School of Mechanical & Aerospace Engineering in collaboration with researchers from NUS and Eastern Regional Research Centre, US Department of Agriculture set out to develop low cost, high sensitivity, and real-time olfactory sensors that can be attached to a variety of food packaging materials including plastic bags, zip-locks or any other air-tight containers to detect food spoilage level. The ultimate goal is to offer a revolutionary and commercially practicable efficient food freshness monitoring system. The work is to identify and quantify the level of food spoilage by *food spoilage indicators*, typically ethanol, nitrogen, and organic acids produced by spoilage microorganisms (Figure 1). The major effort of this work is developing “*food spoilage detector (FSD)*” sensor for detection of food spoilage level. The FSD sensor is a microfluidic sensor that can directly visualize the quantity of FSIs from colour changes on device surface (Figure 2). This FSD sensor is packaged with disposable and patchable stickers for easy implementation on air-tight containers.

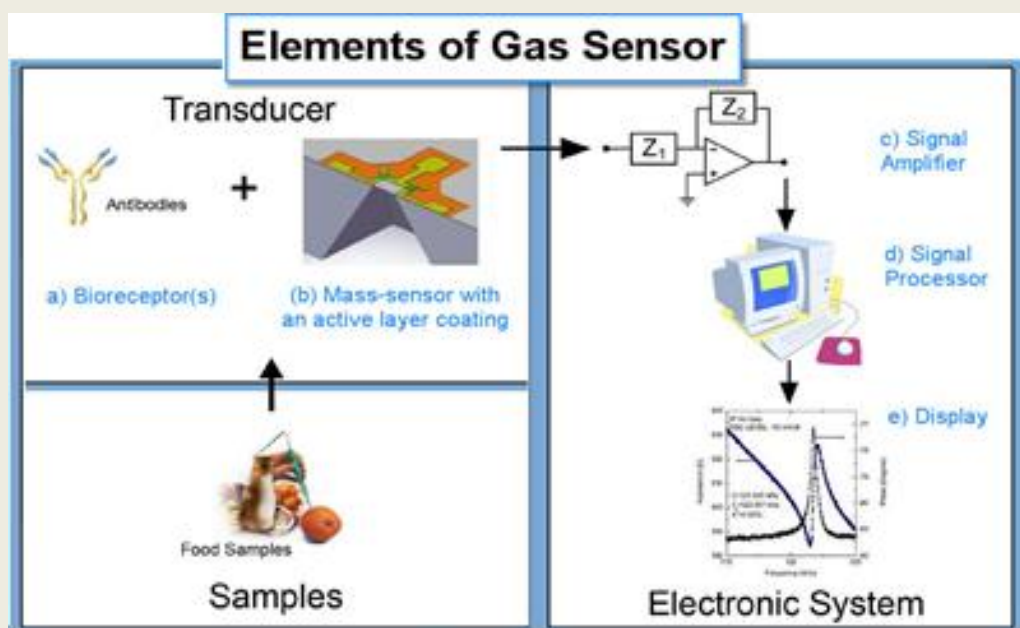


Figure.1 Element of the designed gas sensor

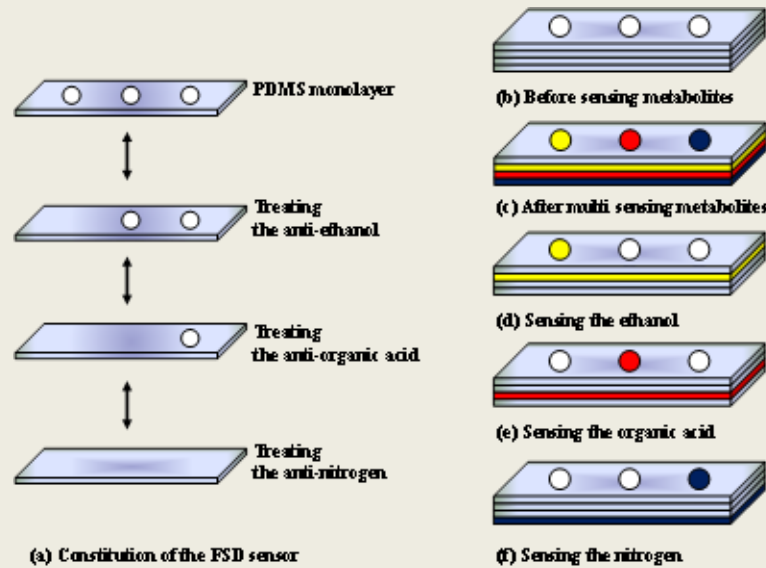


Figure 2. Schematic diagram of (a) constitution of the FSD sensor and (b)~(f) sensing mechanism of the FSD sensor

Prof Nicholas Fang Xuanlai, the *d'Arbelloff Career Development Associate Professor* from the Massachusetts Institute of Technology (Mechanical Engineering Department) delivered the DSO-SAS Joint Seminar on the 4<sup>th</sup> of July 2012 at DSO National Laboratories on "Transformation Acoustics: Virtual Pinholes and Collimators".

Drawing inspiration from the remarkable success of electromagnetic metamaterials in the control and manipulation of electromagnetic waves for a wide range of novel applications, such as in super lens, sub-diffraction limited imaging and cloaking, Prof Fang discussed some of his group's recent research efforts in exploring the manipulation of other form of waves in materials. While previously it was theoretically predicted that acoustic wave in fluids could be bent artificially by providing a desired spatial distribution of anisotropic acoustic elements, the fabrication of such suitable materials designed with the proper anisotropic mass density or bulk modulus based on coordinate transformation have been challenging, primarily because of the requirement of extreme values of these parameters. To overcome such challenges, Prof Fang's group developed a class of lumped acoustic elements, drawing analogies between lumped acoustic elements, such as Helmholtz resonators, and electronic circuit elements to construct a new library of acoustic metamaterials. In the regime

where the effective dimensions of the region in which the sound propagates are much smaller than the wavelength, the phase is roughly constant throughout the element, making such a lumped-parameter model appropriate. This transmission line approach enabled ultrasound focusing through a metamaterial network and low-loss and broadband cloaks with the use of non-resonant constituent elements, exemplified in some of his group's experimental demonstrations of both acoustic metamaterial lens (Phys. Rev. Lett, 102,194301(2009)) as well as a broadband acoustic cloak (Phys. Rev. Lett, 106,024301(2011)).

Prof Fang also discussed some of his recent ongoing work on combining the concepts of complimentary media with transformation acoustics to create virtual acoustic pinholes as well as collimators for ultrasonic imaging, detecting as well as focusing applications to control both acoustic scalar waves such as fluids as well as work in collaboration with groups in chemistry and materials science and MIT on manipulating elastic shock waves in metamaterials. In the same vein, the design of these devices may be readily implemented using non-resonant acoustic elements as well. The realization of these novel broadband acoustic manipulation concepts have potentially far-reaching applications ranging from underwater communication as well as medical ultrasound, which were well appreciated by the audience, comprising of both DSO and SAS members.

“Bubble cavitation plays an important role in the HIFU ablation as well as histotripsy. The characteristics of bubble cavitation were measured and found vary with the progress of histotripsy treatment. Ultrasound parameters (i.e., frequency and pulse duration) have a great effect on the bubble cavitation and the consequent lesion form”

Abstract of paper presented by Zhou Yufeng, Assistant Professor, School of Mechanical & Aerospace Engineering, NTU at Cavitation 2012, Novotel Singapore

## **Bodies**

[www.mom.gov.sg](http://www.mom.gov.sg)

[www.nea.gov.sg](http://www.nea.gov.sg)

## **Technical and Research Sites**

## **Corporate Sites**

[www.acousticaltechnologies.com](http://www.acousticaltechnologies.com)

[www.noisecontrols.com](http://www.noisecontrols.com)

(The Society welcomes interested parties to contribute relevant websites to the above e useful links. For more information, please contact us. Thank you.)

Disclaimers

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