

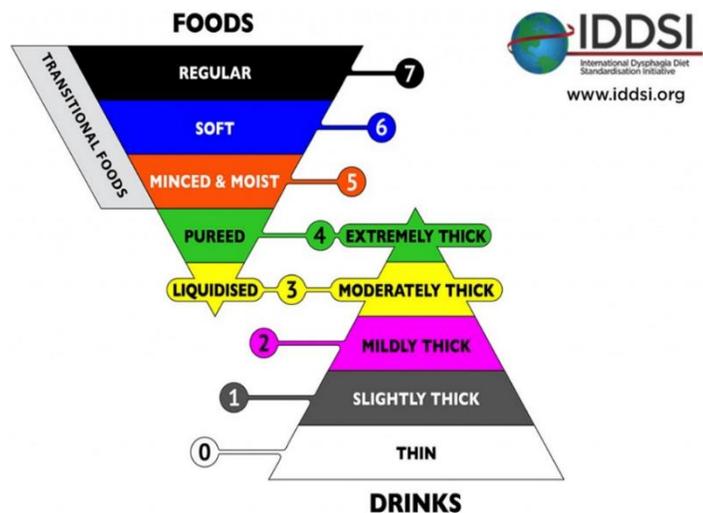


OUR MISSION

The Food Oral Processing Research Laboratory at ZGU will apply integrated experimental approaches to study eating and sensory perception. The main objectives are to improve our fundamental understanding on the principles and mechanisms underpinning eating and sensory perception and to solve eating- and sensory-related problems of immediate concerns to consumers, industries and governments. We aim to make healthy food tastier and tasty food healthier.

FOP Contributes to International Standardisation

Prof. Jianshe Chen has participated in a global effort in diet standardisation for dysphagia patients. The effort is coordinated by the **International Dysphagia Diet Standardisation Initiative (IDDSI)**, an independent, not-for-profit global entity, established in 2013 by a group of experts of clinical, caring, rehabilitation, as well as food background, coming from many different countries. Three years of ongoing work by the IDDSI has culminated in a final dysphagia diet framework. This framework sets globally acceptable terminology and definitions for the description of texture modified foods and thickened liquids used for individuals with dysphagia of all ages, in all care settings, and all cultures. The framework consists of a continuum of 8 levels (0-7), identified by numbers, text labels, as well as color codes (see inserted graph). After the publication of the framework, the IDDSI is now moving to stage two plan - the roll out and adaptation of IDDSI framework in target countries. A MAPA (Monitor Aware Prepare Adopt) roll out strategy has been developed. The implementation of the framework will bring great benefits to food industries and care industries in ensuring the quality of dysphagia diet and improving well-being of dysphagia patients. More information about IDDSI, the framework, and roll out plan can be found at www.iddsi.org.



The IDDSI Framework

DR. CHRISTOS RITZOULIS was educated in Thessaloniki, Greece (BSc in Chemistry) and in Leeds, UK (MSc in Food Science, PhD in Food Science). He has worked for four years in the Hellenic States General Chemical Laboratories, and since 2008 he works at the Department of Food Technology, ATEI of Thessaloniki, Greece, where he is now an Associate Professor/Reader of Food Chemistry. He is member of the editorial board of two international journals, while he has published over 40 scientific publications, five book chapters, and a book on the physical chemistry of foods. Christos will be visiting Zhejiang Gongshang University for the next five years as a Distinguished Expert.



FOP STAFF

DR. XINMIAO WANG has recently joined Food Oral Processing research group as a lecturer. Xinmiao got her bachelor degree in Food Science and Engineering from Harbin Institute of Technology (HIT) and Ph.D. in Agricultural and Biological Engineering from Pennsylvania State University (USA) in May, 2015. More of a food addict, Xinmiao has always been interested in food, not just the taste and joy it brings, but the nutrition and sensation behind. As a Sagittarius (not unexpectedly), Xinmiao loves to take new adventure and to make new friends all over the world, of course, with the accompany of delicious food. She is an outgoing person and enjoys all kinds of hobbies (not to professional level at any though), Xinmiao claimed. If you want to visit our food oral processing lab, Xinmiao will be very pleased to have a chat with you and show you around the lab. (Contact: xmwang@zjgsu.edu.cn) .



FOP ACTIVITIES AND RESEARCH

MR. PERE MORELL, a visiting PhD student from the *Institute of Agro-chemistry and Food Technology* (IATA) of Spain used tribological system to mimic the oral cavity to determine astringency of protein-added yogurts. Increasing the protein content of yogurts would be a good strategy for enhancing their satiating ability. The lubricating properties of the four yogurts were examined by tribological methods with the aim of relating these properties to the sensory sensation measured by flash profiling. Flash profiling was carried out by 13 assessors recruited among employees of the School of Food Science and Biotechnology of Zhejiang Gongshang University (Hangzhou). Oral tribology has shown itself to be an *in vitro* technique that may aid a better understanding of the dynamics of in-mouth lubrication and the physical mechanisms underlying texture and mouthfeel perception. His work is now submitted as a publication in the journal of *Food and Function* of the Royal Society of Chemistry.

INVITED TALKS GIVEN BY PROF. CHEN

- September 24-25 2015, Elderly care conference, Shanghai, "Texture modification and texture standardization of food for elderly"
 - October 15-17, 2015, Food for Elderly International conference, Hangzhou, "Texture modification and characterization of food for elderly" 2015,
 - October 28-31, Food Structure, Digestion, and Health international conference, Wellington, New Zealand, "Food oral destruction: mechanisms and implications"
 - November 12, 2015, NIZO, the Netherlands, "Food-saliva interactions"
 - March 26-27, 2015, Workshop for health cares, Guangzhou, "International standardization of texture modified food for elderly."
- PhD examination:**
- November 13, 2015, Wageningen University, the Netherlands
 - March, 2016, Massey University, New Zealand



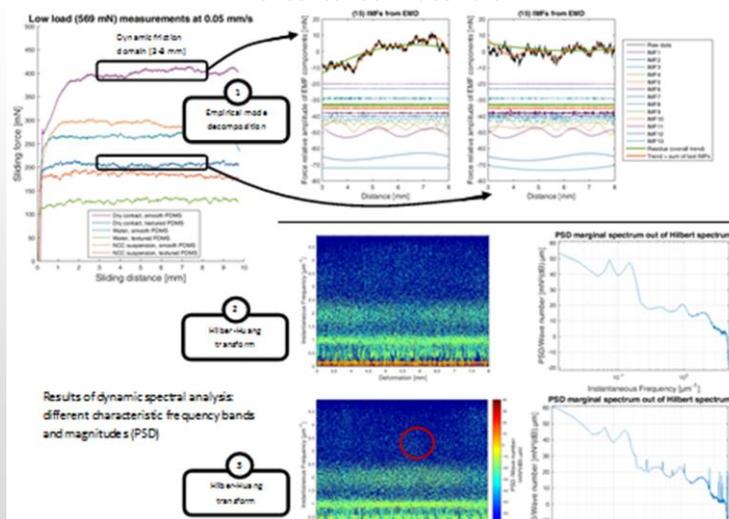
DR. ESTHER KIM, Research Scientist at The New Zealand Institute for Plant and Food Research, visited FOP, ZJGU, in March 2016 to conduct a joint research. She also gave a seminar on "Variation on chewing behavior between consumers and its impact on sensory perception and digestion".



GRANT INFORMATION: Grants and scholarships are available for the postdoctoral researchers and PhD students. For details, please contact us.



Different stick-slip behaviors of dry vs. lubricated surfaces on smooth vs. textured materials

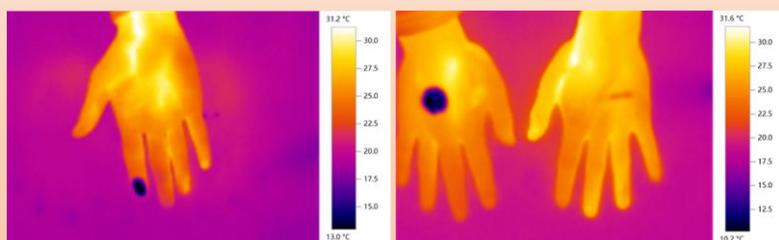


MS. SOLANGE SANAHUJA, a visiting PhD student from Technical University Munich (Germany), spent her 3 months in FOP lab. She used the newly developed tribological system to explore stick-slip effects, intermittent sliding motion, in soft tribology of lubricating model foods. Using modern dynamic spectral analysis methods, she compared friction behavior of smooth and textured polymer surfaces, with lubricants such as water, oil, yoghurt and emulsions, under different normal load conditions. Characteristic stick-slip frequencies could be distinguished. Hence, as vibrations created by stick-slip effects on the surface of the oral mucosa are supposed to influence mechanoreception, they should be considered together with friction coefficient values for the prediction of oral texture. The results will be discussed at the Food Oral Processing conference 2016 and submitted for a special issue in the *Journal of Texture Studies*.

MS. MINGSONG SU: Working on the dynamics of oral conversion of food particles to form a bolus; the properties and essential features of a food bolus; and the sensory ease of bolus swallowing. Currently, she measures the force and energy consumption of soft solid food when the food is under back extrusion using either a flat probe or a ball probe. It is hoped in future a feasible technique and measurement protocol can be developed for texture characterization and classification of dysphagia food, and evaluate what properties and critical criteria of a bolus for safe swallowing.



MR. LV CONG: Sensitivity of an individual's tactile receptors could be influenced by many factors, including physiological, psychological, and environmental conditions. This study has the hypothesis that, apart from physiological and psychological factors, one's tactile sensitivity will be influenced by the temperature and the thermal treatment of the skin. One should have the best tactile sensitivity at or near body temperature, but will have reduced sensitivity both at higher or cooled temperature. This investigation is designed to find out how the tactile sensitivity changes as the skin is warmed up or cooled down. Fingertip and tongue tip were selected as the representative skin parts for tactile sensation measurements. A hollowed metal disc connected with water circulation is used for skin temperature control. A Testo Thermal Imager is used to record surface temperature of the concerned skin part. Semmes-Weinstein Monofilaments (SWM) Touch Sense evaluator (Gilroy, CA, USA) is used to assess one's touching sensitivity. This project is a joint collaboration with Dr. Ian Fisk and Dr. Nicole Yang from Nottingham University in the UK.



DR. NATALIA BROSSARD: MY STORY

I am from Chile and I did a research internship as a visiting Ph. D. student with Prof. Jianshe Chen at FOP, ZJGU. The study was in "Oral tribology" in which Prof. Chen is a recognized international expert. This science topic is an emerging area in food oral process and we worked on the inter-relationship between friction coefficient and red wine astringency.

Our work demonstrated that astringency of polyphenol-rich products is a sensory perception via a physical stimulus and can be quantified using tribology techniques. The work has given rise to a research article and a review article.

One year later, with a great happiness, I obtained the degree of Ph. D. in Agricultural Sciences with expertise in enology and sensory evaluation in the Pontifical Catholic University of Chile. And now I start as a Professor of Enology in the same University. With a huge pride I can say that my experience with Professor Chen and the support given by the ZJGU and especially by the staff and students of the School of Food Science and Biotechnology were fundamental in my career. Thanks to this, I made a very professional study and I learned a lot about another scientific area, which helped me to do an important interdisciplinary advance in enology.

Finally, I can say that this was a great experience in both professional as personal area. Although I did a very long trip from Chile to China just by myself, however I never felt alone. Only I have to say, "Thanks to all" and I hope to come back in the future.

Dr. Natalia Brossard

FUN TIME



DR. CAROL MOSCA is currently working in a collaboration project between Zhejiang Gongshang University and Wageningen University, in the Netherlands. The investigation of the project focuses on the physiological factors that influence the eating behavior of Asian and European consumers and implications to sensory perception and food preference. One aspect is to compare the saliva composition between the different ethnic groups (or groups following different dietary patterns).

RECENT PUBLICATIONS

Laguna, L., Mingioni, M., Maitre, I., Van Wymelbeke, V., Pirttijarvi, T., Artigas, M. G., Izabella, G.-K., Chen, J. & Sarkar, A. (2016). Perception of difficulties encountered in eating process from European elderlies' perspective. *Journal of Texture Studies*, accepted.

Laguna, L., Ettelaie, R., Holmes, M. & Chen, J. (2016). A comparison between young and elderly adults investigating the manual and oral capabilities during the eating process. *Journal of Texture Studies*, accepted.

Ettelaie, R.*, Holmes, M., Chen, J. & Farshchi, A. (2016). Steric stabilising properties of hydrophobically modified starch: amylose vs amylopectin. *Food Hydrocolloids*, **58**, 364-377.

Mosca, A.C.* & Chen, J. (2016). Food oral management: physiology and objective measurements. *Current Opinion in Food Science*, accepted.

Upadhyay, R., Brossard, N. & Chen, J.* (2016). Mechanisms underlying astringency: an tribology approach. *Journal of Physics D*. **49**, 104003, (11pp).

Brossard, N., Cai, H., Osorio, F., Bordeu, E. & Chen, J.* (2016). "Oral" tribological study on the astringency sensation of red wines. *Journal of Texture Studies*, accepted.

Laguna, L., Aktar, T., Ettelaie, R., Holmes, M. & Chen, J.* (2016). Physiological capabilities of eating and effects of ageing. *Physiology and Behaviour*, accepted.

Chen, L., Chen, J., Yu, L. & Wu, K. (2016). Improved emulsifying capabilities of hydrolysates of soy protein isolate pretreated with high pressure microfluidization. *Food Research International*, **69**, 1-8.

Laguna, L. and Chen, J.* (2016) The eating capability: constituents and assessments. *Food Quality and Preference*, **48**, 345-358.

Laguna, L., Sarker, A. & Chen, J. (2015). Assessment of eating capability of elderly subjects in UK: a quantitative evaluation. *Proceedings of the Nutrition Society*, **74**, E167.

Laguna, L., Sarkar, A., Artigas, G. & Chen, J. * (2015). A quantitative assessment of the eating capability in the elderly individuals. *Physiology and Behaviour*, **147**, 274-281.

陈建设, 吕治宏 (2015) 老年饮食障碍与老年食品:食品工业的挑战与机遇. *食品科学*. **36**. 310-315.

JOINT RESEARCH LABORATORY WITH THE UNIVERSITY OF LEEDS,

A Joint Research Laboratory of Food Oral Processing has just been established between Zhejiang Gongshang University and the University of Leeds (UK). The aim of the joint laboratory is to combine complementary skills and expertise from the two universities and to make best use of research facilities

from both sides to deal with scientific problems of eating and sensory perception. The laboratory was jointly revealed on the 28th of March by Prof. Su Weihua, the vice president of ZJGU, and Prof. Mike Morgan, the Head of the School of Food Science and Nutrition, University of Leeds.

The laboratory will be funded by and based at ZJGU. A management team headed by Prof. Jianshe Chen consists of staff from both universities to oversee the directions and strategy of the laboratory. One post-doctoral research fellow will be appointed shortly to the joint laboratory. Joint PhD training programs are also planned for coming years.

GRANT AWARD

A grant has been awarded by the **CHINESE NUTRITION SOCIETY** on the "Texture modification and classification of food for elderly consumers and dysphagia patients". This is the first grant received by the group since its establishment, 2 years ago.



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