IUFoST

Thursday, October 21th, 2021

IUFoST and the IUFoST Working Group on Education, Emerging Interests, and Future Food Areas

7:00 – 9:00 USA and Canada (GMT-4)
13:00 – 15:00 Central European Time (GMT+2)
19:00 – 21:00 Beijing Time (GMT+8)

Future Development of Food Science Education

Invited speakers

1. Future Development of Food Science Education
Dr. I. Sam Saguy
Professor Emeritus of Food Engineering and Biotechnology,
The Hebrew University of Jerusalem, Israel

2. Development of Engineering Science in Relation to Food Science and Technology
Dr. Ferruh Erdoğdu
Professor of Food Engineering,
Ankara University, Turkey

3. Human Nutrition and Food Science – Competitors? Or two sides of the same coin?
Dr. Gunter Kuhnle
Professor of Nutrition and Food Science, University of Reading,
United Kingdom

4. ROUND TABLE /DISCUSSION
Chair: Dr.-Ing. Azis Boing Sitanggang - IPB University, Indonesia

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Abstracts

Dr. I. Sam Saguy
Professor Emeritus of Food Engineering and Biotechnology,
The Hebrew University of Jerusalem, Israel. Sam Saguy

Food science, technology and engineering are at the heart of disruptive evolutionary processes, many of which are related to unabated exponential changes in science, innovation and digital transformation. The exponential rate of acceleration is expressed by time 'templotion' leading to 'new-normal.' The 'old normal' pre COVID-19 has been disrupted, while embracing the 'new normal' becoming the only way forward. Facilitating new mindset and leading future innovation processes, strategic considerations, and developing new partnerships are paramount. Education is typically quite a slow evolving process, however coping with Industry 4.0 and future requirements it should undergo a paradigm shift including the implementation and development of disruptive new thinking and technologies. Open innovation, artificial intelligence, machine learning, big data, Internet of things, 3D printing, robotics, gene editing, microbiome, Enginomics, sustainability, nutrition, health and wellness, bioavailability and personalization are just few typical examples of the tip of the iceberg of new frameworks that are already present in many curricula, but their widespread utilization in food related teaching programs is still slowly evolving, and should be careful assessed. According to theory of creative destruction we are witnessing a significant shift in almost every field where the new disturb the old. The food industry and the education establishments face similar challenges and pressure. Ensuring the food domain maintains its leadership role and leapfrog into the future, its curricula should be updated and simultaneously address the evolving digital virtual requirements. Five-topics in the recommended paradigm shift are recommended: 1. New mindset, open innovation and entrepreneurship. 2. Four-Helix partnerships (academia-industry-government-private business) and ecosystems. 3. Information integration and personalization. 4. Education, hybrid teaching, lifelong learning/unlearning, and, 5. Life ("soft") skills, adaptability quotient, trust and passion. There is no 'yellow brick road,' 'single one-size-fits-all' solution, or an optimal business model. It is up to each institute, to have a proactive role with all its stakeholders finding their own pivot to facilitate the vast transformations required. The time is now to jump-start the digital transformation and to reinvent the food domain curricula. IUFoST is a paramount and a significant bridge and a platform in pursuing these anticipated future changes.

Dr. Gunter Kuhnle
Professor of Nutrition and Food Science, University of Reading,
United Kingdom

With health and environment being the main developmental drivers for food innovation, the need to reflect these developmental paradigms in academic taught and research programs has become all-important. This talk will focus on the link between health and food-related academic programs. Historically, this link simply manifested as "human nutrition" – a subject that has been taught in undergraduate and post-graduate programs for many years. The focus of this subject was predominantly based on determining the proximate composition of the food and linking it to nutrient requirements of the human body. The key information needed was therefore the minimum daily nutrient requirements and whether these were met by the food intake. Given the high historic prevalence of under-nutrition in the world, human nutrition, as an academic subject, aimed to identify foods and appropriately process these so as to meet the minimum nutritional requirements. Nutritional recommendations were initially based on the prevention of deficiencies and allow survival - but this has changed over time and there is an increasing focus away from mere survival to health. This has led to an unfortunate separation between nutrition research and food science. Indeed, in many universities, nutrition and the health effects of foods have become independent academic programs – with little or no food science content. However, if nutrition and the health effects of foods develop independently of food science, we may develop a lot of knowledge and understanding of the subject, but the benefits of the understanding may not reach the society at large, because the nutritionists have ignored food technology and processing! The academic challenge is to create an environment where conventional food sciences are able to flourish along with the nutrition and health effects of foods – not one at the expense of the other. So, the future.....!

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Abstracts

Dr. Ferruh Erdoğdu
Professor of Food Engineering,
Ankara University, Turkey

Engineering science in the future and its relation to food science and technology

`Engineering` is science and math application to solve problems, and the math background is a must for prediction. For example, without knowing the derivative of the function of tan(x), it is not possible to solve for the following integral:

$$\int \left(\tan^2 x\right) dx = ?$$

The physicist `Freeman Dyson` combines the definition of `engineer` with the presence of designing. The field of engineering is divided into mechanical, electrical, civil, chemical, aerospace, biomedical, etc while the concept of food engineering is more like an evolved discipline. It might, however, require the combination/application of the other disciplines. For example, designing a microwave process for thawing of food products seems to be the direct focus of food engineering, but manufacturing the microwave system requires additional knowledge of electrical, mechanical and even software engineering disciplines. As demonstrated by this example, the evolved discipline of food engineering is still evolving. In fact, the initial applications of food engineering focused on the chemistry-oriented studies with emphasis on physical – chemical properties in the area of (food) science and technology, the recent trends are towards to process design, manufacturing and even molecular biology and nanoscale science. This brings out the requirement of in-depth knowledge of math, physics and computer applications such as simulations and computer-aided design. On the other hand, this discipline is not yet included in the possible engineering applications of the future, e.g. drone designing, robot creation, space engineering, etc.

In the view of food processing and food science/technology concept, improved food safety and quality assurance with productivity with applied simulation, artificial intelligence and machine learning approaches (in addition to the use if IoT and big data usage) are expected in the near future. With the introduction of Industry 4.0, combining the digitalization, IoT and cloud for improved smarter processes, the on-going evolution will be more significant, and it should be reserve a seat in the future engineering applications. For this expectation, the engineering background should be in a solid state to prepare the young generation for digitalization and integration of the engineering science with food science and technology.

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