Combining culinary art with food science

What is Culinology?
Culinology is the discipline of combining culinary arts and food science. Hundreds of years ago, commercial food preparation was mainly performed by artisans; the few prepared foods that could be bought, such as bread, beer, preserved meats and fruits, were likely produced by craftspeople with culinary knowledge and very basic – almost a folkloric – understanding of food technology. Butchers would not have known that sodium nitrate interacts with proteins to cure meat, but they would have used the ‘pink salt’ family recipe to make their salumi. Towards the turn of the 20th century, cooks became more and more specialised and (western) culinary techniques were formalised and canonised by the likes of August Escoffier. Food preservation was revolutionised with the invention of canning and the work of Louis Pasteur. One could argue that this is the point when the culinary arts and scientific elements of commercial food preparation began to diverge, the former focusing on creativity and the eating experience, and the latter on functional performance, nutrition and food security. Fast forward to the 90s, and chefs and scientists began to ‘rediscover’ each other. In an effort to revolutionise cooking techniques, some chefs turned to formal food science and concepts such as ‘molecular gastronomy’. Hydrocolloids, enzymes and scientific techniques, such as distillation, were brought into the kitchen. Similarly, food manufacturers realised that security and affordability alone were not enough to maintain market share and so created ‘corporate’ and ‘research’ chef positions to facilitate the development of innovative products. It was around this time that the field of Culinology was formally recognised.

Dimitris Lykomitros, Nathan Schomers and Darryl Holiday explain the mission and activities of the Research Chefs Association and describe plans to collaborate with IFST to develop joint initiatives and opportunities in food innovation.

Research Chefs Association
The Research Chefs Association (RCA) is a professional organisation dedicated to the intersection of food science and the culinary arts. Founded in 1996 in the USA, the RCA has rapidly grown to more than...
food trends end up spreading globally and so it is exciting to think of the possibilities bridging the 'Atlantic gap' will bring to both regions.

Training

The educational resources provided by the RCA range from formal training classes to bite-sized on-line webinars and aim to cultivate a number of core competencies. These were identified through formalised research[1] and are periodically re-evaluated. They range from technical skills, such as knowledge of principles of cooking, product development and scale up, to cross functional skills, such as marketing and sales. Furthermore, the association provides two paths to achieving professional certifications: the Certified Research Chef (CRC), designed for culinary professionals who demonstrate upskilling into food science, and Certified Culinary Scientist (CCS) for professional food scientists who develop their culinary skills. Indeed, this interdisciplinary, holistic approach to product development is often highly beneficial and can lead to competitive advantage.

The CRC and CCS programmes can support career advancement and prove a level of proficiency.
and competency in the field to customers.

According to Pat Clifford, Principal Research Chef at PepsiCo, UK, the company has been able to leverage the Culinary Scientist Program and now has a large number of its Global R&D team certified, building long term knowledge and strength in its innovation pipeline.

**Collaboration**

IFST and RCA are currently exploring the opportunities for joint collaboration. Like IFST, the RCA provides the chance to network with fellow professionals, both formally (with newsletters and events) and informally, through several online communities and fora (useful when looking for specific advice, consultancy services or vendors of more exotic ingredients). These networking opportunities can often lead to collaborative projects and downstream partnerships. Both the RCA and the IFST annual conferences provide the opportunity to network with peers and business relevant figures via the speaker programmes.

**Culinology in practice**

With the increasing sophistication of consumer tastes and the continual search for ‘authentic’ flavours, it is not surprising that the benefit of incorporating culinary thinking into product development is becoming increasingly popular. Indeed, the number of scientific papers and patent applications in this field has increased at an exponential rate over the last fifty years (Figure 1), which suggests that there is now a culinary domain in the field of food science. More recently, this has been recognised by higher education institutions and bachelor degrees in the field of Culinology are now on offer\(^2\).

Culinology can often affect how an organisation delivers innovation. Flavour houses have long identified the value of bringing trained chefs into the flavour/fragrance creation process and have gone as far as creating flagship culinary centres to highlight these capabilities to their customers. One of the most recent examples of this was the 2019 launch of Bell Flavors & Fragrances Culinary Centre in Ketton, Rutland\(^3\). Other examples include PepsiCo\(^4\), which has utilised culinary experts for over a decade to help select and develop new flavours. A good example of this process was the execution of the ‘Do us a flavour’ campaign a few years ago (a consumer involvement

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**Figure 1** Count of patents (A), and scientific papers (B). Source Google Patents, EBSCO
Culinology can contribute and consequently the new used by the flavourists and food to a flavour brief, which can be selected dish is then converted of each concept is selected. The consumer preferred execution and product development, the market preferences, as well as their partners in marketing and product development, the consumer preferred execution of each concept is selected. The selected dish is then converted to a flavour brief, which can be used by the flavourists and food scientists to create the seasoning and consequently the new crisp. Another way in which Culinology can contribute to product development is demonstrated by Impossible Burger, which has leveraged Culinology not only during the development of its flagship vegan burger, but also to bridge the gap with food service customers. To achieve the latter, Impossible Burger relies on its culinary team to create numerous recipes using the product, in order to showcase to potential foodservice customers its versatility and benefits, or even to create inspirational recipes for consumer websites. The chefs essentially become the point of liaison with restaurant partners in order to educate them on how the Impossible product can be used with their existing equipment and systems. In addition, the chefs also help to build a stronger relationship with their customer by assisting with standard operating procedures and best practices. At Cargill, culinarians and research chefs are invaluable in innovation and co-creation sessions. These are one- to two-day workshops where Cargill and a customer work together to solve a specific problem. The culinary skills allow for the quick creation of prototypes in order to demonstrate new concepts or ingredient uses. In addition, the broader understanding of market preferences and the end application are helpful in better translating ‘the ask’ into a brief. ADM has increased its focus on chef-driven creative product design and development as a means of accelerating the product development process and improving the chances of product success. It is clear that Culinology has a lot to offer both industrial food manufacturers and food service professionals. Exposure to new tools and techniques, inspiration for new product development, as well as insights into up-coming trends (many food trends start in the food service industry) are some of the areas in which food companies can benefit. Similarly, best practices in food safety and introduction to new ingredients and equipment are likely to be of interest to food service companies.

**Conclusions**

The RCA aims to provide members with the opportunity to learn, engage, network and share knowledge. The new Europe Chapter of the RCA offers the possibility to form a local network with a global reach. The RCA and IFST are looking forward to working together to bridge the gaps between culinary creativity and our shared interests in food science and technology. We will be exploring opportunities for collaboration in hospitality, food processing and manufacturing, as well as in cultivating competency and building capability for food and drink professionals and the sector as a whole.

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