***Handbook of Molecular Gastronomy: Scientific Foundations and Culinary Applications***

presents a unique overview of molecular gastronomy, the scientific discipline dedicated to the study of phenomena that occur during the preparation and consumption of dishes. It deals with the chemistry, biology and physics of food preparation, along with the physiology of food consumption. As such, it represents the first attempt at a comprehensive reference in molecular gastronomy, along with a practical guide, through selected examples, to molecular cuisine and the more recent applications named note by note cuisine. While several books already exist for a general audience, either addressing food science in general in a "light" way and/or dealing with modern cooking techniques and recipes, no book exists so far that encompasses the whole molecular gastronomy field, providing a strong interdisciplinary background in the physics, biology and chemistry of food and food preparation, along with good discussions on creativity and the art of cooking.

Features:

* Gives A–Z coverage to the underlying science (physics, chemistry and biology) and technology, as well as all the key cooking issues (ingredients, tools and methods).
* Encompasses the science and practice of molecular gastronomy in the most accessible and up-to-date reference available.
* Contains a final section with unique recipes by famous chefs.

The book is organized in three parts. The first and main part is about the scientific discipline of molecular and physical gastronomy; it is organized as an encyclopedia, with entries in alphabetical order, gathering the contributions of more than 100 authors, all leading scientists in food sciences, providing a broad overview of the most recent research in molecular gastronomy. The second part addresses educational applications of molecular gastronomy, from primary schools to universities. The third part provides some innovative recipes by chefs from various parts of the world.

The authors have made a particular pedagogical effort in proposing several educational levels, from elementary introduction to deep scientific formalism, in order to satisfy the broadest possible audience (scientists and non-scientists). This new resource should be very useful to food scientists and chefs, as well as food and culinary science students and all lay people interested in gastronomy.

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Editor(s)

**Biography**

**Róisín Burke** obtained her Ph.D. from University College Dublin and subsequently carried out postdoctoral research at the Agricultural University in Wageningen, The Netherlands. She is a Senior Lecturer in the Technological University, Dublin (TU Dublin), specialising in Culinary Science and Food Product Development. In the last fourteen years she has developed Molecular Gastronomy as a subject discipline in The School of Culinary Arts and Food Technology, TU Dublin. She supervised the first ever Ph.D. in Molecular Gastronomy in Ireland and is currently supervising a number of funded Ph.D. students. Róisín initiated and together with her TU Dublin colleagues developed a B.Sc. (Hons) in Culinary Science which was launched in 2016. She has published widely in international peer reviewed journals and has joined editorial teams. For many years, Róisín is lecturing to international students and is the TU Dublin co-ordinator of the Erasmus+ M.Sc. programme in Food Innovation and Product Design (FIPDes). She has given guest lectures in Ireland and abroad.

**Alan L. Kelly** is a professor in the School of Food and Nutritional Sciences at University College Cork in Ireland. His teaching interests include food processing and preservation, dairy product technology and new food product development, as well as regularly giving courses on effective scientific communication. He leads a research group interested in the chemistry and processing of milk and dairy products, has published over 250 research papers, review articles and book chapters, and has supervised over 40 MSc and PhD students to completion. He has been an editor of the International Dairy Journal since 2005 and has acted as an external examiner in universities and reviewed for journals and funding agencies around the world. In July 2009, he received the Danisco International Dairy Science award from the American Dairy Science Association for his contributions to research in dairy science and technology. In recent years, he has become very interested in the interface between the worlds of food and culinary sciences, and has organized several workshops and seminars on this topic and molecular gastronomy. In 2019, he published a book entitled Molecules, Microbes and Meals: The Surprising Science of Food (Oxford University Press), and in 2020 he published How Scientists Communicate: Dispatches from the Frontiers of Knowledge (Oxford University Press), both of which are aimed at a general audience.

**Christophe Lavelle** is a biophysicist at the CNRS (National Center for Scientific Research) in Paris, France, a principal investigator at the National Museum of Natural History in Paris, and co-head of the Nuclear Architecture and Dynamics research network. While his studies mostly concern epigenetics and the biophysical properties of cells, he also works on the relationship between science and gastronomy. He teaches biophysics molecular gastronomy in several universities. He teaches molecular gastronomy at the universities of Toulouse and Cergy-Pontoise. He is also the founder and president of the Science & Cooking Association and member of the International Chefs Association "Les Disciples d'Escoffier."Author of more than 30 scientific papers published in international journals and a book on medical physics, he is currently involved in several editorial projects related to food science.

**Hervé This** is a chemist at INRA (National Institute for Research in Agronomy) in Paris, France. He is also a professor at AgroParisTech and head of the Molecular Gastronomy Group, in the Laboratory of Chemistry of AgroParisTech also in Paris. He created the scientific discipline of Molecular Gastronomy in 1988 along with Nicholas Kurti (1908-1998). After his PhD on La gastronomie moléculaire et physique, he was invited by French Nobel Prize Jean-Marie Lehn to conduct his studies at the Laboratoire de Chimie des Interactions Moléculaires in the Collège de France. In 2006, while he was moving to AgroParisTech, the French Academy of Sciences asked him to create the Fondation Science & Culture Alimentaire, of which he was appointed scientific director. He writes regular columns and is the author of several books. Dr. This is also an honorary member of various culinary academies as well as the Académie dAgriculture de France. He has received many awards including the Franqui professorship (University of Liège) and the Grand Prix des Sciences de lAliment by the International Association of Gastronomy.