

The Future of Computing and Food

Extended Abstract[†]

Marianna Obrist

SCHI Lab, School of Engineering and
Informatics, University of Sussex
Brighton, UK
m.obrist@sussex.ac.uk

Patrizia Marti

Department of Social, Political and
Cognitive Science, University of Siena
Siena, Italy
patrizia.marti@unisi.it

Carlos Velasco

Department of Marketing, BI
Norwegian Business School
Oslo, Norway
carlos.velasco@bi.no

Yunwen (Tutu) Tu

Tutu Food Design,
San Francisco, USA
yunwentu22@gmail.com

Takuji Narumi

University of Tokyo
Tokyo, Japan
narumi@cyber.t.u-tokyo.ac.jp

Naja L. Holten Møller

University of Copenhagen
Copenhagen, Denmark
naja@di.ku.dk

ABSTRACT

The excitement around computing technology in all aspects of life requires that we tackle fundamental issues of healthcare, leisure, labor, education, and food to create the society we want. The aim of this satellite event was to bring together a variety of different stakeholders, ranging from local food producers, chefs, designers, engineers, data scientists, and sensory scientists, to discuss the interwoven future of computing technology and food. This event was co-located with the AVI 2018 conference and supported by the ACM Future of Computing Academy (ACM-FCA). The event followed a co-creation approach that encourages conjoined creative and critical thinking that feeds into the formulation of a manifesto on the future of computing and food. We hope this will inspire future discussions on the transformative role of computing technology on food.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)** • **Applied computing** → *Social and professional topics*

KEYWORDS

Computing Food, Molecular Gastronomy, Computational Gastronomy, HCI, HFI, Multisensory Experiences

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

AVI '18, May 29-June 1, 2018, Castiglione della Pescaia, Italy
© 2018 Copyright is held by the owner/author(s).
ACM ISBN 978-1-4503-5616-9/18/05.
<https://doi.org/10.1145/3206505.3206605>

ACM Reference format:

M. Obrist, P. Marti, C. Velasco, Y. Tu, T. Narumi, N.L. Holten Møller. 2018. The Future of Computing & Food. In *Proceedings of AVI '18*, 3 pages. <https://doi.org/10.1145/3206505.3206605>

1 INTRODUCTION

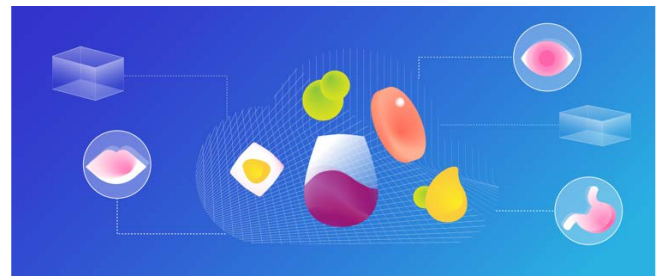


Figure 1: The Interwoven future of Computing and Food.

The human sense of taste and smell have become a target for interaction design and Human-Computer Interaction (HCI) research [5]. While fields such as sensory science, chemistry, biology, and molecular gastronomy have advanced our understanding on sensation and perception, the interactive experiences that can be created based on taste and smell remain widely unexplored within HCI [3]. Despite an increased interest in Human-Food Interaction (HFI) [6], we have only recently started to understand the dimensions and features of taste and smell for multisensory experience design [4]. However, we still lack guidance on *which of those dimensions/features are relevant to account for in multisensory interaction and experience design*. Hence, in order to inform the design of future gustatory, olfactory, and ultimately multisensory interfaces/interactions we need to establish a more detailed understanding of the design space for taste and smell in relation to technology.

The end goal of this event was to formulate a **Manifesto on the interwoven Future of Computing and Food** that will be made available through the *ACM-FCA.org* website. This

manifesto is inspired by debates raised by different and sometimes antipodal perspectives on food like for instance the ‘infamous’ Manifesto of Futurist Cuisine written by Filippo Tommaso Marinetti in 1909, and the avantgarde’s riposte of the Slow Food Manifesto published by Gambero Rosso on 1987. Our Manifesto envisages the future of food with the emergence of computing technology that is changing the way we cook, eat, drink and experience food.

Moreover, Molecular Gastronomy and Computational Gastronomy are emerging fields of research that enrich the discussion around Computing and Food from an interdisciplinary and multi-stakeholder perspective. New data-driven approaches, such as network analysis and data mining, are explored to illustrate for instance the chemical relationships between culinary ingredients across the globe [1]. Considering the above, this event aimed to address pressing questions on the intersection between technology and food, such as: *How will we design and innovate considering food/mouth/digesting system as an interface? How will the future computing landscape explore this interaction design?*

2 EVENT FORMAT

The event was initiated by the Co-Creation Working Group in the ACM Future of Computing Academy², which encourages a co-creation approach to highlight and connect fundamental issues such as food and healthcare with research in computing, to ensure technologies are designed and built to produce a better society. A co-creation approach inspires conjoined creative and critical thinking utilizing various types of expertise in the wider public. Hence, the format of this event combined a series of different activities including:

- Keynote speakers from the Computing & Food Community
- Short 5-10min Inspirational Lightning Talks
- Break-out Group Sessions & Plenary Discussions
- Tasting Event with local food producers and multisensory experimentations with new technology developments (e.g., TastyFloats [7], MetaCookies [2])

2.1 Keynote Speakers

To stimulate discussion across communities, the event had two keynote speakers posing the question “*What does a Data Analyst & Chef have in common?*”

Chef Jozef Youssef, Kitchen Theory Founder & Chef Patron. Youssef is the creative force behind Kitchen Theory. His years of experience in London’s most highly acclaimed Michelin star restaurants and hotels coupled with his passion for gastronomy, art and science all led to him establishing Kitchen Theory in 2010. Since then Youssef has published his first book; *Molecular Gastronomy at Home*, and is currently an associate editor at the *International Journal of Gastronomy and Food Science*. Youssef designs Kitchen Theory’s *Gastrophysics Chef’s Table*, corporate experiences and product ‘sensplorations’, by combining his

exceptional culinary skills with ongoing research into the scientific field of gastrophysics, carried out in collaboration with Professor Charles Spence, head of Oxford University’s Crossmodal Department. Most recently, Youssef has created the *Gastrophysics Chef’s Table*, at which he hosts 10 guests, who are set to experience the most multisensory chef’s table in London.

Dr Kirill Veselkov, Waters Lecturer in Data Analytics and Computational Medicine, Department of Surgery and Cancer, Imperial College London, UK and Member of the WEF Global Agenda Council on the Future of Computing. Dr. Veselkov’s research group focuses on developing computational methods that can make a difference in data-driven global health and disease. He has led the development of a series of field-changing data analytics frameworks to augment emerging molecular (“-omics”) profiling technologies. His group expertise combines the use of a diverse range of computational techniques from signal processing, imaging informatics, machine learning, natural language processing and high performance computing for information extraction from heterogeneous biomedical datasets. His translation interests are precision medicine and digital pathology. Dr Veselkov has received a WEF Young Scientist Award, and currently serves as an active member of the WEF Global Agenda Council on the Future of Computing.

3 ORGANISERS

The event was organised by an interdisciplinary team of experts in the field of computing, Human-Computer Interaction, user experience design, novel interaction techniques, experimental psychology and sensory science, and food design.



Marianna Obrist is leading the Sussex Computer Human Interaction Lab, a research group dedicated to the investigation of multisensory experiences for interactive technology. The interdisciplinary SCHI Lab team explores tactile, gustatory, and olfactory experiences as novel interaction modalities. She is a member of the newly established ACM Future of Computing Academy.



Patrizia Marti is Assistant Professor at the Department of Social, Political and Cognitive Science and part time Full Professor at the Industrial Design Department at Eindhoven University. She is director of a university Fab Lab in Siena. Her research activity concerns designing systems facing cultural, aesthetic and social issues through embodied experiences.

² <https://acm-fca.org/fca-working-groups/co-creation/>



and experience design. Carlos is also a founding member of Neurosketch (Colombia).

Carlos Velasco is an Assistant Professor at BI Norwegian Business School. His research focuses on crossmodal perception and multisensory experiences, in particular on crossmodal correspondences in the context of multisensory marketing, human-computer interaction, food and beverage,



trends.

Yunwen Tu (Tutu) is an experience designer whose passions are the future of food and education. Tutu seeks ways to push design boundaries through her work envisioning how the food of the global diaspora will be impacted by environmental, socioeconomic, political, and technological



olfactory display, taste display and satiety display by utilizing cross-modal interactions.

Takuji Narumi is a lecturer at the Graduate School of Information Science and Technology. His research interests broadly include perceptual modification and human augmentation with virtual reality and augmented reality technologies. He invented a novel haptic display,



She is a member of the newly established ACM Future of Computing Academy.

Naja L. Holten Møller is interested in the transformational role of technology in professional work settings. She critically explores the diffusion of technology into different types of collaborative work and the evolving possibilities and responsibilities such technological diffusion creates.

ACKNOWLEDGMENTS



European Research Council
Established by the European Commission

We thank the organisers of the International Conference on Advanced Visual Interfaces (AVI) 2018 for hosting this event. Special thanks go to Massimo Mecella and Andrea Marrella. This event was co-sponsored by the ACM Future of Computing Academy (ACM-FCA) and was supported by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 638605.



acm
FUTURE OF COMPUTING
ACADEMY

REFERENCES

- [1] Yong-Yeol Ahn, Sebastian E. Ahnert, James P. Bagrow, and Albert-László Barabási. 2011. Flavor network and the principles of food pairing. *Nature Scientific Reports* 1, 196: 7. <https://doi.org/10.1038/srep00196>
- [2] Takuji Narumi, Takashi Kajinami, Tomohiro Tanikawa, and Michitaka Hirose. 2010. Meta cookie. *ACM SIGGRAPH 2010 Emerging Technologies on - SIGGRAPH '10*: 1–1. <https://doi.org/10.1145/1836821.1836839>
- [3] M. Obrist, N. Ranasinghe, and C. Spence. 2017. Special issue: Multisensory human-computer interaction. *International Journal of Human Computer Studies*. <https://doi.org/10.1016/j.ijhcs.2017.06.002>
- [4] M. Obrist, C. Velasco, C. Vi, N. Ranasinghe, A. Israr, A. Cheok, C. Spence, and P. Gopalakrishnakone. 2016. Sensing the future of HCI: Touch, taste, and smell user interfaces. *Interactions* 23, 5. <https://doi.org/10.1145/2973568>
- [5] C. Spence, M. Obrist, C. Velasco, and N. Ranasinghe. 2017. Digitizing the chemical senses: Possibilities & pitfalls. *International Journal of Human Computer Studies*. <https://doi.org/10.1016/j.ijhcs.2017.06.003>
- [6] Carlos Velasco, Anton Nijholt, Marianna Obrist, Rick Schifferstein, Charles Spence, Rick Schifferstein, Charles Spence, and Mhfi International. 2017. MHFI 2017: 2nd International Workshop on Multisensory Approaches to Human-Food Interaction (Workshop Summary). 674–676.
- [7] C.T. Vi, A. Marzo, D. Ablart, G. Memoli, S. Subramanian, B. Drinkwater, and M. Obrist. 2017. Tastyfloats: A contactless food delivery system. In *Proceedings of the 2017 ACM International Conference on Interactive Surfaces and Spaces, ISS 2017*.