



Intelligent Food Systems: a foundational platform for the convergence of food science and artificial intelligence

Jun-Hu Cheng

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The global agrifood system stands at a critical inflection point. Feeding a projected population of nearly ten billion by mid-century, while simultaneously reducing the environmental footprint of food production and ensuring equitable access to nutritious food, represents one of the defining challenges of our era. Traditional approaches to food science and engineering, while remarkably successful throughout the twentieth century, are no longer sufficient to meet the scale, complexity, and urgency of contemporary demands. In this context, *Intelligent Food Systems* emerges - not merely as another academic publication, but as a deliberate response to a fundamental shift in how we must conceive, design, and govern food systems.

The intellectual foundation of this journal rests on a simple yet profound observation: the challenges confronting modern food systems are, at their core, problems of complexity, uncertainty, and coordination. These are precisely the domains in which artificial intelligence (AI) and associated computational technologies have demonstrated transformative potential. Recent advances in machine learning, computer vision, natural language processing, and reinforcement learning are reshaping the boundaries of what is possible in food production, processing, distribution, and consumption. From predictive modeling that optimizes the design of functional food matrices at the molecular level to digital twin environments that enable autonomous, real-time control of thermal processing operations, intelligent technologies are becoming indispensable tools in food science.

The scope of *Intelligent Food Systems* is intentionally broad, reflecting the interconnected nature of the domain it addresses. The journal will publish research spanning the full arc of the food system - from precision agriculture and raw material optimization, through intelligent manufacturing and quality control, to supply chain transparency and personalized nutrition. It will provide a home for work that integrates AI with established food science disciplines, including physics-based modeling, sensory science, and microbiology. Research examining the application of blockchain and the Internet of Things to enhance traceability and reduce waste across food supply chains will also find a natural audience here.



School of Food Science and Engineering, South China University of Technology, Guangzhou 510641, Guangdong, China.

Correspondence to: Prof. Jun-Hu Cheng, School of Food Science and Engineering, South China University of Technology, Guangzhou 510641, Guangdong, China. E-mail: rododmiro.ortiz@slu.se

Yet the journal's mandate extends beyond purely technical advances. Developing intelligent food systems responsibly requires serious engagement with ethical, regulatory, and equity considerations. Algorithmic transparency, data privacy, and the risk of exacerbating nutritional disparities through biased datasets all demand critical examination. The journal will therefore encourage submissions that address these dimensions, recognizing that technological innovation without corresponding attention to governance and equity is not merely incomplete - it may also create unintended consequences.

The need for a dedicated forum in this field is pressing. The World Health Organization has recently underscored that progress in foodborne disease surveillance remains insufficient, despite incremental improvements. The Food and Agriculture Organization of the United Nations (FAO) has called for accelerated transformation of agrifood systems, explicitly identifying digital agriculture, AI, and precision farming as important enabling tools. Research in these areas is currently scattered across journals in food science, computer science, engineering, and nutrition, each with its own conventions, priorities, and limitations. *Intelligent Food Systems* seeks to bridge these disciplinary silos by providing a unified venue for scholarship that neither traditional food science journals nor general AI publications can adequately accommodate.

We envision this journal as a forum not only for showcasing successful applications, but also for the rigorous examination of failures, limitations, and unintended consequences. The path toward genuinely intelligent food systems will be neither linear nor uncontested. It will require sustained dialogue between technologists and food scientists, between industry practitioners and regulators, and between producers and consumers. The pages of this journal will be open to all of these perspectives.

The inaugural issue represents not a conclusion, but a beginning. We invite the global community of researchers, engineers, policymakers, and practitioners to join us in building a body of knowledge equal to the task at hand: creating food systems that are simultaneously more productive, resilient, equitable, and sustainable. The tools of intelligence are increasingly available. The responsibility to deploy them wisely is ours.

DECLARATIONS

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The author contributed solely to the article.

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Not applicable.

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