Title: Knowledge Engineering in Food Computing – Selected Problems and Applications

Abstract: The emerging field of food computing tackles, among others, problems of knowledge acquisition, engineering, and processing in the domain of food. Food is a common human experience, yet working with recipes requires some knowledge about the process, combinations of ingredients, properties of the single constituents, and the resulting dish. This knowledge is often implicit, contextual, or culture-dependent. Making at least parts of it explicit, with some sort of formalization, opens up possibilities to develop intelligent knowledge-based solutions to assist humans in preparing and optimizing food. One of the interesting and relevant problems is searching for substitutions in food recipes. This task may be motivated by different constraints and objectives of a person, including allergies, diets, etc. What ingredient to substitute with what and how will it influence the resulting dish are just some of the questions that require the knowledge of a dietician, or a food technologist (and sometimes: both). While machine learning-based solutions may produce proposals of ingredients that should be replaced with others based on their occurrence in similar contexts, it is not always understandable, why certain ingredients are appropriate or not, and what are the features of the proposed substitutes that satisfy the person's goals. Thus, structured and logic-based solutions may be developed to provide transparent and explainable answers to the questions outlined above.

In this talk, we will discuss recent research threads in the field of knowledge engineering in food computing, including methods of knowledge acquisition, modeling, and reasoning over integrated knowledge. The talk will cover topics such as modeling food-related knowledge in the form of ontologies, ongoing efforts and international initiatives in the area, an ontology design pattern for substitution, building a knowledge graph for substitution, and logic-based solutions for selecting target ingredients to substitute and pruning “wrong” substitutes recommendations.

Biography: Weronika T. Adrian, Ph.D**.** (wta@agh.edu.pl, http://wtadrian.eu, http://kraken.edu.pl) is an Assistant Professor and Deputy Head of the Department of Applied Computer Science, EAIiIB Faculty, AGH University in Krakow. She obtained her Ph.D. from the University of Calabria (Italy), followed by a 2-year postdoctoral contract in the Department of Mathematics and Computer Science, in the group of Prof. Nicola Leone. Her research interests focus on semantic technologies, knowledge graphs, knowledge engineering, and logic programming. She (co-) authored over 60 publications about KRR/KE methods and problems. Adrian has been involved in several national and international R&D projects: HeKatE, BIMLOQ, INDECT, Prosecco, Knowrex, S2BDW, HSC Krosno, TAISTI; and EU programs: Knowledge and Practice, it2edu, SPiN. She is a laureate of the first edition of the “Top 500 Innovators” project within which she completed a program on *Science-Management-Commercialization* at Stanford University. She co-founded the Creativity and Innovation Lab Foundation which promoted, developed, and taught methods of creativity and entrepreneurship.