SPEAKER DETAILS

LAURA ROMAN IS AN ASSISTANT PROFESSOR AT THE UNIVERSITY OF VALLADOLID (SPAIN) AND NOVO NORDISK FELLOW AT THE DEPARTMENT OF FOOD SCIENCE AT AARHUS UNIVERSITY (DENMARK). PREVIOUS POSTDOCTORAL RESEARCHER AT THE SCHOOL OF ENGINEERING AT THE UNIVERSITY OF GUELPH (CANADA), WHERE HER WORK FOCUSED ON CARBOHYDRATE BIOCHEMISTRY AND PROCESSING FOR STRUCTURE-FUNCTION AND IMPROVED HEALTH. LAURA CURRENT RESEARCH EFFORTS CENTER ON THE UNDERSTANDING OF THE MOLECULAR DETAILS OF STRUCTURE FORMATION IN PLANT-BASED FOOD SYSTEMS. HER RESEARCH FOCUSES ON PHYSICOCHEMICAL STUDIES OF PROTEIN-STARCH INTERACTIONS IN COMPLEX BIOPOLYMER MATRICES, WITH A MULTIDISCIPLINARY APPROACH. THE OVERALL GOAL IS TO UNDERSTAND THE CONFORMATIONAL AND SUPRAMOLECULAR MECHANISMS THAT LEAD TO THE INTERACTIONS BETWEEN PLANT-BASED PROTEINS AND STARCH DURING PROCESSING, CRITICAL TO DEVELOP MORE SUSTAINABLE AND NUTRITIOUS FUNCTIONAL PLANT-BASED FOODS. SHE HAS ALSO WORKED ON IDENTIFICATION AND CHARACTERIZATION OF CLIMATE-RESILIENT PROTEIN-RICH CROPS BASED ON THEIR AGRONOMIC TRAITS AND PROTEIN QUALITY TO HELP EXPAND THE AVAILABLE MARKET CHOICES OF SUSTAINABLE PROTEIN RICH LEGUMES.

"Transition towards climate robust protein crops: The potential of lupin"

by ***Laura Roman***

THERE IS AN URGENT NEED TO DELIVER NOVEL SUSTAINABLE, CLIMATE FRIENDLY FOOD SOLUTIONS TO ACCOMMODATE TO A HEALTHY, LESS RESOURCE-INTENSIVE PLANT-BASED DIET. ESTABLISHING A ROBUST SUPPLY OF NUTRITIOUS AND SUSTAINABLE PROTEIN IS BECOMING AN INCREASINGLY CRITICAL NEED, BOTH FOR HUMAN AND ANIMAL CONSUMPTION. IN THIS SCENARIO, FINDING ALTERNATIVE SOURCES OF PLANT-PROTEINS IS THEN OF OUTMOST IMPORTANCE. THIS PRESENTATION WILL FOCUS ON THE POTENTIAL OF LEGUMES, WITH A FOCUS ON LUPIN. LEGUMES ARE A HIGH VALUE CROP, BECAUSE OF THEIR HIGH PROTEIN CONTENT, AND THEIR POTENTIAL FOR RE-BALANCING ECOSYSTEMS. LUPIN IS ONE SUCH LEGUME THAT CAN BE CULTIVATED UNDER DIFFERENT ENVIRONMENTAL CONDITIONS AND SEEMS A PROMISING PROTEIN RICH SOURCE WITH HIGH NUTRITIONAL VALUE. HOWEVER, THE PRESENCE OF ANTINUTRITIONAL COMPONENTS, SUCH AS THE TOXIC QUINOLIZIDINE ALKALOIDS, REPRESENTS THE MAIN DRAWBACK FOR THEIR USE IN FOOD. THIS TALK WILL HIGHLIGHT THE SELECTION AND DEVELOPMENT OF BLUE LUPIN (LUPINUS ANGUSTIFOLIUS) VARIETIES THAT CAN BE SUITABLE FOR THEIR CULTIVATION UNDER DIFFERENT ENVIRONMENTAL CONDITIONS, BASED ON THEIR ROBUSTNESS TOWARDS UPCOMING HARSH CLIMATE CONDITIONS (I.E., HEAT STRESS, AND ELEVATED CO2 LEVELS), AND PROCESSING PERFORMANCE INTO NUTRITIOUS PLANT-BASED FOOD INGREDIENTS. BY EXPLOITING DIFFERENT CROSSBRED BLUE LUPIN MATERIALS AND COMMERCIAL LINES WE EXPECT TO IDENTIFY MORE SUITABLE AND ROBUST GENOTYPES WITH IMPROVED PROTEIN QUALITY, AND, AT THE SAME TIME, REDUCED AMOUNT OF TOXIC SECONDARY METABOLITES, THAT MAY NEGATIVELY IMPACT THEIR PROCESSING QUALITY AND USE FOR FOOD. THIS RESEARCH ALSO AIMS TO UNDERSTAND CLIMATE ROBUSTNESS IN BLUE LUPINS BY EVALUATING THE PHENOTYPIC TRAITS OF DIFFERENT CULTIVARS FOR CLIMATE TOLERANCE. THE COMBINED RESPONSES IN MORPHOLOGY, PHYSIOLOGY, PROTEIN COMPOSITION AND PRESENCE OF OTHER METABOLITES WILL PROVIDE TRAITS FOR GENOMIC STUDIES AND WILL ORIENTATE THE FUTURE BREEDING PROCESS FOR OPTIMAL PROTEIN QUALITY.

SPEAKER DETAILS

MARIO MARTINEZ IS AN ASSOCIATE PROFESSOR AND SAPERE AUDE RESEARCH LEADER AT THE DEPARTMENT OF FOOD SCIENCE AT AARHUS UNIVERSITY. HIS RESEARCH PROGRAM IS ON TRANSLATIONAL GLYCOSCIENCE, APPROACHING THE STRUCTURE AND FUNCTION OF FOOD POLYSACCHARIDES, THEIR BINDING POTENTIAL TO PLANT SECONDARY METABOLITES, THE ELUCIDATION OF THEIR COMPLEX STRUCTURAL BIOCHEMISTRY, AND THEIR FOOD STRUCTURING BEHAVIOUR ALONE OR IN COMBINATION WITH DIETARY PLANT PROTEINS. DURING THE LAST YEARS HIS TEAM HAS ALSO WORK ON THE FUNDAMENTAL ASPECTS RELATED TO THE STRUCTURING TECHNOLOGIES OF SEMI-SOLID PLANT-BASED FOODS, AS WELL AS THE ESTABLISHMENT OF GREEN DERIVATION ROUTES OF POLYSACHARIDES INTO HIGH-PERFORMING BIOMATERIALS. MARIO IS ADJUNCT ASSOCIATE PROFESSOR AT THE WHISTLER CENTER FOR CARBOHYDRATE RESEARCH (PURDUE UNIVERSITY, IN, USA) AND AT THE DEPARTMENT OF PHYSICS OF THE UNIVERSITY OF GUELPH (ON, CANADA). ALL IN ALL, MARIO´S TEAM RELIES ON COHERENT AND FOCUSED FOOD SYSTEM APPROACHES TO FIND COMMON GROUND FOR HEALTH AND ENVIRONMENTAL SUSTAINABILITY.

"Sustainable Exploitation of Plant Proteins to Design Plant-based Foods"

by **Mario Martinez**

STAYING WITHIN PLANETARY BOUNDARIES REQUIRES AMBITIOUS DIETARY CHANGE TOWARDS MORE PLANT-BASED, FLEXITARIAN DIETS. OVER THE PAST DECADE, THE DEVELOPMENT OF NOVEL PLANT-BASED STRUCTURED FOODS HAS EMERGED AS THE MOST PROMISING STRATEGY TO DECREASE MEAT CONSUMPTION. AMONG CONSUMERS, TRADITIONAL MEAT CONSUMERS (THOSE WHO EXPECT MEAT SUBSTITUTES TO BE LIKE REAL MEAT) REPRESENT THE LARGEST CONSUMER SEGMENT AND, THEREFORE, PLANT-BASED FOODS LIKE PROCESSED MEAT IN TASTE AND TEXTURE HAVE THE BEST CHANCE TO REPLACE MEAT. COMPARED TO ANIMAL MEAT, PLANT-BASED MEAT ALTERNATIVES ARE PERCEIVED OF LOWER SENSORY ACCEPTABILITY, MOSTLY CONSISTING OF UNIFORM TASTE, COMPACTNESS, DRYNESS AND SOFTNESS. WHILE FLAVOR CAN BE EASILY MANIPULATED IN MEAT ALTERNATIVES, MIRRORING THE STRUCTURAL COMPONENTS AND TEXTURE OF MEAT HAS SHOWN TO BE ESPECIALLY CHALLENGING DUE TO DIFFICULTIES ASSOCIATED WITH THE DEVELOPMENT OF HIGHLY ANISOTROPIC (FIBRILLAR) STRUCTURES FROM PREDOMINANTLY GLOBULAR PROTEIN SOURCES THAT ARE TYPICALLY FOUND IN PLANTS. THE COMPLEX COLLOIDAL STATE OF PLANT PROTEINS IN THEIR PHYSIOLOGICAL ENVIRONMENT, AS WELL AS THE STRUCTURAL HETEROGENEITY OF PLANT POLYSACCHARIDES (ABUNDANT ALSO IN LESS-REFINED PROTEIN FRACTIONS), IMPOSES MAJOR ANALYTICAL AND PROCESSING DIFFICULTIES FOR THE SUSTAINABLE AND EFFICIENT EXPLOITATION OF THESE BUILDING BLOCKS OF LIFE. IN THIS PRESENTATION, I WILL ENDEAVOR TO PROVIDE THE UNDERLYING MECHANISMS TO FABRICATE PLANT-BASED WHOLE-MUSCLE CUT ANALOGUES USING LESS REFINED PLANT PROTEIN FRACTIONS AND SCALABLE TECHNOLOGIES (E.G., EXTRUSION). SPECIFICALLY, I WILL ENDEAVOR TO DESCRIBE THE STRUCTURE-FUNCTION RELATIONSHIPS NEEDED FOR ANYSOTROPY FORMATION, HIGHLIGHT THE IMPORTANCE OF MINIMAL PROCESSING USING HEMP (CANNABIS SATIVA L.) AS AN EXAMPLE, AND HIGHLIGHT THE STRUCTURING SYNERGIES AMONG ENDOGENOUS COMPONENTS (E.G., POLYSACCHARIDES AND MINERALS) AND EXOGENOUS (FABRICATED FILLERS) ONES.