

Dra NOEMI ELISABET ZARITZKY (Abridged Curriculum Vitae)

Place and date of Birth: La Plata, Argentina. 7 February, 1951.

Nationality: argentinian

Civil status: married.

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CONTACT

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EDUCATION:

- Chemical Engineer, Faculty of Engineering, University of La Plata, Argentina (1971).
- Postgraduate studies in Chemical Engineering. Magister in Engineering. Faculty of Engineering University of La Plata- Organization of the American States (1975)
- Doctor in Chemical Sciences (Ph.D.), Faculty of Exact and Natural Sciences, University of Buenos Aires, Argentina (1984)

- **Professor Emeritus** – Chemical Engineering Department -Faculty of Engineering, National University of La Plata. ARGENTINA since 2016

- **Full Professor** of Fluid Dynamics; Heat and Mass transfer. Chemical Engineering Department. Faculty of Engineering, National University of La Plata. Argentina **1993-2019**.

- **Researcher of the National Scientific and Technological Research Council** of Argentina (CONICET) since 1976. **Present category: Superior Researcher (Highest category) since 2007.**

-Titular Member of the Buenos Aires Academy of Engineering (since 1997)

-Titular Member of the National Academy of Engineering. Argentina (since 2007).

-Titular Member of the National Academy of Exact, Physical and Natural Sciences. Argentina since 2018

-TWAS FELLOW (The World Academy of Sciences for the advancement of science in developing countries) since 1/1/2020

Research lines

Mathematical Modelling and computing simulation. Process Optimization

- Numerical modelling of heat and/or mass transfer in heterogeneous food systems (freezing, cooking, microwave heating and thawing, frying, diffusion of preservatives in tissues) using finite differences and FEM(finite elements).
- Mathematical modeling of the diffusion of gases and liquids in foods and gels
- Mathematical Modeling of microbial growth and decline.
- Computing simulations of heat transfer in irregular domains coupled with enzymatic inactivation, protein denaturation or microbial inactivation. Process optimization.
- Measurement and modeling of thermo-physical properties

Food Engineering

- Crystallization and recrystallization of ice in solutions and frozen tissues. Effect of sugars and hydrocolloids on ice crystals in starch systems.
- Thermal transitions in foods and frozen systems: Determination of glass transitions temperatures in frozen systems by Differential Scanning Calorimetry. Relationship between the glass transition of the maximally concentrated matrix and the stability of frozen systems.
- Analysis of the microstructural changes induced by heating, freezing or refrigeration in starch based systems including different hydrocolloids (xanthan, locust bean and guar gums, sodium alginate, carboxymethylcellulose), lipid phases (monoglycerides and triglycerides) and low molecular weight carbohydrates. Relationship between microstructural changes and induced rheological modifications and exudate production.
- Development of edible coatings and biodegradable films from renewable resources. Microstructure and Physico-chemical characterization of the films (gas and water vapor permeability, Scanning electron microscopy, crystallinity by X ray diffraction, Differential Scanning Calorimetry, Atomic force microscopy).

Application of edible coatings to improve food quality

- Rheological studies in viscoelastic systems: Stress relaxation and dynamic oscillatory tests. Modelling of the linear and nonlinear viscoelastic behavior.
- Stability of low fat oil/water emulsions with nonionic surfactants: effect of hydrocolloids addition. Rheological and Viscoelastic behavior.
- Development of low fat food and gluten free products. Texture and viscoelastic analysis

Waste- water treatment:

Biological waste treatment

- Activated sludge reactors: Design and optimization.
- Effect of different factors (substrate composition, pH and oxygen concentration) on the growth and interaction of flocculant and filamentous microorganisms in activated sludge systems in order to control bulking problems. Control of filamentous microorganisms. Chlorination. Ozonation
- Cr(VI) removal in activated sludge reactors.
- Bisphenol A (endocrine disruptor) removal in biological reactors.

Physicochemical methods for waste water treatments

- Effect of chitosan and other polyelectrolytes in the destabilization of colloidal waste system (oil/water waste emulsions). Techniques applied to analyze the flocculation process: turbidimetry, colloidal titration, microscopic observation, Zeta Potential, microelectrophoresis).
- Effects of ionic strength (salt concentration), length of surfactant molecule, initial oil and surfactant concentrations and pH on the doses of coagulants necessary to destabilize o/w emulsion.
- Development of micro/nanoparticles of chitosan for Cr(VI) removal. Adsorption isotherms and Kinetic modeling.
- Application of chitosan - ferric particles for arsenic removal from contaminated water

Food processing and preservation:

- Cryopreservation of food and biological materials. Effect of freezing rate on the size and morphology of ice crystals and food quality. Recrystallization of ice. Thermal conductivity of frozen systems. Starch systems: Effect of freezing rate on retrogradation of amylose and amylopectin, ice crystals, and rheological behavior.
- Thermal processing of meat tissues: Effect of the treatment on denaturation of proteins and texture.
- Salt diffusion in meat tissues: Influence of on microstructure and water retention.
- Refrigeration of meats: Effect of packaging film gaseous permeabilities on food quality attributes (color, meat pigments by reflectance spectrophotometry, texture, microbial growth)
- Cheese ripening: relationship between caseins breakdown and viscoelastic behavior
- Action of chemical preservatives in vegetables: Diffusion of sodium bisulfite, citric acid, ascorbic acids in vegetable tissues. Effect of chemical preservatives on quality attributes: color (enzymic browning), texture, microbial growth.
- Application of non-thermal methods for food preservation: UV radiation in liquid foods, ozone and high pressure treatments. Analysis of the effects on microbial flora and quality factors

- **Author of 50 Chapters in Books** published internationally. Invited by International Editors from different countries: England, Ireland, Japan, Spain, France, Italy, Denmark, USA, Spain, Brazil, New Zealand.

- **Author of 247 research papers** published in peer reviewed international journals.

-Author of more than 500 presentations in national and international Congresses

Professor of more than 70 Postgraduate courses: Transport Phenomena in Food Engineering, Heat and Mass transfer, Thermal Treatments in Food Technology, Food Freezing, Food Rheology, Physical Properties of Food, Waste treatments, Biodegradable films and coatings, in PhD and Magister programs, of different universities in Argentina, Spain, Chile, Ecuador, Colombia, Brazil.

- **Director of the Center of Research and Development in Food Cryotechnology (CIDCA), National University of La Plata- CONICET – CIC (Period:2003-2016).**

This Institute is devoted to Food Science and Technology and is integrated by more than 150 members

-National Coordinator of RIPFADI (CYTED) Iberoamerican Network of Physical Properties of Food (1993-2004). CYTED is the Ibero-American Program of Science and Technology for Development, created by the

governments of Ibero-American countries to promote cooperation in science, technology and innovation for the harmonious development of Iberoamerica

- Director/CoDirector of 35 PhD Thesis approved

- Head of the Chemical Engineering Department, Faculty of Engineering, University of La Plata. (1994-1995)

- **Visiting Professor:** in University of Wisconsin- Madison(USA) , University of Londrina (Brasil), University of Ecuador, University of Bio- Bio (Chile), University of Colombia , Instituto del Frio Madrid (Spain).

- **Has given invited lectures in more than 125 National and International Congresses:** *International Congress of Engineering and Food (ICEF)*, International Symposium of the Properties of Water (*ISOPOW*), *Ibero-American Congress of Food Engineering(CIBIA)* etc.

- **Has conducted more than 70 technical assistance and technology transfer works demanded by the industrial sector in food engineering.**

-Holds 6 approved Patents on Food Preservation in Argentina and 3 Registered Software

Research areas: Transfer Phenomena, Food Engineering, Biopolymers, Use of waste from the food industry and Treatment of liquid effluents.

• Some of the topics of their specialty are: Food Engineering; Mathematical modeling of energy and matter transfer; Cryopreservation; Rheology and Viscoelasticity; Development and characterization of biodegradable materials; Biopolymers, Wastewater treatment and Recovery of waste from the food industry.

-Head of International Cooperation Projects with: Instituto del Frio de Madrid, Spain (Dr. Pedro Sanz) ; University of Wisconsin, USA, (Dr Richard Hartel); University of Londrina Brasil, (Dr Grossman), University of Huelva, Spain (Dr. Crispulo Gallegos); National University of Colombia (Dr. Eduardo Rodriguez Sandoval)

Editorial Board Member

-Member of the Editorial Board of the Journal Food and Bioprocess Technology: An International Journal .(2007- 2009) .Editor-in-Chief: Da-Wen Sun. Springer, New York

- Member of the Editorial Board of the Journal Food Engineering Reviews . Editor in Chief G. Barbosa Canovas Editores: Michèle Marcotte, J. Peter Clark, Yrjö Roos and Jorge Welti-Chanes. Springer.ISSN: 1866-7910

- Member of the Editorial Board del Journal of Food (CyTA.) Taylor and Francis Group.

HONORS AND AWARDS

-**TWAS AWARD 2019 IN ENGINEERING SCIENCES** (TWAS The World Academy of Sciences for the advancement of science in developing countries) (“The TWAS Prizes are awarded to individual scientists from developing countries in recognition of an outstanding contribution to scientific knowledge”)

- **DISTINGUISHING RESEARCHER OF THE ARGENTINE NATION - YEAR 2015 awarded to DOCTOR NOEMÍ ELISABET ZARITZKY** in recognition of her outstanding work in the creation of new knowledge, the training of human resources and the transfer to the socio-economic environment of technological production. (“ Investigador de la Nación”) MINISTRY OF SCIENCE, TECHNOLOGY AND PRODUCTIVE INNOVATION (MINCYT). PRESIDENTIAL DECREE 1195/2016. PRESIDENCY OF THE Argentinian Nation. November 23, 2016 .(This is the maximum honor awarded to a Scientific and Technological Researcher in Argentina by the Government)

- **BERNARDO HOUSSEY TRAJECTORY AWARD 2015** conferred to Dr. Noemi Zaritzky in the areas of : ENGINEERING, ARCHITECTURE, COMPUTING SCIENCES by the Ministry of Science Technology and

Productive Innovation. MINCYT August 2016.(This is the maximum honor awarded to Scientific and Technological Researchers in defined areas of the knowledge in Argentina by the Government)

-BUNGE & BORN FOUNDATION AWARD conferred to Dr. Noemi Zaritzky in the field of Process Engineering.(2015)

(Dr. Noemi Zaritzky was the first women that received this award in 50 years. The Bunge & Born Foundation is a non-profit organization created in Argentina since 1963, with the mission to “promote scientific research by giving awards, grants and scholarships, and carry out projects to benefit the community in the fields of education, health and culture”and is considered one of the most important awards in Argentina .

-OUTSTANDING WOMEN AWARD 2019. Faculty of Engineering Univ Nacional de La Plata. Distinction granted by the Municipality of La Plata, Institutional Relations Office. March 29, 2019.

-Scientific and Technological Award conferred to Dr. Noemi Zaritzky in the category of Researcher of the Faculty of Engineering by the National University of La Plata . Argentina (2015)

-Distinction Award granted to Dr. Noemi Zaritzky for her contributions in Science and Technology by the Commission of Scientific Research of the Province of Buenos Aires (CIC) .La Plata. Government of the Province of Buenos Aires. May 10, 2016

- Titular Member of the National Academy of Exact, Physical and Natural Sciences . Argentina(2018)

-Dra Noemi Zaritzky declared **Outstanding Personality in Science** by Deliberative Council of the Municipality of La Plata. (2016).

- **Gold Medal. Outstanding Women Award** granted by the Senate of the Province of Buenos Aires. Argentina. (2014) .

-Consecration Award of the National Academy of Exact, Physical and Natural Sciences in Food Engineering (2010).

- OUTSTANDING WOMAN AWARD 2009. Deliberant Council of La Plata. Buenos Aires- Argentina (2009)

- First women elected **Titular Member of the National Academy of Engineering.** Argentina. (since 2007)

- **Consecration Award** of the National Academy of Engineering (ACADEMIA NACIONAL DE INGENIERIA) Argentina (2006).

- Bernardo Houssay Award for Technological Scientific Research , in the category of consolidated Researcher in the Area of Agricultural Sciences , Engineering and Materials. Ministry of Science Technology and Productive Innovation. MINCYT (2006).

- First women elected **Titular Member of the Academy of Engineering Province of Buenos Aires** (since 1997)

- Golden pin to Dr Noemi Zaritzky for her “Outstanding scientific and technological trajectory”. University of Machala, Ecuador. (1996)

Scientific and technological papers awards given to Dr Zaritzky and her research group

-Best research paper Award (First prize) in Food Science and Technology . Publitec (1979)

-M. Marcolla Award . 4ºArgentine Congress of Microbiology (1985).

-Copal Award- First Latinoamerican Congress of Food Microbiology (1987)

-Publitec Award 1994 Best research work with industrial applications .VIII Latin American and Caribbean Seminar on Food Science and Technology. Uruguayan Society of Food Science and Technology, Montevideo, Uruguay, (1994)

-Honorable Mention in the First National Competition for Women Inventors, National Institute of Industrial Property. Argentine Association of Inventors, Buenos Aires (1997)

- Jorge A. Miller Award for the Best Research Paper presented at the VIII Argentine Congress of Food Science and Technology. (1999)
- First Prize in the VI Latin American Congress of Food Microbiology.MICROAL 2000
- First Prize.Best research paper Award in the XII Argentine Congress of Sanitation and Environment. AIDIS 2002
- Best research paper Award in the XIV Argentine Congress of Sanitation and Environment. AIDIS 2004
- Monsanto- CONICET Award for the Best Research Project in Biotechnology Director Dr. Noemi Zaritzky (2005)
- Dr. Raul Trucco Award for the best research paper. Asociación Argentina de Tecnólogos Alimentarios. Argentine Association of Food Technologists.X Argentine Congress of Food Science and Technology, Mar del Plata, (2005).
- Technological Innovation on Meat products Award. IPCVA, Instituto de Promoción de la Carne Vacuna (2007).
- First Prize of the National Innovation Competition (INNOVAR 2008)) MINCYT
- Participant of the Project that received the "Arcor National Award for Innovation in Foods", (2009)
- Accesit Honor Award to Dr. Noemí Zaritzky for her career granted by Grupo Accesit La Plata. Pcia Buenos Aires Argentina. (2009).
- First Prize AIDIS 2014 to the best research work in the 19th Argentine Congress of Sanitation and Environment Buenos Aires (2014).
- Honorable Mention for Innovation 2014 awarded to Dr. Noemi Zaritzky by the National University of La Plata (2014).
- IPCVA Award for Technological Innovation XV Argentine Congress of Food Science and Technology organized by the Argentine Association of Food Technologists CYTAL 2015
- Award for the best work in Poster of the Solid Waste Area .International Congress of Environmental Science and Technology, and II National Congress of the Argentine Society of Environmental Science and Technology 2015. Buenos Aires (2015) .
- SCIENCE, TECHNOLOGY AND INNOVATION 2018 AWARD “CENTENARY OF THE UNIVERSITY REFORM” of the Scientific Research Commission of the Province of Buenos Aires granted to Dr. Noemí Zaritzky. Research topic: “Waste recovery from the food industry: obtaining biopolymers of interest from industrial waste and developing applications for water treatment”. December 28, 2018
- FIRST PRIZE IN THE AREA: NANOCHEMISTRY AND NANOTECHNOLOGY in the XXXII ARGENTINE CONGRESS OF CHEMISTRY awarded to the work "Nanoferulic: from a byproduct of the beer industry towards the regeneration of the skin [13-005]". Authors: P. Bucci; V. Santos; J. Montanari; N. Zaritzky. Autonomous City of Buenos Aires, Argentina, March 12-15, 2019.
- Innovation Award , ARCOR – Ministry of Science, Technology and Productive Innovation of Argentina 2019 (Bucci. Santos and Zaritzky)

Member of Scientific Congress Committees

- IV Iberoamerican Congress of Food Engineering (CIBIA IV) Valparaíso Chile, 2003.
- Internatinal Symposium on the Properties of Water ISOPOW 2004.
- First Latin American Congress of Engineering and Applied Sciences . 2005.
- V Iberoamerican Congress of Food Engineering Alimentos CIBIA V . 2005. Jalisco. Mexico.
- President of the Scientific Committee CYTAL Congress 2007. Argentina.

- Member of the International Scientific Committee 10th International Congress on Engineering and Food, ICEF .Chile, 2008
- Member of the Scientific Committee Second Latin American Congress of Engineering and Applied Sciences. 2009.
- Member of the International Scientific Committee of the VII Iberoamerican Congress of Food Engineering CIBIA 2009. Bogotá Colombia .
- Member of the Scientific Committee of 11th International Symposium on the Properties of Water (ISOPOW XI) "Water Stress in Biological, Chemical, Pharmaceutical and Food Systems" 5 – 10 September, 2010., Querétaro.México.
- Chairperson in the 11th International Congress on Engineering and Food "FOOD PROCESS ENGINEERING IN A CHANGING WORLD" ICEF 11 22 - 26 May 2011, Athens Greece. Food Waste Engineering Session.
- Member of the International Advisory Committee of the 2nd ISEKI Conference, University of Milan, Italy 30 August . 2 September 2011.
- Member of the International Scientific Committee in the XXV Interamerican Congress of Chemical Engineering. Santiago de Chile. Chile 14-17 November 2011.
- Member of the Scientific Committee of the Latin American Congress of Engineering and Applied Sciences. 2012, San Rafael Mendoza Argentina.
- Member of the Evaluation Committee of scientific works in the XIV Argentine Congress of Food Science and Technology CYTAL. Argentine Association of Food Technologists. Rosario Santa Fe. October 23 to 25, 2013.
- Evaluator of scientific works in the II International Congress of Research and Innovation in Engineering, Food Science and Technology- IICTA 2014, Colombia. May 27 to 30, 2014
- Member of the Scientific Committee of the Latin American Congress of Engineering and Applied Sciences. CLICAP 2015, San Rafael, Mendoza.15 to 17 April 2015.
- Member of the Scientific Committee XV Argentine Congress of Food Science and Technology CYTAL. Argentine Association of Food Technologists 3 to 5 November 2015. Buenos Aires.
- Member of the Scientific Committee of II Workshop Biodegradable Polymers and Biocomposites
- III Workshop of the BIOPURFIL project, Bio-based Polyurethane Composites with Natural Filler Buenos Aires November 11 to 13, 2015.
- Member of the Evaluation Committee of Scientific Works of the XVI Argentine Congress of Food Science and Technology CYTAL. Argentine Association of Food Technologists 18 to 20 September 2017. Mar del Plata
- Member of the Scientific Committee of the Latin American Congress of Engineering and Applied Sciences. CLICAP 2015, San Rafael, Mendoza.11 to 13 April 2018

PATENTS

Patent granted (Patent Title of Invention No. 243332) of "A process designed to extend the shelf life of pre-peeled potatoes". L. Giannuzzi and N.E. Zaritzky. National Institute of Industrial Property. National Administration of Patents. Argentina. Approved in Argentina (1993)

Patent granted (Act No. 332982) of "A technological process for pre-peeled vegetables using natural preservatives" L. Giannuzzi and N.E. Zaritzky. National Institute of Industrial Property. National Administration of Patents. Approved in Argentina (1999)

Patent granted "A technological process for Red Delicious or Granny Smith apple cubes kept in orange juice with the addition of chemical preservatives".

Andrés S., Giannuzzi L. and Zaritzky N. National Institute of Industrial Property. National Administration of Patents. Application No. P020104733. Patente Minutes NoAR 037725B1 (2008)

Patent granted A technological process for the fractionation of starch suitable for the food industry. M.A. García, M.N. Martino and N.E. Zaritzky. Minutes No. P000104610. Awarded on 5/18/2009. Patent of invention N°: AR030914B1 (2009)

Patent granted "Meat product and procedure for its preparation" Noemi ZARITZKY / Carolina PENNISE FORELL / Alicia CALIFANO / Silvina Cecilia ANDRES Applicants: CONICET- UNLP Minutes No. P2008 01- 01538, National Institute of Industrial Property. National Patent Administration, Buenos Aires, Argentina. Patent granted 13 October 2013.

Patent granted "Wet mass for the preparation of tarts and pies suitable for celiacs. Zaritzky, Noemí E. Lorenzo, Gabriel; Califano, Alicia N. Applicants: CONICET- UNLP Minutes N ° P 2007-01 02517 Patent granted 7/17/2013, National Institute of Industrial Property. National Patent Administration, Buenos Aires, Argentina. Venture 6/8/2027

REGISTERED SOFTWARE

-Energy Transfer Simulation Software through the MEF in 3D Irregular Geometry Foods in Processes with phase change .F: 13085. File 977932 Authors: M. Victoria Santos, V.Vampa, A.Califano, N. Zaritzky. Headlines: National University of La Plata-CONICET November 24, 2011

-Software for Simulation of Energy Transfer by MEF in Frozen Foods in Irregular 2D / 2D Symmetric Axial Geometries.F: 13086, File 977933
Authors: M. Victoria Santos, V.Vampa, A.Califano, N. Zaritzky.Titles: National University of La Plata-CONICET 24 November 2011

-Software for Simulation of Energy Transfer through the MEF during the Thermal Treatment -Inactivation Kinetics -Macroscopic Balances. F: 13087 File 977934 Authors: M. Victoria Santos, A.Califano, N. Zaritzky.Titles: National University of La Plata-CONICET 24 November 2011

Scientific achievements: *Dr. Noemi Zaritzky has carried out an extensive original work of scientific research and technological development in Food and Environmental Engineering. She is internationally considered among the core of recognized specialists and received many awards.*

Zaritzky also has an important role in University education as Full Professor in the formation of students in research and development and has consolidated a solid research group.

The large number of publications and high number of citations reveal the impact of her work internationally.

Her research achievements are of outstanding significance for the development of scientific and technological knowledge in the areas of Food Engineering, Mathematical modelling, Water treatment and Industrial waste utilization, with important applications to sustainable development

Her main research areas are: Transport Phenomena in Food Engineering, Mathematical modeling of energy and mass transfer, Cryopreservation, Rheology and Viscoelasticity; Development and characterization of biodegradable materials, Biopolymers, Wastewater treatment and Recovery of waste from the food industry.

Dr Zaritzky has developed her entire scientific career in Argentina. She has always focused the research interests in the application of Chemical Engineering principles to the design and optimization of food processes and environmental problems.

Among the different research areas it is important to remark the following:

Mathematical modeling and computing simulations of heat and mass transfer for process optimization in food engineering with significant contributions in the analysis of thermal treatments in irregular domains coupled with enzymatic or microbial inactivation and protein denaturation for process optimization; diffusion of preservatives in tissues; physical properties of food and bio-systems. Modelling of microbial growth and decline

Cryopreservation of food and biological materials, with important contributions in micro-structural analysis in freezing, crystallization and recrystallization of ice in different matrices and the relationship with physical properties, rheological behavior, glass transitions in frozen systems.

Development and characterization of edible coatings and biodegradable films from renewable resources such as starch and other hydrocolloids.

Rheological and viscoelastic characterization of food and biopolymers

Physicochemical and biological wastewater treatment.

In many of these research lines she has published pioneering and relevant works in the international literature.

In the last years the interest was focused on the reuse of wastes from the food industry to obtain high added value products such as biopolymers and their applications (i.e. production of chitosan from the fishing industry wastes and the synthesis of micro/nanoparticles for the treatment of water contaminated with chromium, arsenic etc.)