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Summer School

EUCHIS International School on Chitosan:

One Biopolymer – Plenty of Possibilities

Iasi, Romania

26 October – 1 November 2026



ΨIOChitIns

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Organizing committee



Dr. Habil. Luminita Marin
Petru Poni Institute of Macromolecular Chemistry,
Romania



Prof. Laurent David
Claude Bernard Lyon 1 University, France



Katja Richter
CEO, Heppe Medical Chitosan, Germany



Prof. Anca Hermenean
“Vasile Goldiș” Western University of Arad, Romania



Geta Ciobanu
TERA & MTAS Consulting, Romania

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Dear participants,

We have organized this Chitosan School especially for you, young researchers at the beginning of your scientific careers. Fully aware of the complexity, particularities, and challenges of the chitosan field, we have designed this school to support your development and help you perform confidently in this fascinating research area.

To achieve this, we have invited renowned experts in chitosan, from both academia and industry, who will share with you the knowledge and experience accumulated over many years of laboratory work and active involvement in the scientific community. Their contributions will take the form of lectures, round-table discussions, workshops, and seminars.

We hope that this effort will be rewarded with your deeper understanding of the field and a broader perspective on its scientific landscape by the end of the school.

Wishing you a fruitful and inspiring experience,

The Organizing Committee



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Programme overview

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Opening ceremony Valeria Harabagiu Luminita Marin	Nanosystems Francisco Goycoolea	Antimicrobial Már Másson	Food industry Hélène Lauzon	3D-printing Anayancy Osorio Madrazo	Work visit at Stefan cel Mare University, Suceava*	Poster Awards
Generalities Laurent David	Rheology Alexandra Montembault	Recognition and processing in humans Christian Gorzelanny	Food Packaging Magdalena Gierszewska	Cancer drug delivery Már Másson		Closing Ceremony
Production from insects Thomas Hahn	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Lunch</i>
<i>Coffee break</i>	Crosslinking Magdalena Gierszewska	Biological Evaluation Anca Hermenean	Environmental Remediation Valentina Dinu	Health and well-being Hélène Lauzon	Seminar on Chitosan properties*	
SEC 1 Catherine Ladavière	Hydrogelation/ Electrospinning Luminita Marin	Regulatory Aspects Katja Richter	Do Three Batches Prove a Process? Katja Richter	Scale-up Radu Ciobanu	<i>Lunch</i>	
SEC 2 Katja Richter	Textile industry Thomas Hahn	<i>Lunch</i>	<i>Lunch</i>	Veterinary applications Iolanda Onceriu	Seminars on Chitosan applications and future challenges*	
<i>Lunch</i>	<i>Lunch</i>	From Nanoformulation to Function Francisco Goycoolea	Workshops/ Seminars	<i>Lunch</i>		
Round table 1 Laurent David, Már Másson, Francisco Goycoolea	Visit of the institute	Round table 2 Katja Richter, David Laurent, Hélène Lauzon		Poster presentations		
<i>Dinner</i>	Workshops/ Seminars	POSTER session		<i>Festive dinner</i>		
	<i>Dinner</i>	<i>Light evening snack</i>	<i>Dinner</i>			

*North of Moldavia

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Day 1 (Monday, 26th of October 2026)
Let me introduce myself: Hi, I am Chitosan!

09.00 – 09.30 Opening ceremony

Welcoming message

Dr. Valeria Harabagiu

Presentation of the PIOChitIns project

Dr. Habil. Luminita Marin

09.30 – 10.30

Generalities about chitin and chitosans

Professor Laurent David

10.30 – 11.45

Chitosan production from insect residues

Dr. Thomas Hahn

11.45 – 12.15

Coffee break

12.15 – 13.00

Size Exclusion Chromatography (SEC) of chitosan and chitosan oligomers

Professor Catherine Ladavière

13.00 – 13.45

SEC and chitosans – Is it love at first sight or should they just be friends?

Katja Richter

13.45 – 15.00

Lunch

15.00 – 16.30

Round table with the central theme: *How to write a good paper about chitin/chitosan*

Moderators: **Prof. Laurent David, Prof. Már Másson, Prof. Francisco Goycoolea**

16.30 – 20.00

Dinner

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Day 2 (Tuesday, 27th of October 2026)

Me, myself and my many forms

09.00 – 10.00

Designing chitosan nanosystems: From molecular interactions to nanoparticles, nanocapsules and chitosomes

Professor Francisco M. Goycoolea

10.00 – 10.50

Rheology of chitosan solutions and gels for material development

Professor Alexandra Montembault

10.50 – 11.15

Coffee break

11.15 – 12.00

Ionic and covalent crosslinking of chitosan: From network formation to material performance

Professor Magdalena Gierszewska

12.00 – 12.45

Chitosan crosslinking with monoaldehydes. Chitosan electrospinning

Dr. Luminita Marin

12.45 – 13.30

Chitosan applications in the textile industry

Dr. Thomas Hahn

13.30 – 15.00

Lunch

15.00 – 16.00

Visit of the Petru Poni Institute of Macromolecular Chemistry

16.00 – 18.00

Workshops/Seminars:

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(1) NMR investigation of chitosan: Sample preparation, spectral acquisition, data processing and interpretation, calculation of the degree of deacetylation, and particular considerations

Dr. Alina Nicolescu

(2) Preparation of hydrogels through chitosan crosslinking with monoaldehydes

Dr. Daniela Ailincăi, Dr. Manuela Iftime, Dr. Anda Mihaela Craciun

(3) Preparation of chitosan nanofibers by electrospinning

Dr. Alexandru Anisie, Dr. Diana Serbezeanu

(4) Investigation of morphology and composition by scanning electron microscopy and EDAX on chitosan-based biomaterials, including nanofibers, hydrogels, and nanoparticles

Dr. Daniela Rusu, Dr. Oana Dumbrava

(5) Investigation of morphology by polarized light microscopy on chitosan-based biomaterials including nanofibers, hydrogels, and nanoparticles

Dr. Dumitru Popovici, Dr. Andrei Bejan

(6) Mucoadhesion and bioadhesion measurements on chitosan-based biomaterials

Dr. Marieta Constantin-Fundueanu, Dr. Bianca Andreica, Dr. Vera Platon

(7) Mechanical properties on chitosan-based biomaterials

Dr. Valentina Dinu, Raluca Elena Avram

(8) Unlocking the antimicrobial potential of chitosan based biomaterials. Particularities and challenges (*seminar*)

Dr. Irina Rosca

The workshops will take place in the ICMPP laboratories, equipped with all necessary instruments. Participants will practice producing and characterizing these biomaterials together with members of the ICMPP team.

For better organization, participants are asked to indicate their willingness to take part in up to **five** specific hands-on training sessions.

18.00 – 20.00

Dinner

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Day 3 (Wednesday, 28th of October 2026)

Loved by cells, feared by bacteria

09.00 – 10.00

Antimicrobial chitosan and chitosan derivatives

Professor Már Másson

10.00 – 11.00

Chitin and chitosan recognition and processing in humans

Professor Christian Gorzelanny

11.00 – 11.30

Coffee break

11.30 – 12.30

Biological evaluation of chitosan-based biomaterials for medical applications

Professor Anca Hermenean

12.30 – 13.30

Chitosan regulatory aspects in pharmaceuticals and medical devices

Katja Richter

13.30 – 15.00

Lunch

15.00 – 16.00

From nanoformulation to function: Chitosan-based nanosystems for health, food and bioengineering

Professor Francisco M. Goycoolea

16.00 – 17.00

Round table: Kill your darling? - How industry decides when to continue, change direction or stop (How research decisions are viewed from an industrial perspective. How are negative or inconclusive results evaluated, how decisions are made under uncertainty, and how deadlines, budgets, customer expectations and commercial realities influence whether a project is continued, redirected or stopped.)

Moderators: **Katja Richter, Professor David Laurent, Dr. Hélène Lauzon**

17.00 – 18.00 - Poster session; **18.00 – 19.00** - *Light evening snack*

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Day 4 (Thursday, 29th of October 2026)
Heal, Feed, Wrap, Clean: a day in my life

09.00 – 10.00

Multifunctionality of chitosan in the food industry

Dr. Hélène L. Lauzon

10.00 – 11.00

Chitosan-based materials for active and intelligent packaging: From functionality to application

Professor Magdalena Gierszewska

11.00 – 11.30

Coffee break

11.30 – 12.30

From chitosan to advanced composites: Sustainable materials for environmental remediation

Dr. Valentina Dinu

12.30 – 13.30

Do three batches prove a process? A regulatory view on validation and process understanding

Katja Richter

13.30 – 15.00

Lunch

15.00 – 18.00

Workshops/Seminars:

(1) NMR investigation of chitosan: sample preparation, spectral acquisition, data processing and interpretation, calculation of the degree of deacetylation, and particular considerations

Dr. Alina Nicolescu

(2) Preparation of hydrogels through chitosan crosslinking with monoaldehydes

Dr. Daniela Ailincăi, Dr. Manuela Iftime, Dr. Anda Mihaela Craciun

(3) Preparation of chitosan nanofibers by electrospinning

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(4) Investigation of morphology and composition by scanning electron microscopy and EDAX on chitosan-based biomaterials, including nanofibers, hydrogels, and nanoparticles

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Dr. Daniela Rusu, Dr. Oana Dumbrava

(5) Investigation of morphology by polarized light microscopy on chitosan-based biomaterials including nanofibers, hydrogels, and nanoparticles

Dr. Dumitru Popovici, Dr. Andrei Bejan

(6) Mucoadhesion and bioadhesion measurements on chitosan-based biomaterials

Dr. Marieta Constantin-Fundueanu, Dr. Bianca Andreica, Dr. Vera Platon

(7) Mechanical properties on chitosan-based biomaterials

Dr. Valentina Dinu, Raluca Elena Avram

(8) Unlocking the antimicrobial potential of chitosan based biomaterials. Particularities and challenges (*seminar*)

Dr. Irina Rosca

18.00 – 20.00

Dinner

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Day 5 (Friday, 30th of October 2026)

Am I ready for the real world?

09.00 – 10.00

Chitosan 3D-printing

Professor Anayancy Osorio Madrazo

10.00 – 10.45

Nanoparticles from chitosan-photosensitizer conjugates for photochemical internalization in cancer drug delivery

Professor Már Másson

10.45 – 11.15

Coffee break

11.15 – 12.15

Creating chitosan-based products with added-value to improve health and well-being

Dr. Hélène Lauzon

12.15 – 12.45

Scaling up chemical processes for industrial impact

Radu Ciobanu

12.45 – 13.30

Functional valorization of insect-derived chitosan through the development of formulations for veterinary applications

Iolanda Onceriu

13.30 – 15.00

Lunch

15.00 – 17.00

Poster presentations

18.00 – 20.00

Festive dinner

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Day 6 (Saturday, 31st of October 2026)
Chitosan goes out of the lab and into the North

*Work visit at Stefan cel Mare University, Suceava, North of Moldavia.
Seminars focused on chitosan applications and future challenges.*

Day 7 (Sunday, 1st of November 2026)
It is not goodbye, it is see you next batch!

10.00 – 10.30

Best poster Awards

10.30 – 11.30

Concluding remarks

**Professor Laurent David, Katja Richter, Professor Francisco Goycoolea, Dr. Hélène Lauzon,
Professor Már Másson, Professor Magdalena Gierszewska, Radu Ciobanu, Professor Anca
Hermenean, Iolanda Onceriu, Dr. Valentina Dinu, Dr. Luminita Marin**

11.30 – 12.00

Coffee break

12.00 – 14.00

Lunch

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Lecturers and lectures



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Laurent David

Professor Laurent David is the Group Leader of “Polymer Materials at the Interface with Life Sciences” at the Ingénierie des Matériaux Polymères (Polymer Engineering Laboratory), *Université Claude Bernard Lyon 1, France*. His research group explores the complex relationships between polymer structure, dynamics, and biological function, with a particular emphasis on natural polysaccharides, such as chitin and chitosans.

Professor David earned his Ph.D. in Materials Science in 1993 at INSA Lyon, MATEIS, under the supervision of Professor Serge Etienne, with a thesis focused on molecular mobility in parasubstituted polyaryls. In 2001, he obtained his Habilitation to Supervise Research at INSA Lyon, with a thesis on structure and dynamics in selected non-crystalline systems. His earlier training includes a Master of Science in Mechanics and Materials from École Centrale de Lyon (1990), where he investigated hydrogels for orthopedic applications.

Since 2002, Professor David has been Full Professor at Université Claude Bernard Lyon 1, following his tenure as Associate Professor at MATEIS (1994–2001). Over the past decades, he has built an internationally recognized research program with scientific contributions in major domains: Nanostructure analysis of polymer systems, using SALS, synchrotron SAXS, and neutron scattering (SANS); Glass transition and relaxation phenomena in glass forming systems; Natural polymers, especially chitin and chitosan, processing, structural characterization, and evaluation of dielectric, mechanical, and biological properties; Hydrogels for tissue engineering and wound healing, with a focus on structure-function relationships; Natural fiber spinning.

Professor David has supervised 35 doctoral theses and his publication record includes approximately 250 peer reviewed articles, 3 books, and 35 patents, reflecting both his academic depth and his commitment to innovation and technology transfer. His scientific impact is widely recognized, with an H index of 53 (Web of Science) and 61 (Google Scholar).

Beyond his research achievements, Professor David plays a central role in the European scientific community as President of the European Chitin Society (EUCHIS), where he fosters collaboration, knowledge exchange, and the advancement of chitin and chitosan science across Europe and beyond.

Professor Laurent David’s career exemplifies interdisciplinary vision, and sustained leadership in polymer materials and biopolymer research. His contributions continue to shape the field, bridging fundamental understanding with applications that impact biotechnology, medicine, and sustainable materials.

Talk: Generalities about chitin and chitosans

This introductory lecture will present the fundamentals of chitin and chitosans. The talk will cover their definitions, chemical structures, occurrence in nature, and isolation from biomass.

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The principal methods used for their characterization will be briefly introduced, followed by an overview of their key physicochemical and biological properties. Finally, selected applications of chitosan-based materials in biomedicine and environmental protection will be presented.

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Katja Richter

Katja Richter is the CEO and founder of *Heppe Medical Chitosan GmbH* (HMC), a German company specializing in chitosan and chitosan derivatives for biomedical, pharmaceutical and medical device applications. She has more than 20 years of experience in chitosan technology, industrial scale-up, quality management and regulatory requirements. She studied biotechnology at the Technical University of Braunschweig, Germany, where her focus was on chitosan-based drug delivery systems. Her work focuses on translating chitosan-based concepts from research into reproducible, specification-compliant materials and manufacturing processes. She has extensive experience in material characterization, process development, quality-by-design and regulatory aspects related to ISO 13485 and GMP environments.

In addition to her company, she has been on the Board of EUCHIS (European Chitin Society) since 2009 and treasurer of the society since 2017. Since 2022 she is a board member and treasurer of the association for pharmaceutical companies "Life Science Cluster Saxony Anhalt" in Germany. Katja Richter is also a member of EPNOE (European polysaccharide network of excellence) and member of the analytics group of EPNOE, which is working on standardization of polysaccharide analysis.

Talk 1: SEC and chitosans – Is it love at first sight or should they just be friends?

This talk focuses on the practical challenges of obtaining reliable and comparable SEC results for chitosan. It highlights critical method parameters, common sources of variability and specific considerations when analyzing chitosans across a broad molecular weight range.

Talk 2: Chitosan regulatory aspects in pharmaceuticals and medical devices

Lecture gives a basic overview of the regulatory frameworks relevant to chitosan in pharmaceutical and medical device applications. It explains the role and scope of ISO 13485, EU-GMP requirements and pharmacopeial standards, and highlights how these frameworks differ and where they become relevant for research and development.

Talk 3: Do three batches prove a process? A regulatory view on validation and process understanding

This presentation highlights why testing only a few chitosan batches may not be sufficient to demonstrate robust product performance. It discusses the importance of including chitosans with different relevant material characteristics during research and development in order to understand

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variability, define meaningful specifications and establish a reliable design space for the final product.

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Francisco M. Goycoolea

Professor Francisco Goycoolea earned a BSc in Chemistry/ Pharmacy/ Biology from Universidad La Salle/UNAM, Mexico (1988), an MSc in Food Science from the University of Reading, UK (1990), and a PhD in Food Polysaccharides from Cranfield University, UK (1994). Since 2023, he has been appointed Distinguished Professor at the Faculty of Biology, *Universidad de Murcia, Spain*, under the “Beatriz Galindo” Fellowship. He was a Professor of Biopolymers at the University of Leeds (2016-2023).

Previously, he was a tenured Research Scientist and Group Leader at CIAD, Mexico (1995–2010), held visiting positions at the Universidad Complutense de Madrid and Universidad de Santiago de Compostela, where he was awarded an international incoming Marie Curie Fellowship (2008-2010). As Junior Professor at the University of Münster (2010–2016), he was part of an international graduate school “Molecular and Cellular Glycosciences” and a principal investigator in three international projects.

Professor Francisco Goycoolea is an authority in biopolymer science, nanobiotechnology and food structure, with more than 30 years of experience. His research work focuses on sustainable biomass-derived polymers, particularly chitin and chitosan, as building blocks for soft materials, such as colloidal nanoparticles, hydrogels, and bioinspired materials for biomedical, food and biotechnological applications. He has led projects on microplastic remediation, crustacean-waste valorization and chitosan nanoencapsulation for anti-quorum-sensing applications. His research spans bioactive delivery, interactions with mucosa, epithelia and biofilms, microfluidic cell phenotyping, antibiotic-free antimicrobial strategies.

Professor Francisco Goycoolea has authored more than 200 peer-reviewed publications and book chapters, supervised 23 PhD theses, and collaborated with universities, research centers and industry worldwide. He has held leadership roles in the *European Chitin Society* and the *Iberoamerican Chitin Society* and editorial positions in prestigious journals, such as *Food Hydrocolloids* and *Pharmaceutics*.

Talk 1. Designing chitosan nanosystems: From molecular interactions to nanoparticles, nanocapsules and chitosomes

Chitosans offer unique properties for the formulation of colloidal nanoparticles by different routes. These include matrix-type systems such as those obtained harnessing ionotropic gelation, nanoprecipitation, polyelectrolyte complexation or electrokinetic methods. Emulsion-based methods include solvent displacement: spontaneous emulsification, reversed emulsion physical gelation and Pickering emulsion stabilization. Liposomes coated with chitosan (chitosomes) are

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yet another well-established platform of this kind. In this lecture, I will address the principles of the formation and will also demonstrate how the concepts and tools of nanobiotechnology and soft matter physics help us understand the role of chitosans characteristics (molecular weight, degree of acetylation and pattern of acetylation) on each. With reference to concrete examples, I will show how these principles are used to guide the rational design of the physical properties of these systems. Emphasis will be given to the key techniques of characterization of the biophysical properties.

Talk 2. From nanoformulation to function: Chitosan-based nanosystems for health, food and bioengineering

Chitosans currently offer a sustainable alternative for the design and development of versatile tools based on flexible structures relevant to food, pharmaceuticals, and biomaterials. In this lecture, I will address how chitosans of varying structural characteristics (molecular weight and degree of acetylation) can be designed to control structure, stability, and functionality of applied systems. I will refer to examples of nanoparticles designed for the oral delivery of phytochemicals and active pharmaceutical ingredients, with a focus on improving bioavailability, modulating bioactivity, and targeting specific biological interfaces. I will also show how to leverage the interactions of biopolymers with epithelial barriers, mucous membranes, and bacterial biofilms, opening new opportunities for antimicrobial and antivirulence strategies that go beyond the use of conventional antibiotics. Finally, I will connect these advances with the current challenges and potential synergies with aquaculture research at the University of Murcia.

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Catherine Ladavière

Professor Catherine Ladavière, PhD, earned her doctorate in Polymer Chemistry from Lyon 1 University (France) in 1998. She is a CNRS Research Director at *Claude Bernard Lyon 1 University, France*, and her work focuses on the interface of Life Sciences, particularly the design and physicochemical behavior of lipid layer/polymer nanoparticle assemblies, as well as liposome/polymer hydrogel devices, both developed as delayed-release biosystems. She also possesses extensive expertise in the physicochemical characterization of polymers in solution, colloids in suspension, and structural analyses of macromolecules using MALDI-TOF mass spectrometry.

Talk: Size Exclusion Chromatography (SEC) of chitosan and chitosan oligomers

The lecture will present the principle of Size Exclusion Chromatography (SEC) for polymer characterization, along with the results obtained using this separation technique and its main associated detectors. Examples will be provided for the analysis of chitosan and chitosan oligomers.

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Már Másson

Professor Már Másson is a leading scientist in medicinal chemistry and biopolymer research, with an international academic trajectory spanning Iceland, Denmark, and Japan. He earned his Bachelor of Science in Chemistry from the University of Iceland in 1987, followed by a *Cand. Scient.* (M.S.) in Organic Chemistry from the University of Copenhagen in 1990. In 1995, he completed a Doctor of Engineering in Biotechnology at the Tokyo Institute of Technology, where his research focused on bioelectronics

and biosensors.

After returning to Iceland, Professor Már Másson dedicated the first decade of his career to drug delivery systems, particularly those based on cyclodextrins. He joined the Department of Pharmacy at the *University of Iceland* in 1995 as a Postdoctoral Researcher, became Associate Professor of Medicinal Chemistry in 1998, and has served as Professor of Medicinal Chemistry at the Faculty of Pharmaceutical Sciences since 2005.

Professor Másson leads a research group internationally recognized for its work on the synthesis and characterization of chitosan derivatives. Under his direction, the group developed the influential TBDMS protection strategy, enabling chemoselective and highly controlled modification of chitosan. His team investigates a wide range of applications, including antimicrobial chitosan derivatives, permeation enhancers acting on tight junctions in pulmonary epithelium, chitosan nanocarriers for photochemical internalization, and chitosan-based coatings for regenerative medicine.

Beyond biopolymer chemistry, Már Másson collaborates with engineers and mathematicians to develop numerical modeling frameworks for drug delivery systems, including transdermal and ophthalmic applications. He is co-founder, together with his Ph.D. student Vivien Nagy, of the spin-off company Minamo, which is based on his patented invention (PCT application) and focuses on antimicrobial coatings for silicone medical devices. Professor Másson has also played an important role in the international chitin and chitosan community. He co-organized the 14th International Conference of the European Chitin Society (EUCHIS 2023) and the 15th International Conference on Chitin and Chitosan (ICCC)/1st Conference of the International Federation of Chitin and Chitosan Societies (IFCCS), held in Siglufjörður, Iceland, in September 2023.

Professor Másson is the author or co-author of more than 110 ISI-indexed publications, and inventor or co-inventor on 5 patent applications and 1 granted patent. His scientific impact is reflected in an H-index of 41 (ISI) and 50 (Google Scholar). Beyond his research achievements,

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Professor Másson plays a central role in the European scientific community as a vice-president of the European Chitin Society (EUCHIS) and editor of the prestigious journal *Carbohydrate Polymers*.

Talk 1. Antimicrobial chitosan and chitosan derivatives

This presentation provides an overview of the current state-of-the-art in antimicrobial chitosan and chitosan derivatives, with particular emphasis on how structural modifications influence biological activity and toxicity. It discusses the various synthetic strategies used for the chemical modification of chitosan and highlights the most common functional groups introduced. The antimicrobial derivatives are classified according to the type of functional group attached to the polymer backbone. Key factors affecting antimicrobial performance, (such as molecular weight, pKa and cationic charge density, deacetylation degree, substitution degree, positioning of the cationic charge, hydrophobicity, multiple functional groups, effects of anionic, polar and peptide groups) are examined, together with the proposed mechanisms of antimicrobial action and cytotoxicity. In addition, the presentation outlines the main applications of antimicrobial chitosan and its derivatives, and based on the collective evidence, identifies future research directions aimed at deepening the understanding of their bioactivity and enabling the development of more effective chitosan-based conjugates.

Talk 2. Nanoparticles from chitosan-photosensitizer conjugates for photochemical internalization in cancer drug delivery

Photochemical internalization (PCI) uses photosensitizers and light to release endocytosed therapeutics from intracellular vesicles, thereby enhancing their access to cellular targets. We developed chitosan-based nanoconjugates containing covalently linked photosensitizers for PCI and anticancer drug delivery. TBDMS-protected chitosan enabled efficient synthesis of conjugates with tetraphenylporphyrin (TPP) and tetraphenylchlorin (TPC). The conjugates self-assembled into nanoparticles of approximately 100–300 nm and enhanced PCI-mediated gene delivery in human colon carcinoma cells. TPC conjugates, which permit activation at longer wavelengths, also demonstrated photodynamic therapy and PCI effects with bleomycin in preliminary tumor models. Furthermore, TPC–chitosan conjugates formed biodegradable nanoparticles with high loading and retention of mertansine or cabazitaxel. Drug-loaded nanoparticles showed greater cytotoxicity than free drugs in breast cancer cell lines and accumulated in tumors in mice. These results demonstrate the potential of photosensitizer-chitosan nanoconjugates as multifunctional platforms for light-activated combination cancer therapy and targeted drug delivery.

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Anayancy Osorio-Madrazo

Professor Anayancy Osorio Madrazo is a scientist specialized in polymer biomaterials, materials science, biofabrication, and organ printing. She obtained her Diploma/BSc. in Chemistry from the University of Havana and University of Las Villas, Cuba, in 2001, followed by an MSc. in Materials Science and Engineering from the University of Havana in 2003. She began her academic career as an associate researcher at the Biomaterials Center of the University of Havana and as an instructor at the Faculty of Chemistry and Pharmacy, University of Las Villas.

From 2004 to 2009, she completed her PhD in Polymer Materials and Composites at the University Claude Bernard Lyon 1 and UMR/CNRS 5223 in France. She subsequently conducted postdoctoral research at the Max Planck Institute of Colloids and Interfaces in Germany, where she later became an independent investigator. Between 2011 and 2022, she held research leadership and teaching positions at the University of Freiburg, including Research Group Leader, Lecturer, and Independent Junior Research Group Leader with the right to supervise doctoral theses, equivalent to an Associate Professor position.

In 2023, Osorio Madrazo became Head of the Department of Polymer Biomaterials at Friedrich Schiller University Jena. Since 2024, she has been Head of the Department of Organ Printing at the *University of Bayreuth*, Faculty of Engineering Sciences. Since 2011, she has also been actively involved in university teaching in Germany, developing and teaching courses at Bachelor's and Master's levels in chemistry, polymer processing, bioinspired functional materials, materials science, and biofabrication.

Her scientific career has been recognized through several prestigious distinctions, including an EU Alpha II PhD Scholarship, a Max Planck Society Fellowship for Independent Investigators, the Margarete von Wrangell Grant, an invited fellowship at Harvard Medical School, and the DFG Emmy Noether Junior Research Group Grant of €1.9 million. She has also held invited research and professorial positions in France and Italy and served on research and doctoral examination committees internationally.

Osorio Madrazo has extensive experience in the supervision and mentoring of early-career researchers. Since 2017, she has supervised eight PhD theses, 15 Master's theses, three Bachelor's theses, and six postdoctoral researchers, in addition to hosting numerous advanced laboratory internships. She has served as reviewer, examiner, and president of 15 doctoral defense committees across Germany, France, the United Kingdom, and Spain. Since 2023, she has also served as Secretary General of the European Chitin Society (EUCHIS).

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Talk: Chitosan 3D-printing

This lecture aims to describe and exemplify practical biofabrication approaches used in the development of 3D constructs based on chitosan which aims to mimic the native microenvironment of tissues and cells through additive manufacturing methods like 3D (bio)printing. Chitosan (CHI), a biopolymer with attractive biocompatibility, biodegradability and bioactive properties can be used to obtain viscous systems called (bio)inks, which rheological properties are assessed for extrudability and printability to achieve chitosan-based 3D constructs of high resolution, mechanical stability and possibly spatial resolution of cells and biological compounds, these latter in the context of tissue engineering. Free-standing 3D hydrogel structures of combined relevant biomaterials like chitosan and appropriate mechanical strength can be produced, which scaffold microstructure with interconnected pores allows for cell adhesion, migration, proliferation, and 3D cell growth. 3D (bio)printed chitosan biomaterials are promising for the successful translation into the clinics of tissue engineering functional tissues and organs with bioactivity, biocompatibility, and tunable biodegradability for biomedical applications.

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Christian Gorzelanny

Professor Christian Gorzelanny has been an independent group leader at the *University Medical Center Hamburg-Eppendorf* since 2018. He began his scientific career in Münster and Lyon, where he first came into contact with chitosan in the laboratory of Alain Domard. During his PhD in Münster, he investigated the effects of chitosan on mammalian cells, with a particular focus on human chitinases. He subsequently completed postdoctoral research at the University of Heidelberg, studying the interplay between the coagulation system, pathogens and cancer cells. His current work centers on the molecular interactions between glycosaminoglycans, mammalian chitinases and chitosans in regulating innate immune responses.

Talk: Chitin and chitosan recognition and processing in humans

Mammals, including humans, express a variety of putative chitin receptors, chitinases and chitinase-like proteins. Previous research indicates that these factors cooperate to promote the recognition of chitin-containing pathogens such as fungi. However, the chitin-recognition and processing machinery is not only upregulated during infections but also in sterile chronic inflammatory diseases and cancer, suggesting additional molecular targets beyond chitin or chitosan. Current evidence points to roles in extracellular matrix remodeling, angiogenesis and immune cell activation. In our previous work, we discovered that the human chitinase-like protein chitinase-3-like-1 cooperates with the extracellular matrix component heparan sulfate to facilitate the recognition of chitosan via toll-like receptor 2. Although this molecular mechanism highlights a pathway for pathogen recognition by the innate immune system, similar mechanisms may contribute to the biological activities of chitosan-containing biomaterials that promote wound healing or tissue regeneration.

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Alexandra Montembault

Dr. Alexandra Montembault is a professor at University *Claude Bernard Lyon 1* since 2021. She obtained in 2001 an engineering degree, and a master's degree in biotechnological and food processes. She then obtained her PhD in polymer materials from the University of Lyon 1 in 2004. During her thesis in collaboration with the company Laboratoires Genévrier, she worked on a formulation for cartilage regeneration, associating chitosan physical microgels and chondrocytes. Then she obtained in 2005 a position as an associate professor at the University Claude Bernard Lyon 1.

Today, she works in the Polymer Materials Engineering laboratory (IMP, UMR CNRS 5223), as a group leader of the “Polymer Materials at the Interface with Life Science” research department. Her research activities are focused on the design and development of natural polymer-based materials (in particular, chitosan-based physical hydrogels, solutions, fibers, etc.) for various applications in tissue engineering and delivery of active molecules or macromolecules. She is the co-author of 70 publications published in peer-reviewed journals and 16 patents.

Talk: Rheology of chitosan solutions and gels for material development

Rheology is the science that studies the flow and deformation of matter (liquids, gels, pastes, soft solids, etc.), under the influence of applied forces. In the context of developing chitosan-based materials, this tool can help us, for example, to evaluate the stiffness of gels, to measure the viscosity of solutions to assess their spinnability, and not only. It is also a powerful tool for comparing hydrogel networks and understanding their formation, particularly by determining the gel point.



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Thomas Hahn

Dr.-Eng. Thomas Hahn studied chemistry at the Technical University of Kaiserslautern. From 2008 to 2012, he worked at the Department of Bioprocess Engineering, where he completed his doctorate on innovative downstream processes for the purification of heteropolysaccharides. In 2012, he joined the *Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB* in Stuttgart as a research scientist. Since then, he has developed and led industrial and publicly funded R&D projects on

bioprocess development, analytical methods and the valorization of renewable resources and waste streams. A major focus of his work is the analysis and purification of chitin-containing biomasses from marine, insect and fungal sources, their conversion into high-purity chitosan, and the development of applications in textiles, coatings and wastewater treatment. Since March 2026, he has served as Operational Lead for Biotechnology in Stuttgart, coordinating staff, laboratories and technical resources.

Talk 1: Chitosan production from insect residues

The presentation introduces the production of chitosan from insect-derived side streams, with particular emphasis on residues from Black Soldier Fly processing. It explains how the composition of exuviae and adult insects determines the required sequence of defatting, deproteinization, demineralization and optional bleaching. A further focus is the quantitative balancing of chitin-containing streams to assess chitin recovery and identify suitable routes for their valorization. Special attention is given to analytical methods for monitoring chitin purity throughout the process and to the subsequent conversion of chitin into chitosan. The talk discusses process optimization, reduced use of chemicals and water, scale-up from laboratory to pilot scale, and the influence of process conditions on product quality. It concludes with opportunities for integrating chitosan production into insect biorefineries and valorizing additional fractions such as proteins, lipids and melanin.

Talk 2: Chitosan applications in the textile industry

This presentation provides an overview of chitosan as a versatile bio-based material for textile processing and finishing. Its cationic character, film-forming ability, biodegradability and accessible amino groups enable applications as a sizing agent, binder, coating matrix and functional finishing component. Examples include antibacterial treatments and water-repellent finishes in which modified chitosan supports the fixation of hydrophobic compounds on textile surfaces. The talk addresses formulation, cross-linking, application by established textile processes, performance testing and the influence of chitosan quality on the final material properties. Current limitations,

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including solubility, durability, mechanical performance and cost, are discussed together with future opportunities for circular and locally sourced textile materials.

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Hélène L. Lauzon

Dr. Hélène L. Lauzon, R&D Director at *Primex* since 2013, has been responsible for chitosan-based research and product development at the company, determining business opportunities while contributing to various national and international research projects. Dr. Lauzon has a PhD in Biomedical Science, as well as MS/BS degrees in Food Science. Through her earlier profession as a senior researcher at a food and biotech research institute in Iceland for over 20 years, she has gained experience in microbiological research of fishery products, as well as quality evaluation, product development and management of research projects, being a project manager for many national, Nordic and European projects. Her earlier research has been in the field of spoilage and safety of fishery products, biopreservation, methods to extend shelf life of various fish products, predictive microbiology, as well as development of preventive measures and application of probiotics in aquaculture. Dr. Lauzon is the author of 5 book chapters and about 30 peer reviewed papers (h-index: 23), as well as a co-inventor of 5 granted patents.

Talk 1: Multifunctionality of chitosan in the food industry

Chitosan has received much attention as an interesting biopolymer for academic and applied research over the last decades. This functional material has demonstrated real value for the food industry in food preservation, edible coatings, beverage clarification, pre- and post-harvest handling, meat and dairy preservation, as a fiber in health and nutrition, and sustainable packaging development. This is explained by its multifunctionality, combining for example antimicrobial activity, antioxidant capacity, biodegradability and film-forming properties, furthermore allowing protection and delivery of active ingredients. Some examples will be presented. Such properties indeed extend the use of chitosan at a wider scale, including industrial, medical and cosmetic fields to name a few. Nevertheless, different chitosan sources, processing methods and formulations may influence the properties and performance of chitosan products, while different regulatory requirements worldwide render their development and marketing more complex.

Talk 2: Creating chitosan-based products with added-value to improve health and well-being

Primex ehf is a marine biotech company established in Iceland since 1999. It is a global leader in sustainable production of high quality chitosan. ChitoClear® chitosan, a Primex trademark, is a natural fiber obtained from the shell of coldwater shrimp and forms the basis of all Primex's products used in the development of food supplements, skin care products and medical devices, among others. Primex received the Icelandic Innovation Award in 2012 for great progress in turning waste into value, and has since then developed several chitosan-based products with

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significant clinical values which will be presented. Primex is dedicated to scientific innovation aimed at improving lives of humans and animals, with deep reverence to planet Earth.

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Magdalena Gierszewska

Dr. Magdalena Gierszewska is a researcher at the Faculty of Chemistry, *Nicolaus Copernicus University in Toruń, Poland*, specializing in polymer and materials chemistry, with a particular focus on natural polymers and the development of functional biopolymer-based materials. Her research is centered primarily on chitin and chitosan, including the design, modification and physicochemical characterization of films, coatings, hydrogels and other polymeric systems intended for applications in food packaging, biomedicine

and pharmacy.

A major part of her scientific activity concerns the modification of chitosan-based materials through plasticization, ionic and covalent crosslinking, incorporation of natural bioactive compounds, deep eutectic solvents and other functional additives. Her work combines material design with comprehensive characterization of structure-property relationships, including mechanical, thermal, surface, swelling, barrier and biological properties. She has also been involved in research on biodegradable packaging materials, antimicrobial and antioxidant systems, polymer-solvent interactions and the processing of chitin and chitosan.

She has authored or co-authored more than 40 publications indexed in Scopus and has an h-index of 24. Her research has been conducted within interdisciplinary and international collaborations, including Universidad Carlos III de Madrid, Aarhus University, University of Bologna, University of Ljubljana. She has also been involved in research groups focused on biodegradable packaging materials and biomaterials.

Alongside her research activity, she serves as Editor-in-Chief of Progress on Chemistry and Application of Chitin and its Derivatives and is actively involved in the scientific community working on chitin, chitosan and related biopolymers. Her current research interests focus on designing multifunctional, sustainable polymeric materials and understanding how chemical modification and formulation affect their physicochemical and functional performance.

Talk 1: Ionic and covalent crosslinking of chitosan: From network formation to material performance

Crosslinking is one of the key approaches used to control the structure, stability and functional properties of chitosan-based materials. The presentation will address ionic and covalent crosslinking strategies and their consequences for the organization and behaviour of chitosan networks. The relationship between crosslinking mechanisms and material properties, including swelling, solubility, mechanical performance, transport properties and stability, will be considered. Particular emphasis will be placed on how the selection and extent of crosslinking can be used to

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tailor chitosan-based films, hydrogels and related systems for different applications, while also considering the main limitations and trade-offs associated with individual crosslinking approaches.

Talk 2: Chitosan-based materials for active and intelligent packaging: From functionality to application

Chitosan offers a versatile platform for the development of active and intelligent packaging materials due to its film-forming ability, chemical functionality, biocompatibility and potential biological activity. The presentation will focus on strategies used to introduce active and responsive functions into chitosan-based films and coatings, with particular emphasis on the relationships between material composition, structure and functional performance. Selected approaches involving antimicrobial and antioxidant agents, natural extracts and stimuli-responsive components will be discussed together with their influence on physicochemical, mechanical and barrier properties. Particular attention will also be given to the challenges associated with translating multifunctional chitosan-based systems into practical packaging applications.

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Maria Valentina Dinu

Dr. Habil. Maria Valentina Dinu studied Chemistry at “Al. I. Cuza” University of Iasi, and received her Ph.D. in 2009 from Romanian Academy, *Petru Poni Institute of Macromolecular Chemistry (PPIMC) of Iasi*. During her Ph.D. studies, an important part of the work was carried out at Istanbul Technical University, Turkey, and Wroclaw University of Technology, Poland. In April 2010, she won a post-doctoral fellowship, which was financially supported by the European Social Fund – “Cristofor I. Simionescu” Postdoctoral Fellowship Programme. Within the research activities performed during this post-doctoral fellowship (2010-2013), she spent some months as invited PostDoc in Leibniz Institute of Polymer Research Dresden, Germany, and Institute of Macromolecular Chemistry, Prague, Czech Republic. After working as PostDoc at the Department of Chemistry, University of Basel, Switzerland, she returned to the Functional Polymers Department of PPIMC, in 2015, as a Senior Researcher. In December 2020, she defended the Habilitation thesis and is Member of the “School for advanced studies of the Romanian Academy” as PhD thesis supervisor in PPIMC. Dr. Dinu is highly active in the field of synthesis and functionalization of various hydrogel-based systems, composite materials, and (bio-) functional self-organized polymeric nanostructures, being co-author of 112 papers, with an H-index of 37. In 2012, she received the “Nicolae Teclu” Romanian Academy Award. Currently, Dr. Dinu is Group Leader in the Department of Functional Polymers, PPIMC and is acting as an editor of *Reactive and Functional Polymers* from Elsevier, B.V.

Talk: From chitosan to advanced composites: Sustainable materials for environmental remediation

Chitosan, a polycationic biopolymer obtained by the deacetylation of chitin, has evolved from an inexpensive biomaterial into a versatile platform for the design of advanced materials for environmental protection. Its abundance, biodegradability, biocompatibility, low toxicity, and, in particular, its reactive amino and hydroxyl groups offer a unique combination of chemical functionality and material versatility. At the same time, these intrinsic advantages are accompanied by significant limitations, including limited mechanical stability, pH sensitivity, and reduced performance under certain environmental conditions. These challenges have stimulated the development of chitosan derivatives and composites with tailored physicochemical and functional properties.

This lecture will explore how the chemistry of chitosan can be translated into the design of efficient and sustainable materials for environmental remediation. Starting with the structure,

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sources, and production of chitosan, the main strategies used to modify and functionalize this biopolymer, including chemical modification, cross-linking, incorporation of inorganic and carbon-based phases, and the formation of multifunctional hybrid composites, will be examined. Particular attention will be given to how these approaches influence surface chemistry, porosity, stability, charge, selectivity, and transport properties, and how these characteristics ultimately determine environmental performance.

Building on these fundamental aspects, the discussion will focus on applications in water and wastewater treatment, including the removal of heavy metal ions, dyes, pharmaceuticals, pesticides, and biological contaminants. The roles of chitosan-based materials in adsorption, coagulation-flocculation, membrane processes, catalysis, and hybrid treatment systems will be also considered, with emphasis on the underlying mechanisms and on the relationship between material structure and process performance.

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Radu Gabriel Ciobanu

Radu Gabriel Ciobanu is the Chief Executive Officer (CEO) of *Chemical Company Iasi*, Romania, where he has played a central role in modernizing the company's operations and strengthening its position within the Romanian chemical industry. With a professional background rooted in industrial chemistry and management, he has guided the company through a period of expansion, technological upgrading, and strategic partnerships with both national and international stakeholders.

Under his leadership, Chemical Company Iasi has diversified its portfolio of high-quality chemical products and reinforced its reputation for technical reliability and innovation. He has been instrumental in developing collaborations with research institutes and universities, promoting the transfer of advanced technologies from academic laboratories to industrial production lines.

Radu Gabriel Ciobanu is recognized for his pragmatic leadership style, his commitment to sustainable industrial development, and his ability to integrate scientific expertise into competitive manufacturing processes. His work continues to support the company's long-term vision of becoming a key contributor to Romania's modern chemical sector.

Talk: Scaling up chemical processes for industrial impact

Scaling up chemical processes from laboratory concepts to industrial reality remains one of the most challenging transitions in modern chemistry. Building on the experience presented at the Scale-up Day for Green Chemistry Start-ups, this talk explores the strategic, technical, and operational steps required to transform innovative chemical procedures into robust, economically viable production workflows. The presentation will highlight critical aspects such as process intensification, optimization of reaction conditions, equipment selection, safety integration, and regulatory compliance.

Drawing from practical case studies within Chemical Company Iasi, Radu Ciobanu will illustrate how interdisciplinary collaboration, data-driven decision-making, and sustainable engineering principles accelerate the journey from experimental success to industrial implementation. The presentation aims to provide researchers, engineers, and industry partners with a clear roadmap for navigating the complexities of scale-up, ensuring that innovative chemistry can be deployed efficiently, safely, and with measurable environmental benefits.



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Anca Hermenean

Prof. Dr. Habil. Anca Hermenean is Professor of Histology at “Vasile Goldiș” Western University of Arad, Romania, and Associate Professor at the University of Bucharest and the National University of Science and Technology POLITEHNICA Bucharest. She is a PhD supervisor in Biology and has extensive experience in coordinating multidisciplinary research teams and national and international research projects.

Her research focuses on nanobiotechnology and biomaterials, regenerative medicine and tissue engineering, drug-delivery systems, experimental pharmacology and toxicology, and the molecular mechanisms of tissue injury, repair and fibrosis. A major direction of her work is the biological and preclinical evaluation of biomaterials and nanostructured systems for medical applications, with particular emphasis on biocompatibility, biomaterial-tissue interactions, inflammatory responses, safety, and regenerative efficacy. These directions are also explicitly reflected in her research profile, particularly in *in vivo* biocompatibility and toxicological assessment of nanomaterials and materials designed for bone and cartilage regeneration.

Her research on chitosan-based biomaterials spans more than a decade. She has contributed to the biological evaluation of chitosan-graphene oxide three-dimensional scaffolds for bone tissue engineering, from *in vitro* cytocompatibility studies to *in vivo* evaluation in critical-size bone defects and assessment of their regenerative potential. More recent research has expanded toward chitosan-coated scaffolds for biomedical applications.

Her research combines cellular and molecular approaches, biochemical analyses, biocompatibility and toxicological testing, and preclinical *in vivo* models to investigate the biological performance and safety of advanced materials.

Talk: Biological evaluation of chitosan-based biomaterials for medical applications

Chitosan is a versatile natural polymer with considerable potential for biomedical applications due to its biocompatibility, biodegradability, functional versatility, and ability to be combined with a wide range of bioactive compounds and nanomaterials. Its use in tissue engineering, regenerative medicine, drug delivery, wound healing, and other medical applications requires, however, a comprehensive biological evaluation adapted to the composition, structure, route and duration of exposure, and intended clinical use of the final biomaterial.

This lecture will provide an overview of the main strategies for the biological and preclinical evaluation of chitosan-based biomaterials, following the progression from material characterization and *in vitro* testing to *in vivo* experimental models. The evaluation framework will be discussed in relation to international standards for the biological evaluation of medical devices,

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particularly the ISO 10993 series, highlighting how biological endpoints and testing strategies are selected according to the nature and intended medical application of the material.

Particular attention will be given to cytocompatibility and cell-material interactions, including cell viability, adhesion, proliferation, morphology, oxidative stress, inflammatory responses, and functional cellular behavior.

The transition to *in vivo* evaluation will address local and systemic biocompatibility, toxicity, inflammatory and foreign-body responses, tissue integration, biodegradation, vascularization, and regenerative performance. The selection of appropriate experimental models, endpoints, and analytical methods will be discussed as an essential component of a scientifically robust biological evaluation strategy.

Examples from our research on chitosan-based scaffolds and nanostructured systems will illustrate the integration of *in vitro* and *in vivo* approaches, with particular emphasis on chitosan–graphene oxide 3D scaffolds for bone tissue engineering and regeneration and on more recent chitosan-based biomedical systems.

Overall, the lecture will emphasize an integrated, risk-based and stepwise approach to biological evaluation, connecting international standards, experimental testing, and preclinical evidence required for the translation of chitosan-based biomaterials toward safe and effective medical applications.

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Iolanda Onceriu

Iolanda Onceriu is a medically trained professional with extensive experience in veterinary product development and operational management within *Vanelli*, a company based in Iasi specializing in complementary feeds, veterinary supplements, and innovative solutions for animal health. Building on her medical background, she plays a key role in ensuring that all products and procedures meet rigorous health, safety, and quality standards.

Throughout her career, she has contributed to the coordination of production workflows, the implementation of quality assurance protocols, and the integration of scientific results into practical, market-ready veterinary applications. Her medical training provides a solid foundation for understanding biological processes, evaluating product safety, and collaborating effectively with research institutions and industrial partners.

Iolanda Onceriu is recognized for her professionalism, precision, and ability to manage complex technical activities, making her an essential contributor to Vanelli's efforts to develop safe, effective, and compliant veterinary products aligned with national and European regulations.

Talk: Functional valorization of insect-derived chitosan through the development of formulations for veterinary applications

Within the European PIOChitIns project, Vanelli Group contributes to the valorization of insect-derived chitosan through the development and optimization of formulations with potential applications in the veterinary field. The presentation addresses the pathway from raw material characterization and assessment of chitosan's functional properties to formulation development, analytical validation and pilot-scale translation.

Particular emphasis is placed on correlating material properties with formulation-specific requirements and on the challenges associated with reproducibility, processability and the transition from research to application. By integrating R&D, analytical testing, prototype development and pilot manufacturing capabilities, Vanelli Group aims to facilitate the transition from innovative chitosan to formulated solutions with relevance for the development of human and veterinary products.

Vanelli Group is a pharmaceutical and nutraceutical company with more than three decades of industry experience, established in 1993 and specializing in the development, formulation, and manufacturing of products for both veterinary and human health. The company operates an EU-GMP-certified facility and is supported by a multidisciplinary team with expertise in the development of pharmaceutical, nutraceutical and cosmetic portfolios.

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By integrating capabilities across research and development, formulation, process development and validation, manufacturing, packaging, and technology transfer, Vanelli provides comprehensive contract manufacturing solutions, supporting partners throughout the product development and manufacturing lifecycle, from formulation and process development to commercial-scale production. The company is equipped to accommodate small- to medium-sized production batches and provides flexible manufacturing and packaging solutions tailored to specific partner requirements.

Our portfolio encompasses human and veterinary pharmaceuticals and nutraceuticals, veterinary hygiene products, cosmetics, and biocides, available across a broad range of dosage and packaging forms. The company's operations are underpinned by a strong organizational commitment to quality, innovation, reliability, and sustainability, supported by continuous investment in research and development, strategic partnerships, and a performance-oriented culture.

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Luminita Marin

Dr. Luminita Marin received the university education from “Al. I. Cuza” University, Iasi, Romania (Chemistry Bachelor’s Degree in 1995 and Master’s Degree in 2002), and the PhD in Polymer Chemistry from Petru Poni Institute of Macromolecular Chemistry, Romanian Academy, Romania (2007), with the thesis theme focused on the synthesis and characterization of new liquid crystals based on azomethine units. In 2006, she performed a PhD stage at Istituto per lo Studio delle Macromolecole, Milan, Italy on the synthesis of low molecular weight semiconductors for field effect transistors, and in 2010-2013 she was enrolled as a PostDoc student in the Petru Poni Institute, with the research topic focused on the obtaining dynamic materials based on chitosan. Over this period, in 2011 and 2013, Dr. Marin performed two postdoctoral stages at European Institute of Membranes (IEM), Montpellier, France with the main research activity focused on new supramolecular architectures for biomedical applications. Starting from this point, Dr. Marin refined her topics through development of chitosan biomaterials designed for targeted applications: chitosan based films, hydrogels, nanofibers and formulations for drug delivery, tissue regeneration, wound healing, packaging, soil conditioners and heavy metal sensors. Currently, Dr. Marin is a Senior Researcher and Group Leader *at Petru Poni Institute of Macromolecular Chemistry, Iasi, Romania.*

Throughout her career, Dr. Marin has supervised six doctoral theses, and her scientific output includes over 120 ISI papers, six books and book chapters, three patents, and two patent applications, reflecting both academic depth and a strong commitment to innovation and technology transfer.

She is actively engaged in the scientific community as a board member of the European Chitin Society (EUCHIS) and serves as an editor for Polysaccharides, Polymers, and Chemistry and Application of Chitin and its Derivatives. Her research achievements have been recognized through several distinctions, including the “Costin D. Nenițescu” Award of the Romanian Academy (2006), the Cristofor Simionescu Medal for Excellence in Macromolecular Chemistry awarded by the American Chemical Society (2019), selection on the shortlist of the Luckhurst–Samulski Prize of Liquid Crystals (2015), and inclusion in the World Ranking of Top 2% Scientists Worldwide by Stanford University (2023, 2024, 2025).

Talk: Chitosan crosslinking with monoaldehydes. Chitosan electrospinning

To create continuity with the previous talk on ionic and covalent crosslinking of chitosan, the first part of the presentation will introduce an approach developed in our laboratory for chitosan crosslinking using monoaldehydes. The second part will focus on electrospinning, covering both

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general principles and specific considerations related to chitosan. The main routes for obtaining chitosan nanofibers will be highlighted, together with the influence of electrospinning parameters and chitosan characteristics on fiber morphology. Additionally, the role of various fillers in modulating fiber morphology and properties for targeted applications will be emphasized.

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Dr. Irina Rosca is a senior researcher at the *Petru Poni Institute of Macromolecular Chemistry (PPIMC)*, Iași, Romania. She holds a PhD in Biology from “Alexandru Ioan Cuza” University of Iași and has extensive expertise in microbiology, antimicrobial testing, and the biological evaluation of materials. Since 2012, she has established and developed a microbiology laboratory at PPIMC dedicated to the biological evaluation of bioactive compounds and materials against opportunistic and pathogenic microorganisms, with a particular focus on antimicrobial resistance and nosocomial infections. Over the past decade, she has developed numerous research collaborations focused on the microbiological evaluation of chitosan-based materials in different formulations, including fibers, hydrogels, films, and nanostructured systems, against a broad range of opportunistic pathogens. This collaborative research has contributed to more than 30 scientific publications in the field of antimicrobial chitosan-based materials. In recognition of her research contributions to combating nosocomial infections, she received the Romanian Academy Award “Nicolae Simionescu” for a group of seven papers published in 2018 under the title “Active Molecules in Combating Nosocomial Infections.” Her scientific activity includes 110 articles published in ISI-indexed journals, more than 100 participations in national and international conferences, and two book chapters. She has coordinated two national research projects and has contributed as a member or postdoctoral researcher, to 8 international and 20 national research projects. Her scientific impact is reflected by an h-index of 25 according to Web of Science, with more than 1,700 citations.

Seminar: Unlocking the Antimicrobial Potential of Chitosan-Based Biomaterials: Particularities and Challenges

Chitosan is a versatile biopolymer with significant potential for the development of antimicrobial biomaterials, owing to its biocompatibility, biodegradability, chemical versatility, and intrinsic antimicrobial properties. However, its biological performance is highly dependent on physicochemical characteristics such as molecular weight, degree of deacetylation, solubility, pH, formulation, and surface properties, as well as on the characteristics of the target microorganism. This seminar provides a practical overview of the biological evaluation of chitosan-based biomaterials, based on our research experience with different chitosan formulations, including solutions, films, hydrogels, nanofibers, nanoparticles, composites, and chemically modified materials. Particular attention will be given to the diversity of bacterial and fungal cell envelopes and its implications for chitosan–microorganism interactions. Different *in vitro* microbiological and cell-based methods used for biological screening will be discussed, including agar diffusion,

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MIC/MBC and MIC/MFC assays, time-kill kinetics, biofilm assays, viability and metabolic tests, together with adaptations required for unconventional biomaterial formats. The presentation will also address critical aspects of sample preparation and experimental design, including sample homogeneity, color, stability, sterilization, pH, appropriate controls, and the interpretation of potential assay-related artifacts. Examples will illustrate how antimicrobial results can be correlated with biocompatibility data and how biological testing can be integrated with complementary physicochemical characterization. Overall, the presentation aims to highlight both the potential and the challenges of chitosan-based antimicrobial biomaterials, emphasizing the importance of appropriate experimental design, method selection, and careful interpretation for obtaining reproducible and biologically meaningful results.

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