

# Dr. Antonis Gitsas

## CURRICULUM VITAE



### PERSONAL INFORMATION

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St.-Peter-Straße 25, 4021 Linz, Austria

### EDUCATION – RESEARCH EXPERIENCE

- 2019- Senior Scientist, Compounds & Recyclates, Borealis Polyolefine GmbH, Linz/Austria.
- 2011-2019 Lead Scientist, Polypropylene Research, Borealis Polyolefine GmbH, Linz/Austria.
- 2009-2011 Postdoctoral researcher, AIT Austrian Institute of Technology, Vienna/Austria.
- 2003-2008 PhD Physics, University of Ioannina/Greece.
- 1999-2003 BSc Physics, Department of Physics, University of Ioannina/Greece.

### RESEARCH INTERESTS

Polyolefins structure-property-processing relationships for advanced energy and infrastructure applications  
Polymers under thermodynamic confinement; dynamics and self-assembly  
Design for recyclability and flame retardancy  
Temperature- and pressure-dependent dielectric properties

### MAJOR RECENT PROJECTS (Borealis)

Tailor-made compounds for HVDC capacitor films with increased temperature resistance  
Halogen-free flame retardant polypropylene for Li-ion battery modules  
Polyethylene films for advanced packaging with support to design for recycling  
Low density polyethylene insulation for more efficient cable production  
Optimization of long glass fibre polypropylene production for automotive  
Evaluation of nanomaterials for new application areas

### SELECTED CONFERENCE PRESENTATIONS

- 12.2023 Uni. Ioannina, Physics, Master's Program introduction day 1<sup>st</sup> speaker (invited)
- 10.2023 IEEE centennial Conference on Electrical Insulation and Dielectric Phenomena, NJ.Perspective  
Lecture: "The future of versatile polypropylene composites for lightweight electrification". (invited)
- 3.2023 NHRF, Athens: "Flame retardant polypropylene materials for electric vehicles". (invited)
- 5.2022 New Trends in Polymer Science: Health of the Planet, Health of the People, Turin, Italy.
- 1.2020 21<sup>st</sup> European Symposium On Polymer Spectroscopy, Linz, Austria.
- 10.2018 UoI, Physics: "Advanced thermoplastics for the next generation power cables". (invited)
- 3.2017 5<sup>th</sup> International Conference on Multifunctional, Hybrid and Nanomaterials, Lisbon, Portugal.
- 6.2013 European Polymer Congress EPF 2013, Pisa, Italy.
- 2012&2014 Int. Conf. on Nanostructured Polymers and Nanocomposites, Prague/Dresden.
- 9.2010 NHRF, Athens: "Polymer nanorods for optical waveguide-based biosensors". (invited)
- 7.2010 Macro2010 World Polymer Congress, Glasgow, UK.
- 2006&2018 Greek International Polymer Conference.
- 4.2006 2<sup>nd</sup> International Workshop on Dynamics in Viscous Liquids, Mainz, Germany.
- 7.2007 IMC, Prague: "Self-assembly and dynamics of synthetic and biological copolymers". (invited)
- 2002-2007 Presentations & posters in the Panhellenic Conf. on Solid State Physics & Material Science.

## PAPERS IN PEER-REVIEWED JOURNALS

- [22] Correlation of single-point parameters of linear rheology and molecular weight distribution of polypropylene homo- and copolymers, Gshwendner, G.; Gitsas, A.; Gahleitner, M.; Moser, P.; Paulik, C. *Journal of Applied Polymer Science* 2024; e5523.
- [21] Crystallisation kinetics and associated electrical conductivity dynamics of poly(ethylene vinyl acetate) nanocomposites in the melt state, Stalman G.; Matic A.; Jacobsson P.; Tranchida D.; Gitsas A.; Gkourmpis T. *Nanomaterials* 2022, 12, 3602.
- [20] Crystallization kinetics of melt-mixed 3D hierarchical graphene/polypropylene nanocomposites at processing-relevant cooling rates, Carmeli E.; di Sacco F.; Portale G.; Cavallo D.; Kadar R.; Gitsas A.; Gkourmpis T.; Tranchida D. *Composites Part B* 2022, 247, 110287.
- [19] Mechanical behavior of melt-mixed 3D hierarchical graphene/polypropylene nanocomposites, Gaska K.; Manika G.C., Gkourmpis T.; Tranchida D.; Gitsas A.; Kádár R. *Polymers* 2020, 12, 1309.
- [18] Melt-mixed 3D hierarchical graphene/polypropylene nanocomposites with low electrical percolation threshold, Gkourmpis T.; Gaska K.; Tranchida D.; Gitsas A.; Müller C.; Matic A.; Kádár R. *Nanomaterials* 2019, 9, 1766.
- [17] Byproduct free curing of a highly insulating polyethylene copolymer blend: An alternative to peroxide crosslinking, Mauri M.; Peterson A.; Senol A.; Elamin K.; Gitsas A.; Hjertberg T.; Matic A.; Gkourmpis T.; Prieto O.; Müller C. *J. Mater. Chem. C* 2018, 6, 11292.
- [16] Effect of film structure and morphology on the dielectric breakdown characteristics of cast and biaxially oriented polypropylene films, Rytöluoto, I.; Gitsas A.; Pasanen S.; Lahti K. *Eur. Polym. J.* 2017, 95, 606.
- [15] Nanostructuring polymeric materials by templating strategies, Knoll W.; Caminade A.-M.; Char K.; Duran H.; Feng C.L.; Gitsas A.; Kim D.H.; Lau A.; Lazzara T.D.; Majoral J.-P.; Steinhart M.; Yameen B.; Zhong X. H. *Small* 2011, 7, 1384.
- [14] Designing polymeric nanorod arrays for optical waveguide-based biosensors, Gitsas A.; Lazzara T.D.; Yameen B.; Steinhart M.; Knoll W.; Duran H. *Phys. Status Solidi (c)* 2011, 8, 3179.
- [13] Polycyanurate nanorod arrays for optical-waveguide-based biosensing, Gitsas A.; Yameen B.; Lazzara T.D.; Steinhart M.; Duran H.; Knoll W. *Nano Lett.* 2010, 10, 2173.
- [12] Effects of nanoscale confinement and pressure on the dynamics of pODMA-*b*-ptBA-*b*-pODMA triblock copolymers, Gitsas A.; Floudas G.; Butt H.-J.; Pakula T.; Matyjaszewski K. *Macromolecules* 2010, 43, 2453.
- [11] Hierarchical self-assembly and dynamics of a miktoarm star *chimera* composed of poly( $\gamma$ -benzyl-L-glutamate), polystyrene and polyisoprene, Gitsas A.; Floudas G.; Mondeshki M.; Lieberwirth I.; Spiess H.W.; Iatrou H.; Hadjichristidis N.; Hirao A. *Macromolecules* 2010, 43, 1874.
- [10] Effect of pressure on the phase behavior and segmental dynamics in blends of polystyrene with poly(methylphenyl siloxane), Gitsas A.; Floudas G.; White R.P.; Lipson J.E.G. *Macromolecules* 2009, 42, 5709.
- [9] Poly( $\gamma$ -benzyl-L-glutamate) peptides confined to nanoporous alumina: pore diameter dependence of self-assembly and segmental dynamics, Duran H.; Gitsas A.; Floudas G.; Mondeshki M.; Steinhart M.; Knoll W. *Macromolecules* 2009, 42, 2881.
- [8] Pressure dependence of the glass transition in atactic and isotactic polypropylene, Gitsas A.; Floudas G.; *Macromolecules* 2008, 41, 9423.
- [7] Control of peptide secondary structure and dynamics in poly( $\gamma$ -benzyl-L-glutamate)-*b*-polyalanine peptides, Gitsas A.; Floudas G.; Mondeshki M.; Spiess H.W.; Aliferis T.; Iatrou H.; Hadjichristidis N. *Macromolecules* 2008, 41, 8072.
- [6] Effect of chain topology on the self-organization and dynamics of block copolypeptides: from diblock copolymers to stars, Gitsas A.; Floudas G.; Mondeshki M.; Butt H.-J.; Spiess H.W.; Iatrou H.; Hadjichristidis N. *Biomacromolecules* 2008, 9, 1959.
- [5] Self-assembly and molecular dynamics of copolymers of  $\gamma$ -methyl-L-glutamate and stearyl-L-glutamate, Gitsas A.; Floudas G.; Dietz M.; Mondeshki M.; Spiess H.W.; Wegner G. *Macromolecules* 2007, 40, 8311.
- [4] Self-assembly and molecular dynamics of peptide functionalized polyphenylene dendrimers, Mondeshki M.; Mihov G.; Graf R.; Spiess H.W.; Müllen K.; Papadopoulos P.; Gitsas A.; Floudas G. *Macromolecules* 2006, 39, 9605.
- [3] Role of main chain rigidity and side chain substitution on the supramolecular organization of rigid-flexible polymers, Riala P.; Andreopoulou A.K.; Kallitsis J.K.; Gitsas A.; Floudas G. *Polymer* 2006, 47, 7241.
- [2] Self-assembly of pODMA-*b*-ptBA-*b*-pODMA triblock copolymers in bulk and on surfaces. A quantitative SAXS/AFM comparison, Wu W.; Huang J.; Jia S.; Kowalewski T.; Matyjaszewski K.; Pakula T.; Gitsas A.; Floudas G. *Langmuir* 2005, 21, 9721.
- [1] Effects of temperature and pressure on the stability and mobility of phases in rigid rod poly(*p*-phenylenes), Gitsas A.; Floudas G.; Wegner G.; *Phys. Rev. E* 2004, 69, 041802.

## **PATENTS**

3.2024 Composition for capacitors comprising PP, cyclic olefin polymer and plastomer EP24167008  
1.2024 BOPP film with increased water vapour permeability EP24150007  
10.2023 Compatibilized composition for capacitors comprising PP and cyclic olefin polymer EP23204907  
8.2023 Flame retardant polypropylene composition EP23190573  
6.2023 Polyprop. comp. having intumescent flame retardant and impr. UV stab. EP23178495, EP23178492  
5.2023 Composition comprising PP and COC for capacitors EP23173463, EP23184453, EP23184456  
9.2021 Polyethylene based sealant film with high packaging performance EP4144528  
7.2021 Flame retardant polypropylene composition comprising a synergist WO2023006852  
7.2021 Flame retardant polypropylene composition comprising a biopolymer WO 2023006853  
7.2021 Flame retardant composition comprising a high melt strength polypropylene WO2023006797  
5.2021 Thermally treated biaxially oriented polypropylene film WO2022233733  
3.2021 Flame retardant polypropylene composition WO2022189647, EP23199987  
3.2021 High-barrier blown film polyolefin solutions for barrier coating WO2022184599  
3.2021 High-barrier polyethylene film for packaging WO2022184598  
11.2020 Polyethylene film structures for safer collation-shrink films WO2022106507  
1.2019 PP composition comprising carbonaceous structures and having improved mechanical properties WO2020157298; WO2020157291; WO2020157285  
12.2018 Biaxially oriented polypropylene film with improved breakdown strength US2022033631  
12.2018 Biaxially oriented polypropylene film with improved surface properties KR20210102951  
5.2016 Soft PP composition for films and cable insulations from a non-phthalate ZN catalyst US10519306  
6.2016 Cable with advantageous electrical properties US2019326033  
6.2016 Polymer composition for wire and cable applications with advantageous thermomechanical behaviour and electrical properties US2019233627  
6.2016 Cable with improved electrical properties US10679769  
12.2017 Semiconductive PO comp. comprising reduced graphite oxide worm-like structures, method for preparing the semiconductive polyolefin composition and use thereof WO2019115550; WO2019115548  
12.2017 Polypropylene composition comprising reduced graphite oxide wormlike structures and having improved mechanical properties WO2019115545; WO2019115544  
10.2015 Biaxially oriented films made of propylene polymer compositions WO2017064224  
9.2014 Polypropylene composition for capacitor film ES2771153  
6.2013 Polypropylene with broad molecular weight distribution BR112015030635  
12.2013 BOPP film with improved stiffness/toughness balance MX2016007438

## **BOOK CHAPTERS**

- “Possibilities and limitations of halloysite nanofillers as reinforcing material in polypropylene.” Gitsas, A., Hristov, V., Gahleitner, M. in *DVSPM meeting 2015*, Trauner Verlag ISBN: 978-3-99033-491-1.
- “Nanostructured optical waveguides for thin film characterization” Duran, H; Lau, K. H. A.; Cameron, P. J.; Gitsas, A.; Steinhart, M.; Knoll, W. in *Functional Polymer Films* vol. 2, Wiley-VCH, Weinheim **2011** ISBN: 978-3-527-32190-2.

## **PROPOSALS EVALUATOR & PAPERS REVIEWER**

- FP7 NMP (EU) - Nanosciences, Nanotechnologies, Materials and new Production Technologies.
- National Science Foundation (USA) Division of Materials Research – Polymers.
- Greek Research and Technology Network – Research grants proposals.
- American Physical and Chemical Society, Elsevier, Wiley, The Royal Society of Chemistry, and others.

## **ORGANIZATIONAL EXPERIENCE**

2020- Coordinator of the Borealis Technical Forum  
2018-2020 LIMS software development Agile Product Owner  
2016, 2018 Coordinator of the InnoTech corner at the “Lange Nacht der Forschung”  
(2013-)/2023- (Deputy and) Head Secretary of the Ister Rowing Club.  
1-2.10.2010 1<sup>st</sup> Hellenic Youth Astronomy Conference, Volos, Greece; Head of the organizing committee.

## TEACHING EXPERIENCE

2013- Instructor at the Borealis Business Academy.

2006- Supervision of MSc, diploma students, and summer trainees.

2004-2008 University of Ioannina. Teaching assistant in the undergraduate courses:  
*Thermodynamics; Solid State Physics; Mechanics Laboratory; Computers Laboratory.*

## COLLABORATIONS (Selection)

Dr. Satu Pasanen (now Ecobio Oy – FI)	Dielectric properties of polypropylene films (with VTT)
Dr. Kari Lahti (Tampere University – FI)	
Dr. Ilkka Rytöluoto (now VTT – FI)	
Prof. George Floudas (University of Ioannina – GR)	Effect of stretching on the structural and dynamic properties of polypropylene
Prof. Alfréd Kállay-Menyhárd (Budapest Univ. of Techn. and Economics – HU)	Flame retardancy studies on recyclates
Christina Wagner (Brückner Maschinenbau – DE)	Stretching of polyolefin films for capacitors
Prof. Roland Kádár (Chalmers University of Technology – SE)	Investigation of graphene-polyolefin nanocomposites
Dr. Hatice Duran (TOBB University of Economics & Technology – TR)	Development of MIPs for biosensing (with AIT)
Dr. Sari Laihonen (now Hitachi Energy)	Film capacitors (with ABB)
Valerio Cassio (Met-Lux - LU)	Metallization of polyolefin films

## FUNDING AND HONOURS

- 2023 Borealis Open Innovation Recognition
- 2022- IPCEI grants for research on batteries
- 2022 Borealis Top Reports Writer
- 2021 Editor's Choice Article MDPI
- 2021 Borealis Innovation of the Year Award
- 2014- FFG grants for research on capacitors
- 2011 Front cover, *Physica Status Solidi (c)* November issue.
- 2008 Best Poster Award, 7<sup>th</sup> Hellenic Polymer Conference.
- 2005-2008 Research Grant, European Social Fund and the Greek Ministry of Development.
- 2003-2005 Scholarship, Foundation for Research and Technology-Hellas (FORTH).
- 2003 Graduated 3<sup>rd</sup> among those entered the Physics Department in 1999 (~130 students).
- 1997, 1999 Honours in the Greek National Student Astronomy Challenge.

## FOREIGN LANGUAGES

- English Proficient (C2 of CEFR – Certificate of Proficiency in English)
- German Proficient (C1 of CEFR – Oberstufe Deutsch, Österreichisches Sprachdiplom Deutsch)
- Spanish Basic (A1 of CEFR at Universidad Internacional Menéndez Pelayo, Santander, Spain)
- Czech Elementary (Universita Karlova, summer school 2007, Prague, Czech Republic)

## PERSONAL INTERESTS

Rowing: practicing in Masters B with numerous 1<sup>st</sup> places internationally.

Certified in First Aid (Austrian Red Cross) and Emergency Evacuation Procedures (Chemiepark Linz)

Public awareness of science

Scientific mentoring

Chess