

# Dr. Antonis Gitsas

## CURRICULUM VITAE



### PERSONAL INFORMATION

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### EDUCATION – RESEARCH EXPERIENCE

- 2019- Senior Scientist, Flexible Polymers, 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  
Low-dimensional polymer-based materials  
Novel biomacromolecules and their hierarchical organization  
Temperature- and pressure-dependent dielectric spectroscopy

### MAJOR RECENT PROJECTS (Borealis)

Development of polyethylene films for advanced packaging with support to design for recycling  
Low density polyethylene insulation for more efficient cable production  
Design of polypropylene with increased impact properties  
Business-IT coordination on LIMS software development  
Optimization of long glass fibre polypropylene production for automotive  
Tailor-made polypropylene for capacitor films  
Evaluation of nanomaterials for new application areas

### RESEARCH VISITS

- 3.-6.2011 Institut für Verbundwerkstoffe, Kaiserslautern, Germany
- 2.2009 Max Planck Institute for Polymer Research, Mainz, Germany.
- 2.2009 Max Planck Institute of Microstructure Physics, Halle, Germany.

### PATENTS

- 6.2020 LDPE based blends with superior electrical conductivity US10679769.
- 10.2019 Cable with advantageous electrical properties US2019326033.
- 8.2019 Polymer composition for wire and cable applications with advantageous thermomechanical behaviour and electrical properties US2019233627.
- 3.2019 Cable with improved electrical properties BR112018076291.
- 5.2019 Soft PP composition for films and cable insulations from a non-phthalate ZN catalyst US10519306.
- 6.2019 Semiconductive polyolefin composition comprising reduced graphite oxide worm-like structures, method for preparing the semiconductive polyolefin composition and use thereof WO2019115550; WO2019115548.
- 6.2019 Polypropylene composition comprising reduced graphite oxide wormlike structures and having improved mechanical properties WO2019115545; WO2019115544.
- 10.2018 Biaxially oriented films made of propylene polymer compositions WO2017064224.
- 9.2018 Polypropylene composition for capacitor film KR101939548.
- 7.2017 Polypropylene with broad molecular weight distribution BR112015030635.
- 10.2016 BOPP film with improved stiffness/toughness balance MX2016007438.

## PAPERS IN PEER-REVIEWED JOURNALS

- [1] “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.
- [2] “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.
- [3] “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.
- [4] “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.
- [5] “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.
- [6] “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.
- [7] “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.
- [8] “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.
- [9] “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.
- [11] “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.
- [12] “Pressure dependence of the glass transition in atactic and isotactic polypropylene”, Gitsas, A.; Floudas, G.; *Macromolecules* **2008**, *41*, 9423.
- [13] “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.
- [14] “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.
- [15] “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.
- [16] “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.
- [17] “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.
- [18] “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.
- [19] “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.

## BOOK CHAPTERS

- “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.
- “Possibilities and limitations of halloysite nanofillers as reinforcing material in polypropylene.” Gitsas, A., Hristov, V., Gahleitner, M. in *Danube Vltava Sava Polymer Meeting – DVSPM 2015*, Trauner Verlag ISBN: 978-3-99033-491-1.

## PROPOSALS EVALUATOR & PAPERS REVIEWER

- EE FP7 NMP - Nanosciences, Nanotechnologies, Materials and new Production Technologies.
- National Science Foundation - DMR – Polymers (NSF, USA).
- Greek Research and Technology Network – Research grants proposals.
- Phys. Rev. Lett.; Soft Matter; Macromolecules; J. Mater. Chem; Phys. Chem. Chem. Phys; Nanotechnology; New J. Chem; J. Phys. D; Mater. Lett, Nanomaterials, Polymers, and others.

## ORGANIZATIONAL EXPERIENCE

- 1/2021- Member of the Topics Editor Board of MDPI “Crystals”.
- 2018-2020 Agile software development experience (Product Owner)
- 2016, 2018 Coordinator of the InnoTech corner at the “Lange Nacht der Forschung”
- 2013- Deputy Secretary and IT responsible at the Ister Rowing Club.
- 2011 New AIT laboratory setup
- 1-2.10.2010 1<sup>st</sup> Hellenic Youth Astronomy Conference, Volos, Greece; Head of the organizing committee.
- 2006- Supervision of MSc, diploma students, and summer trainees

## COLLABORATIONS (Selection)

	Activity
VTT Technical Research Centre of Finland - FI (Dr. Satu Pasanen)	Dielectric properties of thin polypropylene films (study leader)
Tampere University of Technology - FI (Dr. Kari Lahti)	
University of Ioannina - GR (Prof. George Floudas)	Effect of stretching on the structural and dynamic properties of polypropylene (study leader)
Polytechs - FR (Cécile Daniel)	Upscaling of tailor-made compound (study leader)
Acano Cleaning Polymers – DE (André Fischer)	Implementation of advanced extrusion cleaning resins (study leader)
Delft University of Technology - ND (Prof. Monique van der Veen)	Industrial Contact Person and reviewer
Dutch Polymer Institute - ND (Dr. Denka Hristova-Boegards)	
Brückner Maschinenbau -DE (Christina Wagner)	Stretching of polyolefin films at lab and pilot scale
Chalmers University of Technology - SE (Prof. Roland Kádár)	Investigation of graphene-polyolefin nanocomposites
TOBB University of Economics and Technology - TR (Dr. Hatice Duran)	Development of molecularly imprinted polymers for biosensing (AIT, study leader)
Tervakoski Films - SK (Dr. Rastislav Veles)	Development of dielectric films
TDK Electronics - ES (Carlos Alba)	Development of film capacitors
ABB - SE (Dr. Sati Laihonon)	Development of film capacitors
Met-Lux - LU (Valerio Cassio)	Metallization of polyolefin films

## SELECTED CONFERENCE PRESENTATIONS

- 1.2020 21<sup>st</sup> European Symposium On Polymer Spectroscopy, Linz, Austria.
- 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.
- 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.
- 2002-2007 Presentations & posters in the Panhellenic Conf. on Solid State Physics & Material Science.

## INVITED LECTURES

4/10/2018 University of Ioannina, Department of Physics: “Advanced thermoplastics for the next generation power cables”.

27/9/2010 National Hellenic Research Foundation, Athens: “Polymer nanorods for optical waveguide-based biosensors”.

31/7/2007 Institute of Macromolecular Chemistry, Prague: “Self-assembly and dynamics of synthetic and biological copolymers”.

## FELLOWSHIPS AND HONOURS

- 2021 Borealis Innovation of the Year Award
- 2011 Front cover of the *Physica Status Solidi* (c) November issue.
- 2010- Member of the Hellenic Polymer Society
- 2008 Best Poster Award in the 7<sup>th</sup> Hellenic Polymer Conference.
- 2005-2008 Research Grant from the European Social Fund and the Greek Ministry of Development (PENED03ED856, in cooperation with Thrace Plastics Co. S.A.: “Study of the effect of pressure on the morphology and dynamics of polypropylene during injection moulding”).
- 2003-2005 Scholarship, Foundation for Research and Technology-Hellas (FORTH).
- 2003 Graduated from the Physics Department 3<sup>rd</sup> among those entered in 1999 (about 130 students).
- 1997, 1999 Honours in the Greek National Student Astronomy Challenge.

## TEACHING EXPERIENCE

2020: Co-supervisor of Erasmus+ student Thanos Theodoridis, Chalmers University of Technology.

2013- Trainer at the Borealis Business Academy.

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

## 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)

Trained in Emergency Evacuation Procedures (Chemiepark Linz)

Alpine skiing

Public awareness of science

Scientific mentoring