

Nickolas D. Polychronopoulos

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Professional Experience

May 1, 2020 – Postdoctoral researcher (full-time)
The Centre for Research and Technology-Hellas (CERTH), Volos,
Greece
Funded project *NanoThermia* (MIS 5050609):
“*Magnetic targeting of nanoparticles across the blood-brain
barrier for the purpose of thermal ablation of glioblastoma
multiforme*”

Oct 1, 2018–Apr. 30, 2020 Research and Development Engineer (full-time)
Polydynamics Inc., Dundas, Ontario, Canada

Sept. 1, 2017–Sept. 28, 2018 Research/Development/Production Engineer (full-time)
Rontis Hellas S.A., Larissa, Greece

March 1, 2016–Aug. 31, 2017 Research and Development Engineer (full-time)
Polydynamics Inc, Dundas, Ontario, Canada

May 7, 2008–Feb. 28, 2016 Process Simulation Specialist (part-time, 25 hours/week)
Polydynamics Inc

May 6, 2007–May 6, 2008 Military service

Feb. 16, 2020–July 10, 2020 Course teaching (4 hours/week):
Feb. 15, 2018–July 6, 2018 MM820 (EN2500) Rheology and Processing of Polymers (ES1)
Department of Mechanical Engineering, Univ. Thessaly, Volos,
Greece
Funded by ΕΣΠΑ 2014-2020: Απόκτηση ακαδημαϊκής διδακτικής
εμπειρίας

Education

- PhD (2016)
Department of Mechanical Engineering, Univ. Thessaly, Volos, Greece
Thesis title: *Variable Cross-Section Flows in Polymer and Composites Processing*, written in English
- MSc (2012)
Department of Mechanical Engineering, Univ. Thessaly, Volos, Greece
Thesis title: *Three-Dimensional Flow Analysis in the Calendering Process*, written in English
- BSc (2007)
Department of Materials Science (Τμήμα Επιστήμης Υλικών), Univ. Patras, Greece
Τίτλος διπλωματικής εργασίας: *Μηχανική στη Μοριακή Κλίμακα – Θεωρία και Προσομοιώσεις Πολυμερικών Αλυσίδων και Νανοκαλωδίων*

Publications in Peer-Reviewed Journals

1. Gkoutas A.A., Polychronopoulos N.D., Sofiadis G.N., Karvelas E.G., Spyrou L.A., Sarris I.E., Simulation of Magnetic Nanoparticles Crossing Through a Simplified Blood-Brain Barrier Model for Glioblastoma Multiforme Treatment, *Computer Methods and Programs in Biomedicine* (IF: 5.428), 212, 106477 (2021) <https://doi.org/10.1016/j.cmpb.2021.106477>
2. Polychronopoulos N.D., Gkoutas A.A., Sarris I.E., Spyrou L.A., A Computational Study on Magnetic Nanoparticles Hyperthermia of Ellipsoidal Tumors, *Applied Sciences* (IF: 2.679), 11(20), 9526 (2021) <https://doi.org/10.3390/app11209526>
3. Polychronopoulos N.D., Sarris I.E., Vlachopoulos J., A Viscous Sintering Model for Pore Shrinkage in Packings of Cylinders, *Rheologica Acta* (IF: 2.627), 60, 397-408 (2021) <https://doi.org/10.1007/s00397-021-01279-z>
4. Demirci A., Teke I., Polychronopoulos N.D., Vlachopoulos J., The Role of Calender Gap in Barrel and Screw Wear in Counterrotating Twin Screw Extruders, *Polymers* (IF: 4.329), 13(7) 990 (2021) <https://doi.org/10.3390/polym13070990>
5. Benos L.Th., Polychronopoulos N.D., Mahabaleshwar U.S., Lorenzini G., Sarris I.E., Thermal and Flow Investigation of MHD Natural Convection in a Nanofluid Saturated Porous Enclosure: An Asymptotic Analysis, *Journal of Thermal Analysis and Calorimetry* (IF: 4.626), 143, 751-765 (2021) <https://doi.org/10.1007/s10973-019-09165-w>
6. Polychronopoulos N.D., Vlachopoulos J., The Role of Heating and Cooling in Viscous Sintering of Pairs of Spheres and Pairs of Cylinders, *Rapid Prototyping Journal* (IF: 3.095), 26(4) 719-726 (2020) <https://doi.org/10.1108/RPJ-06-2019-0162>
7. Polychronopoulos N.D., Vlachopoulos J., Computer Flow Simulation of Moffatt Eddies in Single Screw Extrusion, *International Polymer Processing* (IF: 0.824), 33 (5) 662-668 (2018) <https://doi.org/10.3139/217.3574>
8. Polychronopoulos N.D., Charlton Z., Suwanda D., Vlachopoulos J., Measurements and Comparison to Predictions of Viscosity of Heavily Filled HDPE with Natural Fibers, *Advances in Polymer Technology* (IF:2.389), 37 (4) 1161-1167 (2018) <http://dx.doi.org/10.1002/adv.21775>
9. Polychronopoulos N.D., Papathanasiou T.D., Fluid Penetration in a Deformable Permeable Web Moving Past a Stationary Rigid Solid Cylinder, *Transport in Porous Media* (I.F.: 3.019), 116 (1) 393-411 (2017) <https://doi.org/10.1007/s11242-016-0780-1>
10. Polychronopoulos N.D., Papathanasiou T.D., A Novel Model for Resin Infiltration in Pin-Assisted Pultrusion, *Polymer Composites* (IF: 3.171), 38 (12) 2653-2662 (2017) <https://doi.org/10.1002/pc.23860>
11. Polychronopoulos N.D., Papathanasiou T.D., A Study on the Effect of Drawing on Extrudate Swell in Film Casting, *Applied Rheology* (IF: 1.581), 25 (4) 42425 (2015) <https://doi.org/10.3933/apprheol-25-42425>
12. Polychronopoulos N.D., Papathanasiou T.D., Pin-Assisted Resin Infiltration of Porous Substrates, *Composites Part A: Applied Science & Manufacturing* (IF: 7.664), 71 126-135 (2015) <https://doi.org/10.1016/j.compositesa.2015.01.007>
13. Polychronopoulos N.D., Sarris I.E., Papathanasiou T.D., 3D Features in the Calendering of Thermoplastics: A Computational Investigation, *Polymer Engineering and Science* (IF: 2.428), 54 (7), 1712-1722 (2014) <https://doi.org/10.1002/pen.23719>

Publications in Peer-Reviewed Conference Proceedings

14. Polychronopoulos N.D., Gkoutas A.A., Sarris I.E., Spyrou L.A., *Numerical Analysis of Temperature Distribution in Ellipsoidal Tumors in Magnetic Fluid Hyperthermia*, IEEE Xplore 354-357 (2020) doi: [10.1109/BIBE50027.2020.00064](https://doi.org/10.1109/BIBE50027.2020.00064)
IEEE 20th International Conference on Bioinformatics and Bioengineering (virtual event), Cincinnati, OH, USA, Oct. 26-28, 2020
15. Polychronopoulos N.D., Vlachopoulos J., *Mathematical Modeling of Sintering of Two Cylinders in Fused Filament Fabrication*, AIP Conference Proceedings, 2289 020055 (2020) doi: <https://doi.org/10.1063/5.0028386>
PPS2019 Europe-Africa Regional Conference of the Polymer Processing Society, Pretoria, South Africa, Nov. 18-22, 2019
16. Vlachopoulos J., Polychronopoulos N.D., *Rheology of Wood Plastic Composites Extrusion* pp. 1-6, Ed. B. Hausnerová, ISBN: 978-80-7454-729-4
P. Saha 18: Polymers-Site of Advanced Horizons and Ambits, Tomas Bata University, Zlin, Czech Republic, May 2-4, 2018
17. Vlachopoulos J., Polychronopoulos N.D., Tanifuji S., *Computational analysis and design of single screw extruders having screws of complex geometry with mixing elements*
Society of Plastics Engineers (SPE) Conference Proceedings EUROTEC, Barcelona, Spain, Nov. 3-7 (2011), available from: www.4spe.org

Book Chapters

18. Papathanasiou T.D., Kuehnert I., Polychronopoulos N.D., Chapter 5: Flow-Induced Alignment in Injection Molding of Fiber Reinforced Polymer Composites, in *Flow-Induced Alignment in Composite Materials*, pages 123-185, 2nd Edition, Papathanasiou T.D., Bénard A. (Eds), Woodhead Publishing, Elsevier (2022) <https://doi.org/10.1016/B978-0-12-818574-2.00001-4>
19. Polychronopoulos N.D., Vlachopoulos J., Chapter 4: Polymer Processing and Rheology, in *Functional Polymers. Polymers and Polymeric Composites: A Reference Series*, pages 133-180, Jafar Mazumder M., Sheardown H., Al-Ahmed A. (Eds), Springer Nature Switzerland AG, (2018) https://doi.org/10.1007/978-3-319-92067-2_4-1
20. Vlachopoulos J., Polychronopoulos N.D., Tanifuji S., Peter Müller J., [Chapter 4: Flat Film and Sheet Dies](#), in *Design of Extrusion Forming Tools*, pages 113-140, Carneiro O.S. and Nobrega M. (Eds), Smithers Rapra, London, UK (2012)
21. Vlachopoulos J., Castillo R., Polychronopoulos N.D., Tanifuji S., [Chapter 5: Blown Film Dies](#), in *Design of Extrusion Forming Tools*, pages 141-168, Carneiro O.S. and Nobrega M. (Eds), Smithers Rapra, London, UK (2012)
22. Vlachopoulos J., Polychronopoulos N.D., Chapter 1: Basic Concepts in Polymer Melt Rheology and Their Importance in Processing, in *Applied Polymer Rheology: Polymeric Fluids with Industrial Applications*, M. Kontopoulou (Ed.), pages 1-27, John Wiley & Sons, New Jersey, USA (2011) <https://doi.org/10.1002/9781118140611.ch1>

Invited Publication

23. Thanasis D. Papathanasiou, Nickolas D. Polychronopoulos, *Predicting the Extent of Resin Infiltration in Pin-Assisted Pultrusion*, Society of Plastics Engineers (SPE) Technical Library, March 2016, available from: www.4spe.org

Textbook

24. Vlachopoulos J., Polychronopoulos N.D., *Understanding Rheology of Polymer Extrusion*, 1st Edition, 340 pages, Polydynamics Inc, Dundas, Ontario, Canada (2019). Available from: https://www.researchgate.net/profile/Nickolas_Polychronopoulos

Used for:

- Participants in: Polydynamics 78th (Brussels), 79th (Borouge, Abu Dhabi, UAE) και 80th (AIMPLAS, Valencia, Spain) *International Short Course on Polymer Rheology and Extrusion*
- Lectures course material for MM820 (EN2500) Rheology and Processing of Polymers, Department of Mech. Engineering, Univ. Thessaly

Conference Presentations

- *Sharkskin, Melt Fracture and Die Lip Build Up*, 78th International Intensive Short Course on Polymer Rheology and Extrusion, Polydynamics Inc, Brussels, Belgium, May 16-17 (2019)
- *Some New Results in Optimal Fluid Infiltration in a Flexible Permeable Substrate Moving Past a Rigid Cylinder*, 32nd International Conference of the Polymer Processing Society (PPS-32), Lyon, France, July 25-29 (2016)
- *Understanding the Production of Plastic Films, Sheets and Tapes through Mathematical Modeling*, University of Groningen, The Netherlands, June 8 (2016)
- *Fluid Infiltration of a Permeable Substrate Moving Past a Solid Cylinder*, Polymer Processing Society Conference 2015 (PPS2015), Graz, Austria, September 21-25 (2015)
- *A Modeling Study for the Pin-Assisted Pultrusion of Porous Substrates*, 8th GRACM International Congress on Computational Mechanics, Volos, July 12-15 (2015)
- *A Modeling Study of the Pin-Assisted Resin Infiltration of Porous Substrates*, 10^o Πανελλήνιο Συνέδριο Χημικής Μηχανικής, Παν/μιο Πατρών 4-6 Ιουνίου (2015)
- *Spreading and Pressure Development in Calendering: A Three-Dimensional Approach*, 29th International Conference of the Polymer Processing Society (PPS-29), Nuremberg, Germany, July 15-19 (2013)
- *Πλευρική Διόγκωση Φιλμ και Κατανομή Πίεσης στην 3D Κυλίνδρωση Θερμοπλαστικών*, ΡΟΗ – 8^o Πανελλήνιο Συνέδριο «Φαινόμενα Ροής Ρευστών», Νοέμβριος, Βόλος 16-17 Νοεμβρίου (2012)
- *Some Experiences in Using the OpenFOAM Software for Polymer Processing Analysis*, MontanUniversität Leoben, Leoben, Austria, July 16 (2012)
- *Computational analysis and design of single screw extruders having screws of complex geometry with mixing elements*, SPE EUROTEC, Barcelona, Spain, November 3-7 (2011)

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- *Challenges in Computer – Aided Polymer Extrusion Die Design*, 6th GRACM International Congress on Computational Mechanics, Thessaloniki, June 19-21 (2008)

Reviewer

- Journal of Materials Science
- Polymer Engineering and Science
- International Polymer Processing
- Industrial & Engineering Chemistry Research

Undergraduate thesis co-supervision

- T. Koutsoukos. and T. Manolis, Simulation of Micropolar Fluid Flows: Validation of Numerical Results with Analytical Solutions, Department of Mechanical Engineering, University of Thessaly, Greece

Teaching Assistance

- MM820 (EN2500) Rheology and Processing of Polymers (2nd semester 2015)
Department of Mechanical Engineering, Univ. Thessaly, Volos, Greece
- MM503 (EN0301) Heat Transfer (1st semester 2014)
Department of Mechanical Engineering, Univ. Thessaly, Volos, Greece

Industrial Experience

- **Rontis Hellas S.A.**, one year Sept. 1, 2017 – Sept 28, 2018 (Larissa, Greece)
 - Research and development in coronary and peripheral polymer balloon catheters, including measurement of catheter properties and manufacturing
 - Computer simulations using ANSYS to assess the mechanical properties of double-lumen catheter shaft and balloon
 - Forming and production of polymer balloons
- **Polydynamics Inc.**, full time 3 years, part time 8 years (Dundas, Ontario, Canada)
 - Research and development of software primarily for Additive Manufacturing and specifically in Selective Laser Sintering (SLS) and Material Extrusion Additive Manufacturing
 - Polymer melt flow analysis in processing equipment, interpretation of rheological measurements, interpretation of results and software design improvements for various customers including:

USA

- Ascend Performance Materials LLC, Houston, Texas
- B&P Littleford, Sanigaw, Michigan
- Barr Inc, Onsted, Michigan
- Graham Engineering, York, Pennsylvania
- Iowa State University, Iowa
- Nitta Casings, New Jersey
- Oak Ridge National Laboratory, Tennessee
- Teknor Apex, Leominster, Massachusetts
- Trexel Inc., Wilmington, Massachusetts

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Canada

- Corma Inc, Toronto, Ontario
- Ingenia Polymer Corp, Brantford, Ontario
- Switch Energy Corp., Clinton, Ontario

Greece

- Plastika Kritis S.A.
- Institute of Mechanics of Materials and Geostructures (IMMG), Penteli, Athens
- Katradis Marine Ropes Ind. S.A., Piraeus
- MP Extruders, Metamorfosi, Athens

Japan

- Assistance to Polydynamics local representative T. Nakamura for his customers
- Hyper Advanced Simulation Laboratory (HASL), Tokyo

Austria

- Extrusion Die Systems GmbH, Kirchdorf an der Krems

Germany

- Tesa SE, Hamburg

UK

- Malvern Instruments, Malvern

Spain

University of Zaragoza

Italy

CEAST-ITW Test & Measurement's Group Instron Division, Pianezza, Torino

Egypt

Ain Shams University, Cairo

Brazil

- Resiplastic Ind. E Com Ltda
- University of Campinas (UNICAMP), São Paulo

Taiwan

DKSH Taiwan Ltd, Taipei City

China

Poly Plastic Masterbatch (SuZhou) Co., Ltd, Suzhou City

Turkey

Mikrosan Makina, Kocaeli

Membership in Professional Societies

- Polymer Processing Society (PPS), International
- Society of Plastics Engineers (SPE), USA