

Nickolas D. Polychronopoulos

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Professional Experience

Oct. 2018 - Today Research and Development Engineer
[Polydynamics Inc.](#), Dundas, Ontario, Canada
(full-time)
Sept. 2017 – Sept. 2018 Research and Development/Production Engineer
[Rontis Hellas S.A.](#) (Endovascular Department), Larissa,
Greece (full-time)
Sept. 2017 – Sept. 2018 Research and Development Engineer
[Polydynamics Inc.](#), Dundas, Ontario, Canada
(part-time)
Feb. 2018 – June 2018 One semester course lecturer:
“Rheology and Processing of Polymers” to 4th year
students in the Department of Mechanical Engineering,
University of Thessaly, Volos, Greece
March 2016 – Aug. 2017 Research and Development Engineer
[Polydynamics Inc.](#), Dundas, Ontario, Canada
(full-time)
Sept. 2010 – Feb. 2016 Process Simulation Specialist
[Polydynamics Inc.](#), Dundas, Ontario, Canada
(part-time)
June 2008 – Aug. 2010 Process Simulation Specialist
[Polydynamics Inc.](#), Dundas, Ontario, Canada
(full-time)

Education

PhD (2016)
Department of Mechanical Engineering, University of Thessaly, Volos, Greece.
Thesis title: “Variable Cross-Section Flows in Polymer and Composites Processing”
written in English
Master’s Degree (2012)
State-of-the-Art Methods in Energy, Processing and Antipollution Systems.
Department of Mechanical Engineering, University of Thessaly, Volos, Greece.
Thesis title: “Three Dimensional Flow Analysis in the Calendering Process”
written in English
Bachelor’s Degree (2007)
Department of Material Science, University of Patras, Patras, Greece.
Thesis title: “Molecular Mechanics: Theory and Simulations of Polymer Chains and
Nanowires”
written in Greek

- Peer-reviewed journals**
- J1. **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 (I.F.: 2.801) (accepted)
 - J2. 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 (I.F.: 2.471) (DOI: <https://doi.org/10.1007/s10973-019-09165-w>)
 - J3. **Polychronopoulos N.D.**, Vlachopoulos J., [Computer Flow Simulation of Moffatt Eddies in Single Screw Extrusion](#), International Polymer Processing (I.F.: 0.942), 33 (5) 662-668 (2018)
 - J4. **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 (I.F.: 2.663), 37 (4) 1161-1167 (2018)
 - J5. **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.:1.997), 116 (1) 393-411 (2017)
 - J6. **Polychronopoulos N.D.**, Papathanasiou T.D., [A Novel Model for Resin Infiltration in Pin-Assisted Pultrusion](#), Polymer Composites (I.F.: 2.268), 38 (12) 2653-2662 (2017)
 - J7. **Polychronopoulos N.D.**, Papathanasiou T.D., [A Study on the Effect of Drawing on Extrudate Swell in Film Casting](#), Applied Rheology (I.F.: 1.442), 25 (4) 42425 (2015)
 - J8. **Polychronopoulos N.D.**, Papathanasiou T.D., [Pin-Assisted Resin Infiltration of Porous Substrates](#), Composites Part A: Applied Science & Manufacturing (I.F.: 6.282), 71 126-135 (2015)
 - J9. **Polychronopoulos N.D.**, Sarris I.E., Papathanasiou T.D., [3D Features in the Calendering of Thermoplastics: A Computational Investigation](#), Polymer Engineering and Science (I.F.: 1.92), 54 (7), 1712-1722 (2014)
- Peer-reviewed conference proceedings**
- C10. Vlachopoulos J., **Polychronopoulos N.D.**, Mathematical Modeling of Sintering of Two Cylinders, in Fused Filament Fabrication, Europe-Africa Regional Conference of the Polymer Processing Society (PPS2019), Nov. 18-21, Pretoria, South Africa (2019)
 - C11. Vlachopoulos J., **Polychronopoulos N.D.**, Rheology and Wood Plastic Composites Extrusion, L-01 (6 pages) Polymers (Editor: B. Hausnerová), Tomas Bata University, Zlin, Czech Republic (2018)
 - C12. **Polychronopoulos N.D.**, Papathanasiou T.D., [A Modeling Study for the Pin-Assisted Pultrusion of Porous Substrates](#), 8th GRACM International Congress on Computational Mechanics, July 12-15, Volos, Greece (2015)
 - C13. **Polychronopoulos N.D.**, Papathanasiou T.D., [A Modeling Study of the Pin-Assisted Resin Infiltration of Porous Substrates](#), 10th International Conference in Chemical Engineering, June 4-6, University of Patras, Greece (2015)

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- C14. Vlachopoulos J., **Polychronopoulos N.D.**, Tanifuji S., Computational Analysis and Design of Single Screw Extruders Having Screws of Complex Geometry with Mixing Elements, SPE EUROTEC, Nov. 3-7, Barcelona, Spain (2011)
- C15. Vlachopoulos J., **Polychronopoulos N.D.**, Nakamura T., [Challenges in Computer – Aided Polymer Extrusion Die Design](#), 6th GRACM International Congress on Computational Mechanics, June 19-21, Thessaloniki, Greece (2008)
- Invited Publications**
- I16. Thanasis D. Papathanasiou, **Nickolas D. Polychronopoulos**, Predicting the Extend of Resin Infiltration in Pin-Assisted Pultrusion, SPE Technical Article Briefs, (2016) doi: 10.2417/spepro.006343
- Books**
- B17. Vlachopoulos J., **Polychronopoulos N.D.**, “Understanding Rheology and Technology of Polymer Extrusion”, 340 pages, 1st Edition (ISBN: 978-0-99522407-2-8), Polydynamics Inc, Dundas, Ontario, Canada (2019)
- Book Chapters**
- C18. **Polychronopoulos N.D.**, Vlachopoulos J., [Polymer Processing and Rheology](#), in: [Functional Polymers. Polymers and Polymeric Composites: A Reference Series](#), pages 1-47, Jafar Mazumder M., Sheardown H. and Al-Ahmed A. (eds), Springer International Publishing AG, Cham, Austria (2018)
- C19. 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)
- C20. 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)
- C21. 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)
- Conference/Seminar Presentations**
- Sharkskin Melt Fracture and Die Lip Build Up, 78th International Intensive Short Course on Polymer Rheology and Extrusion, organized by Polydynamics, May 16-17, Brussels, Belgium (2019)
- Moffatt Eddies in Single Screw Extrusion, 9th International Meeting of the Hellenic Society of Rheology, June 23-27, Pythagoreion, Samos, Greece (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), July 25-29, Lyon, France (2016)
- Understanding the Production of Plastic Films, Sheets and Tapes through Mathematical Modeling, University of Groningen, The Netherlands (2016)

Fluid Infiltration of a Permeable Substrate Moving Past a Solid Cylinder, Europe-Africa Regional Conference of the Polymer Processing Society (PPS2015), Sept. 21-24, Graz, Austria (2015)

Flow Induced Resin Infiltration of Porous Substrates, 30th International Conference of the Polymer Processing Society (PPS-30), June 8-12, Cleveland, Ohio, USA (2014)

Spreading and Pressure Development in Calendering: A Three-Dimensional Approach, 29th International Conference of the Polymer Processing Society (PPS-29), July 15-19, Nuremberg, Germany (2013)

Spreading and Pressure Development in 3D Calendering of Thermoplastics, 2012 POH – 8th Hellenic Conference in Flow Transport Phenomena, Nov. 16-17, Volos, Greece (2012)

Some Experiences in Using the OpenFOAM Software for Polymer Processing Analysis, MontanUniversität Leoben, Leoben, Austria (2012)

Reviewer

- International Polymer Processing
- Industrial & Engineering Chemistry Research

**Undergraduate
Theses Co-
Supervision**

Koutsoukos T., Thomas T.
“Simulation of Micropolar Fluid Flows: Validation of Numerical Results with Analytical Solutions” written in English.

**Professional
Experience**

Rontis Hellas S.A. (2017–2018)
Research and Development/Production of polymeric intravascular coronary and peripheral catheters including measurements of properties and performance. Computer simulations using ANSYS to determine maximum burst pressure for balloons and multilumen tubing sections of the catheters.

Polydynamics Inc. (2008–Today)
(partial list of projects using OpenFOAM, Nextrucad and other software of the company):

- Assistance for software installation, operation and interpretation of results to many customers of Polydynamics including: **Oak Ridge National Laboratories, Tennessee (USA), Ascend (USA), Univ. of Zaragoza (Spain), Graham Engineering (USA), Malvern Instruments Ltd (UK), Tesa SE (Germany), CEAST–ITW Test & Measurement’s Group Instron Division (Italy), Viadelo Italy Srl (Italy), Ingenia Polymers Corp. (Canada, USA), Barr Inc (USA), Teknor Apex (USA), University of Campinas (UNICAMP) (Brazil), Resiplastic Ind. & Com LDTA (Brazil), Ain Shams University (Egypt), DKSH (Taiwan).**
- Turbulent flow in sewer and storm water large diameter corrugated plastic pipe with internal roughness for **Corma Inc, Toronto, Ontario, Canada** (2017).
- Turbulent water flow simulation near the fitting of two pipes for **Corma Inc, Toronto, Ontario, Canada** (2016)
- Simulation and flow analysis of a single-screw extruder for **Trexel Inc., Wilmington, Massachusetts, USA** (2015), **B&P Littleford, Sanigaw, Michigan, USA** (2015) and **Switch Energy Corp., Clinton, Ontario, Canada** (2013)

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- Three-dimensional flow simulation of an animal gel in a rotating extrusion die with complex channels for **Nitta Casings, New Jersey, USA** (2014)
- Simulation and flow analysis of flat film dies and rheological analysis for **Extrusion Die Systems, Kirchdorf an der Krems, Austria** (2012)
- Three-dimensional flow simulations and polymer flow analysis for nanocomposites, **Institute of Mechanics of Materials and Geostrutures (IMMG), Penteli, Athens, Greece**, (2012)
- Three dimensional turbulent air flow simulation in a complex cylindrical geometry for **Corma Inc, Concord, Ontario, Canada** (2012)
- Simulations of single-screw extruder and polymer flow analysis of feedblock die, **Plastika Kritis S.A., Iraklio, Crete, Greece**, (2012)
- Simulations and polymer flow analysis of extruded plastic pipes, **Mikrosan, Turkey**, (2011)
- Simulations and polymer flow analysis of flat and spiral dies for **Hyper Advanced Simulation Laboratory (HASL), Tokyo, Japan** (2010)
- Simulations and polymer flow analysis for the production of plastic mooring ropes, **Katradis Marine Ropes Inc. S.A., Piraeus, Athens, Greece**, (2010)
- Development and distribution of new software called CALCUTRUDE LITE. The software was distributed to the participants of the 66th to 76rd International Intensive Short Course on Polymer Rheology and Extrusion on 2011 – 2017, Brussels, Belgium. The software package enables quick calculations of important polymer flow quantities, such as pressures, shear rates and shear stresses in simple flow geometries.

Membership in Professional Societies Society of Plastics Engineers (SPE), USA
Polymer Processing Society (PPS), International

References

1. Dr. Athanasios D. Papathanasiou (PhD supervisor)
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2. Dr. Savvas G. Hatzikiriakos (member of PHD committee)
Department of Chemical and Biological Engineering
The University of British Columbia
2360 East Mall
Vancouver, British Columbia, V6T-1Z3 Canada
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3. Dr. Nikos Vlachos (instructor in several courses)
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