

**Maria Papathanasiou**  
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Research Associate  
Centre for Process Systems Engineering  
Department of Chemical Engineering  
Imperial College London

C511 Roderic Hill Building  
South Kensington Campus  
London, UK, SW72AZ

**RESEARCH DOMAIN: MATHEMATICAL MODELING, PROCESS CONTROL & SUPPLY CHAIN OPTIMIZATION**

**FOUNDATIONS** Dynamic mathematical modeling of bioprocess and biosystems; Global Sensitivity Analysis (GSA); Parameter Estimation; Application of dynamic optimization procedures; Implementation of process control strategies; Supply chain design and optimization.

**APPLICATIONS** Modeling of the immune system including pharmacokinetic/pharmacodynamics; Modeling, optimization and control of bioreactors and separation processes; Supply chain optimization of cell therapies.

**EDUCATION**

**Imperial College London** **UK**  
PhD in Chemical Engineering. Advised by Prof. E.N. Pistikopoulos & Prof. A. Mantalaris 2017

*Thesis Title:* Towards Continuous Biomanufacturing: A Computational Approach for the Intensification of Monoclonal Antibody Production

**Imperial College London** **UK**  
MSc & D.I.C. in Advanced Chemical Engineering 2012

*Thesis Title:* Deriving a Mathematical Model to Describe the Immune Response to the TGN1412 Monoclonal Antibody. Advised by Prof. E.N. Pistikopoulos & Prof. A. Mantalaris

**Technical University of Berlin** **Germany**  
Diploma Thesis in Food Biotechnology and Process Engineering (Part of the ERASMUS Student Exchange Program) 2010

*Thesis Title:* Impact of high pressure treatment on the available glucose content of various starch types. Advised by Prof. D. Knorr & Prof. P. Taoukis

**National Technical University of Athens** **Greece**  
Diploma in Chemical Engineering 2010

**AWARDS & AFFILIATIONS**

**AWARDS** Best Entrepreneurial Idea (3<sup>rd</sup> place); Competition for Entrepreneurship, University for Economics and Business (AUEB), Athens GR 2017

Best Poster Presentation; Centre for Process Systems Engineering (CPSE) Autumn Industrial Consortium Meeting Imperial College London, London UK 2014

Poster Presentation Award Sponsored by Elsevier; International Congress on Engineering and Food (iCEF) 2011, Athens GR 2011

## AWARDS & AFFILIATIONS

**AFFILIATIONS** *Associate Member*, Institution of Chemical Engineers (AMIChemE)  
*Member*, American Institute of Chemical Engineers (AIChE)  
*Member*, American Association for Cancer Research (AACR)  
*Member*, Women in Engineering (WES)

## PROFESSIONAL EXPERIENCE

**RESEARCH** **Centre for Process Systems Engineering, Imperial College London, UK** 2017 - current  
*Research Associate*, Investigating the supply chain of CAR T-cell therapies; developing a mathematical model for cost & time minimization. Part of the Future Targeted Healthcare Manufacturing HUB, EPSRC funded initiative (Grant Reference: EP/P006485/1).

**Energy Institute, Texas A&M University, USA** 2015/2016  
*Visiting Scholar*, Development of an optimization and control strategy for a bioreactor using mammalian cell culture systems for the production of mAbs. Investigating policies towards continuous biomanufacturing.

**Centre for Process Systems Engineering, Imperial College London, UK** 2012/2015  
*Research Assistant*, Development of mathematical models & control strategies for a semi-continuous chromatographic separation process. Close collaboration with ETH Zurich and Chromacon AG. Part of the OPTICO European Project (G.A. No 280813).

**Centre for Process Systems Engineering, Imperial College London, UK** 2012  
*Graduate Researcher*, Development of a mathematical model to describe the functions of the immune system during the TGN1412 clinical trial. Investigation of pharmacokinetics & pharmacodynamics. Project included: Global Sensitivity Analysis, Parameter Estimation and handling of patient data.

**Institute for Food Engineering and Food Processing, Technical University of Berlin, DE** 2010  
*Undergraduate Researcher*, Investigated the effect of high pressure treatment on the digestion profile of starch-based pastes.

**TEACHING** **Advanced Process Optimization** Spring 2017  
[Texas A&M University, USA]  
*Grader*, Reviewed student problem sets & course project. MSc & PhD students.

**Advanced Process Optimization** Spring 2016  
[Imperial College London, UK]  
*Course co-Instructor*, [42 students – Lectured 15 hours] Responsibilities included: course planning; tutorial allocation to course TAs; lecturing theory & part of the tutorials; course project & final exam paper design; evaluation of course project; student exercise sets & examination papers; student assistance during office hours. Final year UG & MSc students.

**PROFESSIONAL EXPERIENCE**

<b>TEACHING</b>	<b>Advanced Process Optimization</b>	Spring 2015, Fall 2014, Spring 2014	
	[Imperial College London, UK]		
	<i>Teaching Assistant</i> , Responsibilities included: tutorial allocation to the rest of the TA team; lecturing; GAMS demonstration; course project and student exercise sets evaluation; grading of exam papers; assistance with office hours. Final year UG & MSc students.		
	<b>Advanced Process Optimization</b>	Summer 2014	
	[Denmark Technical University, Denmark]		
	<i>Teaching Assistant</i> , Responsibilities included: lecturing; course project grading of exam papers; assistance with student questions. PhD students.		
	<b>Numerical Methods</b>	Fall 2013	
	[Imperial College London, UK]		
	<i>Teaching Assistant</i> , Responsibilities included: course outline preparation, course material preparation, tutorial allocation to the rest of the TA team; lecturing tutorials, course project and student exercise sets evaluation; grading of exam papers; assistance with office hours. 3 <sup>rd</sup> & 4 <sup>th</sup> year UG & MSc students.		
	<b>Advanced Process Optimization II</b>	Spring 2013	
	[Imperial College London, UK]		
	<i>Assistant in Course Project</i> , Assisted students with questions on the course project on the design and solution of an optimization problem based on a Heat Exchanger Network, using GAMS.		
<b>MENTORING</b>	<b>Assist in PhD Project Collaboration</b>	2016	
	[Imperial College London, UK]		
	<i>Montaña Elviro Perez</i> ; Design of an optimal feeding strategy for a bioreactor using a mammalian cell culture for the production of mAbs. Comparison between periodic and continuous feeding, using gPROMS ModelBuilder®; <i>Joint with Prof. A. Mantalaris &amp; Prof. E.N. Pistikopoulos</i> ; <a href="#"><u>Peer-Reviewed Publication</u></a>		
	<b>Assist (partially) in PhD Project</b>	2016	
	[Imperial College London, UK]		
	<i>Styliani Avraamidou</i> ; Design of PID & MPC control strategies for a semi-continuous, chromatographic separation process. <i>Joint with Prof. E.N. Pistikopoulos</i> ; <a href="#"><u>Peer-Reviewed Publication</u></a>		
<b>INDUSTRY</b>	<b>JOTIS S.A.</b>	Athens, GR	<b>2017</b>
	<i>Intern</i> , Participation in research proposal writing; Updating & filing of EFSA regulations.		
	<b>JOTIS S.A.</b>	Athens, GR	<b>2009</b>
	<i>Intern</i> , Updated food labels and databases based on the latest regulations by the European Food Safety Authority (EFSA); Market & competition research for oat & cereal products; Improvement of suggested recipes for ready-to-eat cakes & cocoa; Quality controls of raw materials used for baby food production (using HPLC, ELISA and PCR).		

## PEER-REVIEWED PUBLICATIONS; [GOOGLE SCHOLAR PROFILE](#)

7. **Papathanasiou M.M.**, Steinebach F., Morbidelli M., Mantalaris A., Pistikopoulos E.N. Intelligent, model-based control towards the intensification of downstream processes. *Computers and Chemical Engineering*, (105), 173-184. 2017
6. **Papathanasiou, M. M.**, Quiroga-Campano, A. L., Steinebach, F., Elviro, M., Mantalaris, A. Pistikopoulos, E. N. “Advanced model-based control strategies for the intensification of upstream and downstream processing in mAb production”. *Biotechnol Progress*, 33: 966–988. 2017
5. **Papathanasiou, M. M.**, Avraamidou, S., Oberdieck, R., Mantalaris, A., Steinebach, F., Morbidelli, M., Mueller-Spaeth, T. and Pistikopoulos, E. N.. “Advanced control strategies for the multicolumn countercurrent solvent gradient purification process.” *AIChE Journal*, 62: 2341–2357. 2016
4. Oberdieck, R., Diangelakis, N. A., **Papathanasiou, M. M.**, Nascu, I. & Pistikopoulos, E. N. POP – Parametric Optimization Toolbox. *Industrial & Engineering Chemistry Research*, 55, 8979-8991. 2016
3. **Papathanasiou, M.M.**, Reineke, K., Gogou, E., Taoukis, P.S. and Knorr, D. Impact of high pressure treatment on the available glucose content of various starch types: A case study on wheat, tapioca, potato, corn, waxy corn and resistant starch (RS3). *Innovative Food Science & Emerging Technologies*, 30, pp.24-30. 2015
2. Pistikopoulos, E.N., Diangelakis, N.A., Oberdieck, R., **Papathanasiou, M.M.**, Nascu, I. and Sun, M.. PAROC—An integrated framework and software platform for the optimisation and advanced model-based control of process systems. *Chemical Engineering Science*, 136, pp.115-138. 2015
1. Velliou, E. G.; Dos Santos, S. B.; **Papathanasiou, M. M.**; Fuentes-Gari, M.; Misener, R.; Panoskaltzis, N.; Pistikopoulos, E. N.; Mantalaris, A. Towards unravelling the kinetics of an acute myeloid leukaemia model system under oxidative and starvation stress: a comparison between two- and three-dimensional cultures. *Bioprocess and Biosystems Engineering*, 38 (8), 1589-1600. 2015

## PEER-REVIEWED CONFERENCE PROCEEDINGS

8. **Papathanasiou M.M.**, Oberdieck R., Avraamidou S., Nascu I., Mantalaris A., Pistikopoulos E.N: "Development of advanced control strategies for periodic systems: An application to chromatographic separation processes", 2016, *In American Control Conference (ACC)*. IEEE. pp. 4175-4180.
7. Nascu I., Diangelakis N. A., Oberdieck R. **Papathanasiou M.M.**, Pistikopoulos E. N., “Explicit MPC in real-world applications: the PAROC framework”, 2016, *In American Control Conference (ACC)*. IEEE. pp. 913-918.
6. **Papathanasiou, M. M.**; Sun, M.; Oberdieck, R.; Mantalaris, A.; Pistikopoulos, E. N. “A centralized/decentralized control approach for periodic systems with application to chromatographic separation processes”. *11th IFAC Symposium on Dynamics and Control of Process Systems, including Biosystems; 2016;*, *IFAC-PapersOnLine* 49 Paper 7, pp 159-164.

## PEER-REVIEWED CONFERENCE PROCEEDINGS

5. **Papathanasiou M.M.**, Oberdieck R., Mantalaris A., Pistikopoulos E.N. “Computational tools for the advanced control of periodic processes - Application to a chromatographic separation”, 2016, *In Computer Aided Chemical Engineering, Elsevier, Volume 38. pp. 1665-1670.*
4. **Papathanasiou M.M.**, Quiroga-Campano A., Oberdieck R., Mantalaris A., Pistikopoulos E.N., “Development of advanced computational tools for the intensification of monoclonal antibody production”, 2016, *In Computer Aided Chemical Engineering, Elsevier, Volume 38; pp. 1581-1586.*
3. Quiroga-Campano A., **Papathanasiou M.M.**, Mantalaris A., Pistikopoulos E.N., “A Predictive Model for Energy Metabolism and ATP Balance in Mammalian Cells: Towards the Energy-Based Optimization of mAb Production”, 2016, *In Computer Aided Chemical Engineering, Elsevier, Volume 38; pp 1659-1664.*
2. **Papathanasiou, M. M.**; Mantalaris, A.; Pistikopoulos, E. N. “Advanced control strategies for a periodic, two-column chromatographic process”. *IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*; 2016; pp 1-6.
1. **Papathanasiou M.M.**, Steinebach F., Stroehlein G., Müller-Späß T., Nascu I., Oberdieck R., Morbidelli M., Mantalaris A., Pistikopoulos E.N., “A control strategy for periodic systems – application to the twin-column MCSGP”, 2015, *In Computer Aided Chemical Engineering, Elsevier, Volume 37, pp. 1505-1510.*

## ORAL PRESENTATIONS [\*PRESENTER]

19. **Papathanasiou M.M.**, Mantalaris A., Pistikopoulos E.N., “Towards Optimal and Sustainable Operation of Separation Processes: The Computational Approach”, AICHE Annual Meeting 2016 (San Francisco, CA, USA) (presented by Nascu I.\*)
18. **Papathanasiou M.M.**, Mantalaris A., Pistikopoulos E.N., “Intelligent Control Strategies Towards the Intensification of Monoclonal Antibody Production Via Continuous Operation”, AICHE Annual Meeting 2016 (San Francisco, CA, USA) (presented by Nascu I.\*)
17. Quiroga-Campano A.\*, **Papathanasiou M.M.**, Mantalaris A., Pistikopoulos E.N., “Energy-Based Medium Design for Mammalian Cell Fed-Batch Cultures”, AICHE Annual Meeting 2016 (San Francisco, CA, USA)
16. **Papathanasiou M.M.\***, Oberdieck R., Avraamidou S., Nascu I., Mantalaris A., Pistikopoulos E.N: "Development of advanced control strategies for periodic systems: An application to chromatographic separation processes", American Control Conference (ACC) 2016 (Boston, MA, USA)
15. Nascu I.\*, Diangelakis N. A., Oberdieck R. **Papathanasiou M.M.**, Pistikopoulos E. N., “Explicit MPC in real-world applications: the PAROC framework”, American Control Conference (ACC) 2016 (Boston, MA, USA)
14. **Papathanasiou M.M.\***, Oberdieck R., Mantalaris A., Pistikopoulos E.N: “Computational tools for the advanced control of periodic processes - Application to a chromatographic separation”, European Symposium on Computer Aided Process Engineering (ESCAPE) 26 (Portoroz, Slovenia)

13. **Papathanasiou M.M.\***, Quiroga-Campano A., Oberdieck R., Mantalaris A., Pistikopoulos E.N., “Development of advanced computational tools for the intensification of monoclonal antibody production”, European Symposium on Computer Aided Process Engineering (ESCAPE) 26 (Portoroz, Slovenia)
12. Quiroga-Campano A.\*, **Papathanasiou M.M.**, Pistikopoulos E.N., Mantalaris A., “A Predictive Model for Energy Metabolism and ATP Balance in Mammalian Cells: Towards the Energy-Based Optimization of mAb Production”, European Symposium on Computer Aided Process Engineering (ESCAPE) 26 (Portoroz, Slovenia)
11. **Papathanasiou M.M.\***, Sun M., Oberdieck R., Mantalaris A., Pistikopoulos E.N.: “A Centralized/Centralized Control Approach for Periodic Systems with Application to Chromatographic Separation Processes”, 11th IFAC Symposium on Dynamics and Control of Process Systems, including Biosystems (DYCOPS-CAB) 2016 (Trondheim, Norway)
10. **Papathanasiou M.M.\***, Mantalaris A., Pistikopoulos E.N., “Advanced control strategies for a periodic, two-column chromatographic process”, International Conference on Automation, Quality and Testing, Robotics (AQTR) 2016 (Cluj-Napoca, Romania)
9. **Papathanasiou M.M.\***, Mantalaris A., Pistikopoulos E.N., “From Batch to Continuous Operation: Through the Prism of Computational Tools”, 10<sup>th</sup> European PhD Workshop on Food Engineering and Technology 2016 (Buhler Group, Uzwil, Switzerland)
8. **Papathanasiou M.M.\***, Quiroga-Campano A., Oberdieck R. Mantalaris A., Pistikopoulos E.N., “Towards the Intensification of Mammalian Cell Culture Systems”, Cell Culture Conference (Euroscicon) 2016 (London, UK)
7. **Papathanasiou M.M.\***, Sun M., Steinebach F., Mueller-Spaeth T., Morbidelli M., Mantalaris A., Pistikopoulos E.N., “ A Centralized/Decentralized Control Approach for the Multicolumn Countercurrent Solvent Gradient Purification (MCSGP) Process”, AIChE Annual Meeting 2015 (Salt Lake City, UT, USA)
6. **Papathanasiou M.M.\***, Quiroga-Campano A Steinebach F., Mueller-Spaeth T., Morbidelli M., Mantalaris A., Pistikopoulos E.N., “ Advanced Control Strategies Towards the Intensification of Monoclonal Antibody Production”, AIChE Annual Meeting 2015 (Salt Lake City, UT, USA)
5. Oberdieck R.\* , Diangelakis N.A., **Papathanasiou M. M.**, Nascu I., Sun M., Avraamidou S., Pistikopoulos E.N., “ Pop – the Parametric Optimization Toolbox”, AIChE Annual Meeting 2015 (Salt Lake City, UT, USA)
4. Pistikopoulos E.N.\* , Oberdieck R., Diangelakis N.A., **Papathanasiou M. M.**, Nascu I., “ PAROC - a Unified Framework Towards the Optimal Design, Operational Operation and Model-Based Control of Process Systems”, AIChE Annual Meeting 2015 (Salt Lake City, UT, USA)
3. **Papathanasiou M.M.\***, Steinebach F., Stroehlein G., Mueller-Spaeth T., Nascu I., Oberdieck R., Morbidelli M., Mantalaris A. Pistikopoulos E.N., “A control strategy for periodic systems: Application to a chromatographic separation process”, Process Systems Engineering 2015/ European Symposium on Computer Aided Process Engineering 25 (PSE 2015/ESCAPE 25) (Copenhagen, Denmark)

## ORAL PRESENTATIONS [\*PRESENTER]

2. **Papathanasiou M.M.\***, Manthanwar A., Nascu I., Diangelakis N.A., Oberdieck R., Sun M., Avraamidou S., Mantalaris A., Pistikopoulos E.N., “PAROC An Integrated Framework & Software Platform for Multi-parametric Programming & Control”, CPSE Autumn Industrial Consortium Meeting 2014 (London, UK)
1. **Papathanasiou M.M.\***, Steinebach F., Stroehlein G., Diangelakis N.A. M., Mantalaris A. Pistikopoulos E.N., “On the development of multi-parametric controllers for the twin-column MCSGP, AIChE Annual Meeting 2014 (Atlanta, GA, USA)

## POSTER PRESENTATIONS

5. **Papathanasiou M.M.**, Shah N., Decision tools in the assistance of the CAR T-cell industry, CAR-TCR Summit Europe 2018 (London, UK)
4. **Papathanasiou M.M.**, Quiroga-Campano A., Oberdieck R., Mantalaris A. Pistikopoulos E.N., “Advanced Computational tools to enhance continuous monoclonal antibody production” (Poster & Snapshot presentation), 2<sup>nd</sup> Integrated Continuous Biomanufacturing 2015 (San Francisco, CA, USA)
3. **Papathanasiou M.M.**, Nascu I., Diangelakis N.A., Oberdieck R., Mantalaris A., Pistikopoulos E.N., “An integrated software platform for the development and testing of multi-parametric controllers”, Advanced Process Modelling (APM) Forum 2014 (London, UK)
2. **Papathanasiou M.M.\***, Manthanwar A., Nascu I., Diangelakis N.A., Oberdieck R., Sun M., Avraamidou S., Mantalaris A., Pistikopoulos E.N., “PAROC An Integrated Framework & Software Platform for Multi-parametric Programming & Control”, CPSE Autumn Industrial Consortium Meeting 2014 (London, UK) **Best Poster Award**
1. **Papathanasiou M.**, Reineke K., Taoukis P., Knorr D., “Impact of High Pressure Treatment on the Available Glucose Content of Various Starch Types”, International Congress on Engineering and Food (iCEF) 2011 (Athens, Greece) **Best Poster Award Sponsored by Elsevier**

## SERVICE

<b>PROFESSIONAL</b>	<i>Regular Reviewer</i> , Computers & Chemical Engineering	2014-present
	<i>Administrative Support</i> , Assistance with student/staff database (2016-2017)	2016-2017

## SERVICE

<b>COMMUNITY</b>	<i>Student Representative</i> , Centre for Process Systems Engineering, Imperial College London	2014-present
	Improving students experience by receiving student feedback and communicating it to the management team. Organization of social events & activities. Secured funding for the social activities. Secured £1500 (approximately £30 per person) for the Christmas Social Events (2014 & 2015).	
	<i>Fundraiser</i> ; MacMillan Cancer Research Support	2014-2015
	Participated in the MacMillan Coffee Mornings at Imperial College London, raising funds for the institute through bake sales.	

## OTHER SKILLS & ACTIVITIES

<b>LANGUAGES</b>	Greek ( <i>Native speaker</i> )	
	English ( <i>Full professional proficiency</i> )	
	German ( <i>Excellent</i> )	
	Italian ( <i>Excellent</i> )	
<b>COURSES/TRAINING</b>	Health Economics, <i>International Health Management</i> , <i>Imperial College Business School</i>	2018
	Quality by Design for Effective Bioprocess Validation and Characterization, <i>Modular Training for Bioprocess Industries</i> , <i>University College London</i>	2018
	Multivariate Latent Variable Modeling For Process Design And Operation Improvement, <i>Centre for Process Systems Engineering</i> , <i>Imperial College London</i>	2016
<b>ACTIVITIES</b>	<i>BASF Engineering Academy</i> ; <i>BASF SE</i> ( <i>Ludwigshafen, DE</i> )	2014
	Selected to participate at Autumn Engineering Academy, hosted by BASF. Participated in a 3-day intensive training workshop, working in interdisciplinary groups on various “real-world” case studies.	
	<i>Future Leaders Development Program</i> ; <i>Hay Group</i> <i>Greece</i>	2010
	Participated in leadership workshops and worked on the development of a robust business plan for the NGO: The Hellenic Society for the Study and Protection of the Monk seal (MOM)	
	<i>Debating</i>	2002-2005;
	Participated in the Model United Nations (MUN) meetings organized by Costeas-Geitonas School & The (Deutsche Schule Athen; Participated in the The Hague International Model United Nations (THIMUN 2003); President of the (Special Conference on Green Growth & Member of the Organization Committee (CGSMUN 2010); Key concepts discussed in the debates: Environmental concerns, clean water availability in the developing countries, human rights.	2010