

Christos T. Maravelias

Department of Chemical and Biological Engineering
University of Wisconsin - Madison,
1415 Engineering Drive, Madison, WI 53706
Tel: 608-265-9026, Fax: 608-262-5434, E-mail: maravelias@wisc.edu
http://directory.engr.wisc.edu/che/Faculty/Maravelias_Christos/
<http://maravelias.che.wisc.edu/>

EDUCATION

2004	CARNEGIE MELLON UNIVERSITY PhD in Chemical Engineering	PITTSBURGH, PA
1997	LONDON SCHOOL OF ECONOMICS M.Sc. in Operational Research	LONDON, UK
1996	NATIONAL TECHNICAL UNIVERSITY OF ATHENS Diploma in Chemical Engineering	ATHENS, GREECE

PROFESSIONAL EXPERIENCE

08/04 – present	UNIVERSITY OF WISCONSIN DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING CBE Executive Officer Vilas Distinguished Achievement Professor Professor Associate Professor Assistant Professor	MADISON, WI 11/2015 – present 07/2015 – present 09/2014 – present 09/2010 – 08/2014 08/2004 – 08/2010
	DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING Faculty affiliate	03/2009 – present
	WISCONSIN INSTITUTE for DISCOVERY, OPTIMIZATION GROUP Faculty affiliate	2013 –present

AWARDS, HONORS AND FELLOWSHIPS

<i>Covestro Lecturship</i> , Department of Chemical Engineering, Carnegie Mellon University	2016
Best Paper Award, <i>Production and Operations Management Society Applied Research Challenge</i>	2016
2014 Best Paper Award, <i>Computes and Chemical Engineering</i>	2015
Vilas Distinguished Achievement Professor, University of Wisconsin – Madison	2014-2019
2013 Outstanding Young Researcher Award – CAST Division of AIChE	2013
2012 Best Paper Award, <i>Computes and Chemical Engineering</i>	2013
Vilas Associate, University of Wisconsin – Madison	2013-2015
2008 W. David Smith Jr. Graduate Student Paper Award – CAST Division of AIChE	2008
National Science Foundation CAREER Award	2006-2011
Inaugural Olaf A. Hougen Fellowship, University of Wisconsin – Madison	2004-2007
Alexander S. Onassis Public Benefit Foundation Graduate Fellowship	1999-2001
Fulbright Graduate Fellowship (declined)	1999

TEACHING

- Required senior level: *Process Design*.
- Required senior level: *Process Dynamics and Control*.
- Graduate core: *Intermediate Problems in Chemical Engineering*.
- Graduate elective: *Advanced Chemical Process Synthesis and Optimization*.

RESEARCH MENTORING

Former PhD Students: Charles Sung (2009), Matthew Colvin (2010), Arul Sundaramoorthy (2011), Carlos Henao (2012), Kaushik Subramanian (2012), Patricia Nason (2013), Sara Velez (2014), Murat Sen (2014), Andres Merchan (2015).

Current PhD Students: Yachao Dong, Dhruv Gupta, Wenzhao (Tony) Wu, Michael Risbeck, Ho Jae Lee, Lingxun Kong, Xinyue Peng, Yifu Chen, Ranjeet Kumar, Venkatachalam Avadiappan, Yaqing Wu.

Former Postdoctoral Scholars: Pradeep Prasad (2005-06), Jiyong Kim (2009-13), Jeehoon Han (2012-14), Jeff Herron (2013-15), Srinivas Rangarajan (2013-16).

Current postdoctoral Scholars: Yenkie Kirti, Rex Ng, Kefeng Huang, Bruno Calfa, Wangyun Won, Gautham Madenoor Ramapriya.

SELECTED PROFESSIONAL ACTIVITIES

1. PROFESSIONAL COMMITTEES:

- CAST division of the *American Institute of Chemical Engineers* (AIChE), 2nd Vice Chair, 2017.
- CACHE Product and Process Design Task Force (2015 – date).
- Optimization Theme, Wisconsin Institute for Discovery, Advisory Board (2014 – date).
- *Great Lakes Bioenergy Research Center*, Area 2 Leadership Council (2014 – date).
- *Great Lakes Bioenergy Research Center*, Frontiers Working Group (2014 – 2015).
- *Computing and Systems Technology* (CAST) division of AIChE, Director (2011 – 2014).
- Sustainable Manufacturing Advances in Research and Technology Coordination Network.

2. SHORT COURSES:

- *Optimization Methods*, Johnson Controls, Inc., Milwaukee, WI, August 19, **2016**.
- *Mixed-integer programming methods for supply chain optimization*. Pan American Advanced Studies Institute 2011: Process modeling and optimization for energy and sustainability. Angra dos Reis, RJ, Brazil, July 19-29, **2011**.
- *Mixed-integer programming methods for scheduling and production planning*. Department of Chemical Engineering, Texas A&M University, College Station, TX, May 20-22, **2008**.
- *Mixed-integer programming: Basic theory, tools and applications*. Universidad Nacional del Sur – PLAPIQUI, Bahia Blanca, Argentina; Mar. 28 – Apr. 4, **2007**.

3. CONFERENCE ORGANIZATION:

- *Foundations of Computer-aided Process Operations 2017*: Chair.
- *Pan American Advanced Studies: Process Modeling and Optimization for Energy and Sustainability*, 2011: Chair.
- *AIChE 2009 Annual Meeting*: Area 10C Program Coordinator.

4. CONFERENCE SCIENTIFIC COMMITTEES:

- *Process Systems Engineering*: 2009, 2012, 2015 & 2018.
- *European Symposium on Computer Aided Process Engineering*: 2011, 2012, 2015, 2016, and 2017.
- *Foundations of Computer-Aided Process Design*: 2009 & 2014.
- *Foundations of Computer-aided Process Operations*: 2008 & 2012.
- *Mixed Integer Programming Workshop*: 2013.

5. PROPOSAL REVIEWER:

- National Science Foundation (CBET; CDI, Type I & II; EVO).
- American Chemical Society – Petroleum Research Fund.
- National Sciences and Engineering Research Council of Canada.
- Dutch Technology Foundation STW.
- Swiss National Science Foundation.
- Hellenic Ministry of Education, Lifelong Learning and Religious Affairs.

PUBLICATIONS

JOURNAL PAPERS

- [1] Gupta, D.; Maravelias, C.T. From Rescheduling to Online Scheduling. *Chemical Engineering Research and Design*, available online, (DOI: 10.1016/j.cherd.2016.10.035).
- [2] Herron J.A.; Vann, T.; Duong, N.; Resasco, D.E; Crossley, S.P.; Lobban, L.L.; Maravelias, C.T. A Systems-level Roadmap for Biomass Thermal Fractionation and Catalytic Upgrading Strategies. *Energy Technology*, available online, (DOI: 10.1002/ente.201600147).
- [3] Wu, W.; Yenkie, K.; Maravelias, C.T. A Superstructure-based Framework for Bioseparation Network Synthesis. *Computers and Chemical Engineering*, 96, 1-17, **2017**.
- [4] Ng, R.T.L.; Maravelias, C.T. Design of Biofuel Supply Chains with Variable Regional Depot and Biorefinery Locations. *Renewable Energy*, 100, 90-102, **2017**.
- [5] Yenkie, K.M.; Wu, W.; Clark, R.L.; Pfleger, B.F.; Root, T.W.; Maravelias, C.T. A Roadmap for the Synthesis of Separation Networks for the Recovery of Bio-based Chemicals: Matching Biological and Process Feasibility, *Biotechnology Advances*, 34, 1362-1383, **2016**.
- [6] Motagamwala, A.H.; Won, W.; Maravelias, C.T.; Dumesic, J.A. An Engineered Solvent System for Sugar Production from Lignocellulosic Biomass Using Biomass Derived γ -valerolactone. *Green Chemistry*, 18, 5756-5763, **2016**.
- [7] Herron J.A.; Maravelias, C.T. Assessment of Solar-to-Fuels Strategies: Photocatalysis and Electrocatalytic Reduction. *Energy Technology*, 4, 1369-1391, **2016**.
- [8] Merchan A.F.; Lee, H-J.; Maravelias, C.T. Discrete-Time Mixed-integer Programming Models for Solution Methods for Production Scheduling in Multistage Facilities. *Computers & Chemical Engineering*, 94, 387-410, **2016**.
- [9] Gupta, D.; Maravelias, C.T. On Deterministic Rescheduling: Major Considerations, Paradoxes, and Remedies. *Computers and Chemical Engineering*, 94, 312-330, **2016**.
- [10] Wu, W.; Henao, C.A.; Maravelias, C.T. A Superstructure Representation, Generation, and Modeling Framework for Chemical Process Synthesis. *AIChE J.*, 62 (9), 3199-3214, **2016**.
- [11] Kong, L.; Sen, S.M.; Henao, C.A.; Dumesic, J.A.; Maravelias, C.T. A Superstructure-based Framework for Simultaneous Process Synthesis, Heat Integration, and Utility Plant Design. *Computers and Chemical Engineering*, 91, 68-84, **2016**.
- [12] Martagan, T.; Krishnamurthy, A.; Maravelias, C.T. Optimal Condition-Based Harvesting Policies for Biomufacturing Operations with Failure Risks. *IIE Transactions*, 48(5), 440-461, **2016**.
- [13] Ng, R.T.L.; Maravelias, C.T. Design of Cellulosic Ethanol Supply Chains with Regional Depots. *Industrial and Engineering Chemistry Research*, 55, 3420-3432, **2016**.
- [14] Merchan A.F.; Maravelias, C.T. Preprocessing and Tightening Methods for Time-Indexed Mixed-integer Programming Models for Chemical Production Scheduling. *Computers & Chemical Engineering*, 84, 516-535, **2016**.
- [15] Velez, S.; Merchan, A.F.; Maravelias, C.T. On the Solution of Large-Scale Mixed-integer Programming Scheduling Models. *Chemical Engineering Science*, 136, 139-157, **2015**.
- [16] Han, J-H.; Sen, S.M.; Luterbacher, J.S.; Martin Alonso, D.; Dumesic, J.A.; Maravelias, C.T. Process Systems Engineering Studies for the Synthesis of Catalytic Biomass-to-Fuels Strategies. *Computers and Chemical Engineering*, 81, 57-69, **2015**.
- [17] Han, J-H.; Luterbacher, J.S.; Martin Alonso, D.; Dumesic, J.A.; Maravelias, C.T. A Lignocellulosic Ethanol Strategy via Nonenzymatic Sugar Production: Process Synthesis and Analysis. *Bioresource Technology*, 182, 258-266, **2015**.
- [18] Herron, J.A.; Kim, J.; Upadhye, A.A.; Huber, G.W.; Maravelias, C.T. A Generalized Framework for the Assessment of Solar Fuels Technologies. *Energy and Environmental Science*, 8, 126-157, **2015**.
- [19] Velez, S.; Maravelias, C.T. Theoretical Framework for the Formulation of MIP Scheduling Models with Multiple and Nonuniform Discrete-time Grids. *Computers and Chemical Engineering*, 72, 233-254, **2015**.

- [20] Dong, Y.; Sundaramoorthy, A.; Pinto, J.M.; Maravelias, C.T. A MIP Model for Inventory Routing in Industrial Gases Supply Chain. *Industrial & Engineering Chemistry Research*, 53(44), 17214-17225, **2014**.
- [21] Velez, S.; Maravelias, C.T. Advances in Mixed-integer Programming Methods for Chemical Production Scheduling. *Annual Review of Chemical and Biomolecular Engineering*, 5, 97-121, **2014**.
- [22] Merchan A. F.; Maravelias, C.T. Reformulations of Mixed-integer Programming Continuous-time Models for Chemical Production Scheduling. *Industrial & Engineering Chemistry Research*, 53(24), 10155-10165, **2014**.
- [23] Bond, J.Q.; Upadhye, A.A.; Olcay, H.; Tompsett, G.A.; Jae J.; Xing R.; Alonso, D.M.; Wang, D.; Zhang, T.; Kumar, R.; Foster, A.; Sen, S.M.; Maravelias, C.T.; Malina, R.; Barrett, S.R.H.; Lobo, R.; Wyman, C.E.; Dumesic, J.A.; Huber, G.W. Production of Renewable Jet Fuel Range Alkanes and Commodity Chemicals from Integrated Catalytic Processing of Biomass. *Energy and Environmental Science*, 7, 1500-1523, **2014**.
- [24] Nason, T.; Grabow, L.; Mavrikakis, M.; Biegler, L.; Maravelias, C.T. Advanced Solution Methods for Microkinetic Models of Catalytic Reactions: a Methanol Synthesis Case Study. *AIChE J.*, 60(4), 1336-1346, **2014**.
- [25] Subramanian, K.; Rawlings, J.B.; Maravelias, C.T. Economic Model Predictive Control for Inventory Management in Supply Chains. *Computers and Chemical Engineering*, 64, 71-80, **2014**.
- [26] Harjunkoski, I.; Maravelias, C.T.; Bongers, P.; Castro, P.; Engell, S.; Grossmann, I.E.; Hooker, J.; Mendez, C.; Sand, G.; Wassick, J. Scope for Industrial Applications of Production Scheduling Models and Solution Methods. *Computers and Chemical Engineering*, 62, 161-193, **2014**.
- [27] Luterbacher, J.S.; Rand, J.M.; Martin Alonso, D.; Han, J.; Youngquist, J.T.; Maravelias, C.T.; Pfleger, B.F.; Dumesic, J.A. Nonenzymatic Sugar Production from Biomass Using Biomass-derived γ -Valerolactone. *Science*, 343, 207, **2014**.
- [28] Han, J-H.; Sen, S. M.; Alonso, D.; Dumesic, J. A.; Maravelias, C.T. A Strategy for the Simultaneous Catalytic Conversion of Hemicellulose and Cellulose from Lignocellulosic Biomass to Liquid Transportation Fuels. *Green Chemistry*, 16, 653-661, **2014**.
- [29] Merchan, A.G.; Velez, S.; Maravelias, C.T. Tightening Methods for Continuous-time Mixed-Integer Programming Models for Chemical Production Scheduling. *AIChE J.*, 59(12), 4461-4467, **2013**.
- [30] Caes, B.R.; Van Oosbree, T.R.; Lu, F.; Ralph, J.; Maravelias, C.T.; Raines, R.T. Simulated Moving Bed Chromatography: Separation and Recovery of Sugars and Ionic Liquid from Biomass Hydrolysates. *ChemSusChem*, 6(11), 2083-2089, **2013**.
- [31] Kim, J.; Miller, J. A.; Maravelias, C.T.; Stechel, E.B. Comparative Analysis of Environmental Impact of S2P (Sunshine to Petrol) System for Transportation Fuel Production. *Applied Energy*, 111, 1089-1098, **2013**.
- [32] Velez, S.; Maravelias, C.T. A Branch-and-Bound Algorithm for the Solution of Chemical Production Scheduling MIP Models Using Parallel Computing. *Computers and Chemical Engineering*, 55, 28-39, **2013**.
- [33] Velez, S.; Maravelias, C.T. Multiple and Nonuniform Time Grids in Discrete-Time MIP Models for Chemical Production Scheduling. *Computers and Chemical Engineering*, 53, 70-85, **2013**.
- [34] Velez, S.; Maravelias, C.T. Reformulations and Branching Methods for Mixed-integer Programming Chemical Production Scheduling Models. *Industrial & Engineering Chemistry Research*, 52 (10), 3832-3841, **2013**.
- [35] Velez, S.; Maravelias, C.T. Mixed-integer Programming Model and Tightening Methods for Scheduling in General Chemical Production Environments. *Industrial and Engineering Chemistry Research*, 52 (9), 3407-3423, **2013**.
- [36] Kim, J.; Sen, S.M.; Maravelias, C.T. An Optimization-Based Assessment Framework for Biomass-to-Fuels Conversion Strategies. *Energy and Environmental Science*, 6 (4), 1093-1104, **2013**.
- [37] Subramanian, K.; Rawlings, J.B.; Maravelias, C.T.; Flores-Cerrillo, J.; Megan, L. Integration of Control Theory and Scheduling Methods for Supply Chain Management. *Computers and Chemical Engineering*, 51, 4-20, **2013**.

- [38] Velez, S.; Sundaramoorthy, A.; Maravelias, C.T. Valid Inequalities Based on Demand Propagation for Chemical Production Scheduling MIP Models. *AIChE J.*, 59(3), 872-887, **2013**.
- [39] Sen, S. M.; Alonso, D.M.; Wettstein, S.G.; Gurbuz, E.I.; Henao, C.A.; Dumesic, J.A.; Maravelias, C.T. A Sulfuric Acid Management Strategy for the Production of Liquid Hydrocarbon Fuels via Catalytic Conversion of Biomass-derived Levulinic Acid. *Energy and Environmental Science*, 5(12), 9690-9697, **2012**.
- [40] Sen, S.M.; Gurbuz, E.I.; Wettstein, S.G.; Alonso, D.M.; Dumesic, J.A.; Maravelias, C.T. Production of Butene Oligomers as Transportation Fuels using Butene for Esterification of Levulinic Acid from Lignocellulosic Biomass: Process Synthesis and Technoeconomic Evaluation. *Green Chemistry*, 14 (12), 3289-3294, **2012**.
- [41] Subramanian, K.; Maravelias, C.T.; Rawlings, J.B. A State-space Model for Chemical Production Scheduling. *Computers and Chemical Engineering*, 47, 97-110, **2012**.
- [42] Kim, J.; Miller, J.A.; Johnson, T. Stechel, E.; Maravelias, C.T. Fuel Production from CO₂ Using Solar-Thermal Energy: System Level Analysis. *Energy and Environmental Science*, 5 (9), 8417 - 8429, **2012**.
- [43] Sen, S. M.; Binder, J.B.; Raines, R.T.; Maravelias, C.T. Conversion of Biomass to Sugars via Ionic Liquid Hydrolysis: Process Synthesis and Economic Evaluation. *Biofuels, Bioproducts & Biorefining*, 6(4), 444-452, **2012**.
- [44] Maravelias, C.T. A General Framework and Modeling Approach Classification for Chemical Production Scheduling. *AIChE J.*, 58 (6), 1812-1828, **2012**.
- [45] Maravelias, C.T. On the Combinatorial Structure of Discrete-time MIP Formulations for Chemical Production Scheduling. *Computers and Chemical Engineering*, 38, 204-212, **2012**.
- [46] Sen, M.; Henao, C.A.; Braden, D.J.; Dumesic, J.A.; Maravelias, C.T. Catalytic Conversion of Lignocellulosic Biomass to Fuels: Process Development and Technoeconomic Evaluation. *Chemical Engineering Science*, 67, 57-67, **2012**.
- [47] Kim, J.; Reed, J.L.; Maravelias, C.T. Large-scale Bi-level Strain Design Approaches and Mixed-integer Programming Solution Techniques. *PLoS ONE*, 6(9), e24162, **2011**.
- [48] Kim, J.; Henao, C.A.; Johnson, T.A.; Dedrick, D.E.; Miller, J.A.; Stechel, E.B.; Maravelias, C.T. Methanol Production from CO₂ Using Solar-Thermal Energy: Process Development and Techno-Economic Analysis. *Energy and Environmental Science*, 4, 3122-3132, **2011**.
- [49] Colvin, M.; Maravelias, C.T. R&D Pipeline Planning: Task Interdependencies and Risk Management. *European Journal of Operational Research*, 215, 616-628, **2011**.
- [50] Braden, D.J.; Henao, C.A.; Heltzel, J.; Maravelias, C.T.; Dumesic, J.A. Production of Liquid Hydrocarbon Fuels by Catalytic Conversion of Biomass-derived Levulinic Acid. *Green Chemistry*, 13, 1755-1765, **2011**.
- [51] Sundaramoorthy, A.; Maravelias, C.T. Computational Study of Scheduling Approaches for Batch Process Networks. *Industrial and Engineering Chemistry Research*, 50(9), 5023-5040, **2011**.
- [52] Henao, C.A.; Maravelias, C.T. Process Superstructure Optimization Using Surrogate Models. *AIChE J.*, 57(5), 1216-1232, **2011**.
- [53] Kopanos, G; Puigjaner, L.; Maravelias, C.T. Production Planning and Scheduling of Parallel Continuous Processes with Product Family Considerations. *Industrial and Engineering Chemistry Research*, 50, 1369-1378, **2011**.
- [54] Sundaramoorthy, A.; Maravelias, C.T. A General Framework for Process Scheduling. *AIChE J.*, 57(3), 695-710, **2011**.
- [55] Colvin, M.; Maravelias, C.T. Modeling Methods and a Branch and Cut Algorithm for Pharmaceutical Clinical Trial Planning Using Stochastic Programming. *European Journal of Operational Research*, 203, 205-215, **2010**.
- [56] Maravelias, C.T.; Sung, C. Integration of Production Planning and Scheduling: Overview, Challenges and Opportunities. *Computers and Chemical Engineering*, 33 (12), 1919-1930, **2009**.

- [57] Maravelias, C.T.; Papalamprou, K. Polyhedral Results for Discrete-time MIP Formulations for Scheduling and Production Planning. *Computers and Chemical Engineering*, 33(11), 1890-1904, **2009**.
- [58] Sung, C.; Maravelias C.T. A Projection-Based Method for Production Planning of Multiproduct Facilities. *AIChE J*, 55 (10), 2614-2630, **2009**.
- [59] Gimenez, D. M.; Henning G.; Maravelias, C.T. A Novel Network-based Continuous-time Representation for Process Scheduling: Part II. Integrated Framework. *Computers and Chemical Engineering*. 33(10), 1644-1660, **2009**.
- [60] Gimenez, D.M.; Henning, G.; Maravelias, C.T. A Novel Network-based Continuous-Time Representation for Process Scheduling: Part I. Main Concepts and Mathematical Formulation. *Computers and Chemical Engineering*, 33 (9), 1511-1528, **2009**.
- [61] Ferris, M.C.; Maravelias, C.T.; Sundaramoorthy, A. Simultaneous Batching and Scheduling Using Dynamic Decomposition on a Grid. *INFORMS Journal on Computing*, 21 (3), 398-410, **2009**.
- [62] Sundaramoorthy, A.; Maravelias, C.T.; Prasad, P. Scheduling of Multi-stage Batch Processes under Utility Constraints. *Industrial and Engineering Chemistry Research*, 48 (13), 6050-6058, **2009**.
- [63] Colvin, M.; Maravelias, C.T. Scheduling of Testing Tasks and Resource Planning in New Product Development Using Stochastic Programming. *Computers and Chemical Engineering*, 33 (5), 964-976, **2009**.
- [64] Colvin, M.; Maravelias, C.T. A Stochastic Programming Approach for Clinical Trial Planning in New Drug Development. *Computers and Chemical Engineering*, 32(11), 2626-2642, **2008**.
- [65] Sundaramoorthy, A.; Maravelias, C.T. Modeling of Storage Constraints in Batching and Scheduling of Multi-stage Processes. *Industrial and Engineering Chemistry Research*, 47 (17), 6648-6660, **2008**
- [66] Prasad, P.; Maravelias, C.T. Batch Selection, Assignment and Sequencing in Multistage Processes. *Computers and Chemical Engineering*, 32 (6), 1114-1127, **2008**.
- [67] Sundaramoorthy, A.; Maravelias, C.T. Simultaneous Batching and Scheduling in Multi-stage Multiproduct Processes. *Industrial and Engineering Chemistry Research*, 47 (5), 1546-1555, **2008**.
- [68] Sung, C.; Maravelias, C.T. A Mixed-Integer Programming Formulation for the General Capacitated Lot-sizing Problem. *Computers and Chemical Engineering*, 32(1), 244-259, **2008**.
- [69] Sung, C.; Maravelias, C.T. An Attainable Region Approach for Effective Production Planning of Multi-product Processes. *AIChE J.*, 53 (5), 1298-1315, **2007**.
- [70] Prasad, P.; Maravelias, C.T.; Kelly, J. Optimization of Aluminum Smelter Casthouse Operations. *Industrial and Engineering Chemistry Research*, 45 (22), 7603-7617, **2006**.
- [71] Maravelias, C.T. A Decomposition Framework for the Scheduling of Batch Processes. *Computers and Chemical Engineering*, 30 (3), 407-420, **2006**.
- [72] Maravelias, C.T. Mixed Time Representation for State-Task Network Models. *Industrial and Engineering Chemistry Research*, 44 (24), 9129-9145, **2005**.
- [73] Maravelias, C.T.; Grossmann, I.E. On the Relation of Continuous and Discrete Time Models for the State-Task Network Formulation. *AIChE J.*, 52 (2), 843-849, **2006**.
- [74] Maravelias, C.T.; Grossmann, I.E. A Hybrid MIP/CP Decomposition Approach for the Short Term Scheduling of Multipurpose Plants. *Computers and Chemical Engineering*, 28, 1921-1949, **2004**.
- [75] Maravelias C.T.; Grossmann, I.E. Optimal Resource Investment and Scheduling of Tests for New Product Development. *Computers and Chemical Engineering*, 28 (6-7), 1021-1038, **2004**.
- [76] Maravelias, C.T.; Grossmann, I.E. Using MILP and CP for the Scheduling of Batch Chemical Processes. *Lecture Notes on Computer Science*, 3011, 1-20, **2004**.
- [77] Maravelias, C.T.; Grossmann, I.E. Minimization of Makespan with Discrete-Time State Task Network Formulation. *Industrial and Engineering Chemistry Research*, 42 (24), 6252-6257, **2003**.
- [78] Maravelias, C.T.; Grossmann, I.E. New Continuous-Time State Task Network Formulation for the Scheduling of Multipurpose Batch Plants. *Industrial and Engineering Chemistry Research*, 42 (13), 3056 – 3074, **2003**.
- [79] Maravelias, C.T.; Grossmann, I.E. Simultaneous Planning for New Product Development and Batch Manufacturing Facilities. *Industrial and Engineering Chemistry Research*, 40 (26), 6147-6164, **2001**.

BOOK CHAPTERS

- [1] Wu, W-Z.; Kurniawan, D.; Zhu, W.; Maravelias, C.T. Composite-Curve-Based Biomass Procurement Planning Approach. *Advances in Energy Systems Engineering* (Editors: Kopanos, G.M.; Liu, P.; Georgiadis, M.C.), 749-770, Springer, 749-770, **2017**.
- [2] Colvin, M.; Maravelias, C.T. Pharmaceutical R&D Pipeline Planning. To appear in *Handbook on Project Management and Scheduling* (Editors: Schwindt, C.; Zimmermann, J.), Springer, **2014**.
- [3] Aggoun, A.; Maravelias, C.T.; Vazacopoulos, A. Mixed Integer Programming/Constrained Programming. Hybrid Methods. In *Encyclopedia of Optimization* (Editors: Floudas, C.A.; Pardalos, P.M.), 2nd ed., Springer, 2270-2276, **2008** (DOI: 10.1007/978-0-387-74759-0)
- [4] Sung, C.; Maravelias, C.T. Production Planning in Process Systems Engineering. *Process Systems Engineering, Vol. 4: Supply Chain Optimization* (Editors: Georgiadis, M. C.; Papageorgiou, L. C.), WILEY-VCH, Weinheim, **2007**.
- [5] Maravelias, C.T.; Grossmann, I.E. Logic Inference and a Decomposition Algorithm for the Resource-Constrained Scheduling of Testing Tasks in Development of New Pharmaceuticals and Agrochemicals. *Handbook on Modeling for Discrete Optimization* (Editors: Appa, G.; Pitsoulis, L.; Williams, H.P.), Springer's International Series in Operations Research and Management Science, **2006**.

WORKSHOP PRESENTATIONS

- [1] Maravelias, C.T. From Rescheduling to Online Scheduling: Major Considerations, Paradoxes, and Remedies, *LCCC Process Control Workshop*, Lund, Sweden, September 28-30, **2016**.
- [2] Maravelias, C.T. Integration of Production Planning and Scheduling: An Assessment of Bottlenecks Related to Production Plan Execution. *International Seminar on Production Planning and Scheduling*, Petrobras, Rio de Janeiro, Brazil, October 9-11, **2012**.
- [3] Rawlings, J.B.; Stewart, B.T.; Subramanian, K.; Maravelias, C.T. Cooperation-based Optimization of Industrial Supply Chains. *Workshop on Distributed Model Predictive Control and Supply Chains*, Lund University, Lund, Sweden, May 19-21, **2010**.
- [4] Maravelias, C.T. Mixed-integer Programming Methods for Supply Chain Optimization. *Pan American Advanced Studies Institute 2011: Process modeling and optimization for energy and sustainability*. Angra dos Reis, RJ, Brazil, July 19-29, **2011**.

PLENARY, KEYNOTE AND INVITED CONFERENCE PRESENTATIONS

- [1] Maravelias, C.T. (Invited). TBD. *Connaught Global Challenge Symposium: CO2 Chemistry Solutions to Climate Change*, University of Toronto, Toronto, ON, Canada, May 9-10, **2017**.
- [2] Maravelias, C.T. (Plenary). Process Systems Engineering for Biofuels and Biochemicals. *Great Lakes Bioenergy Research Center 2016 Annual Scientific Meeting*, Lake Geneva, WI, May 17-19, **2016**.
- [3] Risbeck, M.J.; Maravelias, C.T.; Rawlings, J.B.; Turney, R.D. (CAST Plenary Session). Mixed-Integer Model Predictive Control for Online Scheduling of HVAC Equipment in Commercial Buildings. *AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, **2015**.
- [4] Herron, J. A.; Maravelias, C.T. (Invited). A Generalized Framework for the Assessment of Solar Fuels Technologies. In Honor of the 2014 Wilhelm Award Winner. *AIChE Annual Meeting*, Salt Lake City, UT, November 8-13, **2015**.
- [5] Maravelias, C.T. (Keynote). Process Systems Engineering for Biomass-to-Fuels/Chemicals Strategies. *3rd International Tailor-Made Fuels from Biomass Conference*, Aachen, Germany, June 23-25, **2015**.
- [6] Maravelias, C.T. (Keynote). Chemical Production Scheduling: From Models to Online Solution Methods. *12th Process Systems Engineering and 25th European Symposium in Computer-Aided Process Engineering Joint Event*. Copenhagen, Denmark, May 31 – June 4, **2015**.
- [7] Maravelias, C.T. (Invited). Recent Advances in Chemical Production Scheduling. In Honor of Ignacio Grossmann's 65th Birthday. *AIChE Annual Meeting*, Atlanta, GA, November 16-21, **2014**.

- [8] Maravelias, C.T. (Invited). On the Solution of Large Scale Chemical Production Scheduling Problems. Larry Evans's 80th birthday: How computing has changed chemical engineering. *AIChE Annual Meeting*, Atlanta, GA, November 16-21, 2014.
- [9] Maravelias, C.T. (Keynote). Process Systems Engineering for Renewable Energy: Lessons Learned, Challenges, and Opportunities. *8th International Conference on Foundations of Computer-Aided Process Design*, Suncadia Resort, Cle Elum, WA, July 13-17, **2014**.
- [10] Velez, S.; Maravelias, C.T. (Invited). Solution Methods for MIP Production Planning and Scheduling Models 11th International Conference on Computational Management Science, Lisbon, Portugal, 29-31 May, **2014**.
- [11] Colvin, M.; Maravelias, C.T. (Invited). Stochastic Programming Models and Algorithms for Pharmaceutical R&D Planning. *13th International Conference on Stochastic Programming*, Bergamo, Italy, 8-12 July, 2013.
- [12] Maravelias, C.T.; Rawlings, J.B.; Subramanian, K. (Invited). A State-space Model for Chemical Production Scheduling. *26th European Conference on Operations Research*, Rome, Italy, 1-4 July, 2013.
- [13] Velez, S.; Maravelias, C.T. (Invited). Valid Inequalities Based on Demand Propagation for Chemical Production Scheduling MIP Models. *26th European Conference on Operations Research*, Rome, Italy, 1-4 July, 2013.
- [14] Colvin, M.; Maravelias, C.T. (Invited). Pharmaceutical R&D Planning. *MathBio4: SCALE Symposium*, Wisconsin Institutes for Discovery, Madison, WI, October 18-19, 2012.
- [15] Subramanian, K.; Rawlings, J.B.; Maravelias, C.T.; Flores-Cerrillo, J.; Megan, L. (Keynote) Integration of Control Theory and Scheduling Methods for Supply Chain Management. *Foundations of Computer-aided Process Operations & Chemical Process Control*, Savannah, GA, January 8 – 11, 2012.
- [16] Zenner, S.; Maravelias, C.T. (CAST Plenary Session). Classification of chemical production scheduling problems and approaches, and a general solution framework. *AIChE Annual Meeting*, Minneapolis, MN, October 16-21, 2011.
- [17] Maravelias, C.T. (Keynote). Integration of Production Planning and Scheduling. In Proceedings: *10th International Symposium on Process Systems Engineering*, Salvador, Brazil, August 16-20, 2009.
- [18] Maravelias, C.T.; Sung, C. (Keynote). Integration of production planning and scheduling: Review, Challenges and Opportunities. In Proceedings: *Foundations of Computer-aided Process Operations*, 13-22, Boston, MA, June 29 – July 2, 2008.
- [19] Colvin, M.; Maravelias, C.T. (Invited). New Product Development Planning Using Stochastic Programming. *2009 INFORMS Annual Meeting*, San Diego, CA, October 11-14, 2009.
- [20] Prasad, P.; Maravelias, C.T. (Invited) Task Selection, Assignment and sequencing in Multistage Batch Processes. *2006 INFORMS Annual Meeting*, Pittsburgh, PA, November 5-8.
- [21] Maravelias, C.T. (Invited). Resource Planning for R&D Portfolio Optimization. *2006 Institute of Industrial Engineers Annual Conference and Exposition*, Orlando, FL, May 20-24.

INVITED SEMINARS

- [1] Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN, February 8, **2017**.
- [2] Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, MA, December 2, **2016**.
- [3] Argonne-Northwestern Solar Energy Research Center, Northwestern University, Evanston, IL, November 3, **2016**.
- [4] Department of Chemical and Biochemical Engineering, Rutgers University, Piscataway, NJ, October 20, **2016**.
- [5] Department of Chemical Engineering, Carnegie Mellon University, September 8, **2016**.
- [6] Department of Chemical and Biological Engineering, Tufts University, January 25, **2016**.
- [7] Department of Chemical and Biological Engineering, Princeton University, December 2, **2015**.

- [8] Institute of Energy Technology, Eidgenössische Technische Hochschule (ETH) Zurich, Switzerland, June 22, **2015**.
- [9] Institute for Chemical and Bio Engineering, Eidgenössische Technische Hochschule (ETH) Zurich, Switzerland, June 10, **2015**.
- [10] Mechanical Engineering, École Polytechnique Fédérale de Lausanne, Switzerland, June 9, **2015**.
- [11] AIChE CAST Division Webinar, January 27, **2015**.
- [12] Center for Control, Dynamical-Systems, and Computation, University of California – Santa Barbara, May 23, **2014**.
- [13] Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, March 27, **2014**.
- [14] Carnegie Mellon University, Enterprise-wide Optimization Seminar Series (webinar), February 27, **2014**.
- [15] Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, PA, February 7, **2014**.
- [16] School of Chemical, Biological & Materials Engineering, University of Oklahoma, Norman, OK, December 5, **2013**.
- [17] Department of Automatic Control, Lund University, Lund, Sweden, October 11, **2013**.
- [18] 25th Anniversary McMaster Advanced Control Consortium Meeting and Workshop, McMaster University, Hamilton, Ontario, Canada, May 15, **2013**.
- [19] Petrobras International Seminar on Production Planning and Scheduling, Rio de Janeiro, Brazil, October 11, **2012**.
- [20] TU Dortmund, Dortmund, Germany, June 28, **2012**.
- [21] Center for Process Systems Engineering, Imperial College, London, UK, June 25, **2012**.
- [22] Department of Computing, Imperial College, London, UK, June 21, **2012**.
- [23] Wisconsin Institute for Discovery - Doing Optimization at Wisconsin Seminar Series, University of Wisconsin, Madison, WI, October 3, **2011**.
- [24] Department of Mathematical Physical and Computational Sciences, Faculty of Engineering, Aristotle University, Thessaloniki, Greece, May 27, **2011**.
- [25] Department of Chemical Engineering, Texas A&M University, College Station, TX, March 8, **2011**.
- [26] Sandia National Laboratories, Albuquerque, NM, February 23, **2011**.
- [27] Department of Chemical and Biological Engineering, Princeton University, 16 February, **2011**.
- [28] ExxonMobil Research & Engineering Company, Annandale, NJ, January 31, **2011**.
- [29] ABB Corporate Research Center, Ladenburg, Germany, June 16, **2010**.
- [30] Department of Chemical and Biological Engineering, Illinois Institute of Technology, Chicago, IL, January 13, **2010**.
- [31] Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, September 24, **2009**.
- [32] Department of Chemical Engineering, University of Delaware, Newark, DE, September 18, **2009**.
- [33] Cervecería Cuauhtemoc Moctezuma, Monterrey, Mexico, August 31, **2009**.
- [34] The Operations Research Society – Mathematical Programming Group, London, UK, May 27, **2009**.
- [35] Automatic Control Laboratory, Eidgenössische Technische Hochschule (ETH), Zurich, Switzerland, May 20, **2009**.
- [36] Center for Computational Engineering Science, RWTH Aachen University, Aachen, Germany, May 18, **2009**.
- [37] School of Chemical and Biomolecular Engineering, Georgia Tech, Atlanta, GA, April 15, **2009**.
- [38] Department of Chemical Engineering, McMaster University, Hamilton, Ontario, Canada, March 26, **2009**.
- [39] Department of Chemical and Biomolecular Engineering, University of California – Los Angeles, January 23, **2009**.
- [40] Praxair, Buffalo, NY, October 23, **2008**.

- [41] Department of Chemical Engineering and Chemical Technology, Imperial College, London, UK, May 30, **2008**.
- [42] Department of Chemical Engineering, University College London, London, UK, May 29, **2008**.
- [43] Department of Chemical Engineering, Universitat Polytechnica de Catalunya, Barcelona, Spain, May 27, **2008**.
- [44] Department of Chemical Engineering, University of Iowa, Iowa City, IA, November 29, **2007**.
- [45] Department of Industrial and Systems Engineering, University of Wisconsin – Madison, Madison, WI, October 12, **2007**.
- [46] Department of Chemical Engineering, Universidad National del Sur, Bahia Blanca, Argentina, March 30, **2007**.
- [47] Centocor, St. Louis, MO, January 7, **2007**.
- [48] Department of Chemical Engineering, University of Rhode Island, Kingston, RI, March 9, **2006**.
- [49] Department of Chemical and Biological Engineering, University of Wisconsin, Madison, WI, March 9, **2004**.
- [50] Department of Chemical Engineering, Texas A&M University, College Station, TX, Spring **2004**.

PATENTS

Maravelias, C.T.; Zenner, S.; Sundaramoorthy, A. Computerized Systems for Chemical Production Scheduling. US 9,146,550 B2, September 29, **2015**.

CURRENT EXTRAMURAL RESEARCH FUNDING

<i>National Science Foundation (CBET-1264096)</i>	\$327,711
<i>Role:</i> PI	04/1/2013 – 03/31/2017
GOALI: Inventory Routing in the Chemical Industry	
<i>American Chemical Society – Petroleum Research Fund</i>	\$100,000
<i>Role:</i> PI	09/1/2013 – 08/31/2016
Online Production Planning and Scheduling	
<i>National Science Foundation (EFRI-1240268)</i>	\$599,963 (\$2,000,000 total)
<i>Role:</i> co-PI (PI: B. Pfleger, UW)	09/2012 – 08/2017
EFRI-PSBR: Cyanobacterial Biorefineries	
<i>The Dow Chemical Company</i>	Total award: \$1,034,431
<i>Role:</i> co-PI (PI: Root, UW)	06/2013 – 05/2017
New Concepts in Concentrated Solar Power Production for LCOE Reduction	
<i>National Science Foundation (CMMI)</i>	\$152,600 (\$325,000 total)
<i>Role:</i> co-PI (PI: A. Krishnamurthy, UW)	09/1/2013 – 08/31/2017
Control and Optimization of Biomanufacturing Systems	
<i>DOE</i>	\$300,000
<i>Role:</i> co-PI (PI: D. Resasco, University of Oklahoma)	09/1/2013 – 03/31/2017
Fractionation and Catalytic Upgrading of Bio-oil	
<i>DOE – Great Lakes Bioenergy Research Center</i>	\$738,879
<i>Role:</i> PI	12/2014 – 11/2017
Technoeconomic Evaluation and Comparison of GLBRC Cellulosic Biofuel Processing Pathways	
<i>DOE – BioEnergy Technologies Office</i>	\$3,334,133 total
<i>Role:</i> co-PI (PI: G. Huber, UW)	10/1/2014 – 09/30/2017
Title: Catalytic Processes for Production of α , ω -diols from Lignocellulosic Biomass	