**Biographical Sketch**

George Stephanopoulos

Date of Birth: June 1, 1947

Place of Birth: Kalamata, Greece

Family Status: Married, One Son, One Daughter

I. **Education**

 1971-74 Ph.D., University of Florida at Gainesville

 1970-71 M.E., McMaster University, Hamilton, Ontario, Canada

 1965-70 Diploma in Chemical Engineering, National Technical University of Athens

II. **Professional Activities:**

 1974-77 Assistant Professor, University of Minnesota

 1977-80 Associate Professor, University of Minnesota

 1980-83 Professor, University of Minnesota (on leave)

 1980-84 Professor, National Technical University of Athens

 1984-89 J.R. Mares Professor of Chemical Engineering, Massachusetts Institute of Technology

 1987-present Director, Laboratory for Intelligent Systems in Process Engineering, Department of Chemical Engineering, Massachusetts Institute of Technology, MIT

 1989-93 Leaders for Manufacturing Professor of Chemical Engineering, MIT

 1992-2017 Arthur D. Little Professor of Chemical Engineering, MIT

 2000-2002 Chief Technology Officer, Managing Executive Director, Mitsubishi Chemical Corporation, Tokyo, Japan

 2002-2005 Director, Member of the Board, Mitsubishi Chemical Corporation, Tokyo, Japan

 2018-present Arthur D. Little Post-Tenure Professor of Chemical Engineering, MIT

 2018-present Professor, School of Molecular Sciences, Arizona State University

 2018-present Professor, School for Engineering Matter, Transport and Energy (SEMTE), Arizona State University

IIa. **Research and Educational Interests**

Research and teaching interests have covered many aspects of Process Systems Engineering, such as: process synthesis; process optimization; process operations modeling, analysis, diagnosis, planning and control. Besides chemical processes, my systems engineering interests led me into a variety of other types of systems, addressing research issues related to the design, analysis, control, optimization of systems, like: networks of chemical or biochemical reactions; integrated manufacturing systems within the scope of a national economy or corporate business; city traffic networks and intercity transportation networks; systems approaches to the design and manufacturing of products; and process systems engineering for integrated molecular-nanoscale processes.

III.A. **Distinctions/Awards:**

* *Demokritos Scientific Research and Innovation Award, 2016*
* *ASEE Chemical Engineering Division CACHE Award* *for Excellence in Computing in Chemical Engineering Education*, 2015
* *The Ambani Life-Time Achievements Award,* ICT-Ambani Corp., November 2013.
* *American Academy of Arts and Sciences,* Fellow, 2012.
* *Founders Award for Outstanding Contributions to the Field of Chemical Engineering,* American Institute of Chemical Engineers (AIChE), 2012
* *Ragazzini Award,* American Automatic Control Council (AACC), 2009
* *100 Chemical Engineers of Modern Era,* American Institute of Chemical Engineers (AIChE), 2008
* *Fellow of AIChE*, 2006
* *William H. Walker Award* for Excellence in Contributions to the Chemical Engineering Literature, American Institute of Chemical Engineers (AIChE), 2003.
* *2003 AIChE Institute Lecture*, American Institute of Chemical Engineers (AIChE), 2003.
* *Honorary Doctor of Science*, McMaster University, June 2002.
* National Academy of Engineering, US, 1999.
* *Best Paper Award: Designing and Systems*, 14th European Meeting on Cybernetics and Systems Research, Vienna, April 1998
* Arthur D. Little Professor of Chemical Engineering, MIT, 1995-present
* *Computing in Chemical Engineering Award*, CAST Division of AIChE, 1993
* 1992 Best Paper Award, *Computers and Chemical Engineering.*
* *Foreign Member of the Russian Academy of Technological Sciences*, 1991
* The *R.W. Fahien Distinguished Alumnus Award*, University of Florida, 1989.
* Leaders for Manufacturing Professor, MIT, 1989
* 1987 Best Paper Award, *Computers and Chemical Engineering*.
* *Curtis McGraw Award for Research*, American Society of Engineering Education, 1986.
* J.R. Mares Professor of Chemical Engineering, Massachusetts Institute of Technology, 1984
* *Allan P. Colburn Award for Excellence in Research*, American Institute of Chemical Engineers (AIChE), 1982.
* *Camille and Henry Dreyfus Teacher and Scholar Award*, 1977
* *G. Taylor Teaching Award*, University of Minnesota, 1977
* Senator, University of Minnesota Senate, 1979-1982.
* Fellowship of Graduate School, University of Florida, 1972-1974
* Scholarship of the National Technical University of Athens, IKY, 1965-1970
* *"Thomaideion" Award* (Graduate with highest Diploma grade in the university), National Technical University of Athens, 1970
* *"Chrisovergeion" Award* (Graduate with highest Diploma grade in Chemical Engineering), National Technical University of Athens, 1970
* Texaco Fellowship, National Technical University of Athens, 1968-1970.
* *First Award*, Greek Mathematical Society, 1965

III. B. **Honorary Lectureships**

* The 2016 *Enrique Rotstein Lecture,* PLAPIQUI-CONICET/Univesidad Nacional del Sur, Argentina, March 2016.
* The 2015 *Bayer Lecture,* Carnegie-Mellon University, April 2015.
* The *2012 Alkis Payatakes Lectureship,* University of Houston, April 2012
* The *2012 Basore Distinguished Lectureship*, Auburn University, April 2012.
* The *2010 Eli Ruckenstein Lecture,* University of Buffalo, State University of New York, April 2010
* The *L.T. Fan Distinguished Lecture Series*, Kansas State University, April 2010
* The *Wilhelm Lectures*, Princeton University, October 2009
* The *2009 Aurel Stodola Medal and Lectureship*, ETH-Zurich, May 2009.
* The *ICE/HT, 25th Anniversary Lecture*, Patras, Greece, September 2009
* The 2008-09 “*Dow M.M.Sharma Distinguished Visiting Professorship in Chemical Engineering Endowment*”, University Institute of Chemical Technology (UICT), University of Mumbai (formerly Bombay)
* The 2005-2006 “*Balwant S. Joshi* Distinguished Visiting Professor in Chemical Engineering / Chemical Technology / Applied Chemistry”, Mumbai University, Institute of Chemical Technology.
* The “*Gerster*” Lecture, University of Delaware, September 2004.
* The “*Roger Sargent*” Lecture, Imperial College, November 2000
* *The Distinguished* Research Lectureship in Chemical Engineering, Carnegie Mellon University, April 2000.
* *The Kelly Lectures,* Purdue University (April 1999*)*
* The *Harry G. Fair Lecture*, The University of Oklahoma (April 1999)
* *Centennial Lecturer*, Technical University of Delft, Delft, The Netherlands (October 1995)
* *Distinguished Lecturer*, Auburn University, Auburn, AL (April, 1993)
* *Merck Distinguished Lecturer*, Rutgers University, Piscataway (April, 1992)
* *Chemical Engineering Distinguished Lecturer*, Texas A & M University, College Station (April, 1991)
* *Distinguished Lecturer*, University of Toronto, Toronto (November, 1991)
* The *Texas Distinguished Faculty Lecturer*, University of Texas, Austin (April 1991)
* The *Stanley Katz Memorial Lecturer*, City College of the City University of New York, April 1989
* The *“ICI Distinguished Visiting Professor”*, University of Newcastle, England, November 1988
* *Distinguished Lecturer for the 900th Anniversary*, University of Bologna, Italy, June 1988
* *Distinguished Visiting Lecturer*, University of Alberta, 1987
* *12th Annual Bicentennial Commemoration Lecturer*, Louisiana State University, 1986
* *Camille and Henry Dreyfus Lectures* by Distinguished Scholars, California Institute of Technology, 1982

IV. **Patents**

* US Patent No. 4,857,278 "Control System for the Czochralski Process"
* Patents filed for the following software systems:
* *BatchDesign-Kit*: MIT Case No.........7568S
* *SMART-Solvent Selector* MIT Case No......... 7539S
* *Waste-Treatment Selector* MIT Case No......... 7626S
* *DB-Miner* MIT Case No..........7489S
* *BioSep-Designer* MIT Case No...........5110S
* *MoleculeDesigner* MIT Case No...........4732S

 V. **Membership and Offices in Technical and Professional Societies:**

 – Member of AIChE, ACS, IEEE, AESS

 – Member of the Chamber of Greek Engineers

 – Trustee of CACHE Corporation

 – AIChE, Vice-Chairman of the Twin Cities section

 – AIChE, Vice-Chairman of the Programming Group 15b

 – AIChE Representative in the Joint Automatic Control Conference, 1979-1980

 – Member of the Control Science Center, University of Minnesota

 Information Science Center, University of Minnesota

 – PSE ‘82, PSE ‘85, PSE ‘88, PSE ’91. Member of the International Programming Committee on Process Systems Engineering;

 – European Federation of Chemical Engineers (1982-84), Member of the Working Group, Computers in Chemical Engineering.

 – UNIDO; Consultant and Member of Advisory Board for the United Nations Industrial Development Organization.

 – Member of Organizing and Programming Committees for

 • *Chemical Process Control ; CPC-2, CPC-3*

 • *Foundations of Computer-Aided Process Operations*, FOCAPO’87, FOCAPO’98

 • *Foundations of Computer-Aided Process Design*; FOCAPD '83, FOCAPD’ 87, FOCAPD’ 94, FOCAPD’ 2000.

 – CAST Division of AIChE, Director (1985-88)

 – IFAC Symposium on “*Fault Diagnosis and Supervision of Process Operations*” (1992) Chairman, International Programming Committee of

 – Chairman, First International Conference on, *Intelligent Systems in Process Engineering*, July 1995.

 – ESCAPE-6, Programming Chair, Rhodes, Greece, May 1996

 – CAST Division, AIChE, Vice-Chair, Chair, 1995-96

* CAST Division, AIChE, Chair, 1997
* DYCOPS-6, Programming Chair, Cheju Island, Korea, June 2001
* IFAC, Programming Co-Chair, The 4th on “On-Line Fault Detection and Supervision in the Chemical Process Industries”, Seoul, Korea, June 2001.
* AIChE Awards Committee; vice-chair 2004-2009

VIa. **Corporate Technical Advisory Boards:**

* Mitsubishi Chemical Corp., Chair of Technical Advisory Board (1997-2000)
* Dow Chemical Corp., Technical Advisory Board on Modeling; 1998-2000.
* Mitsubishi Chemical Corp . Corporate Advisor (2005-2009).
* BP, Co-Director of Operations Academy at MIT (2007-2009).
* Aspen Technology, Chair of Aspen Tech Academy (2012-2015).

VIb. **Industrial Experience and Consulting:**

* ASPEN Technology, Inc.
* BP
* Shell Development Co.
* Honeywell, Inc.
* DuPont,
* Shell, Amsterdam
* Mitsubishi Chemical Corporation
* Eastman Kodak Co.
* EXXON Corporation, Baton Rouge, Louisiana
* Mobil Research and Development Co.
* Japan Energy Corporation
* CHIYODA, Yokohama, Japan
* CONWED Corporation, St. Paul, Minnesota
* Control Data Corporation, Bloomington, Minnesota
* Union Carbide Corporation, W. Charleston, West Virginia
* ICI, Ltd., Runcorn, England
* Center for Economic Studies and Planning, Greece
* MODAR, Inc.
* NASA
* METBA, Aegean Metallurgical Industries

VII. **Editorial Boards:**

 – Founding Editor (with John Perkins), *Process Systems Engineering Series*, Academic Press (Series of Advanced Monographs and Textbooks)

 – Associate Editor, *AIChE Journal*

 – Editorial Board, *Computers and Chemical Engineering Journal*

– Associate Editor, *Artificial Intelligence in Engineering*

 – Editorial Board, *Advances in Chemical Engineering*

– Advisory Board, *Springer Handbook of Automation*

VIII. **Publications:**

 A. **Books**

1. "Synthesis of Heat Exchanger Networks," in *Industrial Energy Conservation*, E. Gyftopoulos (Series Editor), MIT Press (1982).
2. *Chemical Process Control: An Introduction to Theory and Practice*, Prentice-Hall (1984). Also in Greek and Chinese translations
3. *Solutions Manual; Chemical Process Control: An Introduction to Theory and Practice*, Prentice-Hall (1985).
4. *Analysis & Planning of Greek Petrochemical Industry*, KEPE, Athens (1986).
5. *The Scope of Artificial Intelligence in Process Engineering,* CACHE Monoghraph (1990).
6. *Intelligent Systems in Process Engineering: Paradigms for Product and Process Design,* by George Stephanopoulos and Chonghun Han, Volume 21 in the "*Advances in Chemical Engineering Series*", Academic Press (1995).
7. *Intelligent Systems in Process Engineering: Paradigms for Process Operations and Control,* by George Stephanopoulos and Chonghun Han, Volume 22 in the "*Advances in Chemical Engineering Series*", Academic Press (1995).

 B. **Books- Editorial Work**

1. *"Artificial Intelligence in Chemical Engineering Research and Development* (Geo. Stephanopoulos and M. Mavrovouniotis, Editors), Special Issue of *Computers and Chemical Engineering*, Pergamon Press (1988).
2. *CACHE Case-Studies Series in “Knowledge-Based Systems in Process Engineering”,* 3 Volumes. CACHE (1988).
3. *CACHE Monograph Series in “Artificial Intelligence in Process Engineering”,* edited with J. Davis, 3 Volumes published, 2 in preparation. CACHE (1990).
4. *Foundations of Computer Aided Process Design,* J. J. Siirola, I. E. Grossmann and Geo. Stephanopoulos (editors), CACHE-Elsevier (1990).
5. *On-Line Fault Detection and Supervision in the Chemical Process Indistries,* P.S. Dhurjati and Geo. Stephanopoulos, *IFAC Symposia Series,* No.1 (1993).
6. *ISPE ’95: Intelligent Systems in Process Engineering,* Geo. Stephanopoulos, J.F. Davis, and V. Venkatasubramanian (editors), *AIChE Symposium Series*, Vol. 92 (1996).
7. *Proceedings of the European Symposium on Computer-Aided Process Engineering, ESCAPE-6*, Volumes 1 and 2, Geo. Stephanopoulos (editor), *Computers and Chemical Engineering*, (May 1996).
8. *Selected Papers- ESCAPE-6*, Special Issue of *Computers and Chemical Engineering*, Geo. Stephanopoulos and E. Kondili (editors) (1998).
9. *IFAC Proceedings: Dynamics and Control of Process Systems-2001*; Geo. Stephanopoulos, J.H. Lee, and En Sup Yoon, editors. Pergamon Press, 2001.

 C. **Papers**

## 216. “Analysis and Optimization of Multi-Actor Biorefineries”, Muhammad T. Ashraf, Ana I. Torres, Jens Ejbye Schmidt, George Stephanopoulos, Biorefinery – Integrated Sustainable Processes, Springer International Publishing, 2017

215. “Hydrothermal Pretreatment: Process Modeling and Economic Assessment within the Framework of Biorefinery Processes”, Ana I. Torres, Muhammad T. Ashraf, Tanmay Chaturvedi, Jens Ejbye Schmidt, George Stephanopoulos, *Hydrothermal Processing in Biorefineries: Production of Bioethanol and High Added-Value Compounds of Second and Third Generation Biomass,* [Héctor A. Ruiz](https://link.springer.com/search?facet-creator=%22H%C3%A9ctor+A.+Ruiz%22), [Mette Hedegaard Thomsen](https://link.springer.com/search?facet-creator=%22Mette+Hedegaard+Thomsen%22), [Heather L. Trajano](https://link.springer.com/search?facet-creator=%22Heather+L.+Trajano%22), editors, Springer International Publishing, 2017

214. “Design of Multi-Actor Distributed Processing Systems: A Game-Theoretical Approach”, *AIChE Journal,* 62: 3369–3391, 2016.

213. “Evaluation of the production of lipids for fuels and proteins from microalgae by decomposition of the processing network”, Tomasz Bocheński, †a Ana I. Torres, †b,c M. T. Ashraf, J. E. Schmidt, Geo. Stephanopoulos, Proceedings of the 26th European Symposium on Computer Aided Process Engineering, Zdravko Kravanja (Editor), June 12th - 15th, 2016, Portorozˇ, Slovenia. Elsevier B.V., pp.1617-1623, 2016.

212. “Optimization of Lignocellulosic using Multi-Actor Multi-Objective Biorefinery Framework”, M. T. Ashraf, A. I. Torres, I. Cybulska, C. Fang, M. H. Thomsen, J. E. Schmidt, and Geo. Stephanopoulos, Proceedings of the 26th European Symposium on Computer Aided Process Engineering, Zdravko Kravanja (Editor), June 12th - 15th, 2016, Portorozˇ, Slovenia. Elsevier B.V., pp.1317-1323, 2016.

211. “Economically optimal multi-actor processing networks: material flows and price assignment of the intermediates using Lagrangian decomposition”, A. I. Torresa, T. Bochenski, J. E. Schmidt and Geo. Stephanopoulos, Proceedings of the 26th European Symposium on Computer Aided Process Engineering, Zdravko Kravanja (Editor), June 12th - 15th, 2016, Portorozˇ, Slovenia. Elsevier B.V., pp.1383-1388, 2016.

210. “Controlled Formation of Nanostructures with Desired Geometries. Part 4. Multiresolution Optimal Control in Dynamically Directed Self-Assembly of Nanoparticles”, S. Ramaswamy, P. I. Barton, and Geo. Stephanopoulos, *Ind. Eng. Chem. Res*. 2015, 54, 8520−8532

209. “A Novel Approach for the Identification of Economic Opportunities within the Framework of a Biorefinery”, A. I. Torres , I. Cybulska, C. J. Fang, M. H. Thomsen, J. E. Schmidt and G. Stephanopoulos, Krist V. Gernaey, Jakob K. Huusom and Rafiqul Gani (Eds.), *12th International Symposium on Process Systems Engineering and 25th European Symposium on Computer Aided Process Engineering*. 31 May - 4 June 2015, Copenhagen, Denmark. 2015 Elsevier B.V., 2015.

208. “Controlled Formation of Nanostructures with Desired Geometries: Part 3. Dynamic Modeling and Simulation of Directed Self-Assembly of Nanoparticles through Adaptive Finite State Projection”, S. Ramaswamy, R. Lakerveld, P. I. Barton, and Geo. Stephanopoulos, *I&EC Research, 54,* 2015*.*

207. “Laying the Foundations: An Advisor’s Perspective”, Geo. Stephanopoulos, *Computers and Chemical Engineering,* **68**, 2014.

206. “A System-Theoretic, Control-Inspired View and Approach to Process Safety”,

N.G. Leveson and Geo. Stephanopoulos, *AIChE Journal,*  **60**, 2-14, 2014.

205. “A master-equation approach to simulate kinetic traps during directed self-assembly”, R. Lakerveld, G. Stephanopoulos, and P. I. Barton, *J. Chem. Physics,* 66, 184109, 2012.

204. “Process Systems Engineering: From Solvay to Modern Bio- and Nanotechnology. A History of Development, Successes and Prospects for the Future”, Geo. Stephanopoulos and G. V. Reklaitis, *Chemical Engineering Science,* 66, 4272–4306, 2011.

203. “Controlled Formation of Nanostructures with Desired Geometries. Part. II: Robust Dynamic Paths to Robust Desired Structures”, E.O.P. Solis, P.I. Barton, and Geo. Stephanopoulos, *I&EC Research,* 49(17), 7746-7757, 2010.

202. “Controlled Formation of Nanostructures with Desired Geometries. Part. I: Robust Desired Structures”, E.O.P. Solis, P.I. Barton, and Geo. Stephanopoulos, *I&EC Research,* 49(17), 7728-7745, 2010.

201. “Process Systems Engineering: From Solvay to the 21st Century. A History of Development, Successes and Prospects”, George Stephanopoulos, in *10th International Symposium on Process Systems Engineering-PSE2009,* R.M.deBrito Alves, C.A. Oller do Nascimento, and E. Chalbaud Biscaia Jr. (editors), Elsevier B.V. (2009)

200. “Controlled Formation of Self-assembled Nanostructures with Desired Geometries: Robust Dynamic Paths to Robust Desired Structures”, E.O.P. Solis, P.I. Barton, and George Stephanopoulos, in *10th International Symposium on Process Systems Engineering-PSE2009,* R.M.deBrito Alves, C.A. Oller do Nascimento, and E. Chalbaud Biscaia Jr. (editors), Elsevier B.V. (2009)

199. “Controlled Formation of Nanostructures with Desired Geometries”, E.O.P. Solis, P.I. Barton, and George Stephanopoulos, in *Foundations of Computer-Aided Design 2009*, A.A. Linnnger and M.M. El-Halwagi, editors, (2009).

198. “Design Principles and Methodologies for Controlled Formation of Self-Assembled Nanoscale Structures with Desired Geometries*”, E.* O*.* P*. Solis, P.* I Barton, *and* George Stephanopoulos*,* inMolecular Systems Engineering*,* edited by C.S. Adjiman and A. Galindo*,* Volume 6, *Process Systems Engineering Series* (2009).

197. “Multiscale theory for linear dynamic processes: Part 2. Multi-scale Model-Predictive Control”, G. Stephanopoulos, O.I. Karsligil, and M.S. Dyer. *Computers and Chemical Engineering*, **36,** p. 857-884, 2008.

196. “Multiscale theory for linear dynamic processes: Part 1. Foundations”, G. Stephanopoulos, O.I. Karsligil, and M.S. Dyer. *Computers and Chemical Engineering*, **36,** p. 885-912, 2008.

195. "Linking physiology and transcriptional profiles by quantitative predictive models", Misra, J., Alevizos, I., Hwang, D., Stephanopoulos, G., Stephanopoulos, G., Biotechnology and Bioengineering, volume 98, issue 1, 252 - 260, 2007

194. “The multiscale nature of process dynamics and Model-Predictive Control”, O.I. Karsligil, Proceedings of *6th World Congress on Intelligent Control and Automation (WCICA06)*, IFAC, 2006.

193. “ Innovation in a 21st Century Chemical Company”, Geo. Stephanopoulos, *Indian Chemical Engineer,* **47** (4), p.263-270, (2005)

192. “ Nanoscale Process Systems Engineering: Toward Molecular Factories, Synthetic Cells, and Adaptive Devices”, Nicholas Stephanopoulos, Earl O. P. Solis, and G. Stephanopoulos, *AIChE Journal,* **51**, p. 1858-1869, (2005)

191. “Transcriptional therapy with the histone deacetylase inhibitor Trichostatin ameliorates experimental autoimmune encephalomyelitis.” Camelo, S., A. Iglesias, D. Hwang, B. Due, H. Ryu, K. Smith,  S.G. Gray, J. Imitola, G. Duran, B. Assaf, B. Langley, S.J. Khoury, Geo. Stephanopoulos, U. De Girolami, R.R. Ratan, R.J. Ferrante, and F. Dangond. “*Journal of Neuroimmunology*, **164**, 10-21 (2005).

190. “Topological coarse-graining of polymer chains using Wavelet-Accelerated Monte Carlo. I. Freely-jointed chains”, A. E. Ismail, G. C. Rutledge, and G. Stephanopoulos, *J. Chem. Phys.*, **122**(23), 234901(web), (2005)

189. “Topological coarse-graining of polymer chains using Wavelet-Accelerated Monte Carlo. II. Self-avoiding chains*”,* A. E. Ismail, G. Stephanopoulos, and G. C. Rutledge, *J. Chem. Phys.*, **122**(23), 234902(web), (2005)

188. “Wavelet-Accelerated Monte Carlo sampling of polymer chains”, A. E. Ismail, G. Stephanopoulos, and G. C. Rutledge. *J. Polym. Sci. B: Phys.*, **43**(8), 897-910, (2005)

187. “Using wavelet transforms for multiresolution materials modeling”, A. E. Ismail, G. C. Rutledge, and G. Stephanopoulos. *Comp. Chem. Eng.*, **29**, 689-700 (2005)

186. “The molecular signature of late-stage human ALS revealed by expression profiling of post-mortem spinal cord gray matter”, F. Dangond, D.H. Hwang, S. Camelo, P. Pasinelli, M. P. Frosch, Greg. Stephanopoulos, Geo. Stephanopoulos, R.H. Brown, and S.R. Gullans, *Physiol Genomics,* **16**, 229-239, (2004)

185. Iglesias, A., S. Camelo, D. Hwang, R. Villanueva, Geo. Stephanopoulos, F. Dangond. “Microarray detection of E2F pathway activation and other targets in multiple sclerosis peripheral blood mononuclear cells.” *Journal of Neuroimmunology*, **150**, 163-177 (2004).

184. “Inverse Modeling using multi-block PLS to determine the environmental conditions that provide optimal cellular function”, Daehee Hwang, George Stephanopoulos, and Christina Chan, *Bioinformatics*, 20, 487-499 (2004)

# 183. “Identification of Optimal Classification Functions for Biological Sample and State Discrimination from Metabolic Profiling Data”, Lee, K., Hwang, D.,Yokoyama, T., Stephanopoulos, Geo., Stephanopoulos, Greg. N., and Yarmush, M.L., *Bioinformatics,* 20, 959-969 (2004)

182. “Genomic dissection for characterization of cancerous oral epithelium tissues using transcription profile”, Daehee Hwang, Ilias Alevizos, William A. Schmitt, Hiroe Ohyama, Randy Todd, Mamatha Mahadevappa, Janet A. Warrington, George Stephanopoulos, David T. Wong and Gregory Stephanopoulos. *Oral Oncology*, **39**, 3, 259-68 (2003).

181. “ Multiresolution Analysis in Statistical Mechanics. Part 2. The wavelet transform as a basis for Monte-Carlo simulations on lattices”, A. E. Ismail, Greg. C. Rutledge, and Geo. Stephanopoulos, *J. Chemical Physics* **118**, 4424 (2003)

180. “Multiresolution Analysis in Statistical Mechanics. Part 1. Using wavelets to calculate thermodynamic properties”, A. E. Ismail, Greg. C. Rutledge, and Geo. Stephanopoulos, *J. Chemical Physics* **118**, 4414 (2003)

179. “Application of Multivariate Analysis to Optimize the Functions of Cultured Hepatocytes”, C. Chan, D. Hwang, Greg Stephanopoulos, M.L. Yarmush, and Geo. Stephanopoulos, *Biotechnology Progress,* **19**, 580-598 (2003)

178. “Valid Parameter Range Analyses for Chemical Reaction Kinetic Models”, J. Song, Geo. Stephanopoulos, and W. H. Green, *Chemical Engineering Science, Vol. 57, p. 4475-4491, (2002)*

177. “Mapping Physiological States from Microarray Expression Measurements”**,** Gregory Stephanopoulos, Daehee Hwang, William Schmitt, Jatin Misra, and George Stephanopoulos. *Bioinformatics, Vol.18, p.1054-1063, (2002)*

176. “Determination of Minimum Sample Size and Discriminatory Expression Patterns in Microarray Data”, Daehee Hwang, William A. Schmitt, George Stephanopoulos and Gregory Stephanopoulos. *Bioinformatics, Vol. 18, p. 1184-1193, (2002)*

175. “Interactive exploration of microarray gene expression patterns in a reduced dimension.”, ” Misra, J., W.A. Schmitt, D. Hwang, L. Hsiao, S. Gullans, Greg. Stephanopoulos, and Geo. Stephanopoulos, *Genome Research*, 12, 1112-1120 (2002).

174. “The molecular signature of late-stage human ALS revealed by expression profiling of post-mortem spinal cord”, F. Dangond, D. Hwang, P. Pasinelli, M.P. Frosch, Geo. Stephanopoulos, Gr. Stephanopoulos, R.H. Brown Jr., and S.R. Gullans. *Physiological Genomics* 16: 229–239 (2004)

173. “A compendium of gene expression in normal human tissues reveals tissue-selective genes and distinct expression patterns of housekeeping genes”, Li-Li Hsiao, F. Dangond, T. Yoshida, R. Hong, R.V. Jensen, J. Misra, W. Dillon, K.F. Lee, K.E. Clark, P. Haverty, Z. Weng, G. L. Mutter, M.P. Frosch, M.E. MacDonald, E.L. Milford, C.P. Crum, R. Bueno, R.E. Pratt, M. Mahadevappa, J.A. Warrington, Gr. Stephanopoulos, Geo. Stephanopoulos, and S.R. Gullans. *Physiological Genomics,* 2001 7: 97-104

172. “Multi-Scale Approaches in Engineering and Scientific Computing”, Geo. Stephanopoulos, in *Scientific Computing in Chemical Engineering- II; Simulation, Image Processing, Optimization and Control*, F. Keil, W. Mackens, H. Voss, and J. Werther (editors), Springer Verlag, p. 77-92 (1999)

171.“MODEL.LA. : A Phenomena-Based Modeling Environment for Computer-Aided Process Design” , J. Bieszczad, A. Koulouris and Geo. Stephanopoulos, *Foundations of Computer-Aided Process Design*, J. Trainham and M. Malone (editors) (1999)

170. “Batch Process Development: From Reactions to Manufacturing Systems”, Geo. Stephanopoulos, S. Ali, A. Linninger, and E. Salomone, *Computers and Chemical Engineering,*  **23**, p. S975-S986, (1999)

169. “Batch Process Development: Challenging Traditional Approaches”, Geo. Stephanopoulos, A. Linninger, and E. Salomone, *FOCAPD-99 Proceedings*, M. Malone and J. Trainham (editors), Breckenridge, Colorado (Juyly 1999).

168. “A Phenomena-Oriented Environment for Teaching Process Modeling”, A.S. Foss, K.R. Geurts, P.J. Goodeve, K.D. Dahm, Geo. Stephanopoulos, J. Bieszczad, and A. Koulouris, *Chemical Engineering Education*, pp. 292-299 (Fall, 1999)

1. “Wavelet-Based Modulation in Control-Relevant Process Identification”, John Carrier and George Stephanopoulos, *AIChE Journal*, **44**, p. 341-360 (1998)
2. "Explanation-Based, Machine-Learning Techniques for the Improvement of Branch-and-Bound Algorithms", Realff, M. and Geo. Stephanopoulos, *INFORMS Journal on Computing*, **10**, p. 56-71 (1998)
3. “Multi-Scale Considerations in Linear and Nonlinear Estimation and Control”, Geo. Stephanopoulos, Orhan Karsligil and Matthew Dyer, in *Nonlinear Model-Based Control*, R. Berber and C. Kravaris (editors), Kluwer (1998)
4. “A Natural Language Approach for the Design of Batch Operating Procedures”, A. Linninger and Geo. Stephanopoulos, *Informatica*, **22**, p. 423-434 (1998)
5. “Plant-Wide Control Structures and Strategies”, Christine Ng and George Stephanopoulos, Proceedings of DYCOPS-5, Kerkyra, Greece (1998)
6. “Multi-Scale Model-Predictive Control”, Orhan Karsligil, Matthew Dyer and George Stephanopoulos, Proceedings of DYCOPS-5, Kerkyra, Greece (1998)
7. “Synthesis of Control Structures for Chemical Plants”, Christine Ng and George Stephanopoulos, Proceedings of *IFAC Conference on Large-Scale Systems*, Patras, Greece (1998)
8. “Computer-Aided Design of Pharmaceutical Processes Using a Natural Design Language”, *Cybernetics and Systems ’98: Proceedings of the 14th European Meeting on Cybernetics and Systems Research*, R. Trappl (Editor), Vienna, Austria, Vol. 1, pp. 221-226 (1998)
9. “Process Improvement: An Exploratory Data Analysis Approach within an Interval-Based Optimization Framework”, P. Saraiva and Geo. Stephanopoulos, *Production and Operations Management*, **7**, pp.19-37 (Spring, 1998)
10. “Multi-Scale Modeling, Estimation and Control of processing Systems”, George Stephanopoulos, Matthew Dyer, and Orhan Karsligil, *Computers and Chemical Engineering*, **21**, p. S797-S803 (1997)
11. “Pollution Prevention for Production Systems of Energetic Materials”, A.A. Linninger, E. Salomone, S. A. Ali, E. Stephanopoulos, and Geo. Stephanopoulos, *Waste Management*, **17**, pp.165-173 (1997)
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16. "The Synthesis of Heat Recovery Networks for Chemical Processes," G. Stephanopoulos and G. Stephanopoulos, *Proceedings of the International Conference on Energy Use Management*, p. 123, Tucson, Arizona (1977).

15. "A Static Estimator for Use in Process Control," M. Morari and G. Stephanopoulos, *Proceedings of JACC, San Francisco*, p. 1537 (1977).

14. "Mathematical Modeling of the Rubber Industry," G. Stephanopoulos and A. Mora, 109th Meeting of the American Chemical Society, April, 1975. Also in *Rubber Chemistry and Technology*, **49**, p. 1368 (1976).

13. "Process Design in a Dynamic Environment. Part 1: A Decomposition Technique to Study the Stability of Chemical Engineering Systems," G. Stephanopoulos, paper presented at the 68th Annual Meeting of AIChE, November, 1975, Los Angeles; also in *AIChE J.*, **22**, p. 855 (1976).

12. "Analysis and Optimization of Large-Scale Systems. Part 2: Synthesis," G. Stephanopoulos, *Technica Chronica*, **17** (1976).

11. "Analysis and Optimization of Large-Scale Systems. Part 1: Analysis," G. Stephanopoulos, *Technica Chronica*, **17** (1976).

10. "Studies in Process Synthesis: Part II. Evolutionary Synthesis of Optimal Process Flowsheets," G. Stephanopoulos and A.W. Westerberg, *Chem. Eng. Sci.*, **31**, p. 195 (1976).

9. "Studies in Process Synthesis: Part I. Branch and Bound Strategy with List Techniques for the Synthesis of Separation Schemes," A.W. Westerberg and G. Stephanopoulos, *Chem. Eng. Sci.*, **30**, p. 963 (1975).

8. "Synthesis of Optimal Flowsheets by an Infeasible Decomposition Technique in the Presence of Functional Non-Convexities," G. Stephanopoulos and A.W. Westerberg, *Canadian J. Chem. Eng.*, **53** (5) p. 551 (1975).

7. "Note on the Optimization of Constrained Design Problems," G. Stephanopoulos, *J. of Optimization Theory and Applications*, **17** (3/4) p. 337 (1975)

6. "Steady State and Dynamic Studies of a Multi-Product Chemical Plant," A.I. Johnson, A. Lozada, M. Anvari and G. Stephanopoulos, paper presented at the 66th National Meeting of AIChE, Philadelphia, November, 1973. Also in *Canadian J. Chem. Eng.*, **53** (3) p. 340 (1975).

5. "The Use of Hestenes' Method of Multipliers to Resolve Dual Gaps in Engineering Systems Optimization," G. Stephanopoulos and A.W. Westerberg, *J. of Optimization Theory and Applications*, **15** (3) p. 285 (1975).

4. "The Synthesis Problem with Some Thoughts on Evolutionary Synthesis in the Design of Engineering Systems," G. Stephanopoulos and A.W. Westerberg, in Spillers, W.R. (Editor) *Basic Questions of Design*, North-Holland, Amsterdam (1974).

3. "A Stronger Version of the Discrete Minimum Principle," A.W. Westerberg and G. Stephanopoulos, *I & EC Fundamentals*, **13** (3), p. 231 (1974).

2. "Overcoming Deficiencies of the Two-Level Method for Systems Optimization," G. Stephanopoulos and A.W. Westerberg, paper presented at Philadelphia Meeting of AIChE, Nov. 1973, also *AIChE J.*, **19** (6), p. 1269 (1973).

1. "The Effect of Size and Velocity on the Burning Conditions of Fuel Droplets," N., Koumoutsos and G. Stephanopoulos, *Technica Chronica*, **11**, p. 681 (1970).

IX. **Invited Lectures/Seminars:**

1. "Optimization of Non-Convex Systems," University of Florida, May, 1974.

2. "Overcoming the Deficiencies of the Lagrangian Approach for Non-Convex Systems," Control Science Center, Unviersity of Minnesota, October, 1974.

3. "Current Aspects of Chemical Process Design," Purdue University, November, 1976.

4. "Synthesis of Process Flowsheets," Union Carbide, August, 1976.

5. "Synthesis of Control Structures," University of Alberta, March, 1977.

6. "Hierarchical Control of Chemical Processes," Int. Automatic Control, Technical University of Warsaw, Poland, October, 1977.

7. "Synthesis of Control Structures for Chemical Processes," Hungarian Academy of Science, October 1977.

8. "Chemical Process Control," Cambridge University, November, 1977.

9. "Interaction Between Design and Control," ICI England, November, 1977.

10. "Synthesis of Control Structures for Chemical Processes," Imperial College, London, November, 1977.

11. "Control and Process Design," ETH, Zurich, November, 1977.

12. "The Characteristics of Process Control," Control Science Center, University of Minnesota, January, 1979.

13. "An Advanced Course in Process Design," 35 lecture-hours at the Universidad del Sur, Bahia Blanca, Argentina, July, 1979.

14. "Computer-Aided Design," INTEC, Santa Fe, Argentina, July, 1979.

15. "Process Design: Present and Future," CHIYODA Engineering Co., Tokyo, August, 1979.

16. "Design and Control of Chemical Processes," 5 lecture-hours at CHIYODA Engineering Co., Tokyo, August, 1979.

17. "Synthesis of Reaction Paths," University of California, Berkeley, May, 1980.

18. "Synthesis of Reaction Paths," Stanford University, May, 1980.

19. "Synthesis of Reaction Paths," California Institute of Technology, May, 1980.

20. "Synthesis of Process Flowsheets," IVI England, June, 1980.

21. "Analysis and Planning of the Petrochemical Industry," Celaya Technologico Institut, Mexico, June, 1980.

22. "Synthesis of Process Flowsheets," Celaya Technologico Institut, Mexico, June, 1980.

23. "Synthesis in the Design of Chemical Processes," Mobil Research & Development Center, July, 1980.

24. "Synthesis of Reaction Paths," Case-Western Reserve University, October, 1980.

25. "Optimum Synthesis of Chemical Process Flowsheets," Universidad Nacional del Sur, Bahia Blanca, Argentina, August, 1981.

26. "An Advanced Course in Process Systems Engineering," 35 lecture-hours at the Universidad Nacional del Sur, Bahia Blanca, Argentina, August, 1981.

27. "Computers in Chemical Process Control," YPF, Buenos Aires, Argentina, August, 1981.

28. "Synthesis of Reaction Paths," ETH Zurich, May, 1981.

29. "Start-Up Design Procedures," University of Manchester, February, 1982.

30. "Synthesis of Control Structures for Complete Plants," Camille and Henry Dreyfus Lecture at California Institute of Technology, November, 1982.

31. "Synthesis Issues in Process Development," Camille and Henry Dreyfus Lecture at California Institute of Technology, November, 1982.

32. "Synthesis of Control Structures for Chemical Plants," University of Michigan, November, 1982.

33. "Synthesis of Control Structures for Chemical Plants," CHIYODA Engineering Co., Yokohama, Japan, August, 1982.

34. "Synthesis Issues in Process Development," Massachusetts Institute of Technology, June, 1983.

35. "Current State and Future Prospects in Process Control," Massachusetts Institute of Technology, June, 1983.

36. "An Advanced Course in Process Systems Engineering," 36 lecture-hours at the Universidad Nacional del Sur, Bahia Blanca, Argentina, July-August, 1983.

37. "Present State of the Art in Process Control," SHELL, Amsterday, July, 1983.

38. "Synthesis Issues in Process Development," University of California, Davis, April, 1984.

39. "Synthesis Issues in Process Development," University of Massachusetts, Amherst, April, 1984.

40. "Synthesis Issues in Process Development," University of California, Berkeley, April, 1984.

41. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," University of Pennsylvania, October, 1984.

42. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," University of Texas, Austin, October, 1984.

43. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," Carnegie-Mellon University, November, 1984.

44. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," Cornell University, November, 1984.

45. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," University of Maine, January, 1985.

46. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," Purdue University, February, 1985.

47. "Systematic Procedures for the Synthesis of Chemical Reaction Pathways," Georgia Institute of Technology, May, 1985.

48. "Artificial Intelligence in Chemical Engineering," ICI, New Science Group, Runcorn, England, July, 1985.

49. "Synthesis of Chemical Production Routes," University of Rochester, October, 1985.

50. "Artificial Intelligence in Chemical Engineering," Experimental Station, DuPont, December, 1985.

51. "Artificial Intelligence in Chemical Engineering," University of Michigan, March, 1985.

52. "Artificial Intelligence in Chemical Engineering," Northwestern University, April, 1986.

53. "Artificial Intelligence in Chemical Engineering," Illinois Institute of Technology, April, 1986.

54. "Artificial Intelligence in Chemical Engineering," Princeton University, May, 1986.

55. "Scope of A.I. in Process Engineering," University of Maryland, April 1987.

56. "Scope of A.I. in Process Engineering," University of alberta, September, 1987.

57. "A.I. in Biotechnology," University of Alberta, Spetember, 1987.

58. "A.I. in Process Operations," University of South Florida, December, 1987.

59. "A.I. in Process Operations and Control," University of Florida, December, 1987.

60. "A.I. in Biotechnology," AMOCO R & D Co., April, 1987.

61. "A.I. in Real-Time Systems," Union Carbide Co., June, 1987.

62. "A.I. in Computer-Aided Process Control," American Dyanamide, September, 1987.

63. "A.I. in Process Engineering," Mobil R & D, Paulsboro, NJ, November, 1987.

64. "A.I. in Chemical Engineering," Mobil R & D, Princeton, NJ, November 1987.

65. "A.I. and Computing Environments in Process Design Operations and Control," Dow Chemical Co., Midland, MI, January, 1988.

66. "A.I. in Process and Product Development and Design," Xerox Research Center, Mississauga, Ontario, Canada, April, 1988.

67. "The Future of Process Control: Theoretical and Technological Expectations," Exxon Chemicals, North American Mexican Group on Control, Texas, April, 1988.

68. "New Frontiers in Computing for Chemical Engineering," a series of 5 lectures at the lUniversity of Bologna on the occasion of its 900th Anniversary, July, 1988.

69. "Process Control in Mineral Processing," METBA, Athens, Greece, July, 1988.

70. "A.I. in Process Control," Montedison, Italy, July, 1988.

71. "A.I. in Integrated Process Engineering," ICI Engineering, Winnington, England, November, 1988.

72. "Computer-Aided Engineering in Biotechnology," ICI Engineering, Billingham, England, November, 1988.

73. "AI in Process Control," SHELL Development, Houston, December, 1988.

74. "AI in Process Operations and Control," Case-Western Reserve University, April, 1988.

75. "The Control-Loop Revisited," University of Newcastle, UK, November, 1988.

76. "AI and Symbolic Computing in Chemical Engineering," The City College of New York, The S. Katz Memorial Lecture, April, 1989.

77. "AI in Process Engineering," BASF, Ludwigshafen, W. Germany, April, 1989.

78. "Intellignece in Process Operations and Control," McGill University, May, 1989.

79. "Current Status and Future Trends in Process Control," Honeywell, Minneapolis, May 1989.

80. "AI in Process Engineering," Air Products and Chemicals, Allentown, June, 1989.

81. "Distributed process control: The Autonomous Process Control System," Honeywell, July, 1989.

82. "AI in Process Engineering," Union Carbide, September, 1989.

83. "AI in Process Engineering," Mitsubishi Kasei Co., Tokyo, Japan, December, 1989.

84. "AI in Chemical Engineering", Kyoto University, Kyoto, Japan, December, 1989.

85. "Modern Trends in Computer-Aided Control", Koa Oil Co., Tokyo, Japan, December, 1990.

86. "Intelligence in CAD", RSI, Tokyo, Japan, December, 1989.

87. “AI in Process Engineering”, DuPont Engineering Station, Newark, DE, March 1990.

88. “AI in Process Operations and Control”, Shell Development Co., Houston, TX April 1990.

89. “The Scope of Modeling and Symbolic Processing in Chemical Engineering”, University of California, Los Angeles, April 1990.

90. “Pattern Recognition in Process Operations and Control”, University of California, Berkeley, April 1990.

91. “A.I. in Chemical Engineering”, University of California, Santa Barbara, April 1990.

92. “AI in Computer-Aided Process Design and Control”, Ohio State University, Columbus, April 1990.

93. “Process Engineering in Biotechnology”, University of Oulu, Oulu, Finland, September 1990.

94. “AI in Process Engineering”, Technical University of Helsinki, Finland, September 1990.

95. “Recent Trends in Process Operations and Control”, NESTE OY, Helsinki, Finland, September 1990.

96. “Pattern Recognition in Process Operations and Control”, University of Maryland, College Park, MD, November 1990.

97. “Towards the Intelligent Controller”, University of Texas, Austin, Texas, April 1991.

98. “Towards the Intelligent Controller”, Texas A & M University, College Station, Texas, April 1991.

99. “AI and Symbolic Programming in Design”, Mobil Research and Development Co., November, 1991

100. “ Towards the Intelligent Controller”, University of Toronto, November, 1991.

101. “AI in Process Engineering”, ASPEN-WORLD, Aspen Tech, November, 1991.

102. “Object-Oriented Programming in Process Engineering”, Merck and Co., December, 1991.

103. “Pattern-Recognition in Process Operations and Control”, Eastman Kodak Co., December, 1991.

104. "Multi-Resolution Analysis in Process Operations and Control", Rutgers University, April 1992.

105 "Multi-Resolution Analysis in Process Operations and Control", Auburn University, April 1993

106 "Design of *ZAP* Processes for Pharmaceuticals Manufacturing", Merck and Co., April 1993

107 "Multi-Resolution Analysis in Process Operations and Control", University of Minnesota, May 1993.

108 "Wavelets, *Wave-Nets*, and their Use in Monitoring and Control", Honeywell Corp., May 1993.

109 "Design of *ZAP* Processes for Pharmaceuticals Manufacturing", Smith Kline and Beecham, August 1993

110 "Design of *ZAP* Processes for Pharmaceuticals Manufacturing", Ciba Geigy, September 1993

111 "Multiresolution Analysis and Sunthesis in Process Operations and Control", Princeton University, Department of Chemical Engineering, May (1995)

112 "Multiresolution Analysis and Sunthesis in Process Operations and Control", Imperial College, Centre for Process Systems Engineering, June (1995)

113 "Intelligent Systems in Process Engineering", McMaster University, Hamilton, Ontarion, Canada (October 1995).

1. "Intelligent Systems in Process Engineering", University of Connecticut, Storrs, Connecticut (November 1995)
2. "Intelligent Systems in Process Engineering", Carnegie-Mellon University, Pittsburgh, (November 1995)
3. "Intelligent Systems in Process Engineering", Case-Western Reserve University, Cleveland, (November 1995)
4. "Intelligent Systems in Process Engineering", Wayne State University, Detroit, (November 1995)
5. "Intelligent Systems in Process Operations and Control", Mitsubishi Chemical Corporation, Mizushima Works, Japan (January 1996)
6. "Multifaceted Design of Chemical Plants", Mitsubishi Chemical Corporation, Mizushima Works, Japan (January 1996)
7. "Mutli-Scale Methods in Process Operations Analysis and Control", Mitsubishi Chemical Corporation, Mizushima Works, Japan (January 1996)
8. "Mutli-Scale Methods in Process Operations Analysis and Control", Japan Energy Corporation, Mizushima Works, Mizushima, Japan (January 1996)
9. "Intelligent Systems in Process Operations and Control", Japan Energy Corporation, Mizushima Works, Mizushima, Japan (January 1996)
10. "Mutli-Scale Methods in Process Operations Analysis and Control", Kyoto University, Kyoto, Japan (January 1996)
11. "Synthesis of Batch Processing Schemes with Environmental Considerations", Kyoto University, Kyoto, Japan (January 1996)
12. "BatchDesign-Kit: The Electronic Workbench for Batch Process Development", Bayer AG, Leverkusen, Germany (October 1996)
13. "BatchDesign-Kit: The Electronic Workbench for Batch Process Development", Akzo-Nobel, Arnheim, Netherlands (October 1996)
14. "BatchDesign-Kit: The Electronic Workbench for Batch Process Development", Zeneca, Huddesville, UK (November 1996)
15. "BatchDesign-Kit: The Electronic Workbench for Batch Process Development", DuPont, Wilmington, Delaware (November 1996)
16. “Plant-Wide Control”, Kyoto University, Kyoto, Japan (April 97)
17. “ BatchDesign-Kit: Batch Process Development”, Kyoto University, Kyoto, Japan, (April 97)
18. “BatchDesign-Kit”, Rohm and Haas Symposium, (May 97)
19. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, University of Missouri, Rolla (October 1997)
20. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, Caltech (October 1997)
21. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, University of California, Los Angeles (October 1997)
22. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, University of California, Davis (October 1997)
23. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, University of Toronto, Toronto (October 1997)
24. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, Lehigh University, Bethlehem (November 1997)
25. “From Reactions to Processes: Batch Process Development and Design”, University of Rhode Island, Kingston (April 1998)
26. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept of Chemical Engineerin, University of Massachusetts (April 1998))
27. “Multi-Scale Systems Theory: Modeling, Estimation, Control”, Dept. of Chemical Engineering, University of Florida (March 1999)
28. “Plant-Wide Control Structures and Strategies”, Postech, Pohang, Korea (March 1999)
29. “Plant-Wide Control Structures and Strategies”, Seoul National University, Seoul, Korea (March 1999)
30. “MODEL.LA.; A Phenomena-Based Modeling Language”, Dow Chemical Co., Midland, Michigan (June 1999)
31. “Bioinformatics and its Role in Biotechnology”, Mitsubishi Chemical Corporation, Yokohama research Center, Yokohama, Japan (January 2000)
32. “*The Reformation and Rejuvenation of Mitsubishi Chemical Corporation’s R&TD”*, Management of Technology Symposium, Musashi Institute of Technology, February 16, 2002, Shibuya, Tokyo
33. “*Business Growth through Modern Bio-Technology”*, Nomura Bio-Conference, March 4, 2002, Tokyo, Japan
34. “*The Reformation and Rejuvenation of Mitsubishi Chemical Corporation’s R&TD”* , Massachusetts Institute of Technology, May 3, 2002, Cambridge, MA.
35. “*The Reformation and Rejuvenation of Mitsubishi Chemical Corporation’s R&TD”* , The JATES Meeting, May 11, 2002, Tokyo, Japan
36. " The Reformation and Rejuvenation of R&D in Mitsubishi Chemical Corporation", 20th Workshop on “Technological Trends and New Industrial Structures” Institute for Research and Innovation, May 31, 2002, Karuizawa, Nagano.
37. *“ Reshaping a Chemical Company for the 21st Century:  The Case of Mitsubishi Chemical Corporation”,* McMaster University, June 6, 2002, Hamilton Ont. Canada
38. “*The Reformation and Rejuvenation of Mitsubishi Chemical Corporation’s R&TD”* , Management of Technology Conference, July 25, 2002, Tokyo, Japan
39. “*Taming Innovation and Harnessing its Benefits in a Chemical Company: The Case of Mitsubishi Chemical Corporation”*, R&D Management Forum, Gemini Consulting, August 28, 2002, Tokyo, Japan.
40. “*The Reformation and Rejuvenation of Mitsubishi Chemical Corporation’s R&TD”*, Unitika Corp., October 22, 2002, Kyoto, Japan
41. “*The Reformation and Rejuvenation of Mitsubishi Chemical Corporation’s R&TD”*, Sanyo Corp., October 23, 2002, Osaka, Japan
42. “*Reshaping a Chemical Company for the 21st Century*”, International Industry-Academia Symposium, Seoul National University, October 24, 2002, Seoul, Korea
43. “ Invention and Innovation in a Product-Centered Economy”, NTT Annual Global R&D Forum: Keynote Lecture., Atsugi, October 2003.
44. “Overcoming Low “Productivity” of R&D:The “Reformation and Rejuvenation” of Mitsubishi Chemical Corporation’s Research and Technology Development”, Innovation Research Institute, Tokyo, August 2003.
45. “Some Thoughts on the Future Evolution Of API Companies”*,* API Corp., Osaka, Japan, December 2003.
46. “Across the Divide: Lessons an Academic Learned from Industry”, NAE Section 3, October 2003.
47. “The Role of R&D in Shaping the Chemical Industry”; 10th Annual MIT Research and development Conference, Cambridge, MA, October 15, 2003
48. “Systems Engineering in Biology”, IBM at MIT, May 2003.
49. “Invention and Innovation in a Product-Centered Chemical Industry”, 2003 Institute Lecture, AIChE Mtg., San Francisco, November 2003. <http://www.castdiv.org/archive/WebCAST%20Lecture%2010-26-04.pdf>
50. “ R&D Philosophies and Practices in Japan and the US”, MIT in Japan Symposium, Tokyo, January 2003.
51. “Invention and Innovation in a Product-Centered Chemical Industry”, Waseda University, Tokyo, Japan, March 2004
52. “Invention and Innovation in a Product-Centered Chemical Industry”, University of Delaware, Dept. of Chemical Engineering, September 2004
53. “Invention and Innovation in a Product-Centered Chemical Industry”, WebCAST, CAST Corp., October 2004.
54. “Nanoscale Process Systems Engineering”, Penn State University, December 2005

168. “The multiscale nature of process dynamics and Model-Predictive Control”, Plenary lecture at the *6th World Congress on Intelligent Control and Automation (WCICA06)*, IFAC, Dalian, China, July 2006.

169. “ Multiscale estimation and control for linear dynamic processes”, Electrical and Computer Engineering Dept., University of Connecticut, December 2006.

170. “Innovation in a 21st Century Chemical Company: Implications for Chemical Engineering Education and Research”, Plenary Lecture, 6th Panhellenic Scientific Conference of Chemical Engineering, Athens, May-June 2007.

171. "Design Principles and Methods for Nanoscale Structures with Desired Geometries", Texas Tech Univ., Lubbock, TX, October 19, 2007

172. "Design Principles and Methods for Nanoscale Structures with Desired Geometries", Lecture in Centenary Series, Imperial College, London, November 28, 2000

173. "Design Principles and Methods for Nanoscale Structures with Desired Geometries", Centennary Keynote Lecturer, Graduate Students Symposium, Department of Chemical Engineering, Univeristy of Alberta, May 2008.

174. “TPM as the Continuous Improvement Principle in Process Operations”, BP-Pipelines and Logistics, Naperville, Illinois, October 2008.

175. “Process Systems Engineering: History, Accomplishments, Prospects”, AIChE Centennial Meeting, Philadelphia, November 2008.

176. “Predicting the Future from the Past in Process Control”, AIChE Centennial Meeting, Philadelphia, November 2008.

177. “Process Systems Engineering: From Solvay to the 21st Century. A History of Development, Successes and Prospects for the Future”, Institute of Chemical Technology, Mumbai, India, February 3, 2009.

178. “Process Systems Engineering: The Core of Chemical Engineerng Education”, Workshop on Advanced Concepts in Chemical Engineering, UGC Networking Resource Centre, Institute of Chemical Technology, Mumbai, India, February 21, 2009.

179. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, Department of Chemical Engineering, Indian Institute of Bombay, Mumbai, India, February 2009.

180. “Innovation in a 21st Century Chemical Company”, Dow India Glabal R&D Center, Pune, India, February 2009.

181. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, The Stodola Medal Lecture, ETH-Zurich, May 2009

182. “PSE: From Solvay to the 21st Century”, Federal University of Rio, Rio de Janeiro, Brazil, September 2009

183. “After 25 Years, Where to Next?”, ICE/HT, 25th Anniversary Lecture, Patras, Greece, September 2009.

184. “PSE: From Solvay to the 21st Century”, National Technical Universsity of Athens, Athens, Greece, October 2009.

185. “PSE: From Solvay to the 21st Century”, The Wilhelm Lectures, Princeton University, October 2009.

186. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, The Wilhelm Lectures, Princeton University, October 2009.

187. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, The Ruckenstein Lecture, University of Buffalo, April 2010.

188. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, The L.T. Fan Lecture, Kansas State University, April 2010.

189. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, ESCAPE 21, Porto Caras, Greece, June 2011.

190. “Systems Thinking in the Management of Process Operations”, FOCAPO 2012-CPC VIII, Savannah, GA, January 2012.

191. “Revamping Goals and Content of a Process Dynamics and Control Course” FOCAPO 2012-CPC VIII, Savannah, GA, January 2012.

192. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, University of Houston, April 2012

193. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, Auburn University, April 2012.

194. “Systems Engineering at the Nanoscale: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, 9th World Congress of Chemical Engineering, in Seoul, Korea, August 2013.

195. “Controlled Formation of Nanostructures with Desired Geometries”, Workshop on *Frontiers in Multi-Scale Systems Engineering,* KAIST, Daejeon, Korea, August 2013.

196. “Systems Thinking in the Management of Process Operations”, Petroleum Institute, Abu Dhabi, United Arab Emirates, January 2014.

197. "Framework for the Design and Optimization of Biorefinery Networks", A.I. Torres and Geo. Stephanopoulos, *AIChE Annual Meeting,* Atlanta, November 2014.

198. “A Multiresolution Approach to Optimally Control the Dynamic Directed Self-Assembly of Nanostructures”, S. Ramaswamy, P.I. Barton, and Geo. Stephanopoulos, *AIChE Annual Meeting,* Atlanta, November 2014.

199. “A Novel Approach for the Identification of Economic Opportunities within the Framework of a Biorefinery”, A. I. Torres , I. Cybulska, C. J. Fang, M. H. Thomsen, J. E. Schmidt and G. Stephanopoulos, *12th International Symposium on Process Systems Engineering and 25th European Symposium on Computer Aided Process Engineering*. 31 May - 4 June 2015, Copenhagen, Denmark.

200. “Nanoscale Process Systems Engineering: Towards Molecular Factories, Synthetic Cells, and Adaptive Devices”, Bayer Lecture, Carnegie-Mellon University.

201. “Process Systems Engineering: Foundations and Applications”, Max Planck Research Institute on Systems Dynamics and Process Engineering, Magdeburg, Germany, August 2015.

202. "A Multi-Actor Multi-Objective Framework for the Design of Economically Optimal Processing Networks", AIChE Annual Meeting, Salt Lake City, Nov. 2015.

1. “Process Systems Engineering: An Introduction to its Foundations and a Historical Overview of its Development”, PLAPIQUI-CONICET, Univ. Nacional del Sur, Argentina, March 2016
2. “Nanoscale Process Systems Engineering: Toward Molecular Factories, Synthetic Cells, and Adaptive Devices”, PLAPIQUI-CONICET, Univ. Nacional del Sur, Argentina, March 2016
3. “BioRefineries: A Game-Theoretical Case in Distributed Manufacturing”, PLAPIQUI-CONICET, Univ. Nacional del Sur, Argentina, March 2016
4. “From a Process-Centered to a Product- and Customer Value-Centered Chemical Industry: Implications in Academic and Industrial R&D”, PLAPIQUI-CONICET, Univ. Nacional del Sur, Argentina, March 2016
5. “Continuous Improvement: Systems Thinking in Management of Process Operations”, PLAPIQUI-CONICET, Univ. Nacional del Sur, Argentina, March 2016
6. “Nanoscale Process Systems Engineering: Toward Molecular Factories, Synthetic Cells, and Adaptive Devices”, INTEC-CONICET, Univ. Nacional Litoral, Argentina, March 2016
7. “Process Systems Engineering: An Introduction to its Foundations and a Historical Overview of its Development”, Universidad de la Republica, School of Chemical Engineering, Montevideo, Uruguay, February 2016
8. “Process Systems Engineering: Select Topics”, Universidad Nacional de la Republica, School of Chemical Engineering, Montevideo, Uruguay, February 2016