Ahmet Palazoglu, Distinguished Professor

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EDUCATION

Ph.D.	Chemical Engineering	1984	Rensselaer Polytechnic Institute Troy, New York
M.S.	Chemical Engineering	1980	Boğaziçi University Istanbul, Turkey
B.S.	Chemical Engineering	1978	Middle East Technical University Ankara, Turkey

ADMINISTRATIVE EXPERIENCE

2011 – 2014	Chair	Dept. of Chemical Engineering & Mat. Sci. University of California, Davis, CA 95616
2008 – 2011	Vice-Chair	Dept. of Chemical Engineering & Mat. Sci. University of California, Davis, CA 95616

ACADEMIC APPOINTMENTS

2017 – current	Distinguished Professor	Dept. of Chemical Engineering University of California, Davis, CA 95616
1996 – 2017	Professor	Dept. of Chemical Engineering University of California, Davis, CA 95616
1990 – 1996	Associate Professor	Dept. of Chemical Eng. & Mat. Sci. University of California, Davis, CA 95616
1984 – 1990	Assistant Professor	Dept. of Chemical Engineering University of California, Davis, CA 95616

MAJOR COMMITTEE MEMBERSHIP RESPONSIBILITIES

Department: Undergraduate Affairs Committee (*Chair*), Graduate Affairs Committee (*Chair*), Safety Committee, ABET Preparation Committee (*Chair*)

College: Undergraduate Study Committee (*Chair*), Faculty Personnel Committee (*Chair*), Program Planning & Assessment Committee (*Chair*), ABET Preparation Committee, Strategic Planning Committee

Campus: Committee on Committees, Committee on Courses of Instruction, Committee on Planning & Budget, Graduate Council – Academic Planning and Development, Committee on Educational Policy, Committee on Academic Personnel (*Chair*), Academic Senate Executive Committee, Honors Council

Universitywide: Committee on Academic Personnel (C*hair*), Academic Council, Education Abroad Program (EAP) Program Review Committee

Professional: AIChE Area 10b Chair, Organizing/Program Committees for American Control Conference, DYCOPS, ADCHEM, PSE, CPC-IV, CHEMFAS, ISIC-MED, and others.

AWARDS AND HONORS

2018 – Fellow, American Institute of Chemical Engineers (AIChE)
2017 – Otto Monsted Visiting Professorship at Technical University of Denmark
2009 – Guest Professor, Beijing University of Chemical Technology, China
2005 – Tarik Somer Award and Lecture, Middle East Technical University, Turkey

EDITORIAL RESPONSIBILITIES

International Journal of Chemical Engineering – Member of Editorial Board (2007-2013)
Scientia Nanotechnology – Member of Editorial Board (2010-)

ADVISORY BOARD RESPONSIBILITIES

TUPRAS, Turkey, Advisory Board (2015-)
Mars, Inc., Material Science Advisory Board (2017-)

REVIEWING ACTIVITIES

Journals: AIChE J., Ind. & Eng. Chem. Research, Chem. Eng. Sci., Comp. & Chem. Eng., J. Process Control, Automatica, IEEE Trans. Con. Sys. Tech., J. Adaptive Control & Sig. Proc., Control Eng. Practice, Ultramicroscopy, Information Sci., J. Franklin Inst., Math. & Comp. Modeling, Amer. J. Enology & Viticulture, Chem. Eng. Comm., Math. & Comp. Modeling, Biotech. & Bioeng., Optimal Control App. & Methods, IEEE Trans. Automatic Control, Int. J. of Control, Canadian J. of Chem. Eng., Particle & Particle Systems Characterization, J. App. Meteorology and Climatology, Int. J. Neural Systems, Information Sciences, Latin American App. Res., Education for Chem. Eng., Aerosol and Air Quality Res., Crystal Growth & Design, Chem. Eng. Res. & Design, J. Adv. Res. Dynamical & Control Sys., Meteorologische Zeitschrift, Polish J. Env. Studies, Water, Air & Soil Pollution, Transportmetrica, Arabian Journal of Science and Engineering, Applied Thermal Engineering, Air Quality, Atmosphere and Health, J. Fuel, Chemosphere, IEEE Trans. Industrial Informatics, Applied Energy, Journal of Cleaner Production, Atmospheric Pollution Research, J. Power & Energy, Process Integration and Optimization for Sustainability, Adv. in Mechanical Engineering, J. Chemometrics.

Publishers: McGraw-Hill, Taylor & Francis, Birkhauser, Marcel Dekker, Springer.

Funding Agencies: National Science Foundation, American Chemical Society – Petroleum Research Fund, Australian Research Council, Air Force Office of Scientific Research, National Academies NRC Research Associateship Programs, Israel Science Foundation, City University of Hong Kong.

Universities: The University of Sydney, Australia; Murdoch University, Australia; University of New South Wales, Australia.

INTERNATIONAL PROGRAMS AND ACTIVITIES

- Developed a comprehensive Agreement of Cooperation (AOC) between UC Davis and Middle East Technical University (Ankara, Turkey), organized joint workshops, managed faculty/student exchanges.
- Helped develop a comprehensive Agreement of Cooperation (AOC) between UC Davis and Hanoi University of Mining and Geology (HUMG) (Hanoi, Vietnam) and managed faculty/student exchanges and teaching responsibilities.
- Helped develop a comprehensive Agreement of Cooperation (AOC) between UC Davis and Beijing University of Chemical Technology (BUCT) (Beijing, China). Hosted graduate students and faculty.

SABBATICAL VISITS

January – June 2003	Koç University, Turkey
October – December 2002	University of Stuttgart, Germany
October – February 1992	Boğaziçi University, Turkey

COURSES TAUGHT

Chemical Process Control, Process Economics and Optimization, Process Equipment Design, Chemical Plant Design, Unit Operations Laboratory, Chemical Engineering Kinetics, Heat Transfer, Advanced Process Control, Data Analysis and Process Monitoring, Freshman Seminars (Chocolate: Politically Correct?; Reading a Political Novel: Orhan Pamuk's *Snow*)

CURRENT RESEARCH INTERESTS

Dynamics, monitoring and control of processes; Renewable energy systems; Statistical modeling and data mining;

PUBLICATIONS

Books and Book Chapters

8. Romagnoli, J.A. and **A. Palazoglu**, *Introduction to Process Control*, 2nd Edition, Taylor & Francis CRC Press, Boca Raton, FL, (2012).
7. **Palazoglu, A.**, P. Stroeve, and J.A. Romagnoli, "Wavelet Analysis of Images from Scanning Probe and Electron Microscopy," in *Microscopy: Science, Technology, Applications and Education*, A. Mendez-Vilas and J. Diaz (Eds.), Microscopy Book Series #4, Formatex, Badajoz, Spain, (2010).
6. **Palazoglu, A.**, A. Singh, S. Beaver, "Meteorological Triggers for Ozone Episodes in Central California," *Air Pollution Modeling and Its Application XX*, D.G. Steyn and S.T. Rao (eds.), Springer, (2010).
5. Beaver, S., Y. Jia, S-T Soong, C. Tran, S. Tanrikulu, D. Steyn, B. Ainsle, **A. Palazoglu**, and A. Singh, "Cluster Analysis and Classification of Wind Fields for Meteorological and Air Quality Model Validation," *Air Pollution Modeling and Its Application XX*, D.G. Steyn and S.T. Rao (eds.), Springer, (2010).
4. Cinar, A., **A. Palazoglu**, and F. Kayihan, *Chemical Process Performance Evaluation*, Taylor & Francis CRC Press, Boca Raton, FL, ISBN: 0-8493-3806-9 (2007).
3. Romagnoli, J.A. and **A. Palazoglu**, *Introduction to Process Control*, Taylor & Francis CRC Press, Boca Raton, FL, ISBN: 0-8493-3496-9 (2006).
2. **Palazoglu, A.** and K.R. Harris, "Promises and Limitations of Functional Expansions in Nonlinear Model-Based Control," in *Nonlinear Model Based Control*, R. Berber and C. Kravaris (eds.), NATO ASI Series, Kluwer Academic Publishers, The Netherlands (1997).
1. **Palazoglu, A.** and J.A. Romagnoli, "New Results on Robust Controller Design for Chemical Processes," in *Methods of Model Based Control*, R. Berber (ed.), NATO ASI Series, Kluwer Academic Publishers, The Netherlands (1995).

Book Reviews

2. *Nonlinear and Robust Control of PDE Systems – Methods and Applications to Transport-Reaction Processes,* by Panagiotis D. Christofides, *International Journal of Robust and Nonlinear Control*, 13, 787-789 (2003).

1. *Multistage Fuzzy Control - A Model-based Approach to Fuzzy Control and Decision Making*, by Janusz Kacprzyk, *J. of Process Control*, 8, 517 (1998).

Papers Submitted or in Preparation

1. Liu, D.R.C., D. Lavoie, **A. Palazoglu**, N.H. El-Farra, "Dynamic Programming Formulation for Demand Response Optimization," *Comp. & Chem. Eng.*, in preparation (2018).
2. Gajjar, S., M. Kulahci, **A. Palazoglu**, "Least Squares Sparse Principal Component Analysis and Parallel Coordinates for Real-time Process Monitoring," *Ind. & Eng. Chem. Research*, in preparation (2018).
3. Wang, X., L. Lanyu, **A. Palazoglu**, N.H. El-Farra, and N. Shah, "A review and optimization of operational, economic and environmental performance of offshore wind farms with energy storage," *Renewable & Sustainable Energy Reviews*, submitted (2018).
4. X. Ma, L. Zhang, J. Hu, A. Palazoglu, " A model-free approach to reduce the effect of autocorrelation on statistical process control charts,"*J. Chemometrics*, submitted (2018).

Papers in Archival Journals (Web of Science *h* index = 25)

130. Zhang, L., X. Ma, J. Hu, S. Dong, A. Palazoglu, " Formulation of a New Trend CUSUM Chart to Monitor Batch Process Variables," *Ind. & Eng*. *Chem. Research*, in press (2018).
129. Gajjar, S., M. Kulahci, **A. Palazoglu**, "Real-time Fault Detection and Diagnosis Using Sparse Principal Component Analysis," *J. Process Control*, in press (2018).
128. Zhai, C., W. Sun, **A. Palazoglu**, "Analysis of Periodically Forced Bioreactors Using Nonlinear Transfer Functions," *J. Process Control*, 58, 90-105 (2017).
127. Tong, C., **A. Palazoglu**, N.H. El-Farra, "A Decomposition Scheme for Integration of Production Scheduling and Control: Demand Response to Varying Electricity Prices," *Ind. & Eng. Chem. Research*, 56, 8917−8926 (2017).
126. Zhai, C., **A. Palazoglu**, S. Wang, W. Sun, "Strategies for the Analysis of Continuous Bio-ethanol Fermentation under Periodical Forcing," *Ind. & Eng*. *Chem. Research*, 56, 3958-3968 (2017).
125. Gajjar, S., M. Kulahci, **A. Palazoglu**, "Selection of Non-zero Loadings In Sparse Principal Component Analysis," *Chemometrics and Intelligent Laboratory Systems*, 162, 160-171 (2017).
124. Wang, X., N.H. El-Farra, **A. Palazoglu**, "Optimal Scheduling of Demand Responsive Industrial Production with Hybrid Renewable Energy Systems," *Renewable Energy*, 100, 53-64 (2017).
123. Gao, H., Gajjar, S., M. Kulahci, **A. Palazoglu**, "Process Knowledge Discovery Using Sparse Principal Component Analysis," *Ind. & Eng. Chemistry Research*, 55, 12046-12059 (2016).
122. Tong, C., **A. Palazoglu**, "Dissimilarity-Based Fault Diagnosis through Ensemble Filtering of Informative Variables," *Ind. & Eng. Chemistry Research*, 55, 8774−8783 (2016).
121. Gajjar, S., **A. Palazoglu**, "A Data-Driven Multidimensional Visualization Technique for Process Fault Detection and Diagnosis," *Chemometrics and Intelligent Laboratory Systems*, 154, 122-136 (2016).
120. Tong, C., **A. Palazoglu**, N.H. El-Farra, X. Yan, "Energy Demand Management for Process Systems Through Production Scheduling and Control," *AIChE J*., 61(11), 3756–3769 (2015).
119. Wang, X., N.H. El-Farra, **A. Palazoglu**, "Proactive Reconfiguration of Heat-Exchanger Super Networks," *Ind. & Eng. Chemistry Research*, 54, 9178−9190 (2015).
118. Wang, X., **A. Palazoglu,** N.H. El-Farra, "Operational Optimization and Demand Response of Hybrid Renewable Energy Systems," *Applied Energy*, 143, 324-335 (2015).
117. Sun, W., **A. Palazoglu**, A. Singh, H. Zhang, Q. Wang, Z.M. Zhao, D. Cao, "Prediction of Surface Ozone Episodes Using Clusters Based Generalized Linear Mixed Effects Models in Houston-Galveston-Brazoria Area, Texas," *Atmospheric Pollution Research*, 6, 245-253 (2015).
116. Chen, Q., Z.W. Chen, W. Sun, G.A. Yang, **A. Palazoglu**, Z.Q. Ren, "A New Structuring Element for Multi-scale Morphology Analysis and its Application in Rolling Element Bearing Fault Diagnosis," *J. Vibration and Control*, 21(4), 765-789 (2015).
115. Wang, X., H. Teichgraber, **A. Palazoglu** N.H. El-Farra, "An Economic Receding Horizon Optimization Approach for Energy Management in the Chlor-Alkali Process with Hybrid Renewable Energy Generation," *J. Process Control*, 24, 1318-1327 (2014).
114. Tong, C., **A. Palazoglu**, X. Yan, "Improved ICA for Process Monitoring Based on Ensemble Learning and Bayesian Inference," *Chemometrics and Intelligent Laboratory Systems*, 135, 141-149 (2014).
113. Tong, C., N.H. El-Farra, **A. Palazoglu**, X. Yan, "Fault Detection and Isolation in Hybrid Process Systems Using a Combined Data-driven and Observer-design Methodology," *AIChE J*., 60(8), 2805-2814 (2014).
112. Zhang, H., **A. Palazoglu**, X. Zhang, W. Zhang, Z. Zhao, W. Sun, S. Liu, "Prediction of Surface Ozone Exceedance Days Using PCA with a Non-parametric T^2 Control Limit," *Chemometrics and Intelligent Laboratory Systems*, 133, 42-48 (2014).
111. Tong, C., **A. Palazoglu**, X. Yan, "An Adaptive Multimode Process Monitoring Strategy Based on Mode Clustering and Mode Unfolding," *J. Process Control*, 23, 1497-1507 (2013).
110. Sun, W., H. Zhang, **A. Palazoglu**, "Prediction of 8hr-average Ozone Concentration Using a Supervised Hidden Markov Model Combined with Generalized Linear Models," *Atmospheric Environment*, 81, 199-208 (2013).
109. Sun, W., H. Zhang, **A. Palazoglu**, A. Singh, W. Zhang, S. Liu, "Prediction of 24-hour-average $PM_{2.5}$ Concentration using a Hidden Markov Model with Different Emission Distributions in Northern California," *Science of the Total Environment*, 443, 93-103 (2013).

108. Ileri, N., R. Faller, **A. Palazoglu**, S.E. Létant, J.W. Tringe, and P. Stroeve, "Molecular Transport of Proteins through Nanoporous Membranes Fabricated by Interferometric Lithography," *Physical Chemistry Chemical Physics*, 15, 965-971 (2013).
107. Sun, W., G.A. Yang, Q. Chen, **A. Palazoglu** and K. Feng, "Fault Diagnosis of Rolling Bearing Based on Wavelet Transform and Envelope Spectrum Correlation," *J. Vibration and Control*, 19(6), 924-941 (2013).
106. Ileri, N., R. Faller, **A. Palazoglu**, S.E. Létant, J.W. Tringe, P. Stroeve, "Mesoscale Simulations of Biomolecular Transport through Nanofilters with Tapered and Cylindrical Geometries," *Physical Chemistry Chemical Physics*, 14, 15066–15077 (2012).
105. Zhang, H., W. Zhang, **A. Palazoglu** and W. Sun, "Prediction of Ozone Levels Using a Hidden Markov Model (HMM) with Gamma Distribution," *Atmospheric Environment*, 62, 64-73 (2012).
104. Ileri, N., P. Stroeve, **A. Palazoglu**, R. Faller, S.H. Zaidi, H.T. Nguyen, J.A. Britten, S.E. Létant , and J.W. Tringe, "Fabrication of Functional Silicon-based Nanoporous Membranes," *J. Micro/Nanolithography, MEMS, and MOEMS*, 11, 013012 (2012).
103. Singh, A. and, **A. Palazoglu**, "Climatic Variability and its Influence on Ozone and PM Pollution in 6 Non-Attainment Regions in the United States," *Atmospheric Environment*, 51, 212-224 (2012).
102. Zhu, Z., Z. Song and **A. Palazoglu**, "Process Pattern Construction and Multi-Mode Monitoring," *J. Process Control*, 22(1), 247-262 (2012).
101. Zhu, Z., Z. Song and **A. Palazoglu**, "Transition Process Modeling and Monitoring Based on Dynamic Ensemble Clustering and Multi-class Support Vector Data Description," *Ind. & Eng. Chem. Research*, 50, 13969-13983 (2011).
100. Singh, A. and **A. Palazoglu**, "A Statistical Framework to Identify the Influence of Large Scale Weather Events on Regional Air Pollution," *J. Applied Meteorology and Climatology*, 50(12), 2376-2393 (2011).
99. Sun, W., J.A. Romagnoli, P. Stroeve, and **A. Palazoglu**, "Characterization of Surface Coatings of Bacteria Spores Using AFM and Wavelets," *Ind. & Eng. Chem. Research*, 50, 2876-2882 (2011).
98. Robertson, G., **A. Palazoglu** and J.A. Romagnoli, "A Multi-Level Simulation Approach for the Crude Oil Loading/Unloading Scheduling Problem, *Comp. & Chem. Eng.*, 35, 817-827 (2011).
97. Sun, W., Y. Meng, **A. Palazoglu**, J. Zhao, H. Zhang and J. Zhang, "A Method for Multiphase Batch Process Monitoring Based on Auto Phase Identification," *J. Process Control*, 21, 627-638 (2011).
96. Maaß, A., E.D. Tekin, A. Schüller, **A. Palazoglu**, D. Reith, and R. Faller, "Folding and Unfolding Characteristics of Short Beta Strand Peptides under Different Environmental Conditions and Starting Configurations," *Biochimica et Biophysica Acta – Proteins and Proteomics*, 1804, 2002-2015 (2010).
95. Beaver, S., S. Tanrikulu, **A. Palazoglu**, A. Singh, S. Soong, Y. Jia, C. Tran, B. Ainsle, D. Steyn, "Pattern-Based Evaluation of Coupled Meteorological and Air Quality Models," *J. Applied Meteorology and Climatology*, 49(10), 2077-2091 (2010).
94. Beaver, S., **A. Palazoglu,** A. Singh, S-T Soong, and S. Tanrikulu, "Identification of Weather Patterns Impacting 24-hour Average Fine Particulate Matter Pollution," *Atmospheric Environment*, 44(14), 1761-1771 (2010).
93. Yuzgec, U., **A. Palazoglu** and J.A. Romagnoli, "Refinery Scheduling of Crude Oil Unloading, Storage and Processing Using a Model Predictive Control Strategy," *Comp. & Chem. Eng.*, 34, 1671-1686 (2010).
92. Mukherjee, R., F. Hung, **A. Palazoglu**, and J.A. Romagnoli, "Modeling and Multiresolution Characterization for Microfabrication Applications," *Ind. & Eng. Chem. Research*, 49(2) 548-558, (2010).
91. Beaver, S., and **A. Palazoglu**, "Influence of Synoptic and Mesoscale Meteorology on Ozone Pollution Potential for San Joaquin Valley of California," *Atmospheric Environment*, 43, 1779-1788 (2009).
90. Sun, W., R. Mukherjee, P. Stroeve, J.A. Romagnoli and **A. Palazoglu**, "A Multi-resolution Approach for Line Edge Roughness Detection," *Microelectronic Eng.*, 86(3), 340-351 (2009)
89. Mukherjee, R., J.C. Flake, **A. Palazoglu** and J.A. Romagnoli, "A Multi-resolution Spatial Correlation Approach for Line-edge Roughness Characterization," *J. Wavelet Theory and Appl.*, 3(1), 103-122 (2009).

88. Sun, W., J.W. Tringe, S. Letant, P. Stroeve, J.A. Romagnoli and **A. Palazoglu**, "Line Edge Detection and Characterization in SEM Images by Wavelet Decomposition," *IEEE Trans. on Semiconductor Manufacturing*, 22(1), 180-187 (2009).
87. Pakalapati, S., S. Beaver, **A. Palazoglu**, J.A. Romagnoli, "Sequencing Diurnal Air Flow Patterns for Ozone Exceedance Days around Houston, Texas" *Atmospheric Environment*, 43, 715-723 (2009)
86. Beaver, S., and **A. Palazoglu**, "Hourly Surface Wind Monitor Consistency Checking over an Extended Observation Period," *Environmetrics*, 20, 399-415 (2009)
85. Gündeş, A.N., A.N. Mete and **A. Palazoglu**, "Reliable Decentralized PID Controller Synthesis for Two-channel MIMO Processes," *Automatica*, 45(2), 353-363 (2009).
84. Deetz, J.D., R. Faller and **A. Palazoglu**, "Characterization of Domain Instabilities in Lipid Bilayers by Karhunen-Loeve Analysis," *Biochimica et Biophysica Acta – Biomembranes*, 1778, 1154-1180 (2008).
83. Beaver, S., S. Tanrikulu, and **A. Palazoglu**, "Cluster Sequencing to Analyze Synoptic Transitions Affecting Regional Ozone," *J. Applied Meteorology and Climatology*, 47(3), 901-916 (2008).
82. Tai, K., M. Dao, S. Suresh, **A. Palazoglu** and C. Ortiz, "Nanoscale Heterogeneity Promotes Energy Dissipation in Bone," *Nature Materials,* 6, 454-462 (2007).
81. Beaver, S. and **A. Palazoglu** and J.A. Romagnoli, "Cluster Analysis for Autocorrelated and Cyclic Chemical Process Data," *Ind. & Eng. Chem. Research*, 46, 3610-3622 (2007).
80. Beaver, S. and **A. Palazoglu**, "A Cluster Aggregation Scheme for Ozone Episode Selection in the San Francisco, CA Bay Area," *Atmospheric Environment*, 40, 713-725 (2006).
79. Beaver, S. and **A. Palazoglu**, "Cluster Analysis of Hourly Wind Measurements to Reveal Synoptic Regimes Affecting Air Quality," *J. Applied Meteorology and Climatology*, 45(12), 1710–1726 (2006).
78. Switzer, J., S. Bennun-Serrano, **A. Palazoglu**, M.L. Longo, R. Faller, "Karhunen-Loeve Analysis for Pattern Description in Phase Separated Lipid Bilayer Systems," *J. Chem. Phys*., 124, #234906 (2006).
77. **Palazoglu, A.**, "Discussion on: Subspace Identification of Multivariable Hammerstein and Wiener Models," *European J. Control*, 144-145 (2005).
76. Galan, O., J.A. Romagnoli, and **A. Palazoglu,** "Real-Time Implementation of Multi-Linear Model-Based Control Strategies – An Application to a Bench-Scale pH Neutralization Reactor," *J. Process Control*, 14(5), 571-579 (2004).
75. Maksumov, A., R. Vidu, **A. Palazoglu** and P. Stroeve, "Enhanced Feature Analysis Using Wavelets for Scanning Probe Microscopy Images of Surfaces," *J. Colloid and Interface Science*, 272(2), 365-377 (2004).
74. **Palazoglu, A.**, A. Gursoy, Y. Arkun, and B. Erman, "Folding Dynamics of Proteins from Denatured to Native State: Principal Component Analysis," *J. Comp. Biology*, 11, 1149-1168 (2004).
73. Lu, Y., **A. Palazoglu,** and Y. Arkun, "Real-Time Application of Scheduling Quasi-Min-Max Model Predictive Control to a Bench-Scale Neutralization Reactor," *Ind. & Eng. Chem. Research*, 43, 2730-2735 (2004).
72. Arslan, E., M. Camurdan, **A. Palazoglu** and Y. Arkun, "Multi-Model Scheduling Control of Nonlinear Systems Using Closed-loop Gap Metric," *Ind. & Eng. Chem. Research,* 43, 8275-8283 (2004).
71. Carmichael, M., A. Maksumov, R. Vidu, **A. Palazoglu** and P. Stroeve, "Using Wavelets to Analyze AFM Images of Thin Films: Surface Micelles and Supported Bilayers," *Langmuir*, 20, 11557-11568 (2004).
70. Sun, W., **A. Palazoglu**, and J.A. Romagnoli, "Detection of Abnormal Process Trends Using Wavelet-Domain Hidden-Markov Models," *AIChE J.*, 49, 140-150 (2003).
69. Harris, K.R. and **A. Palazoglu**, "Control of Nonlinear Processes Using Functional Expansion Models," *Comp.& Chem. Eng.,* 27, 1061-1077 (2003).
68. Galan, O., J.A. Romagnoli, **A. Palazoglu** and Y. Arkun**,** "The Gap Metric Concept and Implications for Multi-Linear Model-Based Controller Design," *Ind. & Eng. Chem. Research*, 42, 2189-2197 (2003).
67. Yurtsever, E., **A. Palazoglu**, and Y. Arkun, "Conformational Similarities in Isomerization Dynamics of Clusters," *J. Physical Chemistry A*, 107, 6025-6031 (2003).
66. Doymaz, F., **A. Palazoglu**, and J.A. Romagnoli, "Orthogonal Nonlinear Partial Least-Squares," *Ind. & Eng. Chem. Research*, 42, 5836-5849 (2003) .

65. Godasi, S., A. Karakas and **A. Palazoglu**, "Control of Nonlinear Distributed Parameter Processes Using Symmetry Groups and Invariance Conditions," *Comp. & Chem. Eng.*, 26, 1023-1036 (2002).
64. Maksumov, A., D.J. Mulder, K.R. Harris, and **A. Palazoglu**, "Experimental Application of Partitioned Model-Based Control to pH Neutralization," *Ind. & Eng. Chem. Research*, 41, 744-750 (2002).
63. Wong, J.C., K.A. McDonald, and **A. Palazoglu**, "Classification of Abnormal Plant Operation Using Multiple Process Variable Trends," *J. Process Control*, 11, 409-418 (2001).
62. Romagnoli, J.A., **A. Palazoglu**, S. Whitaker, "Dynamics of a Stirred-Tank Heater: Intuition and Analysis," *Chemical Engineering Education*, 35(1), 46-49 (2001).
61. Doymaz, F., J. Chen, J.A. Romagnoli and **A. Palazoglu**, "A Robust Strategy for Real-Time Process Monitoring," *J. Process Control*, 11, 343-359 (2001).
60. Doymaz, F., A. Bakhtazad, J.A. Romagnoli and **A. Palazoglu**, "Wavelet-Based Robust Filtering of Process Data," *Comp. & Chem. Eng.*, 25, 1549-1559 (2001).
59. Doymaz, F., J.A. Romagnoli and **A. Palazoglu**, "A Strategy for Detection and Isolation of Sensor Failures and Process Upsets," *Chemometrics and Intelligent Laboratory Systems*, 55, 109-123 (2001).
58. Harris, K.R., M.C. Colantonio, and **A. Palazoglu**, "On the Computation of a Nonlinearity Measure Using Functional Expansions," *Chem. Eng. Sci.,* 55, 2393-2400 (2000).
57. **Palazoglu, A.** and A. Karakaş, "Control of Nonlinear Distributed Parameter Systems Using Generalized Invariants," *Automatica*, 36, 697-703 (2000).
56. Bakhtazad, A., **A. Palazoglu**, and J. A. Romagnoli, "Process Trend Analysis Using Wavelet-Based De-noising," *Control Eng. Practice*, 8, 657-663 (2000).
55. Galan, O., J.A. Romagnoli, and **A. Palazoglu,** "Robust H_∞ Control of Nonlinear Plants Based on Multi-Linear Models - An Application to a Bench Scale pH Neutralization Reactor," *Chem. Eng. Sci.,* 55, 4435-4450 (2000).
54. Krozel, J.W., **A. Palazoglu,** and R.L. Powell, "Experimental Observation of Dip Coating Phenomena and the Prospect of Using Motion Control to Minimize Fluid Retention," *Chem. Eng. Sci.,* 55, 3639-3650 (2000).
53. Bakhtazad, A., J.A. Romagnoli, and **A. Palazoglu**, "Detection and Classification of Abnormal Process Situations Using Multidimensional Wavelet Domain Hidden Markov Trees," *Comp. & Chem. Eng*., 24, 769-775 (2000).
52. Norquay, S.J., **A. Palazoglu** and J.A. Romagnoli, "Application of Wiener Model Predictive Control (WMPC) to pH Neutralization Experiment," *IEEE Trans. Control Sys. Technology*, 7, 437-445 (1999).
51. Norquay, S.J., **A. Palazoglu** and J.A. Romagnoli, "Application of Wiener Model Predictive Control to an Industrial C2-Splitter," *J. Process Control*, 9, 461-473 (1999).
50. Bakhtazad, A., **A. Palazoglu**, and J.A. Romagnoli, "Process Data De-noising Using Wavelet Transform," *Intelligent Data Analysis, An International Journal*, 3, 267-285 (1999).
49. Harris, K.R. and **A. Palazoglu**, "Transformation Techniques for Time-Discretization of Nonlinear Systems," *Latin American Applied Research, Memorial Issue for A. Desages*, 29, No.3/4, 259-264 (1999).
48. Norquay, S., **A. Palazoglu** and J.A. Romagnoli, "Model Predictive Control Based on Wiener Models," *Chem. Eng. Sci.*, 53, 75-84 (1998).
47. Wong, J.C., K.A. McDonald and **A. Palazoglu**, "Classification of Process Trends Based on Fuzzified Symbolic Representation and Hidden Markov Models," *J. Process Control*, 8, 395-408 (1998).
46. Agamennoni, O., J.L. Figueroa, and **A. Palazoglu**, "Robust Controller Design Under Highly Structured Uncertainty," *Int. J. Control*, 70, 721-733 (1998).
45. Harris, K.R. and **A. Palazoglu**, "Studies on the Analysis of Nonlinear Processes via Functional Expansions. III. Control Design," *Chem. Eng. Sci*., 53, 4005-4022 (1998).
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41. “Experimental Verification of Gap Metric as a Tool for Model Selection in Multi-linear Model-Based Control,” ADCHEM, Hong Kong, China (2004).
42. “Real-Time Application of Scheduling Quasi-Min-Max Model Predictive Control to a Bench-Scale Neutralization Reactor,” ADCHEM, Hong Kong, China (2004). (poster)
43. “Reliable Decentralized PID Stabilization of MIMO Systems,” American Control Conference, Minneapolis, MN June (2006).
44. “Protein Folding as a Challenge for Systems Biology,” FOSBE Conference, Stuttgart, Germany, September (2007). (poster)
45. "Cluster Analysis in Process and Environmental Monitoring,” ICheAP, Ischia, Italy, June (2007).
46. "Meteorological Triggers for Ozone Episodes in Central California,” NATO/SPS, International Mtg. on Air Pollution Modeling and its Application, San Francisco, CA, May (2009).
47. “Probing Protein Folding Dynamics Using Multivariate Statistical Techniques,” ADCHEM, Istanbul, Turkey, (2009).
48. “Short-term Planning Model for Petroleum Refinery Production Using Model Predictive Control,” 9th International Symposium on Dynamics and Control of Process Systems (DYCOPS 2010), Leuven, Belgium, (2010).
49. “A Novel Framework for Multi-Mode Process Modeling and Monitoring,” AIChE Annual Meeting, Minneapolis, MN, (2011).
50. “Studies on the Influence of Weather Patterns on Regional Pollution using Statistical Classification Methods,” VisionDay 2015, Denmark Technical University, Copenhagen, Denmark (2015).
51. “Use of Sparse Principal Component Analysis (SPCA) for Fault Detection,” DYCOPS, Trondheim, Norway (2016).

INVITED SEMINARS / SHORT COURSES

1. "Studies on the Design of Chemical Plants with Improved Dynamic Operability," University of California, Santa Barbara, California, March 1985.
2. "Studies on the Design of Chemical Plants with Improved Dynamic Operability," Bogazici University, Istanbul, Turkey, July 1986.
3. "In Search of Lost Process Dynamics. The Robustness Problem," University of California, Los Angeles, January 1988.
4. "In Search of Lost Process Dynamics. The Robustness Problem," University of Nevada, Reno, April 1988.
5. "In Search of Lost Process Dynamics. The Robustness Problem," Universidad Nacional del Sur, Bahia Blanca, Argentina, August, 1990.
6. "Approximate Models for Nonlinear Control," Systems Control Robotics Seminar, University of California, Davis, October, 1990.
7. "Recent Advances in Process Control," United Nations -TOKTEN fellow, Boğaziçi University and Middle East Technical University, Turkey, December 1990.
8. "Advanced Process Control," *A Short Course*, Seminario XI, Instituto Tecnologico de Celaya, Mexico, February, 1991.
9. "Robust Control," MAME-297 Seminars, Mechanical, Aeornautical and Materials Engineering Department, UC Davis, November, 1991.
10. "Advances in Nonlinear Process Control," Ankara University, Ankara, Turkey, October, 1992.
11. "Some Thoughts on a Graduate Course in Process Control," Middle East Technical University, Ankara, Turkey, October, 1992.
12. "Recent Advances in Process Control Research," Yıldız University, Istanbul, Turkey, November, 1992.

13. "Process Control in the Presence of Model-Plant Mismatch," Turkish Scientific Research Center, Gebze, Turkey, November, 1992.
14. "Recent Trends and Challenges in Process Control Research," Dept. of Chemical Engineering, University of Queensland, Australia, (1994)
15. "Functional Expansions for Nonlinear Processes," Dept. of Chemical Engineering, Carnegie-Mellon University, Pittsburgh, PA, December, 1995.
16. "Robust Process Control," *Short Course*, Dept. of Electrical Engineering, Universidad del Sur, Bahia Blanca, Argentina, August, 1996.
17. "Control of Chemical Processes, Yesterday, Today, Tomorrow," Plenary Lecture at 3rd National Meeting of Chemical Engineers, Erzurum, Turkey, September, 1998.
18. "Research on Intelligent Process Engineering and Control at UC Davis," Chevron, Richmond, CA, April, 1999.
19. "Research on Intelligent Process Engineering and Control at UC Davis," Monsanto-Kelco, San Diego, CA, April, 1999.
20. "Modeling, Control and Monitoring of Chemical Processes," Los Alamos National Laboratory, Los Alamos, NM, August, 1999.
21. "Nonlinear Process Control: From Theory to Practice," UCLA Dept. of Chemical Eng., Los Angeles, CA, January, 2000.
22. "Process Control System Performance Monitoring and Trend Analysis," Tutorial Workshop at American Control Conference, Chicago, IL, June 2000. (jointly with A. Cinar and F. Kayihan)
23. "Exploring the Benefits of Nonlinear Modeling and Control of a Continuous Digester," Weyerhaeuser Technology Center, Tacoma, WA, August (2000).
24. "A New Approach to Process Trending: Wavelet-Based Hidden Markov Models," Weyerhaeuser Technology Center, Tacoma, WA, August (2000).
25. "Process Control System Performance Monitoring and Trend Analysis," Tutorial Workshop at American Control Conference, Arlington, VA, June 2001. (jointly with A. Cinar and F. Kayihan)
26. "Statistical Data Analysis," One-day Short Course, Mars R&D Week, Davis, CA, July 2001.
27. "Process Control System Performance Monitoring and Trend Analysis," Tutorial Workshop at American Control Conference, Anchorage, Alaska, May 2002. (jointly with A. Cinar)
28. "Process Control System Performance Monitoring and Trend Analysis," Tutorial Workshop at IFAC World Congress, Barcelona, Spain, June 2002. (jointly with A. Cinar)
29. "Process Control System Performance Monitoring and Trend Analysis," Tutorial Workshop at TOK 2002, Ankara, Turkey, September 2002. (jointly with A. Cinar)
30. "When Data Talk, Do We Listen," Plenary Lecture, 5th National Meeting of Chemical Engineers, Ankara Turkey, September 2002.
31. "Multi-Linear Model-Based Control and the Gap Metric," University of Stuttgart, Germany, October 2002.
32. "Multi-Linear Model-Based Control and the Gap Metric," University of Aachen, Germany, November 2002.
33. "Techniques in Process Monitoring and Diagnosis," Degussa-Hanau A.G., Germany, December 2002.
34. "Wavelets and Hidden Markov Models in Process Data Management," Koc University Turkey, April 2003.
35. "Four Seminars on Model Predictive Control," Istanbul Technical University, Turkey, May 2003.
36. "Statistical Methods in Total Quality Management," Gaziantep University, Turkey, June 2003.
37. Use of Gap Metric in Designing Multi-Linear Model-Based Controllers for Nonlinear Systems," UC Davis, Control Systems Seminar Series, January 2004.
38. "Use of Gap Metric in Model Selection and Scheduling in Multi-Linear Model-Based Control," UC Santa Barbara, Center for Control Engineering and Computation, April 2004.
39. "From Reactors to Proteins:A Journey in Control," Louisiana State University, Department of Chemical and Environmental Engineering, October 2006.
40. "Feature Extraction and Classification in Process Signals and Microscopy Images Using Wavelets," Illinois Institute of Technology, Department of Chemical Engineering, November 2006.

41. "Statistical Systems Modeling Using Large Datasets," China University of Petroleum, Beijing, China, December 2007.
42. "Process Monitoring: Theory and Practice," Beijing University of Chemical Technology, Beijing, China, April 2009.
43. "Systems Engineering in the Process Industries with Extensions to Energy," Beijing University of Chemical Technology, Beijing, China, September 2011.
44. "Data Mining in the Information Age – But Watch out for Minefields," Bogazici University, Istanbul, Turkey, November 2012.
45. "Data Mining in the Information Age – But Watch out for Minefields," Middle East Technical University, Ankara, Turkey, November 2012.
46. "Nanoscale Feature Extraction in Microscopy Images," Nara Institute of Science and Technology, Nara, Japan, November 2013.
47. "Hybrid Renewable Energy Systems: Forecasting, Optimization and Demand Response," Beijing University of Chemical Technology, Beijing, China, September 2014.
48. "Hybrid Renewable Energy Systems: Forecasting, Optimization and Demand Response," Tsinghua University, Beijing, China, September 2014.
49. "Hybrid Renewable Energy Systems: Forecasting, Optimization and Demand Response," Izmir Institute of Technology, Izmir, Turkey, February 2015.

THESES SUPERVISED AND IN PROGRESS

1. A. Al-Elg, *A study of the dynamics and control of high-purity double-effect distillation columns*. 1987 (MS)
2. T. Khambanonda, *Studies on the robust stability of multivariable feedback systems*. 1989 (PhD)
3. S. Zeghal, *Interaction measures and decentralized control of chemical plants*. 1991 (MS)
4. I.A. Gohar, *Numerical simulation of natural convection in liquid semiconductor metals in modified horizontal Bridgman furnace*. 1993 (MS) (with K. McDonald)
5. C. Celardin, *Modeling and simulation studies of electroplating shops for minimization of hazardous wastes*. 1993 (MS)
6. G.L. Young, *Thermal and stress analysis of crystal growth in a horizontal Bridgman furnace*. 1993 (PhD) (with K. McDonald)
7. E.M. Hanczyc, *Modeling and control of chemical process systems described by partial differential equations*. 1994 (PhD)
8. K.P. Fruzzetti, *Studies on linear and nonlinear model predictive control of chemical processes*. 1994 (PhD) (with K. McDonald)
9. J.C. Wong, *Classification of process trends based on fuzzified symbolic representation and hidden Markov models*, 1998 (PhD) (with K. McDonald)
10. **K.R. Harris, *Analysis and control of chemical processes using functional expansion models.* 1998 (PhD) – College of Engineering Best Dissertation Award**
11. A. Batigun, *Analysis of nonlinear systems using functional expansions*. 2001 (PhD)
12. W. Sun, *Process trend analysis via wavelet-domain hidden Markov models*. 2001 (PhD)
13. F. Doymaz, *Statistical monitoring and modeling of multivariable systems*. 2002 (PhD)
14. S. Godasi, *Identification and control of nonlinear distributed parameter systems*. 2002 (PhD)
15. M. Carmichael, *Analysis of atomic force microscopy images using the wavelet transform*. 2004 (MS)
16. S. Beaver, *Clustering for chemical process monitoring and air quality analysis*. 2006 (PhD)
17. N. Ileri, *Fabrication, characterization, modeling and performance of thin nanoprous membranes*. 2010, (PhD) (with P. Stroeve and R. Faller)
18. A. Singh, *Effects of climate and meteorological variability on regional air quality*, 2011, (PhD)
19. J. Colmenares, *Development of Methods for Real-Time Data Acquisition and Management,* 2012, (MS).
20. X. Wang, *Modeling, Operation and Optimization of Energy Systems Integrating Demand Management*., 2015, (PhD) (with N.H. El-Farra)
21. S. Gajjar, *A Data-Driven Multidimensional Visualization Technique For Process Fault Detection and Diagnosis,* 2015, (MS)

22. C. Beu, *Non-Metric Partial Least Squares Regression: A Comparative Study of Existing Approaches,* 2016, (MS) (with N.H. El-Farra)
23. S. Gajjar, *Capitalizing from Data: Real-time Analytics and Knowledge Discovery,* 2017, (PhD)
24. K. Sheng, in progress, 2018, (MS)
25. E. Liu, in progress, 2019, (PhD) (with N.H. El-Farra)
26. G. Campos, in progress, 2021, (PhD) (with N.H. El-Farra)

PAST AND PRESENT EXTRAMURAL RESARCH FUNDING

1. *NSF*-Research Initiation, "Eigenvalue Inclusion Regions to Study Model Approximations for Distributed Parameter Systems," 6/88-11/90, $60,000
2. *NSF*-U.S.-Argentina Cooperative Research, "Studies on the Robust Control of Chemical Processes," 1/91-12/92, $13,716
3. *NSF*-U.S.-Australia Cooperative Research, "Study on the Control of Linear and Nonlinear Chemical Processes," 2/93-1/95, $17,490
4. *NSF*, "Dynamic Analysis and Control of Nonlinear Processes via Nonlinear Transfer Functions," 5/94-4/97, $142,703
5. *U.S. EPA*, "Studies on the Use of a Ni-W-B Alloy to Replace Chromium in Electroplating Applications," 9/94-9/96, $44,615 (Co-PI)
6. *UNOCAL Foundation*, "Interactive Computer Simulations for Integrated Learning," 3/94-6/95, $15,000 (with K.A. McDonald)
7. *Chevron Research & Technology Company*, "Intelligent Process Monitoring and Diagnosis," 4/94-12/95, $40,000 (Co-PI)
8. *AIGIS Systems Inc.*, "Intelligent Process Monitoring and Diagnosis," 1/96-12/98, $80,000 (Co-PI)
9. *NSF*, “A Study on the Theory and Practice of Nonlinear Process Control Using Functional Expansion (FEx Models,” 5/98-6/01, $210,000
10. *Weyerhaeuser*, “Control of Continuous Digesters,” 1/98-1/01, $75,000
11. *California Air Resources Board,* “Advanced Data Analysis for the Central California Ozone Study (CCOS),” 8/15/01-6/30/02, $111,630.00 (with 4 co-PIs)
12. *NSF-INT,* “US-Turkey Cooperative Research Project: Studies on the Folding Dynamics of Proteins,” $23,220, March 2004-February 2009.
13. *California Air Resources Board contract* 06-1CCOS*,* “Cluster Analysis of Air Quality Data for CCOS Domain,” $150,000, April 2006-October 2008.
14. *Bay Area Air Quality Management District (BAAQMD) contract* 2007-045, “Cluster Analysis of Particulate Dynamics for the San Francisco Bay Area” $40,000, June 2007-September 2008.
15. *Bay Area Air Quality Management District (BAAQMD) contract* 2008-118, “A Holistic Inter-basin Transport Analysis for the Bay Area” $40,000, June 2008-September 2009.
16. *OSIsoft gift,* “Process Monitoring,” $30,000, August 2008-September 2009.
17. *California Air Resources Board contract* 09-3CCOS*,* “Characterization of Particulate Matter Dynamics for the CCOS/CRPAQS Domain,” $120,000, September 2009-May 2012.
18. *California Solar Initiative (CSI)*, “Solar Energy Management and Forecasting in West Village Project,” $160,000, May 2011-January 2013 (Co-PI).
19. *Department of Education,* “Graduate Assistance in Areas of National Need (GAANN): An integrated effort to increase the number of underrepresented and non-traditional students in Chemical Engineering & Materials Science,” $527,000, September 2012-August 2015 (Co-PI).