

Dr. Roberto Cristi
Professor
Dept of Electrical and Computer Engineering
Naval Postgraduate School
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EDUCATION:

- *"Laurea"* from the University of Padua, Italy (1977);
- *MSEE* from Brunel University and the University of Manchester Institute of Technology (UMIST) in the UK (1979);
- *PhD* from the University of Massachusetts at Amherst in 1983, in Electrical and Computer Engineering .

CURRENT POSITION:

- Professor, Department of Electrical and Computer Engineering, Naval Postgraduate School, Monterey, CA 93943. Retiring on December 31, 2022.

PREVIOUS POSITIONS:

- Associate Professor, Department of Electrical and Computer Engineering, Naval Postgraduate School, Monterey, CA 93943 (1990-2005);
- Assistant Professor, Department of Electrical and Computer Engineering, Naval Postgraduate School, Monterey, CA 93943 (1985-1990);
- Assistant Professor, Department of Electrical Engineering, University of Michigan in Dearborn (1983-1985);
- Consultant, Ford Motor Company, Dearborn, Mi (1985), Toyota Research Center, Palo Alto, CA, (2004);
- Research Assistant, Department of Electrical and Computer Engineering, University of Massachusetts, Amherst, MA 01002 (1980-1983);
- Engineer, General Electric Company, Leicester, the United Kingdom (1978-1979);
- Assistente Incaricato, Universita' di Padova, Padua, Italy (1977).

PROFESSIONAL INTERESTS:

1. *Adaptive Control and Signal Processing;*
2. *Adaptive Optics;*
4. *Power and Energy Systems: Microgrids*
5. *Web Based Education*

TEACHING EXPERIENCE:

Graduate Courses Taught Regularly:

EC 3400: Digital Signal Processing

EC4480: Image Processing

EC3130: Electric Machinery

EC4130: Advanced Machinery

Special Topics Taught:

EC4910: Digital Signal Processing for Communications (2003-2016)

EC4300: Adaptive Control Systems (2013)

EC4300: Control of Wind Power Systems (2012)

EC4400: 3D Vision (2014)

Publications (as of 8/8/2022):

Scopus Statistics: "h" factor=14

LIST of PUBLICATIONS:

a) Books:

R. Cristi, "Modern Digital Signal Processing," Thomson - Brooks Cole, 2004;

b) Chapters of Books:

H.Elliott, R.Cristi, M. Das, "Global Stability of Adaptive Pole Placement Algorithms," Adaptive Methods for Control System Design, (Ed. M.N. Gupta), IEEE Press, 1986;

R. Cristi, "Parallel Processing in the Adaptive Control of Linear Systems," Linear Algebra in Signals, Systems and Control, (Ed. B. Nath Datta), SIAM Press, 1988;

A. M. Aziz, M. Tummala, R. Cristi, "Probabilistic Data Association Approach in Distributed Multisensor-Multitarget Tracking Systems," *Recent Advances in Signal Processing and Communications*, WSES Press and World Scientific Publishing Company, July 1999;

T.Axtell, R. Cristi, *Wavefront Reconstruction*, Chapter in Advances in Optics: Book Series, Vol 1, IFSA Publishing, 2018;

c) Journal Articles: Regular Papers:

H.Derin, H. Elliott, R. Cristi, D. Geman, "Bayes Smoothing Algorithms for Segmentation of Binary Images Modeled by Markov Random Fields" *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol PAMI-6, no 6, November 1984, pp 707-720;

H.Elliott, R.Cristi, M. Das, "Global Stability of Adaptive Pole Placement Algorithms," *IEEE Transactions on Automatic Control*, April 1985, pp 358, 356;

R. Cristi, "Parallel Processing in the Adaptive Control of Linear Systems," *SIAM Journal of Matrix Analysis and Applications*, January 1988, Vol 9, no 1, pp 96 - 105;

R. Cristi, F. Papoulias, A.J. Healey, "Adaptive Sliding Mode Control of Autonomous Underwater Vehicles in the Dive Plane," *IEEE Journal on Oceanic Engineering*, July 1990;

R. Cristi, A. Feuer, "On the Persistency of Excitation for Systems Having Purely Deterministic Disturbances," *International Journal on Adaptive Control and Signal Processing*, Vol 4, no. 5, September - October 1990;

R. Cristi, "Markov and Recursive Least Squares Methods for the Estimation of Data with Discontinuities," *IEEE Transactions on Acoustics, Speech and Signal Processing*, November 1990;

R. Cristi, J. Burl, N. Russo, "Adaptive Quaternion Feedback Regulation for Eigenaxis Rotation" *AIAA Journal of Guidance, Control and Dynamics*, November - December 1994;

R. Cristi, M. Caccia, G. Veruggio, "Motion Estimation and Modeling of the Environment for Underwater Vehicles," *International Journal of Systems Science*, Vol. 29, number 10, pages 1135-1143, October 1998;

M. Caccia, G. Casalino, R. Cristi, G. Veruggio, "Acoustic Motion Estimation and Control for an Unmanned Underwater Vehicle in a Structured Environment," *Control Engineering Practice*, pg. 661-670, no. 6, 1998;

A.M. Aziz, M. Tummala and R. Cristi, "Fuzzy Logic Data Correlation Approach in Multisensor-Multitarget Tracking Systems," *Signal Processing*, July 1999 ;

R. Cristi, M. Tummala, "Multirate, Multiresolution Recursive Kalman Filter," *Signal Processing*, no 80, pp 1945-1958, November 2000.

S. Dessalermos, J. Rice, R. Cristi, "Channel Estimation for Adaptive Modulation in Underwater Acoustic Communications", *Navy Journal of Underwater Acoustics*, Vol 56, pp3-35, January 2007;

T. Axtell, R. Cristi, "Generalized Orthogonal Wavelet Phase Reconstruction," *Journal of the Optical Society of America*, JOSA, A Vol 30, issue 5, pp 859-870, May 2013;

S. Chesi, Q. Gong, V. Pellegrini, R. Cristi, M. Romano, "Automatic Mass Balancing of a Spacecraft Three Axis Simulator: Analysis and Experimentation," *Journal of Guidance, Control and Dynamics*, November 2013;

R. Cristi, T. Axtell, "Least-Squares Phase Estimation with Wrapped Measurements and Branch Points," *Journal of the Optical Society of America*, JOSA, A Vol 30, issue 11, pp 2225-2236, November 2013.

M. Ciarcia, R. Cristi, M. Romano, "Emulating Scaled Clohessy-Wiltshire Dynamics on an Air-bearing Spacecraft Simulation Testbed", *Journal of Guidance, Control and Dynamics*, Vol 40, no 10, October 2017.

d) Journal Articles: Short Papers:

R. Cristi, R.V. Monopoli, "Computational Aspects of Discrete Time Adaptive Control," *IEEE Transactions on Automatic Control*, June 1982, pp 722-725;

G. Bilardi, G.L. Cariolaro, R. Cristi, "Mean Value of the Output of a Discrete-Time Volterra System Driven by a Markov Chain," *IEEE Transactions on Information Theory*, Vol IT-31, no. 6, November 1985, pp 838-841

R. Cristi, "Adaptive Control with Finite Time Persistency of Excitation," *IEEE Transactions on Automatic Control*, October 1986, pp 982-985;

R. Cristi, "A Note on Indirect Adaptive Control with Stabilizable Plant Estimates," *IEEE Transactions on Automatic Control*, November 1987, pp 1039, 1040;

R. Cristi, "Internal Persistency of Excitation in Indirect Adaptive Control," *IEEE Transactions on Adaptive Control*, December 1987, pp 1101-1103;

R. Cristi, A. Feuer, "Stability of an Overparametrized Model," *System and Control Letters* 13, (1989), pp 171-175;

M.Das, R. Cristi, "Robustness of an Adaptive Pole Placement Algorithm in the Presence of Bounded Disturbances and Slow Time Variation of Parameters," *IEEE Transactions on Automatic Control*, June 1990, pp 752, 756;

A. Feuer, R. Cristi, "On the Steady State Performance of Frequency Domain LMS Algorithms," *IEEE Transactions on Signal Processing*, January 1993;

A. Feuer, R. Cristi, "On the Optimal Weight Vector of a Perceptron," *IEEE Transactions on Signal Processing*, June 1993.

d) Proceedings of Refereed Conferences (after 2000)

R. Cristi, D.A. Koupsiaris, C.W. Therrien, "Multirate Filtering and Estimation: The Multirate Wiener Filter," 34th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA November 2000.

C.G.R. Taranti, R. Cristi, B.N. Agrawal, "An Efficient Algorithm for Vibration Suppression to Meet Pointing Requirements of Optical Payloads," AIAA Guidance, Navigation and Control Conference & Exhibits, Montreal, Quebec, Canada, 6-9 August 2001;

I. Retsas, R. Pieper, R. Cristi, "Watermark Recovery with DCT Based Scheme Employing Nonuniform Imbedding," 34th Southeastern Symposium on System Theory (SSST-02), Alabama, March 18-19, 2002;

C.W. Therrien, R. Cristi, "Two-dimensional spectral representation of periodic, cyclostationary, and more general random processes," Acoustics, Speech, and Signal Processing, 2002. Proceedings. (ICASSP '02). IEEE International Conference on , Volume: 4 , 13-17 May 2002;

R. Cristi, S. Restaino, J. LeBlanc, "Optimal Distributed Prediction and Estimation Controller with Application to Adaptive Optics and Optical Interferometry," SPIE Astronomical Telescopes and Instrumentation Conference, Glasgow, Scotland, June 2004;

J-W Kim, R. Cristi, B. N. Agrawal, "Attitude Determination for NPS Three-Axis Spacecraft Simulator," AIAA-2004-5386, 2004 AAS/AIAA Astrodynamics Specialist Conference, Providence, RI, July 2004.

T.O. Gulum, P.E. Pace, R. Cristi, "Extraction of Polyphase Radar Modulation Parameters using a Wigner –Ville Distribution Radon Transform," IEEE International Conference on Acoustics, Speech and Signal processing, ICASSP 2008, pp 1505-1508, April 2008;

J. Hall, M. Romano, R. Cristi, "Quaternion Feedback Regulator for Large Angle Maneuvers of Underactuated Spacecraft," American Control Conference, Baltimore, MD, June 30-July 2, 2010;

G. Oriti, A.L. Julian, D. Zulaica, R. Cristi, "Hardware Laboratories for Power Electronics and Motor Drives Distance Learning Courses," Energy Conversion Congress and exposition (ECCE), September 2010;

M. Hagstette, M. Fargues, and R. Cristi, "Extraction of a weak co-channel interfering communication signal using complex independent component analysis," *Proceedings of the 47th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 3-6, 2013.*

C.W. Hewgley, R. Cristi, O. Yakimenko, "Visual Pose Estimation for Shipboard Landing of Autonomous Parafoils," PLANS '14 Conference, Monterey, CA, May 2014.

R. P. Vio, R. Cristi, and K. B. Smith, "Near real-time improved UUV positioning through channel estimation-the unscented Kalman filter approach," in *OCEANS 16, MTS/IEEE*, Monterey, CA, 2016.

R.P. Vio, R. Cristi, K.B. Smith, "UUV localization using acoustic communications, networking, and a priori knowledge of the ocean current" *OCEANS 2017-Aberdeen*, Scotland, June 2017.

D. Oslebo, K. Corzine, T. Weatherford, R. Cristi, A. Masqsood, "DC Pulsed Transient Waveform Characterization Under Wavelet Transformation", *ECCE 2019*, Baltimore, MD, September 2019.

O.A.Yakimenko, K. Paschalidis, R. Cristi, "Feasibility of Using 360deg LIDAR in Small UAVs Missions," 2022 IEEE 17th International Conference on Control and Automation (ICCA), Naples, Italy, June 2022.

M. Karpenko, J. Levitas, R.Cristi, "A Practical Interpolation Pre-Filter for Closed Loop Attitude Guidance," 2022 AAS/AIAA Astrodynamics Specialist Conference, Charlotte, NC, August 2022

e) Articles In Preparation

M. Karpenko, R. Cristi, J. Levitas, "A Practical Interpolation Pre-Filter for Closed Loop Attitude Guidance," to be submitted to the IEEE Transaction on Aerospace and Electronic Systems, October 2022

f) Patents Submitted

M. Karpenko, J. Levitas, R. Cristi, *Method for Implementing Tracking Commands for Spacecraft Reorientation, Guidance and Stir*, submitted January 2022;

R, Cristi, J. Levitas, M. Karpenko, *Method for Error Reduction in Trajectory Interpolation*, submitted September 2022.