

Michalis E. Zervakis

IEEE Senior Member

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PERSONAL DATA

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EDUCATION

Ph.D.

Department of Electrical Engineering, Communications Group, June 1990 University of Toronto, Toronto, Canada;

M.A.Sc.

Department of Electrical Engineering, Communications Group, December 1985 University of Toronto, Toronto, Canada;

Diploma of Eng.

Department of Electrical Engineering, June 1983, Aristotelian University of Thessaloniki, Thessaloniki, Greece.

PROFESSIONAL EXPERIENCE

Oct. 99-Present

Professor at the Technical University of Crete, Greece, Department of Electronic and Computer Engineering. In 2016 the Unit was legally changed to "School of Electrical and Computer Engineering".

Feb. 95-Sept. 99

Associate Professor at the Technical University of Crete, Greece, Department of Electronic and Computer Engineering.

Sept. 90-Nov. 94

Assistant Professor at the University of Minnesota, Duluth, USA, Department of Computer Engineering.

Feb. 90-July 90

Research Scientist, AUG Signals, Toronto, Canada. Conducted research on restoration of multidimensional IR images, moving sequences, and target detection.

Sept. 84-May 90

Teaching and Research Assistant at the University of Toronto, Department of Electrical Engineering.

May 82-Sept. 82

Engineering Assistant, Public Electricity Company, Greece. Supervised the establishment and testing of a new power station in Heraklion, Crete, Greece.

May 81-Sept. 81

Engineering Assistant, Public Electricity Company, Greece. Worked in the maintenance of the local power system in Heraklion, Crete, Greece.

ADMINISTRATIVE ASSIGNMENTS

Associate Dean 2013-Present (till 2017): Member of the Dean's Council, School of Electrical and Computer Engineering.

Member of the Senate 2015- 2017: It is the highest academic authority of the University, responsible for developing the educational and research policy of the entire institution.

2016 Academic Program Evaluator: Participation in the External Evaluation Committee for the Evaluation -Accreditation of three Programs of Study in the Cypriot Academic system.

2014-2015 Member of the Team for the support of the Academic Program in External Review: The team was responsible for the support of Quality Assurance processes in the School of ECE for the External Review Committee Evaluation.

Member 2005-Present and Vice-Chair (2005-2016)

Special Research Fund Account (ELKE) handling the administrative management of all research, educational and development projects.

Director 1995-Present

Digital Image and Signal Processing Laboratory (DISPLAY), Technical University of Crete, Greece, September 1995 to Present. This lab has been legally established as a public body in 1996, under my direction and is equipped with state-of-the-art facilities on imaging systems for surveillance and monitoring.

Director 2007-Present

Laboratory of Automation, Technical University of Crete, Greece, September 2007 to Present. This lab has been renovated and equipped with state-of-the-art experimental facilities for automatic control.

Director 1992-1994

Signals and Systems Research Center (SSRC), University of Minnesota, Duluth, September 1992 to November 1994. In short time, the facility established collaboration with the Mayo clinic, the Natural Resources Research Institute (NRRI), the Superior Recycled Fiber Industries (SRFI), Minnesota Power, and the Minnesota Department of Transportation (MNDOT).

Lab Coordinator 1990-1994

Signal Processing and Communications laboratory, University of Minnesota, Duluth, September 1990 to November 1994.

JOURNAL PUBLICATIONS

- [1] M.E. Zervakis and A.N. Venetsanopoulos, "Design of Three-Dimensional Digital Filters Using Two-Dimensional Rotated Filters", IEEE Trans. on Circuits and Systems, vol CAS-34, no. 12, pp. 1452-1470, December, 1987.
- [2] M.E. Zervakis and A.N. Venetsanopoulos, "Three-Dimensional Rotated Filters; Design, Stability, and Applications", Circuits, Systems, and Signal Processing, vol. 9, no. 4, pp. 383-408, 1990.
- [3] M.E. Zervakis and A.N. Venetsanopoulos, "M-Estimators in Robust Nonlinear Image Restoration", Optical Engineering, vol. 29, no. 5, pp. 455-470, May 1990.
- [4] M.E. Zervakis and A.N. Venetsanopoulos, "A Class of Non-Iterative Algorithms for Nonlinear Image Restoration", IEEE Trans. on Circuits and Systems, vol. CAS-38, no. 7, pp. 731-744, July 1991.
- [5] M.E. Zervakis and A.N. Venetsanopoulos, "Linear and Nonlinear Image Restoration Under the Presence of Mixed Noise", IEEE Trans. on Circuits and Systems, vol. CAS-38, no.3, pp. 258-272, March 1991.
- [6] M.E. Zervakis and A.N. Venetsanopoulos, "Resolution-To-Noise Tradeoff in Linear Image Restoration", IEEE Trans. on Circuits and Systems, vol. CAS-38, no. 10, pp. 1206-1212, Oct. 1991.
- [7] M.E. Zervakis and A.N. Venetsanopoulos, "Convergence Properties of Gauss-Newton Iterative Algorithms in Nonlinear Image Restoration", Multidimensional Systems and Signal Processing, vol. 2, pp. 287-317, 1991.
- [8] M.E. Zervakis and A.N. Venetsanopoulos, "Iterative Least Squares Estimators in Nonlinear Image Restoration", IEEE Trans. on Acoustics, Speech, and Signal Processing, vol. SP-40, no. 4, pp. 927-945, April 1992.
- [9] M.E. Zervakis and A.N. Venetsanopoulos, "Design of a New Restoration Algorithm Based on the Constrained Mean-Square-Error-Criterion", Multidimensional Systems and Signal Processing, vol. 3, pp. 381-408, 1992.
- [10] M.E. Zervakis and T.M. Kwon, "Robust Estimation Techniques in Regularized Image Restoration", Optical Engineering, vol. 31, no. 10, pp. 2174-2190, Oct. 1992.
- [11] M.E. Zervakis, "Optimal Restoration of Multichannel Images Based on Constrained Mean-Square Estimation", Journal of Visual Communications and Image Representation, vol. 3, no. 4, pp. 392-411, Dec. 1992.
- [12] C. Peterson, M.E. Zervakis, and N. Shehadeh, "Adaptive Filter Design and Implementation Using the TMS320C25 Multiprocessor", Computers in Education Journal, vol. 3, no.3, pp. 12-16, July-Sept. 1993.
- [13] T.M. Kwon and M.E. Zervakis, "Design of Regularization Filters Using Linear Neural

Networks", Journal of Artificial Neural Networks, vol. 1, no. 2, pp. 283-306, 1994.

[14] T.M. Kwon and M.E. Zervakis, "A Self-Organizing KNN-Fuzzy Controller and its Neural Network Structure", Journal of Adaptive Control and Signal Processing, vol. 8, pp. 407-431, 1994.

[15] T.M. Kwon, M.E. Zervakis, and A.N. Venetsanopoulos, "Design and Analysis of a Class of Self-Organizing and Trainable Fuzzy Controllers", Journal of Intelligent and Robotic Systems, vol. 8, pp. 407-431, 1994.

[16] T.M. Kwon and M.E. Zervakis, "K-WTA Networks and their Applications", Multidimensional Systems and Signal Processing, vol. 6, pp. 333-346, 1995.

[17] M.E. Zervakis, A.K. Katsaggelos, and T.M. Kwon, "A Class of Robust Entropic Functionals for the Enhancement of Images", IEEE Trans. on Image Processing, vol. 4, no. 6, pp. 752-773, June 1995.

[18] M.E. Zervakis, T.M. Kwon, and J-S Yang, "Multiresolution Image Restoration in the Wavelet Domain", IEEE Trans. on Circuits and Systems II, vol. 42, no. 9, pp. 578-591, Sept. 1995.

[19] J-S Yang, M.E. Zervakis, and T.M. Kwon, "Application of the Quantitative Feedback Theory (QFT) to the Grumman F-14 Pitch Axis Control Problem", Computers in Education Journal, Nov. 94.

[20] J-S Yang and M.E. Zervakis, "Mixed H^2 - Norm Sensitivity Minimization in the DFT Domain for Control System Design", Control-Theory and Advanced Technology, vol. 10, no. 4, pp. 1515-1530, Sept. 1995.

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- [29] K. Rapantzikos, M. Zervakis, and K. Balas, "Detection and Segmentation of Drusen Deposits on Human Retina: Potential in the Diagnosis of Age-Related Macular Degeneration", *Medical Image Analysis*, vol. 7, no. 1, pp. 95-108, Jan 2003.
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- [31] V. Kastrinaki, M. Zervakis, K. Kalaitzakis, 'A Survey of Video Processing Techniques in Traffic Applications', *Image and Vision Computing*, vol. 21, no. 4, pp. 359-381, 2003.
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- [44] P. Kapsalas, P. Maravelaki-Kalaitzaki, M. Zervakis, E. T. Delegou, A. Moropoulou, "A morphological fusion algorithm for optical detection and quantification of decay patterns on stone surfaces", *Construction and Building Materials*, Volume 22, Issue 3, March 2008, Pages 228-238.
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- [46] M. E. Blazadonakis and M.Zervakis, "Wrapper Filtering Criteria via Linear Neuron and Kernel Approaches". *Computers in Biology and Medicine*, Elsevier, Vol38/8 (2008) pp. 894-912.
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And Support Vector Machines", *Journal of Medical Decision Making*, vol:30, no.1, pp.123-131, Jan. 2010, Sage Publications.

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FUNDED RESEARCH PROJECTS

- 1. 2012-2015 CyberSensors**
Leader of ECE team for TUC
Funding Agency: GSRT-Thales Programme.
ECE-TUC budget 195.000 Euro
- 2. 2013-2015 FI-STAR: Future Internet Social and Technological Alignment Research**
Investigator for TUC
Funding Agency: SEVENTH FRAMEWORK PROGRAMME, FP7-ICT
TUC budget 598,676 Euro
- 3. 2012-2015 AI-CARE: Advanced Knowledge Management Systems with Inherence Computational Intelligence and Applications in Health Care**
Investigator for TUC
Funding Agency: NATIONAL PROGRAMMES
TUC budget 126.000 Euro
- 4. 2012-2015 eTRAWELSPA: e-TRAINING FOR WELLNESS IN SPA SERVICES**
Principal investigator for TUC and TSI
Funding Agency: LDV-Life Long Learning (LLP-LdV-ToI-2011-RO-022)
TUC-TSI budget 52.000 Euro
- 5. 2011-2013 YPERTHEN**
Principal investigator for TUC
Funding Agency: INTERREG Greece-Cyprus.
TUC budget 360.000 Euro
- 6. 2011-2015 OncoSeed**
Principal investigator for TUC
Funding Agency: GSRT-Collaboration Programme.
TUC budget 95.000 Euro
- 7. 2011-2013 OASYS**
Principal investigator for TUC
Funding Agency: GSRT-Collaboration Programme.
TUC budget 90.000 Euro
- 8. 2011-2013 Real Time Simulation for Safer vascular Stenting (RT3S)**
Principal investigator for TUC
Funding Agency: FP7-ICT Project N° 248801.
TUC budget 372.000 Euro
- 9. 2010-2011 SYN-EEG**
Principal investigator for TUC
Funding Agency: TUC Basic Research.
TUC budget 15.000 Euro
- 10. 2008-2011 Curricula Reformation & Harmonisation in the Field of Biomedical Engineering (CRH-BME Tempus Project N° 144537-TEMPUS-2008-GR-JPCR)**

Principal investigator for TUC

Funding Agency: TEMPUS IV.

TUC budget 36.000 Euro

11. 2006-2008 Getting Cretan Businesses On-Line and Doing E-Business (eKONES)

Principal investigator for TUC

Funding Agency: Ministry of Development, General Secretariat for Research and Technology.

TUC budget 30.000 Euro

12. 2006-2008 Meta-Genomic Methods and Technologies for Diagnosis and Therapy Selection: Analysis of Genotype and Molecular Markers (GONOTYPOS)

Principal investigator for TUC

Funding Agency: Ministry of Development, General Secretariat for Research and Technology.

Total budget 871.000 euros, TUC budget 100.000 Euro

13. 2006-2008 Integrated Inspection System supported by Automated Motion Detection

Co-Principal investigator for TUC, (PI for TUC Euripides Petrakis)

Funding Agency: Ministry of Development, General Secretariat for Research and Technology

Total budget 800.000 Euros, TUC Budget 244,402 Euro

14. 2006 Semantic Similarity for Knowledge Discovery in Medical Archives (MedSearch)

Participant,

Funding Agency: BIOPATTERN NoE, Fp6

TUC Budget 40,000 Euro

15. 2006 District Technology Platform for Wideband Health Services

Principal investigator for TUC

Funding Agency: District of Crete under the Programme "Poles of Innovation"

16. 2005-2008 TOWL: Time-determined ontology based information system for real time stock

Source: STREP IST, FP6

Participation: Partner (co- leader of TUC team)

Funding: 1.96 Mecu (244,402 Euro for TUC)

17. 2004-2008 Computational Intelligence for biopattern analysis in Support of eHealthcare (BIOPATTERN)

Source: IST

Participation: Partner (scientific leader of TUC team)

Funding: 6.4 Mecu, (320,000 Euro for TUC)

18. 2005-2007 Training Centre for Health Care, Prophylactic and Rehabilitation Services

Source: LEONARDO DA VINCI Community Vocational Training Action, 2nd phase

Participation: Partner (scientific leader of TUC team)

Funding: 198 Kecu, (46,000 Euro for TUC)

19. 2004-2007 **Improving airport Efficiency, Security and Passenger Flow by Enhanced Passenger Monitoring (OPTAG)**
 Source: Aeronautics and Space
 Participation: Partner (scientific leader of TUC team)
 Funding: 1.5 Mecu, (270.000 Euro for TUC)
20. 1998-2001 **High Performance Industrial Vision (HIPER)**
 Source: BRITE-EURAM III
 Participation: Partner (scientific leader of TUC team)
 Funding: 4.5 Mecu
21. 1998-2001 **Advanced Tomographic Sensors for Industrial Multiphase Imaging**
 Source: Thematic Network, BRITE-EURAM III
 Participation: Partner
 Funding: 460 Kecu
22. 11/98-10/2000 **Dissemination of Advanced Control Technologies for Isolated Power Systems with Increased Renewable Energy Sources Penetration**
 Source: THERMIE B
 Participation: Collaborator
 Funding: 125 Kecu
23. 7/97-12/99 **Interdisciplinary Programme for Technology Development and Technology Transfer to the Local Market**
 Source: Dept of Education, EPEAEK, Action 3.1.α.
 Participation: Coordinator
24. 7/97-12/99 **Master's Programme in the area of Technology Development**
 Source: Dept of Education, EPEAEK, Action 3.2.α.
 Participation: Coordinator
25. 1/96-12/99 **Quality Control for House-hold Appliances by On-Line Evaluation of Mechanical Defects (MEDEA)**
 Source: SMT4, Standard Measurement and Testing Programme
 Participation: Partner
26. 1/1/96-31/12/97 **Development of an Automated Robotic System with applications in biomedical Operations**
 Source: Distinct of Crete, Development fund
27. 7/01/94-10/30/94 **Development of a Weather Information System**
 Source: Minnesota, Department of Transportation (MN-DoT)
 Participation: Principal Investigator
 Funding: 25.000 USD
28. 6/01/94-9/01/94 **Characterization of Contaminants in Waste Paper Bales Based on Physical Characteristics of Contaminants**
 Source: Superior Recycled Fiber Industries (SRFI) of Minnesota

Participation: Principal Investigator

Funding: 36.000 USD

29. 12/16/93-12/15/94 Robust Algorithms for Image Compression and Expansion

Source: University of Minnesota, under the program Grant-in-Aid Awards

Participation: Principal Investigator

Funding: 11.880 USD

30. 5/25/93-9/30/93 Wastepaper Classification and Processing

Source: Superior Recycled Fiber Industries (SRFI) of Minnesota

Participation: Principal Investigator

Funding: 71.500 USD

31. 9/1/92-1/31/93 Nonstationary Restoration of Multiframe Images

Source: AUG Signals Ltd., Ontario, Canada

Participation: Principal Investigator

32. 7/16/93-8/30/93 Robust Modeling and Restoration of Multichannel Images

Source: University of Minnesota, under the program Faculty Summer Research Fell

Participation: Principal Investigator

33. 7/01/91-6/30/92 Regularized Reconstruction of Biomedical Images from Limited Views

Source: University of Minnesota, under the program Grant-in-Aid Awards

Participation: Principal Investigator

34. 6/11/91-7/16/91 Constrained Mean-Square Algorithms in Color Image Restoration

Source: University of Minnesota, under the program Faculty Summer Research Fell

Participation: Principal Investigator

DISTINCTIONS

- **Receiving Editor**, since 1/1/2017, Journal of Biomedical Signal Processing and Control, <https://ees.elsevier.com/bspc>
- **Associate Editor**, since 1/1/2017, IEEE Journal of Biomedical and Health Informatics, <http://jbhi.embs.org/editorial-board/associate-editors/>
- Honorary Chair, Steering Committee member, International Technical Committee member, 2017 IEEE Intl Conference on Imaging Systems and Techniques, Oct. 18-20 Beijing, China, <http://ist2017.ieee-ims.org/>
- Technical Committee co-chair, IEEE Instrumentation and Measurement Society, TC-19 Imaging Measurements and Systems, since 20/1/2017
- Technical Program Committee member, IEEE Intl Conference on Biomedical and Health Informatics, <http://bhi.embs.org/2017/>
- Guest Editor, IEEE Journal of Biomedical and Health Informatics, Special Issue on "Informatics for personalized, precision and preventive Healthcare (3P Healthcare)", 2017
- Guest Editor, Journal of Biomedical Signal Processing and Control, Special Issue on "Biomedical Imaging Systems", 2017 <https://www.journals.elsevier.com/biomedical-signal->

[processing-and-control/call-for-papers/special-issue-on-biomedical-imaging-systems](#)

- Guest Editor, Journal Multimedia Tools and Applications, Special Issue on “Multimedia Systems for Critical Engineering Applications”, 2017
<http://static.springer.com/sgw/documents/1597858/application/pdf/Full+Call+Special+Issue+of+MTAP.pdf>
- Guest Editor, Measurement Science and Technology journal, Special Issue on “Imaging Systems and Techniques”, 2017 <http://iopscience.iop.org/journal/0957-0233>
- Local Chair, and Steering Committee member, 2016 IEEE Intl Conference on Imaging Systems and Techniques, Oct.4-5, Chania, Greece, <http://ist2016.ieee-ims.org/>
- Co-Chair, and Steering Committee member, 2015 IEEE Intl Conference on Imaging Systems and Techniques, Sept.16-18 Macau, China, <http://ist2015.ieee-ims.org/>
- Co-Chair, Steering and Local Committee member, 2014 IEEE Intl Conference on Imaging Systems and Techniques, Oct 14-17, Santorini, Greece, <http://ist2014.ieee-ims.org>
- International Committee Chair, 13th IEEE Intl Conference on Bioinformatics and BioEngineering, Nov. 10-13, 2013, Chania, Greece
<http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=6689795>
- Co-Editor, “Data Mining for Biomarker Discovery” Edited by Panos M. Pardalos, Petros Xanthopoulos and Michalis Zervakis, Springer Optimization and Its Applications Volume 65, 2012, DOI: [10.1007/978-1-4614-2107-8](https://doi.org/10.1007/978-1-4614-2107-8)
- General Chair, 14th IASTED Conference on Artificial Intelligence and Soft Computing, June 20-24, 2011, Crete, Greece <http://www.iasted.org/conferences/home-716.html>
- Organizing Committee, 10th International Workshop on Biomedical Engineering, 5-7 October 2011, Kos Greece <http://medlab.cc.uoi.gr/10thbioeng>
- Invited Speaker at ACM PETRA 2011 (www.petrae.org), May 25-27 2011, Crete, Greece.
- Organizing Committee, 6th European Symposium on Biomedical Engineering (IFMBE 2008), June 19 - 21, 2008, Chania, Greece
- Organizing Committee, Intl Conf. on Imaging Systems and Techniques (IST 2008) September 10-12, 2008, Chania, Greece
- Co-Organizer, International Conference on Biomedical Data & Knowledge Mining: Towards Biomarker Discovery, 7-9 July 2010, Chania, Greece
- International Programme Committee and Session Chair: Intl Conf. on Imaging Systems and Techniques (IST-10), July 1-2, 2010, Thessaloniki, Greece
- Session Chair: (ICANN-09), 14-17 September, Limassol, Cyprus
- Special Session Organizer in ICANN-09: Data mining and modelling of brain activity- their use as tools for understanding attentional mechanisms
- International Programme Committee and Session Chair: 9th International Conference on Information Technology and Applications in Biomedicine (ITAB 2009), November 5-7, 2009, Larnaca, Cyprus
- Session Chair: 8th IEEE International Conference on Bioinformatics and BioEngineering (BIBE 2008), October 8-10, 2008, Athens, Greece.

- Organizing Committee, 6th European Symposium on Biomedical Engineering (IFMBE 2008), June 19 - 21, 2008, Chania, Greece
- Organizing Committee, Intl Conf. on Imaging Systems and Techniques (IST 2008) September 10-12, 2008, Chania, Greece
- Programme Committee Member and Session Chair: CIMED-07 (International Conference on Computational Intelligence in Medicine and Healthcare) , 24-27 July, 2007 Plymouth, UK
- Technical Committee Member: IEEE EMBC 2006 (Engineering in Medicine and Biology Conference), August 30-Sept. 3, 2006, New York City, USA
- Chairperson: Undergraduate Research Opportunities Program (UROP) committee, University of Minnesota, Duluth, for the academic year 1993-94.

RESEARCH AREAS

Michalis Zervakis is serving as Professor at the School of Electronics and Computer Engineering and directs the Digital Image and Signal Processing Laboratory and the Laboratory of Automation at TUC. His research interests include modern aspects of signal and image processing, data mining and pattern recognition, imaging systems and integrated automation systems. Under his direction, his group is constantly aiming at strengthening its expertise and its recognition in the International research arena as a centre of excellence for research. This is achieved through collaborations with the industry and academia and its participation in high-caliber European and National funded research.

His research covers a wide range of design, analysis, architecture, implementation and validation fields. He and his team maintain long experience in many areas of R&D with particular strength in the following.

- Image / video processing and compression, Image / Video content analysis and description (e.g., motion analysis, shape analysis, object tracking),
- Design and analysis of surveillance systems; panoramic image generation; real-time implementation of integrated imaging systems on DSP boards
- Non-destructive inspection and monitoring; Image analysis methods for erosion/corrosion evaluation; Quantification of pollution effects on stone surfaces; Non-destructive vibration analysis of electric machines
- Information systems technology with emphasis on the management (processing, information extraction, dissemination and retrieval) of complex information.
- Pattern recognition, class discrimination and prediction, regression, stochastic and network modeling, feature extraction.
- Bioinformatics, biostatistics, biomedical signal analysis and medical imaging systems with applications in marker selection from mass genomic data, electro-encephalogram (EEG) analysis, time-frequency biosignal and EEG characterization, modeling of disease state and progression (diabetes, dementia , Alzheimer's disease), Cancer research on

diagnosis & prognosis (breast, brain and ovarian cancer, leukemia).

- Graph theoretical aspects with applications in biological networks and biomarker interaction across cohort models, identification of clinical subtypes, progression models and comorbidity association networks, data visualization and presentation.

The DISPLAY lab www.display.tuc.gr covers a wide range of analysis, architecture, implementation and validation areas. Applications include bioinformatics, biosignal analysis and medical Imaging, biomarker selection from mass genomic data, time-frequency biosignal and EEG characterization, modeling of disease state and progression, as well as cancer research on diagnosis & prognosis. The Lab has extensive experience on issues of pattern recognition, machine learning, data and knowledge mining, applications in biomedical datasets, biostatistics, biomarker extraction and prediction, disease diagnosis and prognosis.

The Automation lab performs teaching and research on all major sectors of systems, such as computer and control systems, mechatronics and robotics, industrial informatics and systems biology. Particular areas of automation for the Lab include Computer Aided Design (CAD), Computer Aided Management (CAM), robotics, quality control, as well as integrated systems for factory automation with image processing tools, decision making algorithms and graphical user interfaces to simulate, design, and monitor complex processes.