

EDUCATION

Tampere University of Technology, Tampere, Finland **2001-2005**
PhD, Institute of Signal Processing.

BILKENT University, Ankara, Turkey **1994-1996**
MSc, Electrical and Electronics Engineering, GPA 3.61 / 4.0
(With Honors: Deans list, R. A. Scholarship awarded by the University)

BILKENT University, Ankara, Turkey **1989-1994**
BSc, Electrical and Electronics Engineering, GPA 3.21 / 4.0
(With Honors: Deans list, Scholarship awarded by the University)

ACADEMIC EXPERIENCE

Dept. of Electrical Engineering, Qatar University, Doha, Qatar Aug. 2015 - Present
Professor

Dept. of Signal Processing, Tampere University of Technology,
Tampere – FINLAND, Dec. 2014 – Dec. 2016
Research Manager of the Department,
R. Director of *Center for Visual and Decision Informatics (CVDI)* in Finland

Dept. of Electrical Engineering, American University of Sharjah,
Sharjah – UAE, Aug. 2013 – Sep. 2014
Visiting Professor

Dept. of Signal Processing, Tampere University of Technology,
Tampere – FINLAND, Dec. 2009 - 2015
Professor

Dept. of Signal Processing, Tampere University of Technology,
Tampere – FINLAND, Sep. 2007 – Dec. 2009
Asst. Professor (Docent)

Inst. of Signal Processing, Tampere University of Technology,
Tampere – FINLAND, June 2005 – Sep. 2007
Senior Researcher

Digital Media Institute, Tampere University of Technology,
Tampere – FINLAND, May 2001 – June 2005
Researcher

Digital Media Institute, Tampere University of Technology,
Tampere – FINLAND, May 2001 – June 2005
Researcher

NON-ACADEMIC EXPERIENCE

Nokia Mobile Phones, Tampere – FINLAND, Jan. 2000 – April 2001,
Senior R&D Engineer,

Nokia Research Center, Tampere – FINLAND, Feb. 1999 – Jan. 2000

R&D Engineer

Schlumberger Wireline & Testing

Point Noire, in Congo, Port Gentil, in Gabon, Port Harcourt and Warri, in Nigeria, Sfax, in Tunisie, Alexandria, in Egypt, Hassi Massaoud, in Algeria, Nov. 1996 – Jan. 1999

System and Field Engineer

PUBLICATIONS SUMMARY

- The author of the following two books:
 - ***Content-Based Management of Multimedia Databases*, Book: Lambert Academic Publishing, 308 pages, May 2012.**
 - ***Multi-dimensional Particle Swarm Optimization for Machine Learning and Pattern Recognition*, 321 pages, August. 2013.**
- The author of 4 book chapters:
 - *A Generic and Patient-Specific Electrocardiogram Signal Classification System*, Book: ECG Signal Processing, Classification and Interpretation (Book of Springer), Chapter 4, pp. 79-99, 2011.
 - *Perceptual Color Descriptors*, Book: Perceptual Digital Imaging: Methods and Applications (Book of CRC Press / Taylor & Francis), pp. 319-358, September 2012.
 - “An Optimized k-NN Approach for Classification on Imbalanced Datasets with Missing Data”, Book: Advances in Intelligent Data Analysis XV (Book of Springer), pp. 387-392, October 2016.
 - “Structural Damage Detection in Real Time: Implementation of 1D Convolutional Neural Networks for SHM Applications”, Book: Structural Health Monitoring & Damage Detection, Volume 7 pp 49-54, March 2017. DOI: 10.1007/978-3-319-54109-9_6
- **> 45 refereed journal articles (appeared or forthcoming) in:**
 - *Nature – Scientific Reports*
 - *IEEE Transactions on Biomedical Engineering*
 - *IEEE Transactions on Image Processing*
 - *IEEE Transactions on Multimedia*
 - *IEEE Transactions on Systems, Man, and Cybernetics (B)*
 - *IEEE Transactions on Speech and Audio Processing*
 - *IEEE Transactions on Geoscience and Remote Sensing*
 - *IEEE Transactions on Neural Systems & Rehabilitation Engineering*
 - *IEEE Transactions on Knowledge and Data Engineering*
 - *IEEE Transactions on Neural Networks and Learning Systems*
 - *IEEE Transactions on Industrial Electronics*
 - *Journal of Biomedical Informatics (Elsevier)*
 - *Ecological Informatics (Elsevier)*
 - *Neural Networks (Elsevier)*
 - *Pattern Recognition (Elsevier)*
 - *Pattern Recognition Letters (Elsevier)*
 - *Journal of Image and Vision Computing (Elsevier)*
 - *Image Communication (Elsevier)*
 - *Expert Systems with Applications (Elsevier)*
 - *Applied Soft Computing Journal (Elsevier)*
 - *Journal of Sound and Vibration (Elsevier)*

- Neurocomputing (Elsevier)
- Mechanical Systems and Signal Processing (Elsevier)
- Ecological Informatics (Elsevier)
- EURASIP Journal on Advances in Signal Processing
- EURASIP Journal on Audio, Speech, and Music Processing
- *IEEE Proceedings Vision, Image and Signal Processing*
- Neural Computing and Applications
- Multimedia Tools and Applications
- Remote Sensing (MDPI)
- **> 100 papers in peer-reviewed international conference proceedings.**

RECENT AWARDS AND ACHIEVEMENTS (Last 4 years)

- September 2017: My research team tied in **the 1st place** in PhysioNet Challenge 2017 - AliveCor among 75 teams.
- August 2017: The PhD theses that I supervised, “Quantum Cuts, A Quantum Mechanical Spectral Graph Partitioning Method for Salient Object Detection”, won the **best PhD Nordic Thesis Award** in SCIA 2017.
- July 2017: My article, Real-Time Vibration-Based Structural Damage Detection Using One-Dimensional Convolutional Neural Networks, became **the 3rd most popular paper** of the Journal of Sound and Vibration (Elsevier) journal
- January 2017: The author of the article, “Real-Time Patient-Specific ECG Classification by 1D Convolutional Neural Networks” became **one of the top-10 most popular articles** in IEEE Transaction on Biomedical Engineering.
- September 2016: My research team got **the 2nd place** in **PhysioNet Challenge 2016** among 48 teams.
- April 2015: My team’s proposal ranked **the 3rd place** among 280 teams at the 7th International IEEE EMBS Neural Engineering Conference (BCI Challenge@NER 2015).
- The author of the paper nominated for the Best Paper Award in ICIP 2015: “Visual Saliency by Extended Quantum Cuts“, IEEE Int. Conference on Image Processing, ICIP'15, Sep. 2015.
- April 2015: My team’s proposal ranked **the 3rd place** in Brain-Computer Interface Challenge among 260 teams. The challenge was the main event of the 7th International IEEE EMBS Neural Engineering Conference (BCI Challenge@NER 2015).
- The author of the paper that won the **Best Paper Award** in **ICPR’14** conference: , "*Automatic Object Segmentation by Quantum Cuts*", Int. Conf. on Pattern Recognition, ICPR'14, Stockholm, Sweden, Aug. 24-28, 2014.
- The author of the paper that was nominated for the **Best Paper Award** in **EUVIP’14** conference: “Evolutionary Feature Synthesis by Multi-dimensional Particle Swarm Optimization”, EUVIP’14, the 5th European Workshop on Visual Information Processing, France, 10-12 Dec. 2014.
- The author of the paper nominated for the **Best Paper Award** in **IEEE ICIP’13** conference: "*QUANTUM MECHANICS IN COMPUTER VISION: AUTOMATIC OBJECT EXTRACTION*", 2013 IEEE Int. Conference on Image Processing, ICIP'13, 15-18 Sep. 2013.
- 2010-2015: The article, “Evolutionary Artificial Neural Networks by Multi-Dimensional Particle Swarm Optimization“, is **the 4th most cited paper** in the Neural Networks journal.

ADMINISTRATION AND TEACHING EXPERIENCE

- ❑ Research Director of the Multimedia Research Group in Finland
- ❑ Research Director of the *Center for Visual and Decision Informatics* (CVDI) in Finland
- ❑ Research Manager of the Department of Signal Processing in TUT
- ❑ Regular lecturers on the following courses:
 - Digital Signal Processing
 - Digital Image Processing
 - Multimedia Analysis and Retrieval
 - Digital Audio Processing
 - Multimedia Graduate Seminar
 - Electrical Circuits and Systems
 - Signals and Systems
 - Computer Vision and Digital Image Processing
 - Statistical Signal Processing
 - Optimization Methods
 - Advanced Signal Processing
 - Probability Theory
- ❑ Supervision of the 21 MSc students and 14 PhD students (In TUT and QU)

INTERNATIONAL PROJECTS INVOLVED

- **COST-211bis** (EU Research Group for Redundancy Reduction Techniques for Video Signals).
- **COST-211ter** (EU Research Group for Highly Efficient Coding Schemes for Multimedia Services and LBR Applications).
- **COST-211quad** (EU Research Group for Content-based Multimedia Indexing and Retrieval).
- **SCHEMA** (EU Network of Excellence in Content-Based Semantic Scene Analysis and Information Retrieval)
- **COST-292** EU Research Group (Network of Excellence in Semantic Multimodal Analysis of Digital Media)
- **JPSearch** (International Sub-Group under JPEG for the Standardization of Digital Image Search and Retrieval)

RESEARCH PROJECTS AND GRANTS OBTAINED OVER THE LAST 4 YEARS

Source of Funds	Title of Projects	Duration (months)	Start Date	Total Value (Euro/USD)	Names of Other Contract Holders
QNRf – NPRP9	SIMUPOR: Simulation of microscale biogeochemical processes in porous media using advanced computer vision methodologies	36	10.2016	900,000 \$	
QNRf – NPRP10	Qatar Greener Schools Initiative	36	09.2017	750,219\$	Prof. Adel Ghastli
Academy of Finland	DETECT: Advanced Computational and Statistical Techniques for Biomonitoring and Aquatic Ecosystem Service Management	36	07.2015	597,970€	

Alma Media Oy	Content-based Learning and Retrieval of Interior Pictures	12	01.2013	105,000€	
Data to Intelligence (D2I)	Data to Intelligence	12	01.2012	198,000€	Prof. Moncef Gabbouj Tampere University of Technology
Data to Intelligence (D2I) <i>F-secure, Nokia and Packet Video</i>	Data to Intelligence	12	01.2013	166,000€	Prof. Moncef Gabbouj Tampere University of Technology
Data to Intelligence (D2I) <i>A-lehdet Oy and Tieto Oy</i>	Multimedia Learning and Management	12	01.2014	141,000€	
Data to Intelligence (D2I) <i>A-lehdet Oy</i>	Classification of Images of Real State and Interior Objects	12	01.2015	147,000€	
Tampere University of Technology, <i>Big Data Center</i>	Classification of Images of Real State and Interior Objects	12	01.2013	35,000€	
Tampere University of Technology, <i>Big Data Center</i>	Multimedia Big Data Management and Learning	12	01.2013	35,000€	
Tampere University of Technology, <i>Center of Excellence</i>	Multimedia Big Data Management and Learning	12	01.2010	50,000€	
Academy of Finland	Professor Pool	12	06.2013	45,000€	
TUBITAK – Turkey 1001 Research Project	Management of Large Polarimetric SAR Repositories by Self-Organized Clouds of Evolutionary Classifier Networks	30	11.2014	85,000€	Prof. Turker Ince (Izmir University of Technology)

AREAS OF RESEARCH AND EXPERTISE

BIOMEDICAL SIGNAL PROCESSING, PATTERN RECOGNITION, COMPUTER VISION AND MACHINE LEARNING

- Major research work on the following areas:
 - Patient-Specific Biomedical Signal Processing
 - Biomedical Image Processing and Retrieval
 - ECG and EEG classification
 - Automatic object extraction and segmentation.
 - Audio classification, segmentation and audio based multimedia retrieval.
 - Inventor of *Hierarchical Cellular Tree* and *Progressive Query* techniques.
 - Machine Intelligence and Computer Vision in Remote Sensing and Biomedical Signals
- Inventor of **Multi-Dimensional Particle Swarm Optimization**, which is applied to:
 - Holter ECG and EEG Classification (state-of-the-art)
 - Optimal Dynamic Data Clustering (state-of-the-art)
 - Best Dominant Color Extraction (state-of-the-art)
 - Optimization in Dynamic Environments
 - Evolutionary Artificial Neural Networks (state-of-the-art)
 - Synthetic Aperture Radar Classification (state-of-the-art)
- Co-Inventor of the state-of-the-art automatic object segmentation method: **Quantum Cuts***(*see: <http://muvis.cs.tut.fi/>)
- Inventor of **Generalized Operational Perceptrons**

COMMUNICATION TECHNOLOGIES AND CODING

- Implementation of MPEG4 over IP client and server application. Real time streaming of MPEG4 media over RTP whilst using RTSP as the signaling protocol.
- SIP (Session Initiation Protocol) User Agent stack implementation for VoIP terminals.
- Development of the media stack for an IP telephony project. Furthermore, an adaptive QoS (Quality of Service) module design and implementation for adaptive bit-rate and buffer size settings.
- Realization of a high resolution delay and jitter measurement mechanism of the media packets between two or more terminals to derive a better modeling of the real network characteristics.
- Worked as an active participant in an international COST group, which develops algorithms in LBR and VLBR Video coding standards such as H.261, H.263 and MPEG-4.
- Development of several published techniques and algorithms in the following areas: “Speech and speaker recognition by DCT coefficient correlations via Neural Networks”, “LBR speech coding by spectral estimation”, “Image Enhancement and Edge Detection by Line Fields”, “Noise Reduction by Energy Function Minimization” and a MSc thesis (1996) on “Regularized Motion Estimation Techniques and Their Applications on Video Coding”.

MULTIMEDIA TECHNOLOGIES AND DATA MINING

- The architect of MUVIS framework (see <http://muvis.cs.tut.fi/>). MUVIS is a prototype framework which is developed to bring a global solution for the content-based multimedia management, particularly involving in the following areas:
 - Content-based management of the multimedia collections (i.e. indexing, retrieval, browsing, etc.).
 - Video summarization and scene extraction.
 - The M-MUVIS project: MUVIS in Mobile platforms.
 - A generic platform for developing aural/visual feature extraction, video shot boundary detection and spatial segmentation.
 - An environment primarily used for both MSc and PhD students to develop state-of-the-art techniques on this field.