Dr Vesna Zeljkovic
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## PROFILE

A researcher in the field of signal and image processing with more than ten years of experience, developing mathematical models and novel algorithms for the analysis of 2D images that have applications in video surveillance, analysis of complex optical spectra, public health, homeland security and national defense: 1) Detection and tracking of stationary and/or moving objects, 2) Shape recognition and object identification, 3) Analysis of complex and large data including images, 4) 1D Innovative analysis of audio and video signals and their conversions, 5) shape recognition in ISAR radar images, 6) simulation and mathematical modeling of cancerous bones**.** I participated in obtaining a $ 5 million NSF grant and a $ 700,000 DoD grant. Competent university professor, PhD advisor, facilitator of learning and enthusiastic student mentor enabling the pursuit of academic excellence and success through mutual accountabilities. Innovative and creative thinker committed to finding the desired results to difficult problems and personally dedicated to following projects through to completion.

## Education

**University of Novi Sad** October 1998 – June 2004

PhD – Electrical Engineering, Telecommunications, Image Processing
- Advisor Zeljen Trpovski, **University of Novi Sad**
- co-Advisor Dr Ebroul Izquierdo, **Queen Mary University of London**
- Doctoral Dissertation: "***Moving Object Detection in Image Sequences Independent of Scene Illumination"***

**University of Belgrade** March 1996 – June 1998

Masters Degree – Electrical Engineering, Telecommunications, Adaptive Digital Signal Processing
- Masters Thesis: "***Application of Nonlinear Volterra Filter in Interference Suppression in Transmission Systems of Phase Modulated Signals"***
- Cumulative GPA: 9.3/10.0

**University of Belgrade**
October 1991 – February 1996

Bachelor of Science Degree – Electrical Engineering, Telecommunications
- Diploma Thesis: "***The Simulation of Single-Output Stage Circuit used for Generation of Stimulation Pulses"***, GPA: 10.00/10.00
- Cumulative GPA: 8.56/10.00

**Mathematical High School "Mihailo Pupin", Belgrade** 1987-1991
- Valedictorian

Cumulative GPA: 5.00/5.00

## PROFESSIONAL EXPERIENCE

**Associate Professor** September 2009 – September 2011
*Prince Mohammad Bin Fahd University* Al Khobar, The Kingdom of Saudi Arabia
Prepare and deliver lectures in undergraduate courses: Digital Systems, Circuits I, Circuits II, Electronics I.

**Visiting Associate Professor** August 2008 – May 2009
*Delaware State University* Dover, DE

Prepared and delivered lectures in PhD courses: Pattern Recognition, Digital Image Processing, Digital Signal Processing and an undergraduate course: Statistics.

Graduated two PhD students
NSBE Chapter Advisor

- Mentored and advised undergraduate engineering students for the National Society of Black Engineers, NSBE

**Visiting Assistant Professor** July 2006 – July 2008
*Delaware State University* Dover, DE

Prepared and delivered lectures to Delaware State University PhD students on:

- Digital Image Processing

Prepared and delivered lectures to Delaware State University undergraduate Engineering students on:

- Introduction to Combinational Circuits,
- Introduction to Sequential Circuits

Developed a new graduate PhD course for the Applied Mathematics and Theoretical Physics graduate program

- Digital Signal Processing

Mentored and supervised two PhD students for their PhD dissertations
NSBE Chapter Advisor

- Mentored and advised undergraduate engineering students for the National Society of Black Engineers, NSBE
- Attended an NSBE conference in Ohio 2007 with engineering students to promote career development

Co-organizer of the CMNST weekly Graduate Seminar/Workshop Series for the Fall Semester of 2007

**Research Associate** January 2005 - May 2006
*Delaware State University* Dover, DE

Prepared and delivered lectures to Delaware State University PhD students on:

- Digital Image Processing

NSBE Chapter Advisor

- Mentored and advised undergraduate engineering students for the National Society of Black Engineers, NSBE
- Attended NSBE conference in Pittsburg 2006 with engineering students to promote career development

**Telecommunication Engineer** July 2002 - June 2004
*IT Department, Government of Serbia* Belgrade, Serbia

Prepared and delivered lectures on IT courses to Government employees

Interpreter for English for the Government of Serbia

Participated in Image Processing Research Project sponsored by Ministry of Science of Republic of Serbia

**Research Assistant** October 2000 - July 2002
*Faculty of Technical Sciences, University of Novi Sad, Serbia* Novi Sad, Serbia

Contributed to Image Processing Research Project sponsored by the Ministry of Science of the Republic of Serbia

**Research Assistant** October 1998 - October 2000
*Faculty of Electrical Engineering, University of Belgrade, Serbia* Belgrade, Serbia

Contributed to Image Processing Research Project sponsored by the Ministry of Science of the Republic of Serbia

**Teaching & Research Assistant** March 1996 - June 1998
*Faculty of Electrical Engineering, University of Belgrade, Serbia* Belgrade, Serbia

Supervised students' laboratory and class work on:

- Fundamentals of Telecommunications
- Optical Telecommunications
- Digital Signal Processing I
- Digital Signal Processing II
- Digital Signal Processing III
- Electrical Measurements

Participated in Signal Processing Research Project sponsored by Ministry of Science of Republic of Serbia

## AWARDS AND HONORS

- EB-1 status as the Outstanding Professor and Researcher recognized by the US Government 2007
- Certificate of Recognition by Metal Industry Committee of the Industry Applications Society, Institute of Electrical and Electronics Engineers, IAS IEEE for writing and presenting the paper "Automatic Pattern Classification of Real Metallographic Images" at IAS IEEE conference, October 2009
- Ministry of Science and Technology fellowship for prominent young researchers 1996-2004
- 2006/2007 Merit Award at Delaware State University
- 2007 Delaware Valley Science Fairs, Judge
- 2006, 2007, 2008 National Society for Black Engineers "NSBE" Chapter Advisor
- 2005, 2006, 2007, 2008 Supplemental Instruction and Tutoring Volunteer at Delaware State University

## DOCTORAL STUDENTS

1. Robert B. Vincelette Jr., Delaware State University, 2009
2. Claude M. Tameze, Delaware State University, 2009

## AWARDED GRANTS PARTICIPATION

- Subproject "Applied Laser Spectroscopy" on $5,000,000 NSF Grant HRD-0630388, 2006-2011
- "Adaptive Approach to Identify Unusual Behavior in Video Imagery" $700,000 DoD grant, P-54412-CI-ISP, 2008-2011

## SESSION CHAIR AND PROGRAM COMMITTEE MEMBER

**1.** Session Chair

- August 2008, Computer Vision Systems , at VIE 2008 in Xian, China

**2.** Member of International Program Committee

- Workshop on Pattern Analysis and Recognition (PAR'2010) at the International Conference on High Performance Computing & Simulation (HPCS 2010), June 2010

## INVITED TALKS

**1.** University of District of Columbia

- December 2, 2008, School of Engineering and Applied Sciences, Professional Development Series. Invited Lecture on: *"Shape and Pattern Recognition Algorithms"*

## PEER REVIEWS

**1.** IEEE Transactions on Image Processing

2. Journal IET Radar Sonar Navigation
3. International Journal of Digital Multimedia Broadcasting
4. Journal of Biomedical Science and Engineering (JBISE)
5. CBMI 2008, IEEE conference
6. EURASIP Journal on Image and Video Processing
7. EURASIP Journal on Advances in Signal Processing
8. European Signal Processing Conference, EUSIPCO 2007
9. Computer Science and Information System (ComSIS) International Journal
10. The Second International Conference on Mobile Multimedia Communications (MobiMedia 2006)

## IEEE JOURNAL PUBLICATIONS

1. **Vesna Zeljković**, Qiang Li, Robert Vincelette, Claude Tameze, Fengshan Liu, "Automatic Algorithm for ISAR Images Recognition and Classification", *IET Radar, Sonar and Navigation*, 2009.
2. **Vesna Zeljković**, Claude Tameze, Robert Vincelette, Ebroul Izquierdo, "Different Nonlinear Diffusion Filters Combined with Triangle Method Used for Noise Removal from Polygonal Shapes", *IET Image Processing*, 2009.
3. **Vesna Zeljković**, Andres Dorado, Ebroul Izquierdo, "Combining a Fuzzy Rule-Based Classifier and Illumination Invariance for Improved Building Detection**",** *Circuits and Systems for Video Technology, IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 14, No.11, Nov. 2004, pp. 1277 – 1280.
4. **Vesna Zeljković**, A. Dorado, Ž. Trpovski, E. Izquierdo, "Classification of Building Images in Video Sequences", *IEE Electronics Letters*,Vol. 40 , No. 3, 5th February 2004, pp. 169-170.
5. **Vesna Zeljković**, Željen Trpovski, Vojin Šenk, "Improved Illumination Independent Change Detection for Real World Video Sequences", *YUJOR*, Serbia and Montenegro, 2004.

## BOOK CHAPTERS

Robert B. Vincelette, Claude Tameze, Marko Savic, **Vesna Zeljkovic**, "Efficient Shape Recognition Method Using Novel Metric for Complex Polygonal Shapes", book Advances in Applied and Computational Mathematics, Volume II, Nova Science Publishers, 2007.

## PRESENTATIONS AND CONFERENCES

1. **Vesna Zeljković,** Qiang Li, Robert Vincelette, Claude Tameze, Fengshan Liu, "Aircraft Identification by Unions of ISAR Images", MOBIMEDIA conference 2009

2. **Vesna Zeljković,** Qiang Li, Robert Vincelette, Claude Tameze, Fengshan Liu, "Noise resistant algorithm for radar images recognition and classification", Signal and Data Processing of Small Targets 2009, SPIE "Small Targets" conference 2009.

3. **Vesna Zeljković,** Pavel Praks, Robert Vincelette, Claude Tameze, Ladislav Válek, "Automatic Pattern Classification of Real Metallographic Images", IEEE Industry Applications Society 2009, IEEE conference

4. **Vesna Zeljković,** Claude Tameze, Robert Vincelette, Ebroul Izquierdo, "Nonlinear Diffusion Filter and Triangle Method Used for Noise Removal from Polygonal Shapes", VIE *2008*, IEEE conference

5. **Vesna Zeljković,** Robert Vincelette, Claude Tameze, "Combined Nonlinear Inverse Diffusion Filter and Triangle Method Used for Noise Removal from Polygonal Shapes", ICIP *2008*, IEEE conference

6. Robert Vincelette, Claude Tameze, **Vesna Zeljković,** Ebroul Izquierdo, "Noise Removal from Polygonal Shapes Using Combined Inverse Diffusion Filter and Triangle Method", CBMI *2008*, IEEE conference

7. Robert Vincelette, Claude Tameze, Noureddine Melikechi, **Vesna Zeljković**, Ebroul Izquierdo, "Empirical Analysis of Blood Plasma LIBS Images Using Different Nonlinear Diffusion Techniques", *IASTED 2007*

8. Claude Tameze, Robert Vincelette, Noureddine Melikechi, **Vesna Zeljković**, "Empirical Analysis of Blood Plasma LIBS Images Using the Different Nonlinear Diffusion Methods", *TELSIKS 2007*

9. Robert Vincelette, Claude Tameze, Noureddine Melikechi, **Vesna Zeljković**, Ebroul Izquierdo, "Improved Nonlinear Diffusion Method Applied on LIBS Blood Plasma Images", *ETRAN 2007*

10. Claude Tameze, Robert Vincelette, Noureddine Melikechi, **Vesna Zeljković**, "Empirical Analysis of LIBS Images Using the Nonlinear Diffusion Method", *ELMAR 2007*

11. Claude Tameze, Robert Vincelette, Noureddine Melikechi, **Vesna Zeljković**, Ebroul Izquierdo, "Empirical Analysis of LIBS Images for Ovarian Cancer Detection", *WIAMIS 2007*

12. **Vesna Zeljković**, Pavel Praks, "A Comparative Study of Automated Iris Recognition Using the Biorthogonal Wavelets and the SVD-Free Latent Semantic Methods", ZNALOSTI 2007 Annual Conference on Knowledge Acquisition, Czecho-Slovak Knowledge Technology Conference, 21.2. – 23.2. 2007, VSB-Technical University of Ostrava, Ostrava, Czech Republic, pg. 143-154, Ed. Peter Mikulecky, Jiri Dvorsky, Michal Kratky, ISBN 978-80-248-1279-3, February 21-23, Ostrava, Czech Republic

13. **Vesna Zeljkovic**, Robert B. Vincelette, Marko Savic, "Novel object identification algorithm", *DOGS 2006*.

14. **Vesna Zeljkovic**, Robert B. Vincelette, Marko Savic, "Efficient Shape Recognition Method Using Novel Metric for Complex Polygonal Shapes", *MOBIMEDIA 2006*.

15. Steven Rock, **Vesna Zeljkovic**, Noureddine Melikechi, "Application of Laser-Induced Breakdown Spectroscopy for the Rapid Identification of Biomarkers", 3rd Minority Serving Institutions Research Partnerships Conference, 2006 (MSIRP'06), Edinburg, Texas. (won 3rd award)

17. **Vesna Zeljkovic**, Dragoljub Pokrajac, "Improved Spatial-Temporal Moving Object Detection Method Resistant to Noise", *ICEST 2006***.**

18. **Vesna Zeljkovic**, Dragoljub Pokrajac, "Motion Detection Based Multimedia Supported Intelligent Video Surveillance System", *ELMAR 2006***.**

19. Dragoljub Pokrajac, **Vesna Zeljković**, "Influence of the Salt and Pepper Noise on Spatial-Temporal Method for Moving Objects Detection", *IASTED 2005*.

20. Dragoljub Pokrajac, **Vesna Zeljković**, Longin Jan Latecki, "Spatial-Temporal Algorithm for Moving Objects Detection in Infra Red Video Sequences", *TELSIKS 2005*.

21. **Vesna Zeljkovic**, Dragoljub Pokrajac, "Improved Illumination Independent Moving Object Detection Algorithm in Infrared Video Sequences**",** *ICEST* 2005**.**

22. Dragoljub Pokrajac, **Vesna Zeljković**, Longin Jan Latecki, "Noise-Resilient Detection of Moving Objects Based on Spatial-Temporal Blocks", *ELMAR 2005*.

23. **Vesna Zeljkovic**, Dragoljub Pokrajac, Longin Jan Latecki, "Noise Robust Spatial-Temporal Algorithm for Moving Objects Detection**",** *XLIX ETRAN* 2005**.**

24. **Vesna Zeljković,** Dragoljub Pokrajac, Andres Dorado, Ebroul Izquierdo, "Application of the Improved Illumination Independent Moving Object Detection Algorithm on the Real Video Sequence", *WIAMIS 2005*.

25. **Vesna Zeljković**, Željen Trpovski "Illumination Independent Moving Object Detection in Real Sequence**",** *DOGS 2004***,** Sombor, Serbia and Montengro, 2004.

26. **Vesna Zeljković**, Andres Dorado, Željen Trpovski and Ebroul Izquierdo, "A Modified Shading Model Method Used for Building Extraction", *ETRAN 2004*, Cacak, Serbia and Montengro, 2004.

27. **Vesna Zeljković**, Andres Dorado, Ebroul Izquierdo, "A Modified Shading Model Method for Building Detection", *WIAMIS 2004*, Lisabon, Portugal, 2004.

28. **Vesna Zeljković**, Rade Dragovic, "Moving Object Detection in Video Sequence Independent of the Scene Illumination - Software Solution", *YU INFO 2004*, Kopaonik, Serbia and Montengro.

29. Rade Dragovic, **Vesna Zeljković**, "Video Conferences - the Possibilities of Application in Judiciary", *YU INFO 2004*, Kopaonik, Serbia and Montengro, 2004.

30. **Vesna Zeljković**, Rade Dragovic, "Software Solution for Moving Object Detection in Video Sequence Independent of the Scene Illumination", *IT 2004*, Zabljak, Serbia and Montengro, 2004.

31. **Vesna Zeljković**, Željen Trpovski, Vojin Šenk, "Improved Illumination Independent Moving Object Detection in Real World Video Sequences", *4th EURASIP Conference focused on Video/Image Processing and Multimedia Communications*, Zagreb, Croatia, 2003.

32. **Vesna Zeljković**, Željen Trpovski, "Moving Object Localization Applying Change Detection", *DOGS 2002*, Novi Bečej, Yugoslavia, 2002.

33. **Vesna Zeljković**, Miodrag Popović, "Detection of Moving Objects in Video Signal under Fast Changes of Scene Illumination", *TELSIKS 2001*, Niš, Yugoslavia, 2001.

34. Miodrag Popović, **Vesna Zeljković**, "Moving Object Extraction from Image Sequences using Edge Information", *DOGS 2000*, Novi Sad, Yugoslavia, 2000.

35. **Vesna Zeljković**, Miodrag Popović, "Illumination Independent Moving Object Extraction from Video Sequences", *ETRAN 2000*, Soko Banja, Yugoslavia, 2000.

36. **Vesna Zeljković**, Zoran Dobrosavljević, "Interference Suppression by Volterra Filter", *ETRAN 1998,* Beograd*,* 1998.

37. Zoran Dobrosavljević, M.Dukić, **Vesna Zeljković**, "Broadband Interference Suppression in DSSS Receiver by Volterra Filter", *IEEE Fifth International Symposium on Spread Spectrum Techniques & Applications*, South African Republic*,* 1998.

38. Zoran Dobrosavljević, **Vesna Zeljković**, "Volterra Filter Application for Interference Suppression in 2−ΦM Signals Transmission", *TELFOR*, Beograd, Serbia, 1997.

39. **Vesna Zeljković**, "Signal Transmission Channel Simulation", in Proc. Serbian Department for Science and Technology, Internal conference of Ministry of Science, Zlatibor, Serbia, 1996.

## PROFESSIONAL ASSOCIATIONS

Institute of Electrical & Electronics Engineers

- 2000-Present
- link: http://www.ieee.org

## LANGUAGE SKILLS

Excellent spoken and written knowledge of:

1. English ("Certificate of Proficiency in English", Cambridge),
2. French ("Diplome Approfondi de Langue Francaise", Ministere de l'Education Nationale Francaise, Republique Francaise),
3. Italian ("Certificato di Conoscenza della Lingua Italiana", Universita per Stranieri, Perugia),
4. German ("Konversation Niveau", The Institute for Foreign Languages, Belgrade),
5. Spanish ("Diploma de Espanol como Lengua Extranjera", El Ministerio de Education y Ciencia, Madrid).