George Papandreou

Department of Statistics
University of California, Los Angeles
email: gpapan AT stat.ucla.edu
web: www.stat.ucla.edu/~gpapan

Education

2003–2009 **Ph.D. in Electrical & Computer Engineering**, *National Technical University of Athens*, Greece.
Ph.D. Thesis: Image Analysis and Computer Vision: Theory and Applications in the Restoration of Ancient Wall Paintings
Advisor: Prof. Petros Maragos

1998–2003 **Diploma/M.Eng. in Electrical & Computer Engineering**, *National Technical University of Athens*, Greece.
GPA: 9.54/10 (highest honors), ranked in top 1% of the class
Diploma Thesis: Fast Algorithms for the Evolution of Geodesic Active Contours with Applications in Computer Vision (*Advisor*: Prof. Petros Maragos)

Research experience

2009–now **Postdoctoral Research Scholar**, *University of California, Los Angeles*.
Member of the *Center for Image and Vision Science* (CIVS) (civs.stat.ucla.edu), working with Prof. Alan Yuille. Research on visual object detection, audiovisual speech analysis, statistical pattern recognition.

2003–2009 **Graduate Research Assistant**, *National Technical University of Athens*, Greece.
Member of the *Computer Vision, Speech Communication & Signal Processing* (CVSP) group (cvsp.cs.ntua.gr). Participated in national and European research projects in the areas of computer vision and multimodal processing:

PENED: Development of image inpainting techniques for the digital restoration of missing parts in ancient wall paintings excavated at the pre-historic Aegean settlement of Akrotiri, Thera.

MUSCLE: Research on facial image analysis and multimodal feature fusion for audiovisual speech processing. Development of a real-time audiovisual speech recognition prototype.

HIWIRE: Research on audiovisual processing for robust speech recognition in noisy environments.

ASPI: Work on speech inversion (recovery of vocal tract geometry) using audiovisual information.

Summer 2006 **Visiting researcher**, *Trinity College Dublin*, Ireland.
Project: Image inpainting with complex wavelets.
Mentor: Prof. Anil Kokaram.

2001–2003 **Undergraduate Research Assistant**, *Demokritos Nat. Center for Scientific Research*, Greece.
Member of the Demokritos' Institute of Informatics & Telecommunications, participating in the European research project *WIN*. Worked on design and deployment of wireless WAN network and development of Internet services. Contributed in writing research proposals for follow-up funding.
Mentor: Dr. Stelios C.A. Thomopoulos.

Research interests

Image analysis & computer vision

Variational and PDE methods for image denoising, segmentation, and inpainting. Face analysis with parametric shape and appearance models. Statistical models of natural images, applied to image inpainting. Multiscale techniques for image modeling. Deterministic and stochastic techniques for inference with missing data. Multigrid algorithms for efficient computations. Cultural heritage and medical imaging applications.

Multimodal processing — Probabilistic approaches to multimodal fusion. Multimodal asynchrony modeling. Combined acoustic and visual modeling of human speech, with applications to audiovisual speech synthesis and recognition.

Scholarships and awards

2006–2009 **Onassis Public Benefit Foundation**, Graduate studies scholarship.

2007 **IEEE International Workshop on Multimedia Signal Processing (MMSP)**, Student paper contest runner up award.

2004–2007 **Greek State Scholarships Foundation**, Graduate studies scholarship in the area of artificial intelligence and its applications.

1999–2003 **Latsis Public Benefit Foundation**, Undergraduate studies scholarship.

2001 **Technical Chamber of Greece**, Award to top ranking students in the School of E.C.E.

2000–2001 **National Technical University of Athens**, Papakyriakopoulos (awarded twice, 2000 and 2001) and Kritikos (2001) awards for excellence in mathematics.

Teaching experience

2006–2009 **Graduate Teaching Assistant**, *National Technical University of Athens*, Computer Vision class (School of E.C.E., 8th semester), *Instructor*: Prof. Petros Maragos.
Served as lab and teaching assistant. Contributed to student homework grading and development of new lab exercises and supplementary teaching material. Assisted diploma thesis students working on computer vision projects at the CVSP group.

Invited talks and presentations

2009 **PENED Workshop**, *Digital Restoration of Missing Parts in the Wall Paintings of Thera*, PENED project Workshop: Digital Cultural Heritage Technologies with Applications at the Pre-Historic Settlement of Akrotiri-Thera.

2009 **Demokritos Nat. Center for Scientific Research, Athens, Greece**, *Multiresolution image models with application to image segmentation and digital restoration of missing parts in ancient wall paintings from Akrotiri-Thera*, *Host*: Dr. Gerasimos Potamianos.

2009 **Akrotiri Excavation, Thera, Greece**, *Capturing high resolution photos and automatically filling-in gaps in Theran wall paintings*, Princeton Univ. and Akrotiri Excavation Summer Course: Reassembling and Studying the Thera Frescoes.

2009 **Institute for Language and Speech Processing, Athens, Greece**, *Audiovisual speech analysis*, *Host*: Dr. Argiro Vataki.

2008 **University of California, Los Angeles**, *Multi-resolution techniques for efficient image analysis and modeling*, UCLA Image Processing Research Group, *Host*: Prof. Luminita Vese.

2007-2008 **Real-time audiovisual speech recognition demonstrator**, Presented at the demo session of three IEEE conferences (MMSP-07, ICASSP-08, CVPR-08).

2006 **Trinity College Dublin**, *Feature uncertainty in multimodal fusion and learning*, SIGMEDIA group, *Host*: Prof. Anil Kokaram.

2006 **MUSCLE Workshop**, *Multimodal fusion: Application to audiovisual speech recognition and audiovisual speech inversion*, MUSCLE Network of Excellence Workshop, Paris, Dec. 6, 2006.

2005 **MUSCLE Workshop**, *Audiovisual speech recognition*, MUSCLE Network of Excellence Workshop, Paris, April 28, 2005.

Professional activities

Journal paper reviewing

2005–present **IEEE Transactions on Image Processing**.
2006–present **IEEE Transactions on Pattern Analysis and Machine Intelligence**.
2006 **International Journal of Computer Vision**.
2008 **Pattern Recognition**.

Memberships

2003–present **Institute of Electrical and Electronics Engineers (IEEE)**.
2003–present **Association for Computing Machinery (ACM)**.
2008–present **Society for Industrial and Applied Mathematics (SIAM)**.
2004–present **Technical Chamber of Greece**.

Open-source research software

2008 **GAC++**, *A C++ toolbox for geometric active contours and other related PDE-based computer vision models*, (GPL license).
2008 **AAMtools**, *A MATLAB toolbox for building active appearance models and fitting them to still and moving images*, (GPL license).

Computer skills

Programming, Experienced in C/C++, Matlab, OpenGL, Java.
Other, System administration (Linux, Windows), document processing in LaTeX.

Languages

English **Fluent** *Cambridge ESOL CPE (CEFR level C2)*
German **Good** *Goethe-Institut ZMP (CEFR level B2)*
Greek **Native**

Scientific publications

Journal articles

[1] G. Papandreou and P. Maragos. Multigrid geometric active contour models. *IEEE Transactions on Image Processing*, 16(1):229–240, January 2007.

[2] G. Papandreou, A. Katsamanis, V. Pitsikalis, and P. Maragos. Adaptive multimodal fusion by uncertainty compensation with application to audiovisual speech recognition. *IEEE Transactions on Audio, Speech and Language Processing*, 17(3):423–435, March 2009.

[3] A. Katsamanis, G. Papandreou, and P. Maragos. Face active appearance modeling and speech acoustic information to recover articulation. *IEEE Transactions on Audio, Speech and Language Processing*, 17(3):411–422, March 2009.

[4] S. Lefkimmiatis, P. Maragos, and G. Papandreou. Bayesian inference on multiscale models for Poisson intensity estimation: Applications to photon-limited image denoising. *IEEE Transactions on Image Processing*, 18(8):1724-1741, August 2009.

Refereed conference proceedings

[1] G. Papandreou and P. Maragos. A fast multigrid implicit algorithm for the evolution of geodesic active contours. In *Proc. IEEE Int. Conf. on Comp. Vision and Pat. Rec. (CVPR)*, Washington DC, June 2004, volume II, pages 689–694.

[2] G. Papandreou and P. Maragos. Image denoising in nonlinear scale-spaces: Automatic scale selection via cross-validation. In *Proc. IEEE Int. Conf. on Image Processing (ICIP)*, Genova, Italy, Sept. 2005, volume I, pages 481–484.

[3] G. Papandreou and P. Maragos. A cross-validatory statistical approach to scale selection for image denoising by nonlinear diffusion. In *Proc. IEEE Int. Conf. on Comp. Vision and Pat. Rec. (CVPR)*, San Diego, CA, June 2005, volume I, pages 625–630.

[4] A. Katsamanis, G. Papandreou, V. Pitsikalis, and P. Maragos. Multimodal fusion by adaptive compensation for feature uncertainty with application to audiovisual speech recognition. In *Proc. 14th European Signal Processing Conf. (EUSIPCO)*, Florence, Italy, Sept. 2006.

[5] V. Pitsikalis, A. Katsamanis, G. Papandreou, and P. Maragos. Adaptive multimodal fusion by uncertainty compensation. In *Proc. Int. Conf. on Spoken Language Processing (ICSLP), Pittsburgh, PA*, Sep. 2006, pages 2458–2461.

[6] A. Katsamanis, G. Papandreou, and P. Maragos. Audiovisual-to-articulatory inversion using hidden Markov models. In *Proc. IEEE Workshop on Multimedia Signal Processing (MMSP)*, Chania, Greece, Oct. 2007, pages 457–460.

[7] G. Papandreou, A. Katsamanis, V. Pitsikalis, and P. Maragos. Multimodal fusion and learning with uncertain features applied to audiovisual speech recognition. In *Proc. IEEE Workshop on Multimedia Signal Processing (MMSP)*, Chania, Greece, Oct. 2007, pages 264–267.

[8] A. Katsamanis, G. Papandreou, and P. Maragos. Audiovisual-to-articulatory speech inversion using active appearance models for the face and hidden Markov models for the dynamics. In *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, NV, Apr. 2008, pages 2237–2240.

[9] G. Papandreou, P. Maragos, and A. Kokaram. Image inpainting with a wavelet domain hidden Markov tree model. In *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, NV, Apr. 2008, pages 773–776.

[10] A. Katsamanis, G. Ananthakrishnan, G. Papandreou, P. Maragos, and O. Engwall. Audiovisual speech inversion by switching dynamical modeling governed by a hidden Markov process. In *Proc. 16th European Signal Processing Conf. (EUSIPCO)*, Lausanne, Switzerland, Aug. 2008.

[11] G. Papandreou and P. Maragos. Adaptive and constrained algorithms for inverse compositional active appearance model fitting. In *Proc. IEEE Int. Conf. on Comp. Vision and Pat. Rec. (CVPR)*, Anchorage, AK, June 2008.

[12] S. Lefkimmiatis, G. Papandreou, and P. Maragos. Photon-limited image denoising by inference on multiscale models. In *Proc. IEEE Int. Conf. on Image Processing (ICIP)*, San Diego, CA, October 2008, pages 2332–2335.

[13] S. Lefkimmiatis, G. Papandreou, and P. Maragos. Poisson-Haar transform: A nonlinear multiscale representation for photon-limited image denoising. In *Proc. IEEE Int. Conf. on Image Processing (ICIP)*, Cairo, Egypt, November 2009.

Book chapters

[1] G. Papandreou, A. Katsamanis, V. Pitsikalis, and P. Maragos. Adaptive multimodal fusion by uncertainty compensation with application to audiovisual speech recognition. In P. Maragos, A. Potamianos,

and P. Gros, editors, *Multimodal Processing and Interaction: Audio, Video, Text*, chapter 4, pages 111–126. Springer-Verlag, New York, 2008.

[2] P. Maragos, P. Gros, A. Katsamanis, and G. Papandreou. Cross-modal integration for performance improving in multimedia: A review. In P. Maragos, A. Potamianos, and P. Gros, editors, *Multimodal Processing and Interaction: Audio, Video, Text*, chapter 1, pages 3–48. Springer-Verlag, New York, 2008.

References

References available upon request.