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Editorial

Celebrating the life and work of Maria Petrou

This Special Edition in Celebration of Maria Petrou, was conceived shortly after she died in October 2012 and was in response to friends and colleagues who wanted to remember both her personal warmth and exceptional scientific achievements. The idea was to have a variety of contributions including novel scientific articles, reviews of topics close to Maria's areas of interest, and personal recollections from friends and colleagues.

The call for papers was issued in May 2013 and resulted in 27 submissions. Of these about 8 were of a non-technical nature and have been edited together to form the "Homage to Maria Petrou", which is a compendium of recollections of various interactions with Maria, spanning her whole career. The remaining articles were of a technical nature, and have been peer reviewed according to the usual process followed in Pattern Recognition Letters. This peer review has produced 9 revised papers, which are also included in the Special Edition. These papers are authored by former students, colleagues and followers of Maria's work. All cite her contributions to the field and place themselves in the context of her work. Several of the articles list Maria as a posthumous co-author.

The technical contributions as follows: The paper "Progress in the restoration of image sequences are degraded by atmospheric turbulence" by Ronen Gal, Nahum Kiryati and Nir Sochen reflects Maria's long standing interest in remote sensing, and explains how atmospheric degradation can be overcome in motion sequences. This interest in remote sensing was one of her earliest in the field of image analysis, and grew out of her first post in the area as a postdoc in the Department of Geography at Reading University. This lead her to work extensively on the problem of mixed pixels, and this interest is reflected in the paper "Subpixel temporal spectral imaging" authored by former student Olga Duran and posthumously by Maria herself. Finally under the heading of remote sensing, a second posthumous paper "A rule-based classification methodology to handle uncertainty in habitat mapping employing evidential reasoning and fuzzy logic" authored by Zisis Petrou et al. describes how her work in AI and pattern recognition can be brought to bear on image interpretation problems in remote sensing.

Maria always described herself as having a soft-spot for geometry, and ascribed this to sharing her nationality with Pythagoras. The paper "Rotation invariant co-occurrence features based on digital circles and discrete Fourier transform" by Antonio Fernández and Francesco Bianconi builds on this interest together with her long standing fascination with the Hough transform to present a new shape characterisation technique. Maria enjoyed teaching and preparing innovative teaching material. She also thought a great deal about how people learn and how you should best help them to learn. Many of her ideas here influenced the development of the tower of knowledge which is described in "Tower of Knowledge for Scene Interpretation: A Survey" by Mai Xu and Zulin Wang.

After first moving to Surrey, Maria developed an interest in the renormalisation group approach to image processing. This was a natural direction for her not only since the method draws on ideas from physics, but also that the original work in this area was performed by fellow Greek, Basilis Gidas. In the paper "Fast pose invariant face recognition using super coupled multiresolution Markov Random Fields on a GPU" by Shervin Rahimzadeh Arashloo and Josef Kittler, the renormalisation group approach is applied to face recognition and efficiently implemented on a GPU.

In her first post in computer vision at Reading University, Maria worked on an Alvey project with David Hogg, and was fascinated by his then pioneering work on modelling walking people. The paper "Identification of people walking along curved trajectories" by Yumi Iwashita, Koichi Ogawara and Ryo Kurazume, captures this long standing interest, as does the paper "Human Activity Recognition From 3D Data: A Review" by Lu Xia and Jake Aggarwal, which shows how far this field has moved over the past 25 years.

As a physicist by training, Maria was instinctively drawn to problems involving light, and this influenced her recent work on photometric stereo. The papers "Error analysis of photometric stereo with colour lights" by Martin Klaudiny and Adrian Hilton and "Cast Shadows estimation and synthesis using the Walsh Transform" by Vasileios Argyriou, Ferdinand Redelinghuys and Maria herself, both address this research interest, with new insights into photometric stereo and how it can be employed in the real world.

In addition to the scientific papers and the compendium of recollections, this special edition also contains accounts of her work at the University of Surrey and CERTH in Thessaloniki, together with a reprint of her obituary which appeared in the Guardian. We thank the authors of the technical papers and the personal recollections for providing us with the material for this celebration of Maria's life. We also thank Gabriella Sanniti di Baja for encouraging us to embark on editing it, and for her patience when the project ran slowly. We are also very grateful to the staff at Elsevier, especially Journal Manager Janet Amali Joseph who helped us bring the special edition into being.

This is of course just one of several tributes to Maria. There will be a workshop in the Autumn of 2014 at CERTH to celebrate her scientific achievements. The IAPR, of which Maria served as both Newsletter Editor and Treasurer, among other posts, plans to remember Maria through a named biennial award to a female scientist. At the time of going to press, details of the award are still being discussed, but should be finalised in time for approval at the IAPR Governing Board Meeting in Stockholm, and an announcement during ICPR.

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