

# BMVA News

The Newsletter of the British Machine Vision Association and Society for Pattern Recognition

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<http://www.bmva.org/>

**BMVA** News<sup>1</sup> is published every three months. Contributions on any activity related to machine vision or pattern recognition are eagerly sought. These could include reports on technical activities such as conferences, workshops or other meetings. Items of timely or topical interest are also particularly welcome; these might include details of funding initiatives, programmatic reports from ongoing projects and standards activities. Items for the next edition should reach the Editor by 10 December 2015.

## Editorial: *How Can We Train the Robots?*

BMVC 2015 was not only the largest ever, but also included far more papers on deep learning. How can this have happened? My participation in neural networks in the early 1990s gradually petered out as I (amongst many others) realised that it was hard to find out what algorithm strategies the trained networks were following, so it was difficult to be sure they wouldn't fall over on the job, and even more difficult to convince industrial partners of their viability in real applications. But if yesterday's neural networks were of unproven reliability, what could have changed since then? Of course, computers now have larger memories and are also much faster. However, another key hardware advance is the widespread use of GPU processing, which permits large vectors to be processed in one go. All these factors mean that training is far less limited and it is now possible to train NNs on hundreds of thousands of image patterns rather than just a few hundred. In addition, whereas backpropagation – in its time a considerable breakthrough – has been improved by use of rectification instead of the old sigmoidal activation function.

An important feature of convolutional NNs (CNNs) is the layer that does 'maxpooling' and makes the signals sparse enough to be processed efficiently by a fully connected network; at the same time the input section, which carries out the convolutions, converts whole images to whole images using overlapping windows, thereby retaining the original image format over several layers. These arrangements follow certain characteristics of the HVS, so now we have a *really* biologically inspired system, which means that there is high expectation of the whole architecture being guaranteed to work reliably. Maybe it would be fully guaranteed if sufficient training were possible, but note that the training data has to be found, selected and labelled by human operators. Thereby hangs a tale, as I realised long ago that, instead of spending his time on producing algorithms, the vision system designer spent it in searching for the right training data, and on balance no less brain work was involved.

All this points to something else I have long asserted (and hopefully not repeated excessively in my editorials) – that vision systems will not be competent until robots with vision can crawl around and grow up like babies,

## Contents

Editorial: <i>How Can We Train the Robots?</i> .....	1
BMVC Goes to York .....	2
BMVA Elections 2015 .....	2
Wanted: A Student Representative for the BMVA Executive Committee .....	2
BMVA Distinguished Fellow 2015: Professor Mark Nixon.....	3
BMVC: Summary and Statistics.....	3
Prizes at BMVC 2015.....	4
BMVC 2015 .....	4
Around and About at BMVC.....	5
BMVA Workshop on Visual, Tactile and Force Sensing for Robot Manipulation .....	10
BMVA Technical Meetings.....	10
Review of BMVA Meeting on Context Aware Cognitive Systems.....	10
Report on BMVA Computer Vision Summer School 2015.....	11
ICRA 2015 Review .....	12
Pictures to be Included in BMVA News .....	13
BMVC 2016.....	13
A Few More Memorable Moments from BMVC.....	14

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automatically feeding themselves with huge quantities of the right training. Think about it: in one day a baby will be looking around its environment for ~12 hours and seeing ~10 frames every second, all of which amounts to over 400,000 frames, and the same again every day, until by 1 year it has seen and interpreted a staggering 100 million frames. Actually, whereas a fast computer could probably keep up with 'looking at' that many frames, the other problem is that of feeding it with the *right* frames, duly labelled. This almost certainly means that further improvements in robot vision will require a gross change from supervised to unsupervised learning.

Meanwhile, our BMVC invited speaker, Professor Kristen Grauman, had some penetrating thoughts on how to ensure that the right data became available at the right rates – namely use of egomotion to generate 'first-person vision': she was aiming to get computers to emulate humans in perceiving the continuity of their own visual stream – and also achieving it. Part of achieving it was to get the computer to look at the right places in the egomotion scene and pay attention to them – which amounts to making controlled saccades as humans do. It certainly seems that we need to 'watch this space' for more exciting developments. Indeed, supervised learning can more easily become unsupervised learning if we go along the egomotion track. Unfortunately, the speaker took me by surprise and left us with no printed version of her paper. So it's possible I am just recalling bits of what she actually said and reinventing the rest. Either way, it doesn't really matter. In science, truly good ideas will be followed by other workers and re-implemented and adapted, or else forgotten and buried by even better work: in this instance, only time will tell.

Meanwhile, I have to report on little Eva, now 20 months, who very suddenly progressed from not 'wasting time' on speaking, and is now saying about 100 words ranging from an impressive number of nouns (door, garden, supper, ...) to a few adjectives and verbs (empty, running, fell over, upsadaisy, dropped it, upside down, ...). Curiously, the moon has made a big impression on her and she's always asking where it is ("mooon?", her voice rising at the end).

Finally, I have to admit that I made a mistake in what I said recently about having nothing to fear from robots. In fact, this was in response to various people warning that super-intelligent robots might take over the world. However, my mistake was that of not realising that *intellectually impoverished* robots are *already* running small parts of the world. For, 25–30 years ago, the old stock exchanges were found to operate too slowly and trading had to be done by computer. As a result, the 2008 crash, which might have been triggered by a modest peak in prices, was exacerbated and enhanced into a huge event: if it had been managed by humans this might well have been eliminated at its onset. So what I am afraid of is not super-intelligent robots taking over the world but super-stupid robots working at such high speeds that they don't realise what's happening and are unable to stop what they are doing in time. It's the old syndrome once again: Quis custodiet ipsos custodes? (Who watches the watchmen?) Or in this case, who protects us from the robots?

Professor Roy Davies  
Editor, BMVA News  
email: e.r.davies@rhul.ac.uk

## BMVC Goes to York

I am pleased to announce that BMVC will be held at the University of York in 2016. This is the second time our annual conference will visit York, the first time being as long ago as 2004. The conference dinner promises to be something really special as it is to be held in the National Railway Museum. Note that the 2016 conference will be held on 19–22 September; this is about a week later in the month than usual, so make a note of the dates in your diaries now! For more information, please visit the conference website: <http://bmvc2016.cs.york.ac.uk/>.

Adrian Clark (BMVA Chair)  
email: [chair@bmva.org](mailto:chair@bmva.org)

## BMVA Elections 2015

This year, only three candidates stood for election to the Executive Committee:

- Dr N Campbell
- Professor E R Davies
- Professor M Mirmehdi.

This was fewer than the number of posts available, so all were duly elected. This will leave the ExCo a little short of manpower so we shall be approaching a small number of people to ask them to be co-opted. If you would like to be involved in the running of the BMVA, now is the perfect time to volunteer! Note that this is an excellent way for newly-appointed academics to raise their profile!

Adrian Clark (BMVA Chair)  
email: [chair@bmva.org](mailto:chair@bmva.org)

## Wanted: A Student Representative for the BMVA Executive Committee

The BMVA's Executive Committee (ExCo) normally includes a research student. Until recently, Paul Tar at Manchester filled that role but he now has his PhD so we are seeking a new PhD student to be part of the ExCo. It would be helpful, though not essential, if anyone thinking of putting their name forward had attended the BMVA's Computer Vision Summer School. The successful applicant will get a small but significant job to do on the ExCo, most likely involving other UK vision research students.

The BMVA pays expenses to attend ExCo meetings (four or five per year) and, as an added bonus, the successful applicant will receive a travel bursary, above the rate normally available, to attend an international conference. Please get in touch with the BMVA Chair if you are interested.

Adrian Clark (BMVA Chair)  
email: [chair@bmva.org](mailto:chair@bmva.org)

## BMVA Distinguished Fellow 2015: Professor Mark Nixon



Mark Nixon is Professor in Computer Vision in the School of Electronics and Computer Science at the University of Southampton. When you hear Mark's name, the thing that you associate most closely with it is the analysis of gait – the way people walk. His early work attracted DARPA funding, almost unheard of for a UK institution, where it was used to explore how to identify individuals at a distance. Their gait recognition work – and the psychedelic tunnel along which people walk to have their gait captured – appeared in the very first episode of the BBC science programme *Bang Goes the Theory*.

However, this was not Mark's initial foray into early research on biometrics. He and his colleagues – notably John Carter – were early workers on face recognition and later went on to join the pioneers of ear biometrics. Subsequently, he has explored the fusion of biometrics and is now exploring how biometrics can be spoofed – and hopefully, how spoofed biometrics can be countered. He has given many invited and plenary talks on biometrics at conferences and meetings; many of these are available online and are well worth listening to. Along the way, Mark has developed new techniques for static and moving shape extraction, both parametric and non-parametric. As well as applying this to biometrics, these techniques have found application in medical image analysis.

Mark has not been entirely idle outside the narrow constraints of performing academic research. He chaired the 9<sup>th</sup> BMVC, which was held at Southampton in September 1998, and went on to co-chair the IAPR International Conference on Audio-Visual Biometric Person Authentication (AVBPA 2003). In the following year he was Publications Chair for the International Conference on Pattern Recognition (ICPR 2004) at Cambridge. He also co-chaired the 7<sup>th</sup> International Conference on Face and Gesture Recognition, held at Southampton in 2006.

Mark's vision book, *Feature Extraction and Image Processing*, co-written with Alberto Aguado, remains a popular choice for vision courses almost a decade after it first appeared. With Tieniu Tan and Rama Chellappa, he wrote *Human ID based on Gait*, part of the Springer Series on Biometrics. He and his colleagues wrote the survey on gait biometrics in *Biometrics: Personal ID in Networked Society*, and the ear biometrics chapter in *The Handbook of Biometrics*.

Mark has long been one of the BMVA's representatives on the Governing Board of the IAPR: there not only has he

represented the UK's interests but also he has been involved in several of its committees.

It is with great pride and pleasure that we name Mark Nixon the BMVA Distinguished Fellow for 2015.

Adrian Clark (BMVA Chair)

Roy Davies (DF Committee Chair)

## BMVC: Summary and Statistics

It was our great pleasure to welcome all participants of the 26<sup>th</sup> British Machine Vision Conference (BMVC) to Swansea. Swansea University is set in rolling parkland and enjoys a prime position overlooking Swansea Bay, the start of the famously dramatic Gower coastline.

BMVC is one of the top events in the field of Computer Vision and has always maintained a single track format. Because of its increasing popularity and quality it has become established as a prestigious event on the vision calendar. This year BMVC attracted a record number of submissions. A total of 553 valid papers were received, which represents just over a 25% increase from the last BMVC record achieved in 2013. The majority (87%) of the submissions were from overseas, reflecting the international status of the conference.

For BMVC 2015, we have substantially expanded the international reviewer pool to 270, prior to the paper submission deadline. As a result, we were able to reduce the average paper load per reviewer to 6.3. Each paper had at least one area chair and in most cases each was handled by two of our team of 54 area chairs. For the first time we split the borderline rating into borderline accept and borderline reject to help the referees to decide which side they really wished to support. Accepted papers needed strong support from reviewers and area chairs. Papers that required extensive changes, new experiments, further comparisons to existing methods, improved clarity and other changes that would normally require a second review cycle were not accepted. We would like to thank all reviewers and area chairs for their diligent work and prompt responses.

In total, 186 papers were accepted – corresponding to a 33% overall acceptance rate – in line with recent BMVCs. Among those, 41 papers were selected for oral presentation, i.e., around 7% of the submitted papers – amongst the lowest oral acceptance rates of BMVC. The BMVC 2015 programme contained the largest number of technical papers since the inception of BMVC in 1990. Using the first author's affiliation, 15% of the accepted papers were from a UK-based institute, 32% from Europe (excluding UK), 27% from Asia, 22% from North America, 3% from South America, 1% from Australia, and 1% from Africa. This year, BMVC published its proceedings entirely online and, for environmental reasons, without the use of USB drives. Three prizes were selected and awarded at the conference. We also awarded five student bursaries to encourage participation, particularly where financial support was needed.

This year, we also introduced changes to the workshop programme. We moved the student workshop from Friday to Thursday pm, which used to be a free afternoon, so that the conference could be more compact. Meanwhile, we

expanded the workshop programme to allow four parallel sessions. The topics that were proposed by the organisers enriched the conference and further encouraged participation. In total, the four workshops contained 6 keynote speeches and 33 accepted papers.

BMVC 2015 had 331 registered delegates, which was another record in the BMVC series. This year, there were strong interests from industry to support BMVC, with 11 sponsors providing financial and in-kind contributions. We are grateful to Movidius, Qualcomm, Microsoft, nVidia, IET, Ocado technology, Google, and other sponsors for their generous support.

We were honoured to have three distinguished scholars as invited speakers. Dr Andrew Fitzgibbon (Microsoft) delivered the conference tutorial on fitting models to data. Professor Ron Kimmel (Israel Institute of Technology) and Professor Kristen Grauman (University of Texas at Austin) were the two keynote speakers at the main conference. We are grateful to their inspiring contributions.

BMVC 2015 was organised by the Computer Vision and Medical Image Analysis group and members of the Visual Computing group in the Department of Computer Science at Swansea University. We are indebted to a number of people who contributed generously to the organisation of the conference: Jingjing Deng, Sue Phillips, Mike Edwards, Julie Pellard, Robert Palmer, Jonathan Jones, David George, James Jones, Joss Whittle, Dean Thomas, and Neil Jenkinson. We thank BMVA executive committee members for their support and in particular Toby Breckon for his time in sorting out various finance matters so promptly. We also received generous support from the organisers of previous BMVCs at Bristol University and Nottingham University, namely Dima Damen, Majid Mirmehdi, Michel Valstar, Andrew French, Susannah Lydon, and Tony Pridmore.

## Prizes at BMVC 2015

### The ‘Best Science Paper’ Award went to:

*Sketch-a-Net that beats humans*, Qian Yu, Yongxin Yang, Yi-Zhe Song, Tao Xiang and Timothy Hospedales, Queen Mary, University of London

The prize is for £1000 cash + £300 Wiley book voucher.

This prestigious award is to recognise the outstanding scientific quality of the work presented at BMVC. The work must show outstanding scientific rigour, major novelty, and comprehensive comparative analysis. It is awarded based on Area Chair and reviewer recommendations.

### The ‘Best Industry Paper’ Award went to:

*Deep perceptual mapping for thermal to visible face recognition*, M Saquib Sarfraz and Rainer Stiefelhagen, Institute of Anthropomatics and Robotics, Karlsruhe Institute of Technology

The prize is for £500 cash + Nvidia card (Titan X) + €300 Springer book voucher.

This prize is awarded to the work with the most demonstrable impact or potential in industrial applications.

The work needs to contain major novelty and thorough validation.

### The ‘Best Poster’ Award went to:

*Robust global motion compensation in presence of predominant foreground*, Seyed Morteza Safdarnejad, Xiaoming Liu and Lalita Udpa, Michigan State University

The prize is for £300 cash + £200 CRC book voucher.

The selection of this award is based on the scientific quality of the work, poster design, and presentation delivery.

In the photo on p. 8, the person accepting the prize was a colleague of the authors.

### Outstanding reviewers

We would like to thank all reviewers for their contributions. In particular, the following researchers are recognised as “Outstanding Reviewers for BMVC 2015” for their hard work in providing detailed, insightful and high quality reviews for all the papers assigned to them. They were nominated by at least one BMVC Area or Organisation Chair:

- Pablo Alcantarilla, Toshiba Research Europe
- Relja Arandjelovic, Inria
- Michael Edwards, Swansea University
- Michal Havlena, ETH Zurich
- Piotr Koniusz, Inria LEAR
- Yonghuai Liu, Aberystwyth University
- Yasushi Makihara, Osaka University
- Philippos Mordohai, Stevens Institute of Technology
- Adeline Paiement, University of Bristol
- Emanuele Rodola, Technische Universität München
- Enrique Sánchez-Lozano, University of Nottingham
- Xiaomeng Wang, University of Nottingham.

Xianghua Xie, Mark Jones, Gary Tam  
BMVC2015 Chairs  
email: [bmvc2015@swansea.ac.uk](mailto:bmvc2015@swansea.ac.uk)

## BMVC 2015

I’ve just added the stats from BMVC 2015 to the list on the BMVA website at: <http://www.bmva.org/bmvc:stats/>. You’ll see that it is the biggest conference we have ever held!

I’m sure I speak for everyone on the ExCo in offering our congratulations to Jason. BMVC chairman is a big job and he has made it look really easy. Well done, Jason!

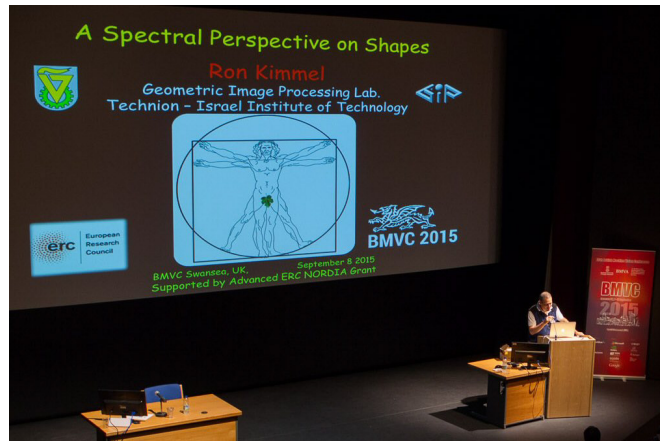
Please pass on our congratulations to your colleagues and to all the student helpers who made it run so smoothly.

Adrian Clark (BMVA Chair)  
email: [chair@bmva.org](mailto:chair@bmva.org)

### Around and About at BMVC



Andrew Fitzgibbon's pre-conference Tutorial by was well populated by staff and students alike: its content was highly impressive, using learning machines to recognise the shapes of killer whales leaping out of the water and performing all possible contortions!



In his keynote lecture, Professor Ron Kimmel gave delegates the benefit of a lifetime exploring shape descriptions. Face 'flattening' using the right spectral metrics was a fascinating illustration.



The Welcome Reception was held at the National Waterfront Museum. Outside, delegate silhouettes mingled with those of the boats and waterfront buildings.



In her keynote, Professor Kristen Grauman dramatically analysed ways in which computers can emulate humans in perceiving the continuity of their motion: she called it 'first-person' vision.



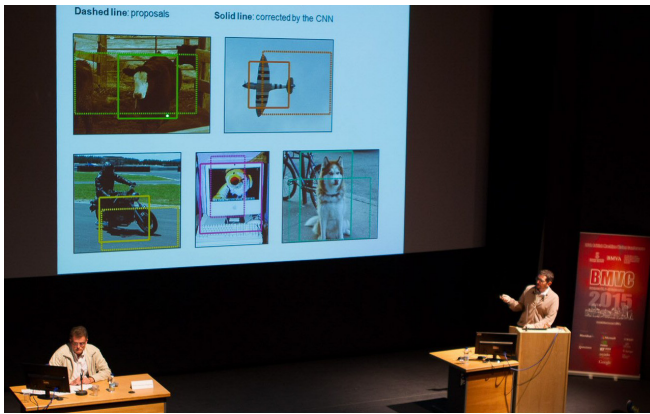
Inside, delegates rapidly got into interesting conversations over a drink or two.



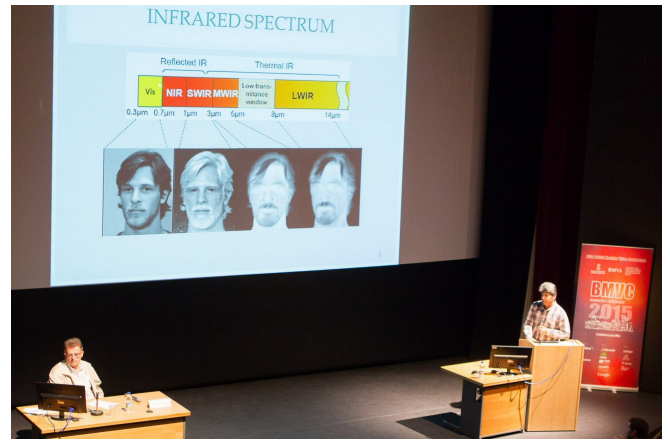
Shaofei Wang gave an interesting lecture on multi-target (mainly pedestrian) tracking.



In Wales information about exhibits normally appears in both Welsh and English – though people seemed to have little time for either!



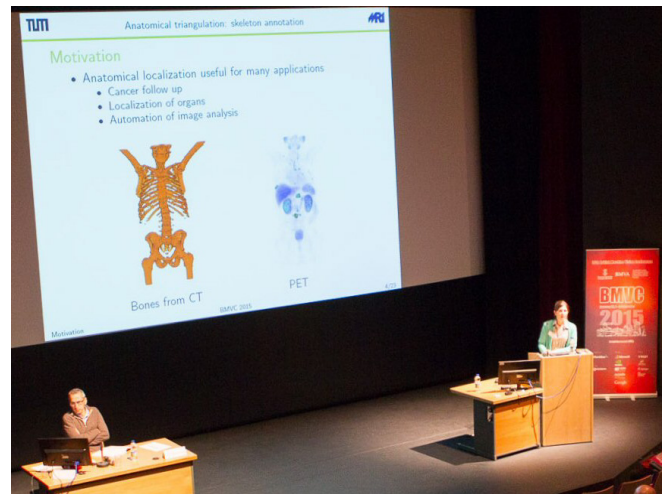
Karel Lenc presenting his paper “R-CNN minus R”, here being used to improve bounding box location.



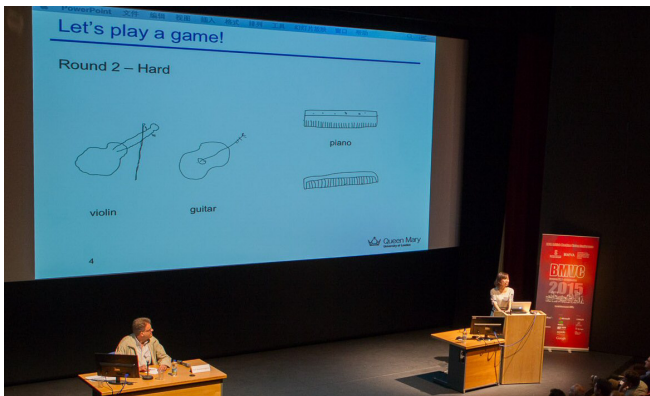
Saqib Sarfraz presents his paper on deep perceptual face mapping, which was awarded ‘Best Industry Paper’ prize.



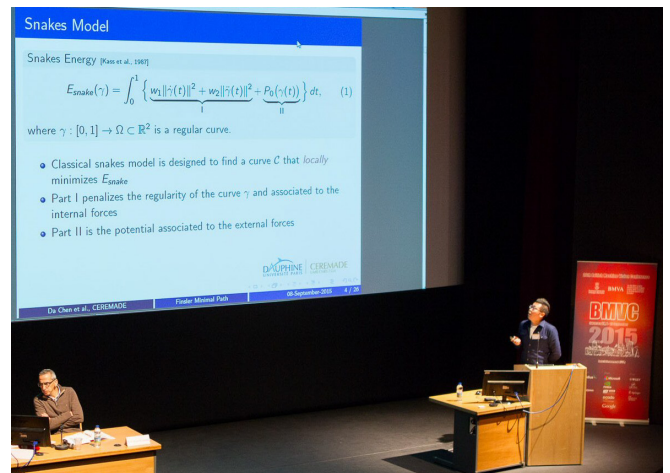
Michal Hradiš presents his paper on text (as well as face) deblurring using CNNs.



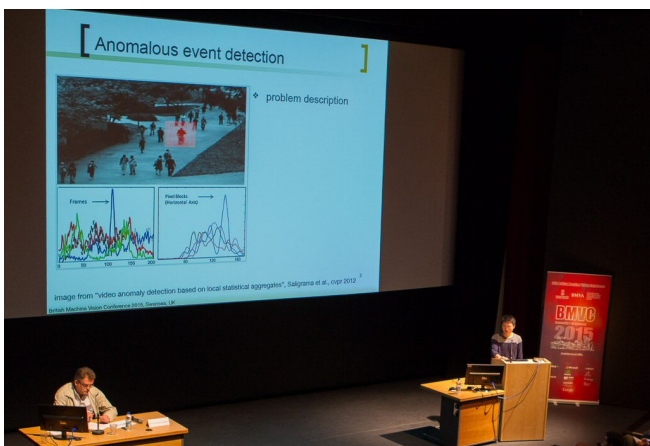
Marie Bieth presenting her paper on anatomical triangulation for dense skeleton annotation.



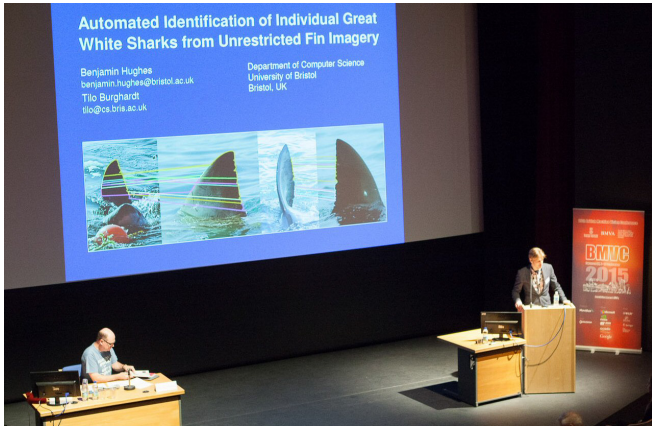
Qian Yu describes her research on ‘Sketch-a-Net’, which earned her the ‘Best Science Paper’ prize.



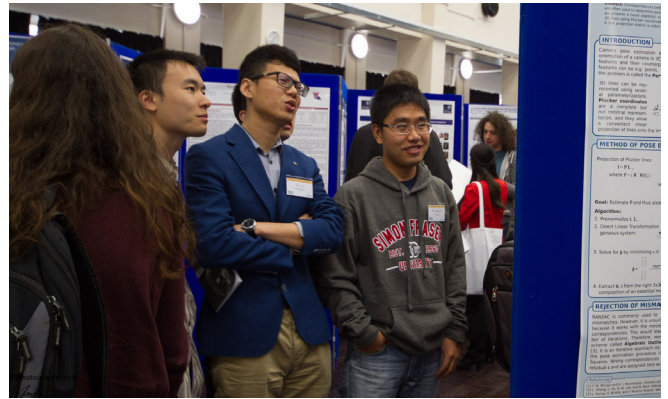
Da Chen presenting his paper on curvature-penalised snake computation.



Dan Xu presenting his paper on learning deep representations for anomalous (abnormal) event detection.



Tilo Burghardt presents his and Benjamin Hughes' fascinating work on identification of great white sharks from the crinkly trailing edges of their fins.



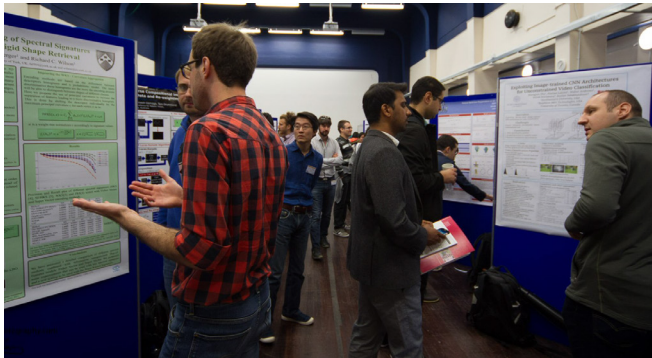
Here there was a strong focus of attention (unfortunately on the other side of the poster board).



Dahua Lin presenting his paper on generation of semantic and lingual descriptions of indoor scenes.



The Banquet was held in the Brangwyn Hall, some of whose murals had oddly been deemed too risqué for the House of Lords – though they formed a highly suitable backdrop for our celebrations.



The posters proved so popular that it only seemed possible to take photographs early in the day.



Around the table from Ron Kimmel (nearest the camera): Adeline Paiement, Tilo Burghardt, Roy Davies, Antonis Argyros, Vittorio Ferrari and Majid Mirmehdi.





Important conference organisers and dignitaries: *left to right*, Jingjing Deng, Gary Tam, Mark Jones, Xianghua Xie, Mark Nixon, Adrian Clark, Bob Fisher and Richard Wilson.



Mark Jones presents Qian Yu with the prize for the 'Best Science Paper'.



The harpist did sterling work setting the scene ...



Saquist Sarfraz receives the prize for the 'Best Industry Paper'.



Mark Jones presents the 'Best Poster' prize to a colleague of the authors (see details on p. 4).



Attention is drawn as the Prize Presentations are about to start.



Rapt attention to the prize awards ...

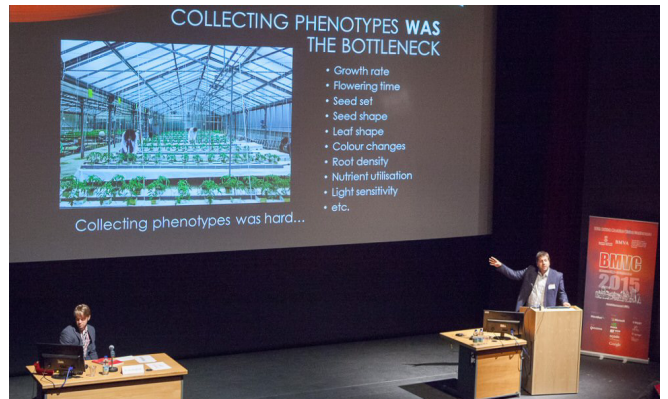




Adrian Clark (BMVA Chair) prepares to sing Mark Nixon's praises before presenting him with the Distinguished Fellow award.



Richard Wilson takes his chance to tell everyone how exciting the next BMVC will be. With the banquet being held in the famous National Railway Museum at York, there should at least be no trouble getting people to submit papers.



An unusual lecture topic which demonstrates the value of holding workshops at conferences such as BMVC.



Mark responding to his award, (i) recounting with much humour stories from his career, and (ii) presenting an entertaining quiz for everyone present. This was the first time this had been attempted at BMVC, and on this showing seems likely not to be the last ...



In his keynote, Bob Fisher waxes lyrical about fish recognition in massive video databases.



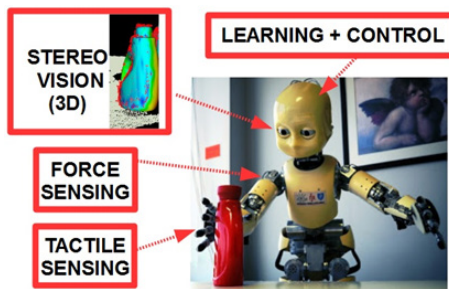
Mark Nixon gives a fascinating keynote on biometrics and how 'spoofing attacks' can be repulsed.



As editor, I would like to accord special thanks to our brilliant BMVA photographer, Jonathan Jones (pictured above), without whom this pictorial record of the conference would have been virtually non-existent.

Professor Roy Davies  
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## BMVA Workshop on Visual, Tactile and Force Sensing for Robot Manipulation



This one-day symposium will take place in London on Wednesday 9 December 2015

Chairs: Lorenzo Jamone and Serena Ivaldi  
Keynote speakers: Kaspar Althoefer, Jeremy Wyatt, and Bruno Siciliano.

[www.bmva.org/meetings](http://www.bmva.org/meetings)

### Programme

- 9.15 Welcome and introduction
- 9.30 *Keynote*: Bruno Siciliano (University of Naples) – Vision for robotic manipulation
- 10.15 Jinguo Tian (University of Manchester) – Simulation of wireframe object representations for a 3D robotic vision system
- 10.30 Coffee break
- 11.00 Serena Ivaldi (INRIA Nancy) – Multimodal object learning with iCub
- 11.15 *Keynote*: Jeremy Wyatt (University of Birmingham) – Steps towards manipulation
- 12.00 Lunch break
- 13.00 *Invited*: Lorenzo Natale and Vadim Tikhanoff (IIT) – Seeing and touching objects: an overview of the iCub tactile and visual capabilities

- 13.35 Zhe Su (University of Southern California) – Slip classification using tangential and torsional skin distortions on a biomimetic tactile sensor
- 13.50 *Invited*: Antonio Morales (Universitat Jaume-I) – Sensor-based robust grasping and manipulation
- 14.25 Lorenzo Jamone (University of Lisbon) – Learning sensorimotor model for robotic manipulation from human demonstration
- 14.40 Coffee break
- 15.10 *Invited*: Yasemin Bekiroglu (KTH) – Learning to assess grasp stability from vision, touch and proprioception
- 15.45 *Keynote*: Kaspar Althoefer (King's College London) – Combining vision and touch for object manipulation
- 16.30 Conclusion and Discussion
- 17.00 Move to pub.

### Registration

Book online at [www.bmva.org/meetings](http://www.bmva.org/meetings):

- £10 for BMVA Members
  - £30 for non-Members
- (These figures include lunch.)

Andrew Gilbert  
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## BMVA Technical Meetings

*We Need your Help!*

We are currently Seeking Volunteers to host meetings in 2016. This is not an onerous task and involves (i) organizing a program of speakers (by call for papers or invitation) (ii) chairing the meeting on the day. All other arrangements (finances, food, registration, room-booking, etc.) will be taken care of by myself. It's a really good way to meet new people and reconnect with others in the field, and looks great on your CV with minimal effort.

Please contact myself, Andrew Gilbert, if you are interested and would like more details about hosting one of the future meetings.

Andrew Gilbert  
Technical Meetings Organizer  
email: [a.gilbert@surrey.ac.uk](mailto:a.gilbert@surrey.ac.uk)

## Review of BMVA Meeting on Context Aware Cognitive Systems

This meeting took place on 17 July 2015 at the British Computer Society, London.

The notion of 'Context' often crops up when discussing human or artificial intelligence: it is consensual across multiple fields (psychology, AI, robotics and computer vision) that it plays an important role in perception, action and reasoning. This workshop was motivated by the realisation that despite agreement over the importance of

context, we still lack a common definition and clear formalism of context across fields of study. Hence, Frank Guerin, Sinan Kalkan and Angelo Cangelosi and I decided to organise this interdisciplinary meeting to discuss and confront our take on context and its role on cognition in psychology, computer vision and robotics.

The day started with a presentation by David Hogg, entitled “Learning to recognise objects in context”. David demonstrated the importance of specialising classifiers to different contexts to improve recognition. In a second part, he also demonstrated how a simple model of social interaction could improve pedestrian tracking in videos. This was followed by a presentation of the PROForma language by John Fox (Oxford). Then Martin Stoelen (Plymouth University) presented his research on the importance of visual context for developmental robotics. The morning session closed with a talk from Kenny Coventry (University of East Anglia), entitled “Language, space and context”, where Kenny offered a psychologist’s perspective on the subtle interactions between language, personal space and perception of distance.

The afternoon session kicked off with a presentation by Florentin Wörgötter from Göttingen University (Germany), entitled “Actions and objects: A grammatical view”, in which he discussed what could be the elementary components allowing a cognitive robot to learn complex actions, such as “making a sandwich”, from demonstration. Specifically, he argued that objects can be decomposed into nameable parts according to convex regions, and that complex actions can apparently be decomposed into chains made of a limited number of simple components. This was followed by a presentation of Hande Celikkanat, from the Middle East Technical University (Turkey), who presented her PhD work on learning context in a humanoid robot, and how it could be used to improve visual detection and action planning. The session closed with a talk by Ben Tatler (Aberdeen University) on “Context and attention”, in which he presented his view on human attention and especially how task and situation context appeared to influence gaze to

a large extent, showing the limitation of classical eye tracking results on visual search scenarios.

The final session of the day was opened by Walterio Mayol-Cuevas (Bristol University), who presented his work on “Contextual wearable vision” and specifically how intelligent tools and wearable systems could be developed using modern computer vision and could infer context to best serve the user. This was followed by a discussion led by Frank Guerin (Aberdeen University) on the outstanding questions and issues involved in using context in robotic systems. The day ended with a presentation from the US Air Force research team on funding opportunities, before we all moved to an Italian restaurant to continue scientific discussions over dinner and wine.

The workshop was sponsored by the BMVA and the EU-projects Poeticon++ and Robot-ERA.

Andrew Gilbert  
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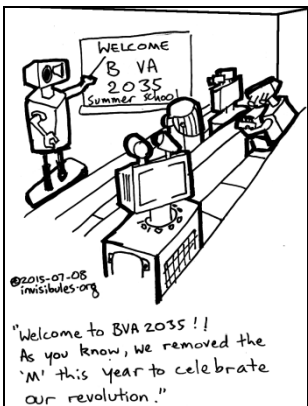
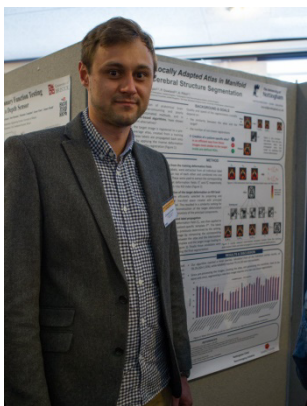
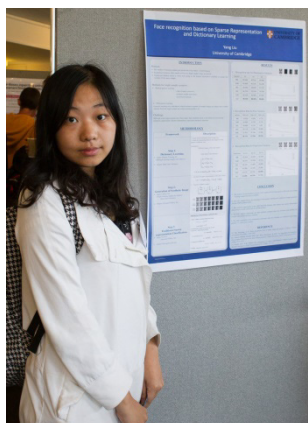
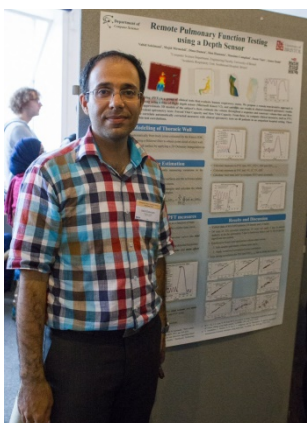
## Report on BMVA Computer Vision Summer School 2015

The BMVA Computer Vision Summer School is probably the longest-running annual event in the field. Its 20<sup>th</sup> edition was held this year at Swansea University on 6–10 July. Since last year the summer school has moved from relying on EPSRC sponsorship to becoming a self-sustained event. The summer school still offers substantial discount to students and early career researchers from UK institutions, e.g., the UK non-residential early rate of £250 versus £490 for non-UK. A total of 65 delegates from 13 different countries, with 21 attendees from outside UK, attended this year’s summer school. The group photo below was taken in front of the Digital Technium – where the lab sessions took place – on the last morning, when we were blessed with beautiful sunshine.



Group photo: BMVA Summer School attendees

The attendees had a busy week of lectures on a range of current topics in computer vision. A total of 17 speakers from academia and industry delivered 18 ninety-minute lectures and two lab sessions. The poster session also proved to be popular. The Best Poster prize went to V. Soleimani of Bristol University for “Remote pulmonary function testing using a depth sensor”. The recipient was awarded £100 and Professor Roy Davies’s book *Computer and Machine Vision: Theory, Algorithms, Practicalities*. Two runner-up prizes (£50 each) were awarded to L. Zhao of Queen Mary University for “Pop-up modelling of hazy scenes” and to C. Arthofer of Nottingham University for “Building a locally adapted atlas in manifold space for cerebral structure segmentation”. The attendees also enjoyed the summer school banquet at the Meridian Tower (the tallest building in Wales), overlooking the majestic Swansea Bay.



Poster prizewinners: (top) V Soleimani, L Zhao, and (lower left) C Arthofer. The lower right cartoon was contributed by Andrew Kay (<http://invisibles.org>).<sup>2</sup>

On behalf of the organisers, I would like to thank the speakers, attendees, and volunteers. Please keep an eye open for announcements of the 21<sup>st</sup> edition in 2016.

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<sup>2</sup>It is a pleasure to acknowledge Andrew Kay’s delightful and highly appropriate cartoon. I would also like to encourage other readers and authors to provide similar illustrations in this vein – Ed.

## ICRA 2015 Review

ICRA is the IEEE Robotics and Automation Society’s flagship conference and is a premier international forum for robotics researchers to present their work. This year’s ICRA was held on 26–30 May 2015 at the Washington State Convention Center in Seattle, Washington, USA. In this year’s ICRA, more than 2700 people registered, which was a record in ICRA’s history.

### Robotic Challenges

One of the most interesting robotics challenges of this year was the Amazon picking challenge: 25 teams from different universities and institutions all over the world went to the final game and had a real-life competition in ICRA. The team from TU Berlin won the first prize. On communicating with the team players, I found that robustness of robot application still leaves a lot of room for improvement because most of the robots work well in their home labs but cannot adapt properly to the environment in the competition.

### Keynote talks

Many famous professors were invited to give keynote talks at the meeting: the talks by Professor Daniela Rus (MIT), Professor Danica Kragic (KTH) and Professor Carme Torras (IRI) were particularly impressive. Professor Rus presented work to design new robots using 3D printing techniques: their robots are able to self-assemble by heating and self-decompose by sinking in water. Professor Kragic presented approaches for visually-guided robot caging and grasping. They proposed a system for integrated grasp synthesis and grasp adaptation based on impedance control and finger gating. Professor Torras presented their work on reinforcement learning for deformable object manipulation, which was very relevant for my work: we had a valuable conversation after her talk.

### Technical Sessions



My presentation was on 27 May, and afterwards I had a lot of questions during the interactive session. I met many guys working on deformable object manipulation and similar topics and discussed the difficulties of our research. Two pieces of work were very interesting and relevant to my research: these were “Re-grasping and unfolding of garments using predictive thin shell modelling” reported by Li Yinxiao et al.; and “Collaborative human-robot manipulation of highly deformable materials” reported by Kruse Daniel. In fact, plenty of other novel works on

robotics were presented in the techniques session. Here is a selective list:

- Learning to assess terrain from human demonstration using an introspective GP classifier
- GP-GPIS-OPT: Grasp planning with shape uncertainty using Gaussian process implicit surface and sequential convex programming
- Unsupervised grasping pose estimation for grasping
- Spike time based unsupervised learning of receptive fields for event-driven vision
- A friction-model-based framework for reinforcement learning of robotic tasks in non-rigid environments
- Efficient RGB-D object categorization using cascaded ensembles of randomized decision trees
- Real-Time grasping detection using convolutional neural networks
- RGBD object recognition and pose estimation based on pre-trained convolutional neural network features
- Efficient monocular pose estimation for complex 3D models
- 3D object pose detection using foreground/background segmentation
- Object classification using dictionary learning and RGBD covariance descriptors
- Optimism-driven exploration for nonlinear systems.

#### Activities

ICRA also provided a lot of social opportunities. For example, two great banquets were held in the Seattle Art and Flight Museums. Pictures taken at these two events are presented below.



Finally, I would like to thank BMVA for providing me with a generous travel award to attend this conference.

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## Pictures to be Included in BMVA News

Reports of conferences and other articles in BMVA News look much better and attract more readers if they have pictures accompanying them. The adage that a picture is worth 1000 words is only half the story as motivation to read an article depends critically on its attractiveness. Pictures can be supplied in a variety of formats though jpg and tiff are preferable. More importantly, the resolution should be sufficiently high to match the good quality paper we now use for printing the newsletter. A common rule is 300 dpi (dots per inch), which translates to ~120 pixels per cm. Likewise, pictures that are compressed to less than 100 kB are often satisfactory, with 400 kB generally providing a good balance between distortion and the degree of overkill (!) nowadays achievable with quite inexpensive cameras.

Professor Roy Davies  
Editor, BMVA News  
email: e.r.davies@rhul.ac.uk

## BMVC 2016



The 27<sup>th</sup> British Machine Vision Conference will be held at the University of York (Heslington West Campus) on 19–22 September 2016. For more information, please visit the conference website: <http://bmvc2016.cs.york.ac.uk/>.

Professor Richard Wilson  
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### A Few More Memorable Moments from BMVC



Quiz: Name the 'known unknowns' in these pictures (who already appeared on pp. 5–9). *More difficult:* Name the five 'unknown unknowns' including those whose name labels are indecipherable.