

## PEOPLE - FACULTY



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Dr. Ali Dawood



Dr. Hassan Al-Muhairi



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## PEOPLE - VISITING

- ▶ Prof. David R Bull
- ▶ Dr. Paul Hill

## RESEARCHERS / STUDENTS

- ▶ Mr. Essa Basaeed
- ▶ Dr. Husameldin Mukhtar
- ▶ Mr. Khalfan Al-Marashada
- ▶ Ms. Sohailah Makhmasi
- ▶ Ms. Yasmeen Saleh
- ▶ Mr. Mohammed Sami Zitouni
- ▶ Mr. Claudio Tortorici
- ▶ Mr. Alaa El Khatib
- ▶ Ms. Nour Aburaed
- ▶ Mr. Buti Al Delail

## VSAP - FUTURE PROJECTS

- ▶ Gesture recognition and articulated object tracking
- ▶ Biometrics and interaction with robotic devices
- ▶ 3D feature-based search and retrieval
- ▶ Efficient algorithms and architectures for feature-based image processing
- ▶ Collaborative visual environments
- ▶ Perceptual image enhancement
- ▶ Low light and low contrast imaging
- ▶ Airborne video processing
- ▶ Underwater visual processing and communications
- ▶ Vision based robotic control
- ▶ Visual inspection of advanced manufacturing processes
- ▶ Medical image enhancement and classification

### Find Us

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**KHALIFA**  
UNIVERSITY

RESEARCH@VSAP



### VSAP RESEARCH CENTER

VSAP is a joint research initiative between Khalifa University of Science, Technology and Research (KUSTAR), U.A.E. and the University of Bristol, U.K.

## RESEARCH THEMES



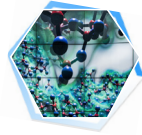
### SURVEILLANCE AND MACHINE VISION

- » Scene Understanding
- » Detection and Tracking
- » Vision for UAV/JGV
- » Crowd Analysis



### VIDEO COMMUNICATIONS & IMAGE SECURITY

- » Secure Video Communication
- » Joint encryption and compression
- » Efficient video coding
- » Digital Watermarking



### BIOMETRICS AND BIO-IMAGING

- » 2D/3D Face Recognition
- » Facial expression analysis
- » Micro/Macro scale enhancement
- » Segmentation and Evaluation



### SURVEILLANCE AND MACHINE VISION



#### FACILITIES

- » Indoor surveillance environment consisting of 6 cisco cameras with a 4TB Rack Server.
- » Dark room environment for lighting controlled data collection and experimentation
- » Cameras: Canon 1D, Lytro Illum, FLIR Thermal camera, USB FLEA, Kinect, among others.



#### EXPERTISE

- » Low-level image enhancement
- » Contrast enhancement
- » Perceptual image processing
- » Target detection, tracking, re-identification and motion analysis
- » Multi-camera modeling, calibration, tracking.
- » Moving camera target detection and tracking
- » Visual search and classification

#### Current Projects

- » Illumination invariant gesture recognition
- » Sensor fusion-based big data analytics for healthcare surveillance system
- » Crowd behavior and emotion analysis for situation awareness
- » Target detection in remote sensing using image fusion
- » Efficient image and video denoising

#### Completed Projects

- » Intelligent multi-sensor surveillance system for elderly care
- » Efficient algorithms and architectures for feature point detection
- » Target detection, tracking and Identification using multiple cameras (static/moving)
- » Autonomous human target identification and tracking using multiple cameras in crowded environments
- » Low light image enhancement – fog/haze removal



### VIDEO COMMUNICATION AND IMAGE SECURITY



#### FACILITIES

- » VSAP hosts HPC facilities through its IBM Server (IBM System x3650 M3).
- » Samsung SUR40 with Microsoft® PixelSense™.
- » VSAP strongly partners with University of Bristol and Khalifa University Robotics Institute (KURI) for data acquisition, field-testing and operations.
- » VSAP works together with the Information Security group at KU on some projects.



#### EXPERTISE

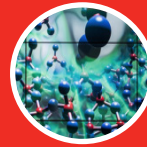
- » Scalable video coding, Transcoding.
- » Link adaptation.
- » Wireless video communication efficiency, complexity and resilience
- » Digital watermarking.

#### Current Projects

- » Video security assurance framework based on an efficient joint encryption compression approach
- » Digital watermarking for medical images

#### Completed Projects

- » Digital image watermarking for satellite images
- » Link adaptation for wireless video communication systems



### BIOMETRICS AND BIO-IMAGING



#### FACILITIES

- » Dedicated Biometrics lab space within the VSAP center.
- » 3D Face scanners, Bumblebee Stereo camera, Multispectral Fingerprint scanner, Fujitsu PalmSecure Palm Vein Scanner and Gazepoint EyeTracker.
- » VSAP strongly partners with University of Bristol and Biomedical Engineering Department at KU for field testing and operations.
- » VSAP also has strong links with key medical institutions and clinics that provide necessary support and data on several projects.



#### EXPERTISE

- » 2D/3D Face analysis
- » Face Expression Analysis
- » Macro-scale / Micro-scale object motion capture, detection, tracking and analysis
- » Segmentation and detection
- » 2D, 3D modeling and reconstruction
- » Visualization and assessment of medical digital images

#### Current Projects

- » Capsule localization using multiple images in capsule endoscopy
- » People identification from partially hidden 3D facial images
- » Computer-aided diagnosis system for early and automated detection of infantile dysmorphic syndrome in the UAE
- » Detecting Down Syndrome in infants using 2D and 3D facial images
- » Volumetric detection and tracking of cell particles

#### Completed Projects

- » A Grading System for Assessing Posterior Capsule Opacification using Medical Images
- » Detection and segmentation of sputum cell for early lung cancer detection
- » Encoding and alignment of 3D facial images
- » Computer-aided diagnosis system for early detection of cervix cancer from pap smear images