



University of  
**Strathclyde**  
Engineering

# Centre of Excellence in Signal and Image Processing

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# 1. INTRODUCTION

Lead Staff:

- Professor Tariq S Durrani (Head) –Chair of Signal Processing
- Professor John Soraghan –Texas Instruments Chair
- Professor Stephen Marshall –Chair of Image Processing
- Professor Robert Stewart –Xilinx Chair of DSP Systems

Plus 35 researchers.

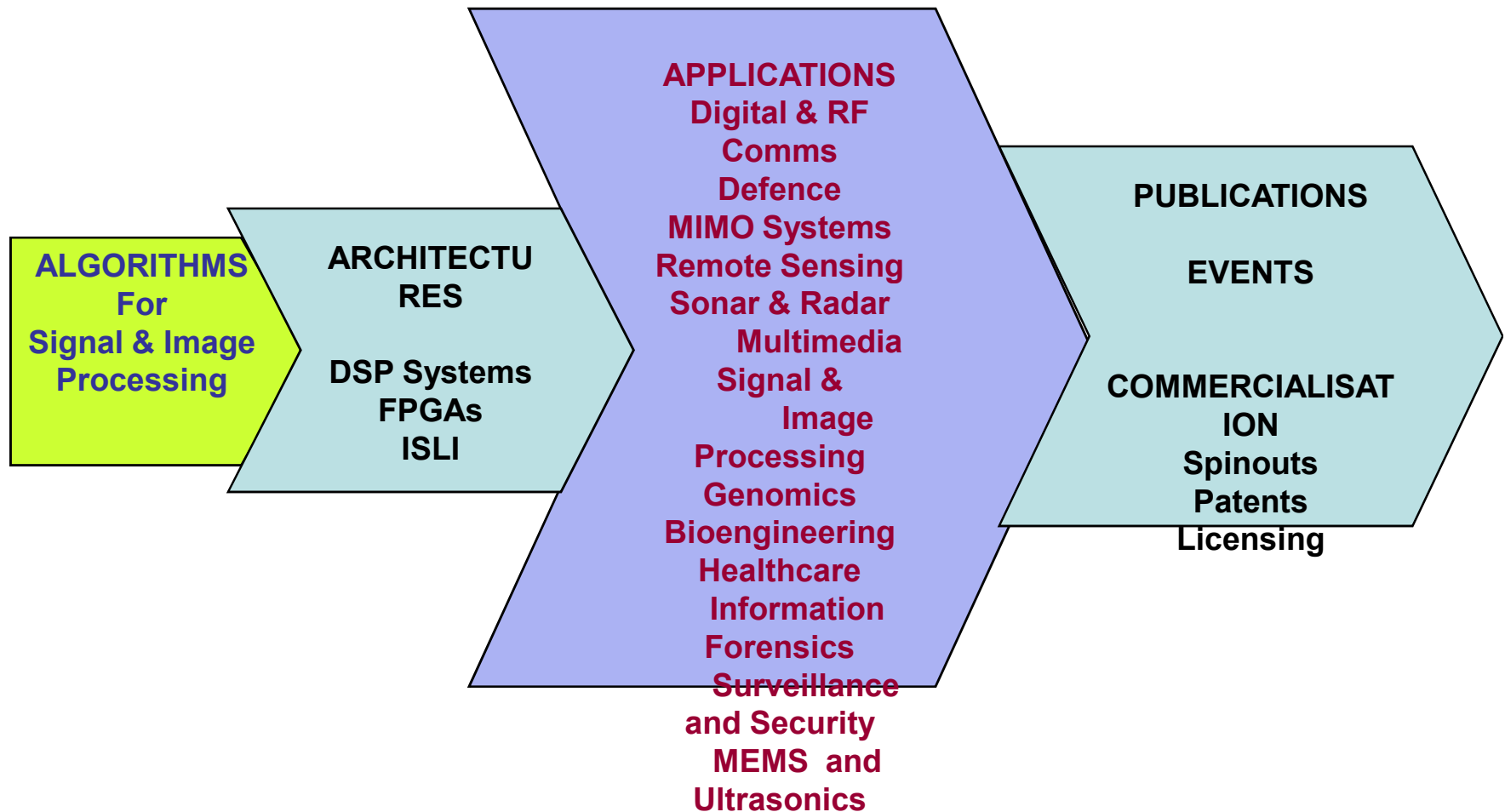
## 2. OBJECTIVES

- Conduct fundamental, strategic and applied research of the highest quality to meet needs and opportunities in industry
- Foster inter-disciplinary research collaboration supported by innovation and excellence.
- Ensure leading position in the world for research on Signal and Image Processing.

## 3. PRIORITY THEMES

- Novel Algorithms for Signal and Image Processing
- DSP Technologies
- Signal Processing Applications in RF Communications, Defence and Remote Sensing
- Information Forensics, Surveillance and Security
- Multimedia Systems and Image Processing
- Biomedical and Genomic Signal Processing

# Signal & Image Processing Value Chain



## 4. TRACK RECORD

- 35 PhDs since last RAE in Signal/Image Processing
- ~ 40 journal/conference papers per year.
- ICC-2007 –IEEE Flagship conference
- Texas instruments Chair in Signal Processing – only one in Europe
- Xilinx Chair in DSP Systems – only in the world.
- SRIFII and Faculty Funding for Multimedia Signal Processing Research Labs
- Funding support from EPSRC, Qinetiq, EU, Scottish Enterprise, NHS, Texas Instruments, Proof of Concept and otherS.
- Spinout Companies

# 5. RESEARCH DIRECTIONS-

## Fundamentals & Technologies

- ***Novel Algorithms for Signal and Image Processing***

Non-linear Non-Stationary Signal Processing

Copulas

Adaptive Arrays-natural gradient techniques

Multirate Systems

Empirical Mode Decomposition

Compressed Sensing

- ***DSP Technologies***

IP cores for Programmable devices

FPGA + DSP developments

Filter bank based transceiver systems

Novel architectures for Signal/Image Processing.



## 5. RESEARCH DIRECTIONS (APPLs i)

- ***Signal Processing Applications in Communications and Defence and Remote Sensing***

MIMO Systems & Test bed MIMO Radar Systems  
Adaptive receivers for space-time coding and CDMA  
Broadband beamforming in acoustics, sonar and radar.  
Biologically Inspired Signal/Image Processing  
Multispectral SAR target detection  
Digital & RF Communication Systems  
Condition Monitoring Methods for the Utilities  
**Strathclyde Centre for Defence Signal Processing**

- ***Information Forensics and Security***

Data Integrity  
Information & sensor reliability  
Digital water-marking  
Integrity of transmission and storage  
Secure audio & video services  
Secure encryption.

## 5. RESEARCH DIRECTIONS (APPLs ii)

- ***Multimedia Systems & Image Processing***

  - Video Analytics and Data Fusion

  - Distributed Video Coding

  - 3D TV and Digital Holographic Methods

  - Multi-channel Audio Systems

  - Compression, noise reduction, encryption & distribution.

  - Multispectral imaging sensors data processing

  - Integrated image processing for NDT – with CUE

- ***Biomedical and Genomic Signal Processing***

  - Wearable/portable devices

  - Signal Processing for Speech, Sleep Apnoea, Tinnitus & Auscultation

  - Facial Paralysis Score systems

  - National Human Genome- Boolean models

  - Echocardiographical Data Sequence Analysis

## 6. SIGNAL PROCESSING - Events

- Comms KTN –DSP Scotland Roadmapping event 3 June 08
- IEEE EDERS-2008 with Texas Inst- Tel Aviv 18 June 08
- Sandpit event on Stochastic Systems & Time Series 2-3 Dec 08
- International Workshop on Security – with EPSRC, NSF
- IEEE Statistical Signal Processing Workshop – 5-7 June 09
- EUSIPCO'09 Glasgow - 24-28 August 09
- Triple Helix VII International Conf – 17-19 June 09
- IEEE GlobeCom 2009

## 7. COMMERCIALISATION

### Patents

- Over 10 SP Patents in last 10 years

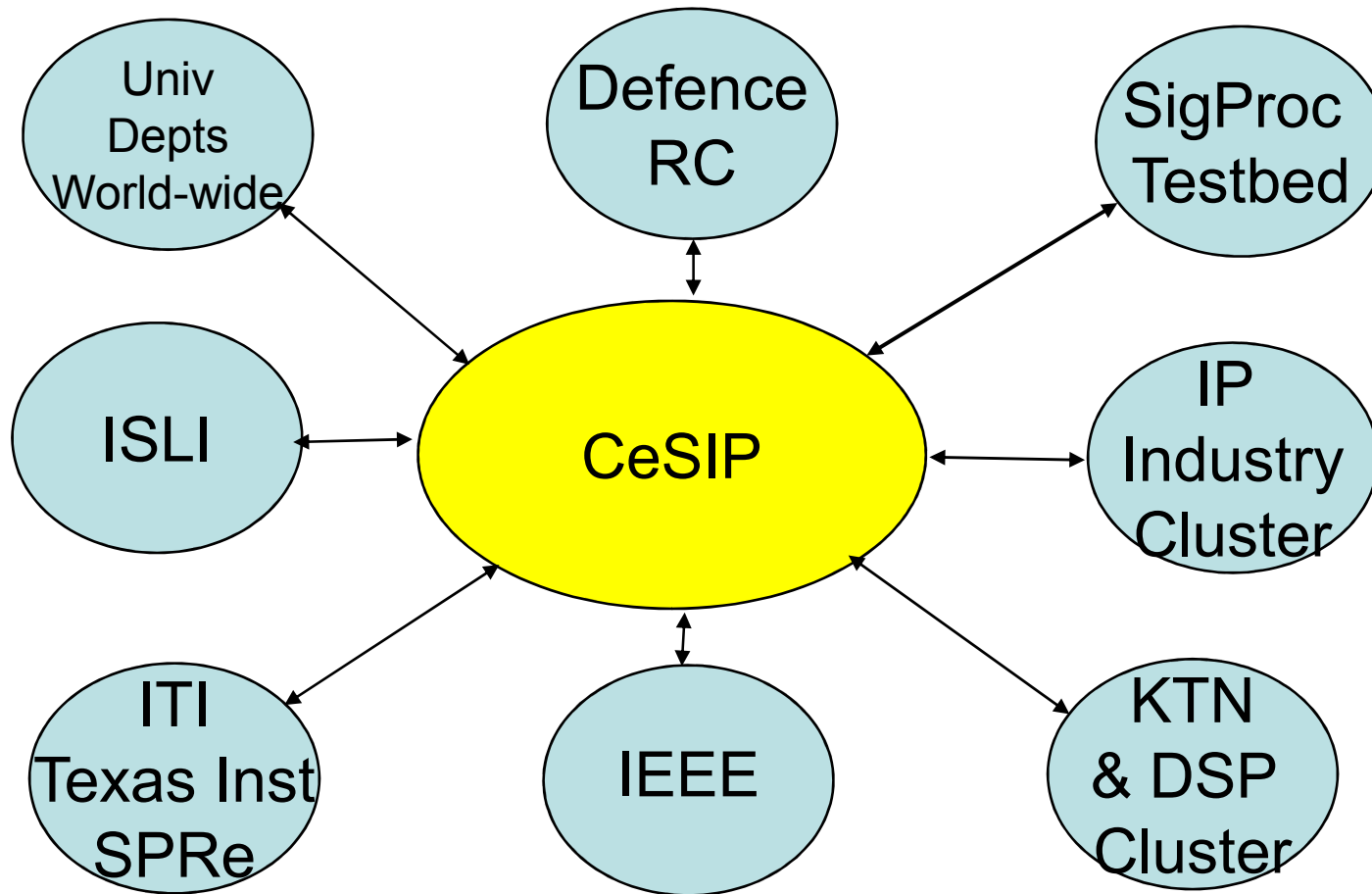
### Spin-Outs

- PSI Electronics Ltd
- Appleshare Ltd
- Ateeda Ltd
- Vibtech Ltd
- Steepest Ascent Ltd.

### Licensing

- Shaw Water
- BVOS, USA
- Facial processing software for Biomed Applications

# CONNECTIONS





THANK YOU

Q & A.