

# MARK R. P. THOMAS

**Work Address** Communications & Signal Processing Research Group  
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## Current Position

**Research Associate in Acoustic Signal Processing** 02/2010 – present  
EEE Dept., Imperial College London.  
European Commission Future and Emerging Technologies (FET) FP7 project:  
Self-Configuring ENvironment-aware Intelligent aCoustic sensing (SCENIC).

## Education

**MEng in Electrical and Electronic Engineering** 09/2002 – 09/2006  
(1<sup>st</sup> Class Hons.) EEE Dept., Imperial College London.  
Significant courses: Digital Signal Processing, Speech Processing, Communica-  
tions, Digital System Design.  
Significant coursework: iECG Portable 12-channel ECG device.  
Thesis (supervised by Dr. Patrick A. Naylor): “A Novel Loudspeaker Equalizer”.

**PhD in Speech Processing** 10/2006 – 03/2010  
EEE Dept., Imperial College London.  
Thesis (supervised by Dr. Patrick A. Naylor): “Glottal-Synchronous Speech Pro-  
cessing”.

## Research Interests

Signal processing for speech, audio and acoustics. In particular:

**Multichannel blind system identification and equalization:** closed-form and adap-  
tive noise-robust channel-based acoustic signal processing.

**Multichannel Signal Processing:** Microphone array processing with linear, pla-  
nar and spherical microphone arrays. The localization of reflecting surfaces  
within an acoustic environment using uncontrolled sources.

**Glottal-Synchronous Speech Processing:** detection of glottal closing and open-  
ing instants from speech and EGG signals, data-driven models of speech and  
applications of glottal-synchronous methods to speech processing.

## Work Experience

**Teaching Assistant** 04/2007 – present  
Real-Time DSP. MSc and MEng (part IV).  
Digital Signal Processing. BEng/MEng (part III).  
Digital Electronics. BEng/MEng (part I).

**Pre-University & Vacation Trainee** 09/2001 – 09/2006  
BBC Research and Development Department.  
Collaborated with the WorldDAB Forum to develop coding standards for DAB

data channels. Designed multichannel audio hardware for BBC / Direct Digital Plasma Ltd. HDTV displays.

#### Other Experience

Events and Technical Officer, Imperial College Choir. 09/2003 – 08/2006

#### Awards and Honors

IDEA League Grant for Research Collaboration. 11/2008  
Royal Academy of Engineering International Travel Grant. 07/2009  
UK Engineering and Physical Sciences Research Council (EPSRC)  
Doctoral Training Award. 10/2006 – 04/2010  
Schlumberger MEng Group Project Prize. 06/2005  
BBC R&D University Sponsorship. 09/2002 – 06/2006  
Innovation Award, Surrey SATRO Festival of Engineering & Science. 07/1999

#### Invited Talks

Annual Research Colloquium, RWTH Aachen. 07/2009  
Microsoft Research. 08/2011

#### Skills

*Spoken Languages:* English (native), French (advanced), German (beginner), Slovak (beginner), Hungarian (beginner).  
*Programming:* HTML, PHP/MySQL, L<sup>A</sup>T<sub>E</sub>X, MATLAB, C/C++, Java, Pascal, Assembler, Unix shells.  
*Music:* Grade 7 Pianoforte (Hons.) 07/1999

#### Professional Memberships

Associate Member, Institution of Engineering & Technology. Joined 09/2006  
Member, Institute of Electrical & Electronics Engineers. Joined 09/2006

#### Professional Activities

**Peer Reviewing:** IEEE Transactions on Audio, Speech and Language Processing

#### Journal Publications

F. Antonacci, J. Filos, M. R. P. Thomas, E. A. P. Habets, A. Sarti, P. A. Naylor and S. Tubaro, "Inference of Room Geometry from Acoustic Impulse Responses," submitted to *IEEE Trans. Audio, Speech, Lang. Process.*

T. Drugman, M. R. P. Thomas, J. Gudnason, T. Dutoit and P. A. Naylor, "Detection of Glottal Closing instants from Voiced Speech: A Quantitative Review," to appear in *IEEE Trans. Audio, Speech, Lang. Process.*, 2011

M. R. P. Thomas, J. Gudnason, D. P. W. Ellis and P. A. Naylor, "Data-Driven Voice Source Waveform Modelling," to appear in *Speech Communication*, 2011

M. R. P. Thomas, J. Gudnason and P. A. Naylor, "Estimation of Glottal Closing and Opening Instants in Voiced Speech using the YAGA Algorithm," to appear in *IEEE Trans. Audio, Speech, Lang. Process.*, 2011

M. R. P. Thomas and P. A. Naylor. "The SIGMA Algorithm: A Glottal Activity Detector for Electroglottographic Signals," *IEEE Trans. Audio, Speech, Lang. Process.* vol. 17, no. 8 pp. 1557–1566, Nov. 2009.

### Conference Publications

A. Sarti, W. Kellermann, R. Rabenstein, P. A. Naylor, M. Omologo, P. Svaizer, F. Antonacci, P. Annibale, P. Bestagini, A. Canclini, D. Markovic, K. Kowalczyk, M. R. P. Thomas and A. Brutti, "The SCENIC Project: Space-Time Audio Processing for Environment-Aware Acoustic Sensing and Rendering," to appear in *Proc. AES 131st Convention*, New York, Oct. 2011.

M. R. P. Thomas, N. D. Gaubitch and P. A. Naylor, "Application of Channel Shortening to Acoustic Channel Equalization in the Presence of Noise and Estimation Error," to appear in *Proc. Workshop on App. of Signal Processing to Audio and Acoust. (WASPAA)*, New Paltz, New York, Oct. 2011.

A. Canclini, F. Antonacci, M. R. P. Thomas, J. Filos, A. Sarti, P. A. Naylor and S. Tubaro, "Exact Localization of Acoustic Reflectors from Quadratic Constraints," to appear in *Proc. Workshop on App. of Signal Processing to Audio and Acoust. (WASPAA)*, New Paltz, New York, Oct. 2011.

J. Filos, A. Canclini, M. R. P. Thomas, F. Antonacci, A. Sarti and P. A. Naylor, "Robust Inference of Room Geometry from Acoustic Impulse Responses," to appear in *Proc. European Signal Processing Conf. (EUSIPCO)*, Barcelona, Spain, August 2011.

D. P. Jarrett, E. A. P. Habets, M. R. P. Thomas N. D. Gaubitch and P. A. Naylor, "Dereverberation Performance of Rigid and Open Spherical Microphone Arrays: Theory & Simulation," to appear in *Proc. Workshop on Hands-Free Speech Communication and Microphone Arrays (HSCMA)*, Edinburgh, Scotland, May 2011.

D. P. Jarrett, E. A. P. Habets, M. R. P. Thomas and P. A. Naylor, "Simulating Room Impulse Responses for Spherical Microphone Arrays," to appear in *Proc. International Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Prague, Czech Republic, May 2011.

M. R. P. Thomas, N. D. Gaubitch, E. A. P. Habets and P. A. Naylor, "Supervised Identification and Removal of Common Filter Components in Adaptive Blind SIMO System Identification," in *Proc. International Workshop Acoust. Echo and Noise Control (IWAENC)*, Tel-Aviv, Israel, August 2010.

M. R. P. Thomas, B. Geiser, J. Gudnason, P. A. Naylor and P. Vary, "Voice Source Estimation for Artificial Bandwidth Extension of Telephone Speech," in *Proc. International Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Dallas, USA, March 2010.

J. Gudnason, M. R. P. Thomas, P. A. Naylor and D. P. W. Ellis, "Voice Source Waveform Analysis and Synthesis using Principal Component Analysis and Gaussian Mixture Modelling," in *Proc. Interspeech Conf.*, Brighton, UK, Sept. 2009.

M. R. P. Thomas, J. Gudnason and P. A. Naylor, "Detection of Glottal Closing and Opening Instants using an Improved DYPSA Framework," in *Proc. European Signal Processing Conf. (EUSIPCO)*, Glasgow, Scotland, August 2009.

M. R. P. Thomas, J. Gudnason and P. A. Naylor, "Data-Driven Voice Source Waveform Modelling," in *Proc. International Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Taipei, Taiwan, April 2009.

M. R. P. Thomas, J. Gudnason and P. A. Naylor, "Application of the DYPSA Algorithm to Segmented Time Scale Modification of Speech," in *Proc. European Signal Processing Conf. (EUSIPCO)*, Lausanne, Switzerland, Aug. 2008.

M. R. P. Thomas and P. A. Naylor, "The SIGMA Algorithm for Estimation of Reference-Quality Glottal Closure Instants from Electroglottograph Signals," in *Proc. European Signal Processing Conf. (EUSIPCO)*, Lausanne, Switzerland, Aug. 2008.

M. R. P. Thomas, N. D. Gaubitch, Jon Gudnason and P. A. Naylor, "A Practical Multichannel Dereverberation Algorithm using Multichannel DYPSA and Spatiotemporal Averaging," in *Proc. Workshop on App. of Signal Processing to Audio and Acoust. (WASPAA)*, New Paltz, New York, Oct. 2007.

N. D. Gaubitch, M. R. P. Thomas and P. A. Naylor, "Subband Method for Multichannel Least Squares Equalization of Room Transfer Functions," in *Proc. Workshop on App. of Signal Processing to Audio and Acoust. (WASPAA)*, New Paltz, New York, Oct. 2007.

M. R. P. Thomas, N. D. Gaubitch and P. A. Naylor, "Multichannel DYPSA for Identification of Glottal Closure in Reverberant Speech," in *Proc. European Signal Processing Conf. (EUSIPCO)*, Poznan, Poland, Sept. 2007.

#### **Contributions to Books**

N. D. Gaubitch, M. R. P. Thomas and P. A. Naylor, "Dereverberation using LPC-Based Approaches," in *Speech Dereverberation*, P. A. Naylor and N. D. Gaubitch, (eds.), Springer 2010, ch.4, pp. 99–132.

#### **Internal Publications**

M. R. P. Thomas and C. Poole, "Alternative Hardware for ASIMux Video Playout Software," *BBC R&D Technical Note* no. 2267, Oct. 2003.

M. R. P. Thomas, "Project SPuD: Sound Processor and Delay for Plasma Display Panels," *BBC R&D Design Manual* AAA-1824-0130, Sept. 2002.

M. R. P. Thomas, A. Wiewiorka and T. Ferne, "A Tokenising Compression Algorithm," *BBC R&D Technical Note* no. 1830, Apr. 2002.

**Other Interests** Playing piano in university band, singing in local church choir, automotive maintenance/performance tuning esp. electronic fuel injection, precision engineering.