

**12th EUROPEAN SYMPOSIUM ON ULTRASOUND CONTRAST IMAGING
25-26 JANUARY 2007, Rotterdam, The Netherlands**

WEDNESDAY, 24 January 2007

18.00 - 20.00 Registration - Welcome Drinks - Posters Hilton Hotel

THURSDAY, 25 January 2007

08.00 - 09.00 Registration

09:00 - 09:15 Opening and in memoriam Martin Blomley *Folkert ten Cate-David Cosgrove*

09.15 - 10.30 **QUANTITATIVE CONTRAST APPLICATIONS**..... *Chairpersons: Otto Kamp-Liza Villanueva*

Mark Monaghan	Real Time 3D Myocardial Perfusion-Is it Feasible?	1
Rolf Vogel	The Measurement of Myocardial Blood Flow by MCE	3
Roxy Senior	Quantitative assessment of myocardial perfusion by MCE	5
Osama Soliman	Assessment of Intra- and Extra-vascular Mechanisms of Myocardial Perfusion Abnormalities in Hypertrophic Cardiomyopathy by Myocardial Contrast Echocardiography	6

10.30 - 11.00 Intermission

11.00 - 12.30 **TECHNOLOGY I** *Chairpersons: Michel Versluis-Ayache Bouakaz*

Peter Burns	Technology for Bubble Imaging: Current State of the Art	8
Paul Dayton	High-contrast high-speed imaging using a copper vapor laser to resolve contrast agents in tissue	10
Rob Eckersley	Microbubble contrast agent detection using pulse encoded sequences	11
Benjamin Dollet	Microbubble spectroscopy of UCA: Influence of the shell and of a confining wall	13
Rune Hansen	Improving contrast agent detection with SURF imaging	15

12.30 – 14.00 **LUNCH**

14.00 - 14.30 **ICIN*-Lecture** *Chairperson: Ton van der Steen*

Alexander Klibanov	Ultrasound molecular imaging in fast-flow conditions in murine models: targeted microbubbles carrying polymeric sialyl Lewis ^x	18
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14.30 – 15.45 **ANGIOGENESIS** *Chairpersons: Peter Burns-Mark Monaghan*

Flordeliza Villanueva	Molecular Imaging	20
Steve Feinstein	Non-invasive Cardiovascular Imaging	21
Stuart Foster	Update on high frequency contrast imaging in the mouse	22
Annemieke van Wamel	Assessment of tumour development using molecular ultrasound contrast imaging	23
Jim Chomas	Cadence CPS Capture Vascular Imaging	26

15.45 – 16.15 Intermission

16.15 – 17.30 **EXTRACARDIAC CLINICAL APPLICATIONS** *Chairpersons: Folkert ten Cate-David Cosgrove*

Thomas Albrecht	Up-date on transit time analysis of the liver	27
Fuminori Moriyasu	New applications of contrast ultrasound imaging to diagnosis of tumorous and diffuse liver diseases	30
Mike Averkiou	Challenges of quantitative tumor response imaging with microbubbles.....	32
Hans-Peter Weskott	Contrast Enhanced Ultrasound (CEUS) in ICA stenosis in patients with predominantly soft plaques: First Results.....	35
Francois Tranquart	Use of Contrast-Enhanced Ultrasound in Gynecology	37

18.30 - 22.30 **SOCIAL EVENT (Incl. Dinner buffet)**..... 107

*ICIN = The Interuniversity Cardiology Institute of the Netherlands

12th EUROPEAN SYMPOSIUM ON ULTRASOUND CONTRAST IMAGING

FRIDAY, 26 January 2007

07.30 - 08.00	Registration	
07.30 - 09.00	POSTER DISCUSSION A	<i>Moderator: Folkert ten Cate</i>
1a)	Andrea Grêt	Influence of Coronary Pressure on Myocardial Blood Volume: First Measurements in Humans..... 41
2a)	Attila Nemes	Role of Parasternal Data Acquisition During Contrast Enhanced Real-Time Three-Dimensional Echocardiography 43
3a)	Richard Kroll	Ultrasound targeted microbubble destruction increases capillary permeability in hepatomas..... 44
4a)	Jan Skrok	Markedly increased signal enhancement after the second injection of SonoVue® compared to the first – a quantitative normal volunteer study..... 45
5a)	Julia Alter	Delivery of antisense oligonucleotides to mdx myocardium using ultrasound and microbubbles..... 46
6a)	Margaret Wheatley	Visualizing Chemotherapy: Contrast Driven Drug delivery 48
7a)	Ine Lentacker	Lipoplex loaded microbubbles for ultrasound targeted gene delivery 49
8a)	Bernadet Meijering	Unraveling the mechanisms of ultrasound microbubble targeted gene delivery 50
07.30 - 09.00	POSTER DISCUSSION B	<i>Moderator: Nico de Jong</i>
1b)	Kostas Tsiglifis	Non-linear oscillations and collapse of encapsulated microbubbles subject to ultrasound..... 52
2b)	Nicolas Rognin	A new Method for Enhancing Dynamic Vascular Patterns of Focal Liver Lesions in Contrast Ultrasound 55
3b)	Peter Bevan	Acoustic characterization of Definity disruption 59
4b)	Emmanouil Glynos	A Systematic Study of the Mechanical Behaviour of Microbubbles by Using Atomic Force Microscopy Force-Distance Curves 62
5b)	Kevin Chetty	High Speed Optical Observations and Simulation Results of SonoVue™ Microbubbles at Low Insonation Pressures 64
6b)	Sergio Casciaro	Microbubble Deterioration Mechanisms of a Phospholipidic Contrast Agent..... 65
7b)	Paul Dayton	Detection of Adherent Contrast Agents for Applications in Molecular Imaging with Ultrasound..... 70
8b)	Marlies Overvelde/ Valeria Garbin	3D optical micromanipulation of UCA: bubble-bubble and bubble-wall interactions..... 71
9b)	Jeroen Sijl	Combined optical and acoustical characterization of individual UCA microbubbles 74
10b)	Sébastien Mulé	Regularized Estimation of Microbubbles Attenuation and Backscatter Coefficients in Contrast-Enhanced Ultrasound Studies..... 76

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09.00 - 10.30	TECHNOLOGY II <i>Chairpersons: Paul Dayton-Peter Frinking</i>	
Nico de Jong	Spherical, rectangular and triangular bubble vibrations.....	78
Thierry Bettinger	Detection of vascular expression of P-Selectin and VEGF-R2 with antibody-targeted micro-bubbles using a Vevo 770 micro-ultrasound system	81
Marcia Emmer	Vibrating microbubbles at low acoustic pressures	84
David Thomas	Initial results of an investigation into single bubble acoustics using amplitude modulation	85
Ross Williams	Nonlinear Golay-Encoded Contrast Agent Imaging	88

10.30 - 11.00 **INTERMISSION**

11.00 - 12.30	TUMOUR APPLICATIONS OF MICROBUBBLES . <i>Chairs: Thomas Albrecht-Steve Feinstein</i>	
Yuko Kono	The use of contrast enhanced ultrasound in liver patients' clinical care	90
Nathalie Lassau	Dynamic Contrast Enhanced-ultrasonography (DCE-US) with Quantification of Tumour Perfusion. Interest to evaluate the Efficacy of Anti-angiogenic Treatments	95
Thilo Hölscher	Contrast Applications in Brain Ultrasound	96
Iris Eder	Targeted binding of microbubble contrast agents to $\alpha_v\beta_3$ integrin expressing prostate cells.....	99

12.30 - 13.45 **LUNCH**

Announcement of the winners of the Martin Blomley poster prize and the technical poster-prize.

13.45- 15.15	CLINICAL CASES <i>Chairpersons: Stuart Foster-Folkert ten Cate</i>	
Otto Kamp	Infused microbubbles to facilitate sonothrombolysis in patients with acute ST-elevation myocardial infarction	101
Jaroslav Kasprzak	Echocardiographic differentiation of apical hypertrophic cardiomyopathy and apical noncompaction: the role for contrast	102
David Cosgrove	Neovascularisation of Carotid Plaque	103
Steve Feinstein	A Vascular Case and Cardiac Case; Diagnosis made with the assistance of Contrast Ultrasound	104
Caroline Veltman	Left Ventricular Function In Patients Treated With Skeletal Myoblasts: Results Of A 4-Year Follow-Up.....	106

15.15 - 15.30 **DISCUSSION AND CONCLUSIONS**..... *Folker ten Cate-Nico de Jong*

15.30 **ADJOURN**

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Combined optical and acoustical characterization of individual US contrast microbubbles

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Optical ultra high-speed imaging of ultrasound contrast agents has revealed new detailed information on the dynamics of these microbubbles, e.g. surface modes and “compression-only” behavior¹. How these non-spherical and non-symmetrical bubble oscillations translate into an acoustic response is unknown. Until recently, acoustic studies were hindered by the ability to isolate a single contrast microbubble and by the transducer calibration and sensitivity. A quantitative study on the acoustical backscatter of individual BR14 bubbles (Bracco Research S.A., Geneva, Switzerland) was presented here last year². Depending on the initial bubble radius, driving pressure amplitude and frequency, acoustical methods can provide an even better sensitivity, while optical methods are limited by the resolving power of the optical system. A combination of the two methods will therefore provide a more complete characterization of ultrasound contrast agents.

Our setup consists of a transmit transducer transmitting a pulsed ultrasound beam, exciting a single BR14 bubble confined in a 200 μm capillary tube positioned at the focal point of the transducer. Another focussed receive transducer collects the echoes of the single bubble. Simultaneously, the time resolved radial oscillation of the very same bubble were recorded optically at a frame rate of 15 million frames per second with the Brandaris camera. The receiving transducer was accurately calibrated, therefore both the optical and acoustical recordings provide quantitative information on the microbubble response, allowing for a direct comparison between the two methods.

Individual bubbles with initial bubble radii below, around and above the resonance radius were insonified with a 2.25 MHz sinusoidal acoustic pulse with peak rarefactional amplitude of 60 kPa or 100 kPa. The acoustic responses and simultaneous optical recordings of the radial oscillations of the very same bubble confirm that the two methods are indeed complementary. Larger bubbles, oscillating off resonance, were more easily detected acoustically, whereas the dynamics of bubbles oscillating close to resonance were better detected optically. Furthermore, for larger bubbles oscillating in the linear regime, the measured acoustic bubble response was in good agreement with the response predicted from the optically recorded radial bubble dynamics.