

1:00pm-5:00pm | Oct 21, 2015 (Wednesday)

2B

Title:	Ultrasound Contrast Agents: Theory and Experiment
Lecturer:	Nico de Jong , Erasmus MC Rotterdam, The Netherlands. Michel Versluis , University of Twente, The Netherlands.
Abstract:	The course consists of 6 topics: a) An overview will be presented of experimental, pre-clinical and clinical contrast agents (bubbles, droplets, and particles), including their physical properties, coating characteristics and stability. b) Models of microbubble dynamics in an acoustic field will be discussed, starting with simplified models based on a one-dimensional mass-spring system and more complex models describing the viscoelastic behavior of the stabilizing shell. c) Acoustic characterization methods for UCA will be presented, including fundamental and harmonic scattering and attenuation, as well as the influence of ambient pressure, temperature and gas concentration. d) Discussion of optical and acoustical methods for the characterization of single microbubbles. e) Imaging methods for contrast agents, e.g. fundamental, harmonic, subharmonic and superharmonic imaging and multi-pulse methods such as pulse inversion, power modulation, chirp excitation and radial modulation. f) Molecular imaging with ultrasound and ultrasound-mediated drug and gene delivery: targeting, bubble-cell and bubble-tissue interactions, mechanisms for controlled release and subsequent uptake.

Biography



Nico de Jong graduated from Delft University of Technology, The Netherlands, in 1978. He got his M.Sc. in the field of pattern recognition. Since 1980, he has been a staff member of the Thoraxcenter of the Erasmus University Medical Center, Rotterdam, The Netherlands. At the Dept. of Biomedical Engineering, he developed linear and phased array ultrasonic probes for medical diagnosis, especially compound and transesophageal transducers. In 1986 his interest in ultrasound applications shifted toward the theoretical and practical background of ultrasound contrast agents. In 1993 he received his Ph.D. for "Acoustic properties of ultrasound contrast agents." His current interests are 3D (matrix) transducers, bubble behavior and fast framing camera systems. Since 1996 he organizes, together with the cardiologist Dr. Folkert ten Cate, the annual European Symposium on Ultrasound Contrast Imaging, held in Rotterdam and attended by approximately 175 scientists from all over the world. Nico de Jong is also part-time professor at the Delft University of Technology.



Michel Versluis graduated in Physics in 1988 at the University of Nijmegen, the Netherlands, with a special interest in Molecular Physics and Astrophysics. Later, he specialized in the application of laser-induced fluorescence imaging for flame diagnostics resulting in a successful defense of his PhD thesis in 1992. Michel Versluis is now a professor at the University of Twente, the Netherlands, in the Physics of Fluids group working on bubbles and droplets in physical acoustics and medical acoustics. He is specialized in the study of microbubbles as a tool for medical diagnosis and therapy. Prof. Versluis teaches various courses in Applied Physics, Biomedical Engineering and Technical Medicine, one of them focusing specifically on the physics of bubbles.