



**Winter School on
THERAPEUTIC ULTRASOUND**

**Ecole de Physique des Houches,
France**

**March 26th – 31st
2017**

Information about the School



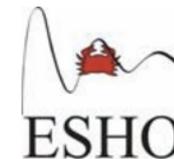
With the support of:

- Focused Ultrasound foundation
- International Society for Therapeutic Ultrasound
- Acoustical Society of America
- Society for Thermal Medicine
- European Society for Hyperthermic Oncology
- Labex WIFI



Acoustical Society of America

The premier international scientific society in acoustics, dedicated to increasing and diffusing the knowledge of acoustics and its practical applications.



Participants of the School



Program

DATE	TIME	LECTURER	TITLE	DATE	TIME	LECTURER	TITLE
Sunday March 26	From 3.00 pm Arrival – Registration						
Monday March 27	8.45 – 9.00	J.-F. Aubry / G. ter Haar / V. Khokhlova	Welcome/ Overview & introduction	Wednesday March 29	Chair: Betsy Repasky		
	Chair: Larry Crum				8.45 - 9.30	F. Sottolini	The route to commercialisation
	9.00 - 9.45	R. Cleveland	Acoustic propagation – soft tissue		9.30 - 10.15	B. Werner	Brain therapies: delivery
	9.45 – 10.30	J.-F. Aubry	Focusing Ultrasound		Coffee break		
	Coffee break				10.40 - 11.15	G. ter Haar	Histology for HIFU
	11.00 - 1130	G. ter Haar	Biophysics: Heating, thermometry		11.15-12.00	H. Gruell	Ultrasound mediated drug delivery
	1130 - 12.15	L. Crum	Cavitation – applications		12.00 Lunch 5.30 pm Coffee		
	12.30 Lunch 5.00 pm Coffee				Chair: J. Hwang		
	Chair: Jean-Francois Aubry				5.45 - 6.15	H. Gruell	Thermal biology, thermal dose, cavitation dose
	5.30 – 6.00	T. Deffieux	Basics of US imaging		6.15 – 6.45	A. Gangi	Competing technologies
6.00 – 6.30	F. Steinmeyer	Basics of MR imaging	Evening : Gluhwein lecture: The trials and tribulations of translation (L. Crum)				
Tuesday March 28	6.30 pm Welcome Drink / Dinner			Thursday March 30	Chair: Oleg Sapozhnikov		
	Evening : The Antikythera Mechanism: Decoding an Ancient Greek Mystery (M. Freeth)				9.00 – 9.45	O. Sapozhnikov	Histotripsy
	Chair: Florian Steinmeyer				9.45-10.15	E. Repasky	Tumour immunology/immunotherapy
	8.45 - 9.15	R Berriet	Ultrasound transducers		Coffee break		
	9.15 – 9.50	M. Pernot	Monitoring & Guidance – US		11.00-11.45	R. Cleveland	Lithotripsy & SWT
	9.50 – 10.30	B. Quesson	Monitoring & Guidance – MR		12.00 Lunch 4.30 pm Coffee		
	Coffee break				Chair: L. Crum		
	11.00 – 11.45	M. Horsman	Tumour biology & physiology		5.30 – 6.45	Student presentations	
	11.45 – 12.15	J. Hwang	Oncology: conventional physical treatments		Evening : (Table) Football world cup		
	12.30 Lunch 5.00 pm Coffee				Friday March 31	Chair: Vera Khokhlova	
Chair: Robin Cleveland			9.00 - 9.45	C. Lafon		Matching transducer geometry to clinical targets	
5.30 - 6.15	R. Roy	Biophysics: Cavitation	9.45 - 10.15	G. ter Haar		Experimental design	
6.15 – 6.45	O. Sapozhnikov	Calibration & field characterisation	Coffee break				
Evening : What you always wanted to know about MRI and did not dare to ask (F Steinmeyer / B Quesson)			11.00 - 11.45	J.-F. Aubry		FDA and CE Approved Devices	
			11.45 - 12.00	Closing			
			Lunch Departure to the airport				

Lecturers

Lecturer	Institute	Country
Jean-François Aubry	Institut Langevin, Paris	France
Gail ter Haar	Institute of Cancer Research, Sutton	Great Britain
Afshin Gangi	Kings College London	Great Britain
Ron Roy	University of Oxford	Great Britain
Thomas Deffieux	Institut Langevin, Paris	France
Rémi Berrier	Imasonic, Besançon	France
Florian Steinmeyer	Technische Hochschule Nuremberg	Germany
Mathieu Pernot	Institut Langevin, Paris	France
Bruno Quesson	Université Bordeaux	France
Joo Ha Hwang	University of Washington, Seattle	USA
Mike Horsman	Aarhus University	Denmark
Larry Crum	University of Washington, Seattle	USA
Holger Gruell	Eindhoven University of Technology	Netherlands
Oleg Sapozhnikov	Moscow State University, Moscow	Russia
Frederic Sottolini	CarThera, ICM Brain and Spine Institute, Paris	France
Beat Werner	University of Zurich	Switzerland
Elizabeth Repasky	Roswell Park Cancer Institute, New York	USA
Cyril Lafon	LabTau, Inserm U1032, Lyon	France
Robin Cleveland	University of Oxford	Great Britain

Lecturers



J.F. Aubry



G. ter Haar



A. Gangi



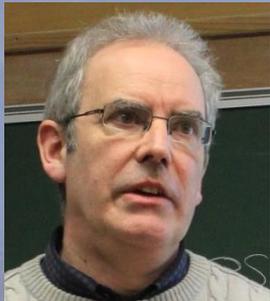
R. Roy



T. Deffieux



R. Berriet



F. Steinmeyer



M. Pernot



B. Quesson



J. H. Hwang



M. Horsman



L. Crum



H. Gruell



O. Sapozhnikov



F. Sottolini



B. Werner



E. Repasky



C. Lafon



R. Cleveland

Participants from MSU, Russia



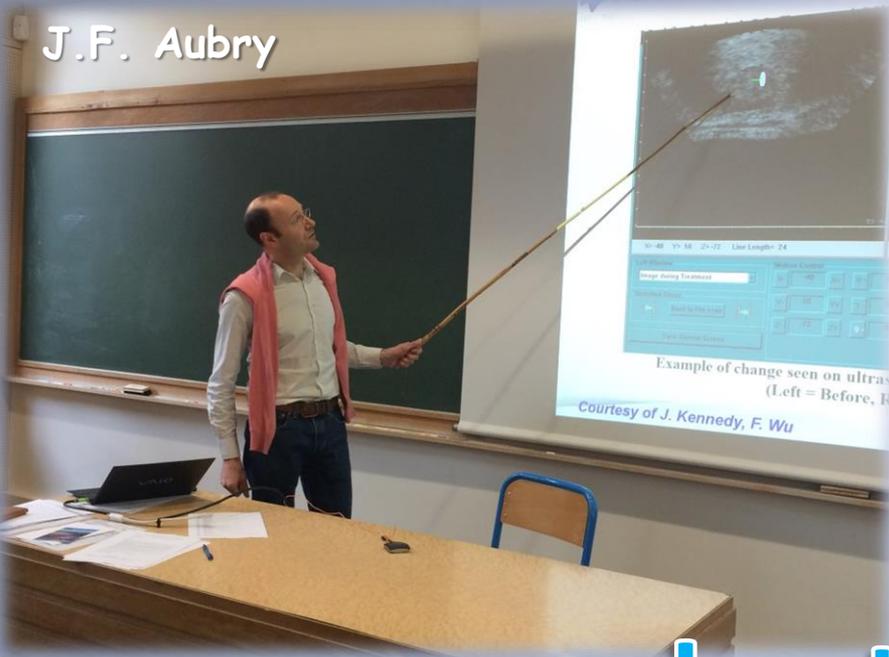
O. Sapozhnikov

E. Annenkova

A. Nikolaeva

P. Rosnitskiy

J.F. Aubry



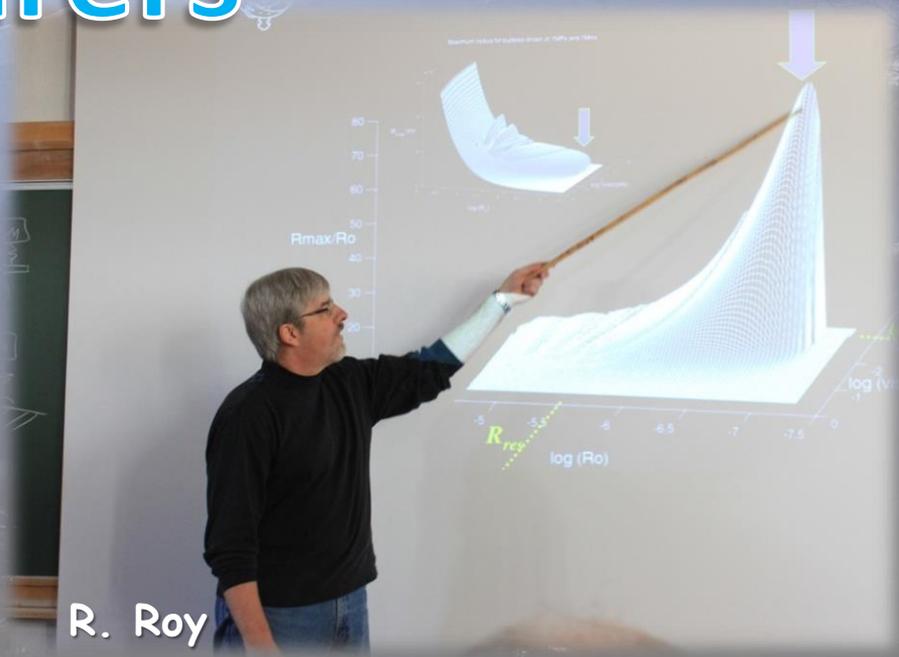
G. ter Haar



Lecturers

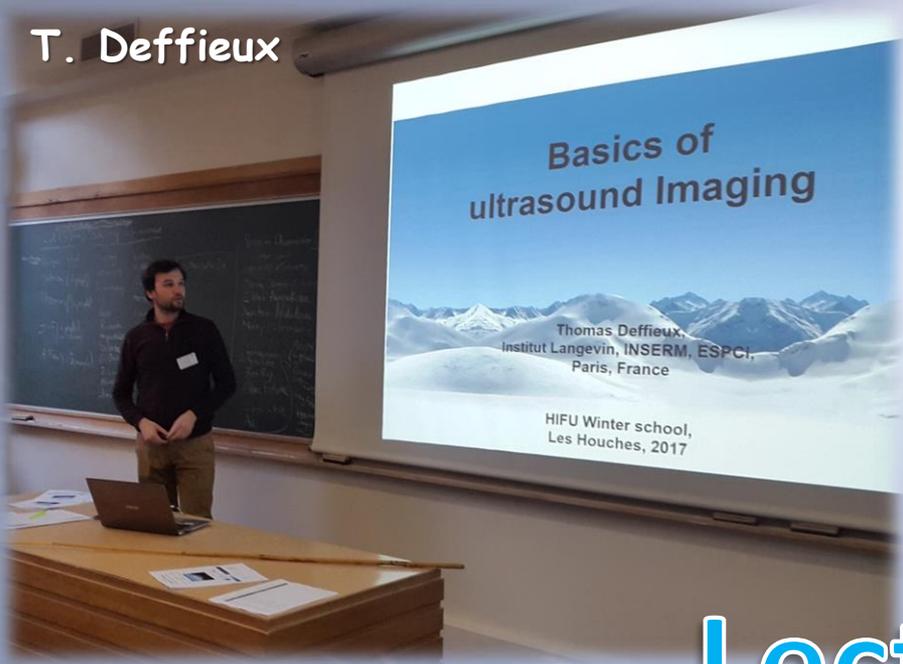


A. Gangi



R. Roy

T. Deffieux

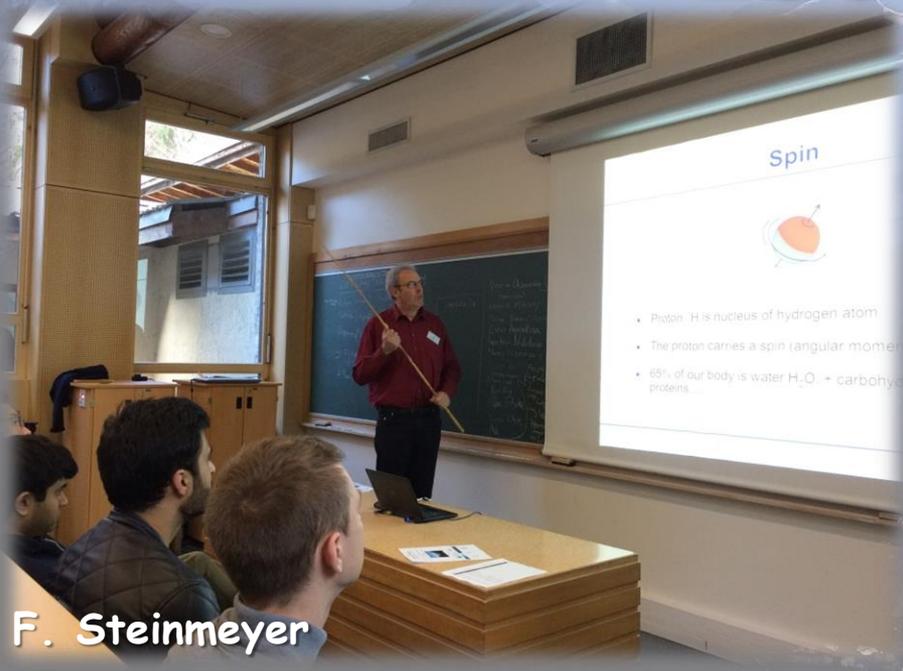


R. Berriet



Lecturers

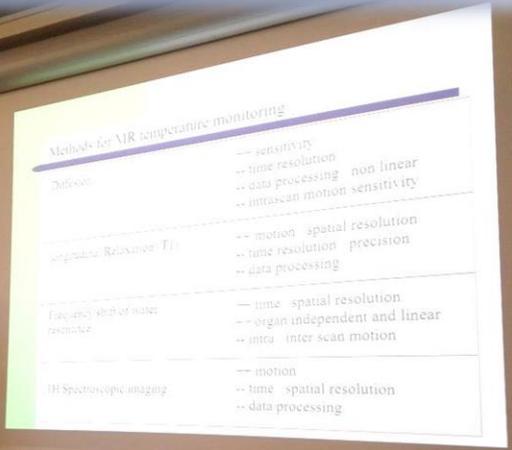
F. Steinmeyer



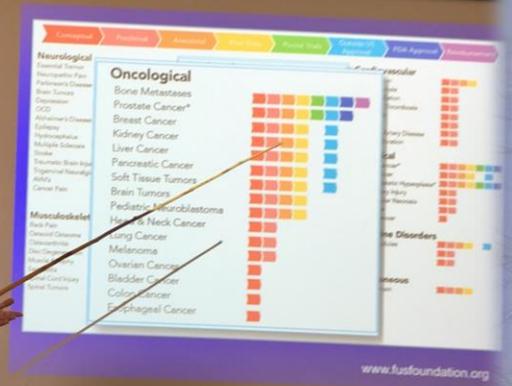
M. Pernot



B. Quesson

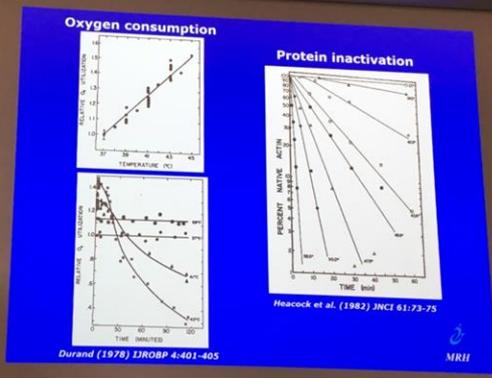


J. H. Hwang

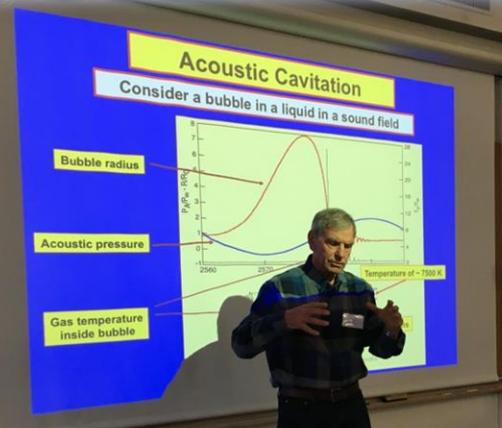


Lecturers

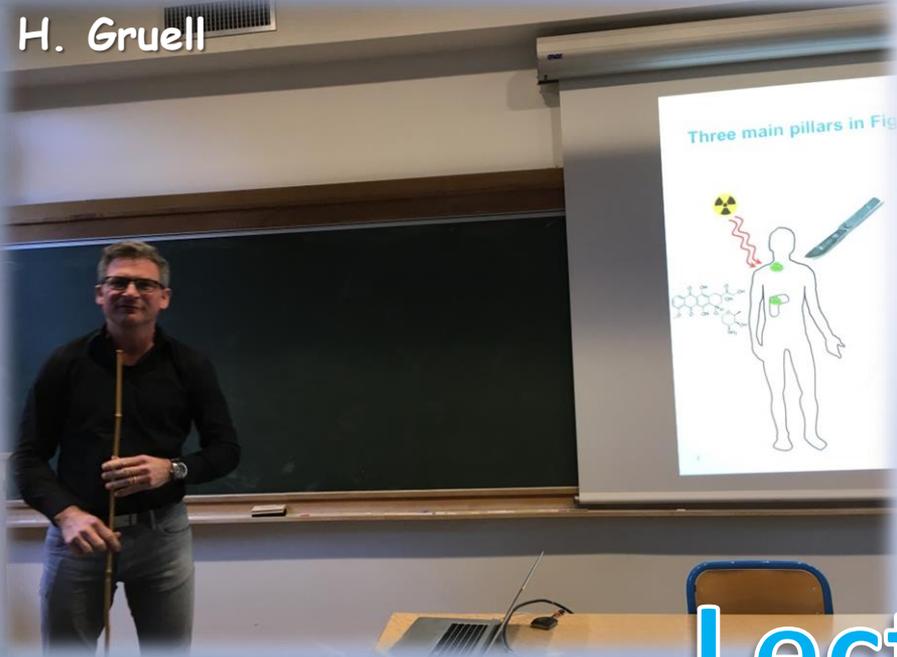
M. Horsman



L. Crum



H. Gruell

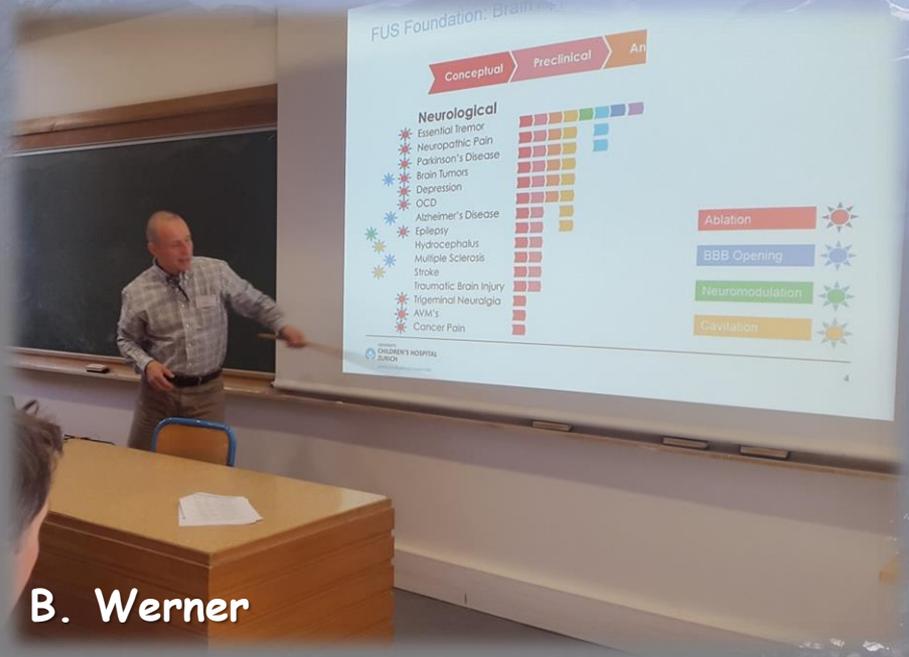


O. Sapozhnikov

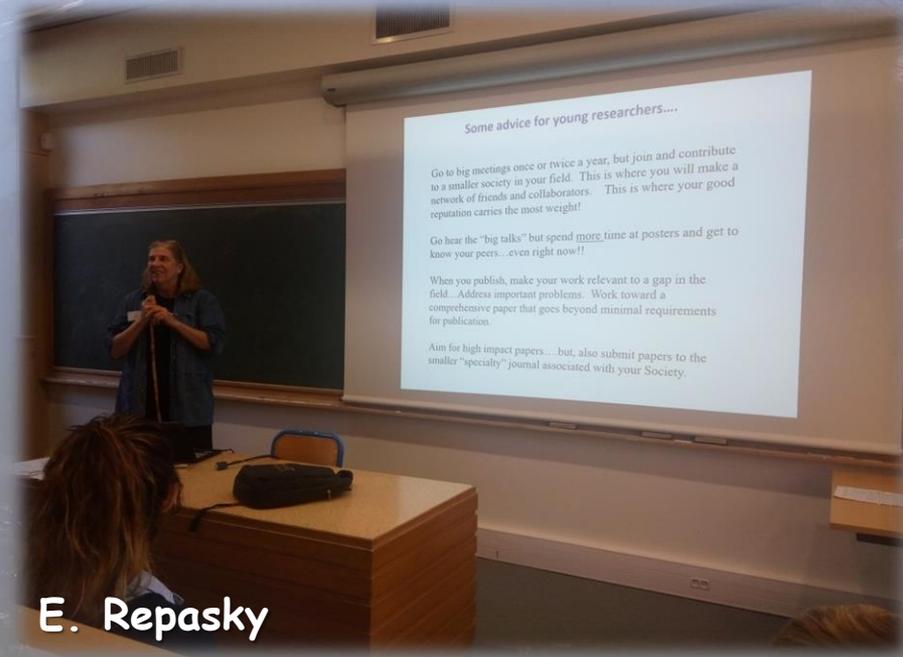


Lecturers

B. Werner



E. Repasky



Typically with extracorporeal sources

Lecturers

150 mm
Surface 189 cm
Tissue attenuation @ 1 MHz Exposure 150 J for 6s

C. Lafon

Acoustic Wave Equation

$$\nabla^2 p - \frac{1}{c_0^2} \frac{\partial^2 p}{\partial t^2} = 0$$

1-D propagation: D'Alembert's Solution

$$p(x,t) = f\left(t - \frac{x}{c}\right) + g\left(t + \frac{x}{c}\right)$$

"Plane wave" traveling in positive x direction

"Plane wave" traveling in negative x direction

Right traveling 

Left traveling 

Waveform can be ANY SHAPE not only sinusoidal

R. Cleveland

Lecture room



Accommodation



Coffee breaks





Restaurant



Gala dinner





Gala dinner



Best student presentation



Akaki Jamburidze
Best student presentation



Award Ceremony

Best student presentation



Best student presentation



Hermes Kamimura
Best student presentation



Matheus de Andrade
Best answer



Award Ceremony

Prateek Katti and Sandra Ekdawi
Best questions



Skiing



Chamonix



See you in
2019...

