| Year | Facts | Person/Event | Country/Society |
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| 1761 | Auscultation | Leopold Auenbrugger | Austria |
| 1819 | Stethoscope | R.T.H. Laennec | France |
| 1826 | Experiment on velocity of sound in water | Jean-Daniel Colladon, Charles Sturm | Switzerland |
| 1842 | Detection of the Doppler effect by Christian Doppler, Salzburg Austria | Christian Doppler | Austria |
| 1851 | Ophthalmoscope | Hermann Helmholtz | Germany |
| 1854 | Laryngoscope | Manuel Garcia (singer) | Spain |
| 1876 | Cystoscope | Max Nitze | Germany |
| 1877 | The theory of sound | Lord Rayleigh | England |
| 1880 | Discovery of the piezoelectric effect | Pierre and Jacques Curie | France |
| 1912 | The tragic loss of the Titanic | | England |
| 1914-1918 | WWI | | |
| 1917 | First piezoelectric US transducer using a single large quartz crystal | Paul Langevin | France |
| 1928 | US could be used to detect hidden flaws in metals | Sergei Sokolov | Soviet |
| 1931 | Invention of the echo sounder by Alexander Behm, Kiel | Alexander Behm | Germany |
| 1937 | US through transmission used to visualize ventricles in the brain | Karl Dussik, Friedrich Dussick | Austria |
| 1939 | Der Ultraschall (English edition) published | L. Bergmann | Germany |
| 1939-1945 | WWII | | |
| 1941 | Pulse-echo US instrument with a second non-generating transducer to detect returning echoes | Donald Sproule and others working for Henry Hughes and Son | England |
| 1941 | Reflectoscope with a single transducer as both generator and receiver | Floyd Firestone | USA |
| 1946 | Use of high-intensity US as a noninvasive surgical technique to treat brain-related disorders | William Fry | USA |
| 1947 | Hyperphonograms of cerebral ventricles produced | Karl Dussik, Friedrich Dussick | Austria |
| 1947 | Experiments on detection of gallstones and foreign bodies using A-mode presentation of reflected echoes | George Ludwig | USA |
| 1949 | Measured the thickness of excised bowel tissue using a Navy radar trainer operating at 15 MHz | John Wild | USA |
| 1949 | First International Congress on Ultrasound in Medicine in Erlangen and Dussik presented his hyperphonograms | Karl Dussick | USA |
| 1949 | Japan's first A-mode US equipment at the research laboratories of Nihon Musen (Japan Radio) Company (now Aloka) | Rokuro Uchida | Japan |

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| 1949 | Ultrasonics' published | Benson Carlin | USA |
| 1949 | Internationaler Kongress „Ultraschall in der Medizin“ (Ultrasound in Medicine) in Erlangen, Germany. The chairman of the meeting was a prophet as he summarized at the end: we can expect that ultrasound will find its way into the medical diagnosis in the near future in a larger scale | | Germany |
| 1950 | Built a pulse-echo electronic scanner and recorded first cross-sectional US image using a 35mm camera | Douglass Howry | USA |
| 1951 | Built scanners for multiposition (compound) scanning (published in 1952, B-29 version in 1954) | Douglass Howry, Roderick Bliss, Gerald Posakony | USA |
| 1951 | Developed A-mode machine | Kikuchi | Japan |
| 1951 | Earliest US image of breast tumors produced in the living subject | John Wild and John Reid | USA |
| 1951 | Began to apply A-mode US to detect gall stones and breast cancers in Japan | Wagai | Japan |
| 1951 | Earliest handheld B-mode contact scanners for clinical use | John Wild and John Reid | USA |
| 1952 | Conference at the University of Illinois (1955, 1962) | William Fry | USA |
| 1952 | Reported intracerebral hematoma and brain tumors using 2 MHz flaw detection equipment | Tanaka, Wagai | Japan |
| 1952 | Reported abdominal mass using 2 MHz flaw detection equipment | Douglas Howry | USA |
| 1952 | AIUM officially established | AIUM | USA |
| 1953 | Launched clinical echocardiography using the pulse-echo technique. | lnge Edler, Hellmuth Hertz | Sweden |
| 1954 | Their first echocardiogram with M-mode recording at 35 mm photographic film | lnge Edler, Hellmuth Hertz | Sweden |
| 1955 | Published spectacular cross-sectional images of the limbs and neck | Douglas Howry, Joseph Holmes | USA |
| 1955 | Conference at the University of Illinois; the first diagnostic paper on “Echographic Tissue Diagnosis” was given | John Wild, John Reid | USA |
| 1955 | Smaller and better transducers started to be made using new piezoceramic materials such as barium titanate and lead zirconate-titanate. | | |
| 1955 | Applied Doppler ultrasound to cardiovascular investigation (published in 1956) | Shigeo Satomura, Yasuharu Nimura | Japan |
| 1956 | Use of ultrasound in orbit | Henry Mundt, William Hughes, Folke Jansson | USA (HM, WH), Sweden (FJ) |
| 1956 | Demonstrated evidence of intracranial tumor or hemorrhage from shift in the midline echo (1953) and published (1956) | Lars Leksell, Douglas Gordon | Sweden |
| 1956-1957 | Distinguish between ascites, ovarian cysts. and fibroid tumors on the basis of their echo patterns A-mode equipment for measuring fetal biparietal diameter. Introduction of the full bladder technique for scanning of the uterine contents | Ian Donald | UK |

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| 1957 | Localization of foreign bodies in the eye | Arvo Oksala | Finland |
| 1957 | lnterscience Research Institute, a not-for-profit research institute located in Champaign, Ill., was founded | William J. Fry, Francis J. Fry, Reginald C. Eggleton. | USA |
| 1958 | First International Congress on Bio-Medical Engineering held in the uncompleted UNESCO building in Paris | Ormerod (Chairman), Gordon (Vice-Chairman) | France |
| 1958 | A seminal paper on the “Investigation of abdominal masses by pulsed ultrasound” published | Ian Donald, Tom Brown | UK |
| 1958 | The first compound B-mode contact scanner patented, which did not need a water bath | Tom Brown | UK |
| 1958 | US diagnosis began in China with the establishment of the Ultrasonic Medical Research Group at the Sixth People’s Hospital in Shanghai. The group was led by Shih An. | Shihn An | China |
| 1958 | Doppler instruments were introduced into medicine | | |
| 1959 | Second International Congress on Bio-Medical Engineering held in Paris | | France |
| 1959 | The first National Ultrasound Conference was convened in Wuhan, China | | China |
| 1959 | Ultrasonic Research Section of the National (formerly Commonwealth) Acoustic Laboratory was formed in Sydney | George Kossoff | Australia |
| 1959 | Polaroid film was available | | |
| 1960 | Aloka produced their first commercial medical A-scanner, the SSD-2 | | Japan |
| 1961 | The Japan Society of Ultrasonics in Medicine (JSUM) was formed and the first meeting was held at Juntendo University in Tokyo on May 10, 1961. Toshio Wagai was elected as the President | | Japan |
| 1962 | Mark I scanner (called in publications the CAL [Commonwealth Acoustic Laboratory] Echoscope), a compound water bath scanner completed | | Australia |
| 1962 | The medical physicist Peter Wells developed his version of the multi-joint articulated arm scanner based on Diasonograph electronics and put it to clinical use in Bristol, England in 1962. | Peter Wells | UK |
| 1962 | The first meeting on medical and biological ultrasound was organised and the proceedings were published in 1965 | William J. Fry | USA |
| 1963 | Ekoline 20, an A-mode and B-mode instrument for echoencephalography, was introduced by Smith Kline-Precision | | |
| 1964 | Physionics marketed three-jointed articulated-arm handheld scanner | | |
| 1964 | The Societas Internationalis pro Diagnostica Ultrasonica in Ophthalmologia (SIDUO) was formed and its first international symposium was held in East Berlin | | Germany |

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| 1965 | The First International Conference on Diagnostic Ultrasound was organised and held with the sponsorship of the University of Pittsburgh. The proceedings of this meeting were published by Plenum Press in 1966. | | USA |
| 1965 | The first commercial real-time scanner, the Vidoson, was developed by Richard Soldner and manufactured by Siemens Medical Systems of Germany | | Germany |
| 1966 | The second SIDUO meeting was held in Brno, Czechoslovakia. Denis White encouraged the Executive of SIDUO to open its membership to every aspect of diagnostic ultrasound | Denis White | Czechoslovakia |
| 1968 | Publication on a phased-array transducer for two-dimensional imaging | Jan C. Somer | |
| 1969 | The third meeting of SIDUO was renamed 'Ultrasound 1969: 1st World Congress on Ultrasonic Diagnostics in Medicine Vienna, June 2 including meetings of SIDUO III and AIUM' | | Austria |
| 1969 | The British Medical Ultrasonics Group which was sponsored by the British Institute of Radiology, was formed in December 1969 (Later became the British Ultrasound Society in 1977) | | UK |
| 1969 | Mark II scanner introduced | | Australia |
| 1969 | The concept of grey scale echography was introduced and implemented it in the examination of the breast and of the pregnant uterus | George Kossoff | Australia |
| 1969 | The introduction of pulsed Doppler | Donald Baker, Peter Wells, Pierre Peronneau | USA (DB), UK (PW), France (PP) |
| 1969 | The American Society of Ultrasound Technical Specialists (ASUTS) was formed under the aegis of the AIUM (In 1980 changed its name to the Society of Diagnostic Medical Sonographers (SDMS) in order to be more inclusive | | USA |
| 1969 | The Swiss formed the Swiss Society for Diagnostic Ultrasound at the conclusion of the Vienna Congress | | Switzerland |
| 1970 | The Australian Society for Ultrasound in Medicine (ASUM) was established in March 1970 and held their first scientific meeting in August 1971 | | Australia |
| 1970 | Because Europe was still divided by the Cold War, Poland, East Germany, and Czechoslovakia had organized the Ultrasound in Biology and Medicine society (UBIOMED) in 1970 | | Europe |
| 1971 | Publication on linear array real-time scanning | Nicolaas Bom | Netherland |
| 1971 | East German formed their national ultrasound society (19711120) | | Germany |
| 1971 | The proceedings of the 1969 Vienna Congress, entitled ULTRASONO GRAPHIA MEDICA, were published in 1971 by Verlag der Wiener Medizinischen Akademie, with K. Ossoinig and J. Bock as editors | | |

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| 1972 | Publication on the use of gray scale | |
| 1972 | Hungarians formed their natioan society (Hungarian Biophysical Society, 19720110) | Hungary |
| 1972 | European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) was founded in Basel, Swizerland with the delegates of 13 European societies (19720211) | EFSUMB |
| 1972 | The section on Ultrasound in Medicine and Biology was organised in the Academy of Sciences of USSR by Profs. L. R. Gavrilov, A. P. Sarvazyan and V. B. Akonian | USSR |
| 1973 | Rohe and Unirad introduced the first commercial analog scan converters with gray scale in the U.S. | |
| 1973 | The Rotterdam Congress held in 1973 was advertised as the Second World Congress on Diagnostic Ultrasound. It did not include the biannual meeting of SIDUO. | Netherland |
| 1973 | WFUMB was officially formed at the General Assembly by the association of five societies - AIUM, JSUM, EFSUMB, SIDUO and ASUM. The first General Assembly elected Dr. G. Baum as President and approved the Constitution and accepted Pergamon Press as publisher for its journal, Ultrasound in Medicine and Biology. | WFUMB |
| 1973 | The first issue of UMB was published (September) | UMB |
| 1974 | The proceedings of the Rotterdam meeting “Ultrasonics in Medicine”, Ed. M. de Vlieger, D. White and V. Mc Ready were published by Excerpta Medica, Amsterdam, in 1974. | Netherland |
| 1974 | The American Registry of Diagnostic Medical Sonographers (ARDMS) was formed | USA |
| 1974 | Japanese Journal of Medical Ultrasonics was published as the official journal of JSUM | Japan |
| 1974 | A prototype of Octoson completed by UI | Australia |
| 1976 | A commercial model of the Octoson was available in 1976, and was used for scanning the breast, as well as the heart, abdomen, testes, and other areas. | Australia |
| 1976 | The first WFUMB Congress was held in San Francisco in 1976 (WFUMB'76), hosted by AIUM and with the mutual cooperation of AIUM (21st), EFSUMB, JSUM, ASUM, SIDUO (6th) and others | WFUMB |
| 1979 | European Committee for Ultrasound Radiation Safety was fromed by EFSUMB | EFSUMB |
| 1979 | The second WFUMB Congress was held in Miyazaki (also named the 4th World Congress | WFUMB |
| 1980 | The American Society of Ultrasound Technical Specialists (ASUTS) changed its name to the Society of Diagnostic Medical Sonographers (SDMS) | USA |

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| 1982 | The third WFUMB Congress (WFUMB-82) was held in Brighton hosted by British Medical Ultrasound Society | | WFUMB |
| 1982 | The First WFUMB Seminar on Safety and Standardization of Ultrasound in Obstetrics was held for three days immediately after WFUMB-82 | | WFUMB |
| 1983 | The AIUM/NEMA standard was developed and accepted | | AIUM |
| 1983 | FLAUS was formed | | FLAUS |
| 1985 | The fourth WFUMB Congress (WFUMB-85) was held in Sydney hosted by ASUM combined with the 1st Congress of World Federation of Sonographers and the 1st WFUMB Safety and Standardization Symposium | | WFUMB |
| 1985 | The ASUM changed its name to the "Australasian Society", which was inclusive of Australia and New Zealand | | ASUM |
| 1986 | LAFSUMB was established | | |
| 1986 | MASU was founded in April 1986 and Hassen Gharbi was the first President and founder | Hassen Gharbi | |
| 1987 | First AFSUMB was held in Tokyo | | AFSUMB |
| 1988 | The first issue of WFUMB NEWS was published | | WFUMB |
| 1988 | The Asian and the Latin Federations joined WFUMB | | AFSUMB |
| 1988 | WFUMB-88 (5th) was held in Washington DC hosted by AIUM. The History and Archives Committee had Historical Symposium on Diagnostic Ultrasound and Kodak Health Sciences published the proceedings of this meeting entitled “Medical Diagnostic Ultrasound: A Retrospective on its 40th Anniversary”. The 2nd Congress of World Federation of Sonographers and the 2nd WFUMB Safety and Standardization Symposium were also held | | WFUMB |
| 1989 | Kretztechnik of Austria began to market the first commercial 3-D scanner, the Combison 330 | | Austria |
| 1991 | WFUMB-91 (6th) was held in Copenhagen, Denmark | | EFSUMB |
| 1992 | New AIUM/NEMA standard was developed | | AIUM |
| 1992 | Peter Wells appointed as UMB editor (served until 2006) | | UMB |
| 1994 | WFUMB-94 (7th) was held in Sapporo, Japan, in conjunction with the 4th Congress of World Federation of Sonographers | | WFUMB |
| 1996 | At a WHO sponsored meeting held in Philadelphia in 1996, a joint Scientific Group prepared a report on Training in Diagnostic Ultrasonography – Essentials, Principles and Standards | | WHO |
| 1997 | WFUMB-97 (8th) was held in Buenos Aires, Argentina | | WFUMB |
| 1997 | WFUMB website established | | WFUMB |

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| 2000 | WFUMB-2000 (9th) was held in Florence, Italy (May 6~10). The Florence Congress was the last Congress to be co-shared with the Congress of Sonographers | WFUMB/EFSUMB |
| 2000 | The WFUMB educational activities, the “African and Asian projects”, were launched | WFUMB |
| 2002 | The first issue of ECHOES was published as a continuum od WFUMB Newsletter | WFUMB |
| 2002 | The first WFUMB Basic Course on Ultrasonography was held in Moshi, Tanzania (February 4-8) and the first WFUMB Training for the Trainers Ultrasound Workshop was held in Dhaka, Bangladesh (June 6-8) | WFUMB |
| 2003 | WFUMB-2003 (10th) was held in Montreal, Canada (June 1~4). A CD-ROM on “History of Medical Ultrasound” has been compiled under the supervision of the committee, and the CD-ROM was given to each of the participants of the congress. WFUMB Honorary Life Members were bestowed upon the previous WFUMB Presidents Dr. H. Thompson, Dr. G. Koss off, Dr. F. Weill and Dr. B. Goldberg. | WFUMB/AIUM |
| 2003 | WFUMB Administrative Council Meeting (May 31) decided to establish WFUMB Centers of Excellences (COE) at certain places in developing countries of the world | WFUMB |
| 2004 | The first WFUMB COE opened in Bangladesh in February. Dr. Kane Bala, Bangladesh Institute of Ultrasound in Medicine and Research is the primary link in this WFUMB initiative. The second WFUMB CEO was established in Kampala, Ugandaby a contract with the Uganda Society of Ultrasound (UGASON) and the first workshop was conducted on October 16-20 | WFUMB |
| 2004 | WFUMB Training Courses were held at Manila (Phiippines), Freetown (Sierra Leon), and Beijing (China) | WFUMB |
| 2005 | The first WFUMB Latin American Education Project Course was held in Lima, Peru (March 10-13) | WFUMB |
| 2005 | The third WFUMB CEO was established in Caracas, Venezuela, and the first workshop was held (June 22-25) in Guayana | WFUMB |
| 2005 | A WFUMB-sponsored book entitled “Manual of Diagnostic Ultrasound in Infectious Tropical Diseases” was published (edited by Dr. Lutz H. and Dr. Gharbi H) | WFUMB |
| 2006 | WFUMB-2006 (11th) was held in Seoul, Korea (May 28~ June 1) | WFUMB/AFSUMB |
| 2006 | WFUMB Training Course was held in Jakarta, Indonesia (January 27-29) | WFUMB |

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| 2006 | Dr. Wells P.N.T., the Editor-in-Chief of Ultrasound in Medicine and Biology stepped down from this position and WFUMB Honorary Life Member was bestowed upon him. Dr. Christy K. Holland was appointed as the new Editor-in-Chief. | WFUMB |
| 2007 | A new WFUMB COE was established in Romania and the inaugural workshop was held in Timisoara (June 1). | WFUMB |
| 2007 | At the meeting with the AIUM held in 2007 in New York it was agreed that, commencing in 2009, the AIUM office would be responsible for the provision of secretarial services to WFUMB and that the office would be co-located with the AIUM in Washington, DC. | WFUMB |
| 2007 | Inaugural workshop of the Romanian CEO in Craiova | WFUMB |
| 2007 | The WFUMB Safety Committee work on the Safe Use of Ultrasound Contrast Agents is completed and a document is published in UMB | WFUMB |
| 2007 | WFUMB Executive Bureau with AFSUMB Congress, Bangkok in November 2007 | WFUMB |
| 2008 | WFUMB Training Course was held in Agra, India (February 15-17) | WFUMB |
| 2008 | A joint meeting of WFUMB Council and Board members of ISR in Marrakech in June. | WFUMB |
| 2008 | WFUMB Training Course was held s were held in Ulaanbaatar, Mongolia (July 24-26) | WFUMB |
| 2009 | WFUMB-2009 (12th) was held in Sydney, Australia (August 30~September 3) | WFUMB/ASUM |
| 2009 | The interval between WFUMB Congresses and the term of WFUMB officers were reduced from 3 years to 2 years | WFUMB |
| 2010 | Three courses of African education porject were held in Lusaka-Zambia (8-12 February), Tripoli-Libya (25-27 June), and Kigali-Rwanda (12-16 December) | WFUMB |
| 2011 | WFUMB-2011 (13th) was held in Vienna, Austria in conjunction with the 23rd Congress of EFSUMB (August 26~29) | WFUMB/EFSUMB |
| 2011 | WFUMB Training Course was held in Bangkok, Thailand (16-18 February) | WFUMB/AFSUMB |
| 2013 | WFUMB-2013 (14th) was held in Sao Paulo, Brazil (May 2~5) | WFUMB/FLAUS |
| 2015 | WFUMB-2015 (15th) was held in Orlando, USA (March 21~25) | WFUMB/AIUM |
| 2017 | WFUMB-2017 (16th) was held in Taipei, Taiwan (October 13~17) | WFUMB/AFSUMB |

| Abbreviation | Title | Authros | Remarks |
|---|---|---|---|
| 0000_ECHOES_00 | WFUMB Newsletter 'year_ECHOES_vol' | WFUMB | |
| 1984_Kossoff | President's message. UMB 1984;10(3):287-288 | Kossoff G<br>Goldberg B | |
| 1990_White | The conception, birth and childhood of WFUMB and its specialist and continental federations: the first quarter century. UMB 1990;16(4):333-348 | White DN | |
| 1997_Levi | The history of ultrasound in gynecology 1950-1980. UMB 1997;23(4):481-552 | Levi S | |
| 2001_Watanabe | History of WFUMB and AFSUMB. JUM 2001;9:167-175 | Watanabe H | www.aium.org |
| 2003_WFUMB HMU | History of Medical Ultrasound compiled by WFUMB History/Archices Committee | Goldberg B<br>Wells P<br>Claudon M<br>Kondratas R | 2003_WFUMB HMU_04_02' means 'page 02 of reference 04 in the compilation |
| 2013_AIUM website | From current AIUM website | AIUM | |
| 2013_ICUS website | From current International Contrast Ultrasound Society (ICUS) news at website | ICUS | www.icus-society.org |
| 2013_Kossoff | A history of WFUMB and its presidents, 1969–2011 (UMB in press) | Kossoff G<br>Goldberg B | |
| 2013_WFUMB website | From current WFUMB website | WFUMB | www.wfumb.org |

| Year | Fact | Person/subject | Place | Reference |
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| 1761 | Tapping of the chest cavity and listening for sound variations made by internal organs such as the heart and lungs – a procedure known as **auscultation** – was introduced into Western clinical practice by the Viennese physician Leopold Auenbrugger in 1761 | Leopold Auenbrugger | Vienna | 2003_WFUMB HMU_04_02 |
| 1819 | invention of the **stethoscope** by the French clinician R.T.H. Laennec in 1819 | R.T.H. Laennec | France | 2003_WFUMB HMU_04_02 |
| 1826 | the Swiss physicist Jean-Daniel Colladon and the mathematician Charles Sturm performed an experiment on Lake Geneva in 1826 to determine the **velocity of sound in water** | Jean-Daniel Colladon<br>Charles Sturm | Lake Geneva, Switzerland | 2003_WFUMB HMU_04_03 |
| 1851 | Invention of **ophthalmoscope** by Hermann Helmholtz | Hermann Helmholtz | Germany | 2003_WFUMB HMU_05_02 |
| 1854 | Invention of **laryngoscope** by Manuel Garcia, singer | Manuel Garcia | Spain | 2003_WFUMB HMU_05_02 |
| 1876 | Invention of **cystoscope** by Max Nitze | Max Nitze | Germany | 2003_WFUMB HMU_05_02 |
| 1877 | The basic properties of sound were described in the classic work of Lord Rayleigh (English physicist), **'The Theory of Sound'** | Lord Rayleigh | England | 2003_WFUMB HMU_04_04 |
| 1880 | it was the discovery of the **piezoelectric effect** by the French physicists Pierre and Jacques Curie in 1880 that proved the key for echo-sounding techniques because it provided a way to generate ultrasound waves and became the principle of ultrasonic transducers. | Pierre and Jacques Curie | France | 2003_WFUMB HMU_04_04 |
| 1912~ | The tragic loss of the **Titanic** during her maiden voyage in 1912 and the havoc caused by **U-boats** during World War I provided strong impetus to find ways of detecting submerged objects. Inspired by the sinking of the Titanic, a young Russian émigré electrical engineer, Constantin Chilowsky, came up with an idea for an ultrasonic detection system, which he brought to the attention of the French government. | Constantin Chilowsky | Russia, France | 2003_WFUMB HMU_04_04 |
| 1912 | Alexander Behm (Kiel, Germany) and (independently) Lewis Richardson (England) developed the echo sounder. Their work was stimulated by the Titanic catastrophy and their idea was to detect the icebergs with the aid of sound waves | Alexander Behm<br>Lewis Richardson | Germany<br>England | Harald Lutz provided |
| 1917 | They were intrigued because by then World War I and the U-boat menace had begun. They quickly turned it over to a leading member of the French scientific community, physicist Paul Langevin, for testing. In 1917, Langevin built the **first piezoelectric ultrasound transducer** using a single large quartz crystal and successfully tested it at sea. But the war ended before this apparatus could be installed on ships. Nevertheless, this work formed the basis of SONAR (sound navigation and ranging) detection, which was more fully developed during World War II. | Paul Langevin | France | 2003_WFUMB HMU_04_05 |
| 1917 | Already in April 1917, when testing his first quartz transmitter in a laboratory tank, Langevin observed that fish placed in the beam close to the transmitter were “killed immediately” and that certain observers who plunged their hands in the same region experienced “a painful sensation.” | Paul Langevin | | 2003_WFUMB HMU_04_31 |
| First World War 1914-1918 | Its biological effects first became apparent when, during the World War I, Langevin noted that in his attempts to develop a technique to detect ultrasonic echoes from submarines, small fish were killed around the generator. | Paul Langevin | | 1990_White |
| 1915-1918 | Cooperative work between France, Britain, and the United States continued from 1915 through the end of the war, but practical results were not achieved in time for application to the war effort. This work, nevertheless, formed the basis of SONAR detection, more completely developed during World War II. | | France, Britain, United States | 2003_WFUMB HMU_05_2 |
| 1927-1930 | According to Wesley Nyborg in his detailed two-part historical paper on the biological effects of ultrasound and the development of safety guidelines, the period 1927-1930 was one of discovery. | | | 2003_WFUMB HMU_04_31-32 |

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| 1927-1939 | Wood and Loomis (1927) reported upon the **biological effects of ultrasound** and Freundlich (1932) suggested its use as a diathermic agent which was put into practice seven years later by Pohlman et al. (1939). | Wood RW and Loomis AL<br>Pohlman | USA | 1990_White |
| 1920s-1930s | During the 1920s and 1930s, ultrasound was used for **therapeutic heating**, particularly in physical therapy, for the **sterilization** of biological preparations such as vaccines, and for cancer therapy, often in combination with X-rays. | | | 2003_WFUMB HMU_04_05 |
| 1920s-1930s | In the 1920s and 1930s, therapeutic applications and biophysical investigations preceded diagnostic uses of ultrasound, and the first professional meetings and conferences of ultrasound practitioners in the 1950s also focused on **therapeutics and bioeffects** rather than diagnosis. | | | 2003_WFUMB HMU_04_37 |
| 1920s-1930s | Meanwhile, medical applications of ultrasonics in the 1920s and 1930s were virtually all therapeutic. From the turn of the century and even earlier, enthusiasm was strong in medical circles for therapeutics based on irrradiating the body to achieve a variety of tonic, restorative, balancing, and even disruptive effects. Ultrasound, only one of many such modalities, was widely applied in **cancer therapy in Germany**, and in **physical therapy in Europe and the United States**. | | | 2003_WFUMB HMU_05_3 |
| 1928 | The Soviet physicist Sergei Sokolov proposed in 1928 that **ultrasound could be used to detect hidden flaws in metals**. He pursued his research at the V. I. Ulyanov (Lenin) Electrotechnical Institute in Leningrad using through transmission, namely, a transducer on one side of the object being tested produced the sound waves and another transducer on the other side acted as a receiver. Interruptions in the passage of the sound waves were used to locate and measure flaws, similar to but less expensive and cumbersome than X-ray imaging. | Sergei Sokolov | Soviet | 2003_WFUMB HMU_04_05 |
| 1928 | In 1928 Soviet physicist S. Y. Sokolov first suggested the use of ultrasonic energy for industrial purposes such as detecting otherwise hidden flaws. | Sergei Sokolov | Soviet | 2003_WFUMB HMU_05_3 |
| 1930s-1940s | Even though the full-blown development of diagnostic medical imaging with ultrasound had to await the end of World War II and the post-war demobilization of expertise, there were a few attempts during the late 1930s and early 1940s to produce images of interior body structures, notably the brain. | | | 2003_WFUMB HMU_04_08 |
| 1930s-1940s | By this time several important and influential texts on ultrasonics were available. Among them was L. Bergmann's **Der Ultraschall**, which appeared in a 1939 English edition, and Benson Carlin's **Ultrasonics**, published in 1949 and outlining the physical principles of industrial ultrasound applications. In addition to work in physics and engineering, the 1940s saw increased research into the biophysical effects of ultrasonics, prompted perhaps by its widespread use in medical therapeutics. | Bergmann L<br>Benson Carlin | Germany<br>USA | 2003_WFUMB HMU_05_3 |
| 1939~1945 (World War II) | And with the development of **SONAR** during WW II, the “diagnostic” capacities of ultrasound were extended even more completely within the military context | | | 2003_WFUMB HMU_05_3 |
| 1939~1945 (World War II) | During World War II, many engineering and medical personnel were exposed in some way to the principle of detection via ultrasonic waves. Military SONAR and radar techniques were based on an echo principle; it was imperative that the required information be retrieved by the original source. Medical and industrial equipment applied through transmission techniques, but by the war's end the **Firestone Reflectoscope** and its industrial counterparts had expanded the potential of echo techniques in industry | Floyd Firestone | USA | 2003_WFUMB HMU_05_3 |

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| 1937~ | In Austria, in 1937, the psychiatrist Karl Dussik and his brother Friedrich, a physicist, began using ultrasonic through transmission and photographic plates, rather than X-rays and dyes, to discover abnormalities in the shape of the ventricles in the brain. Such abnormalities would suggest abnormal growth of brain tissue and the presence of tumors. By moving the transmitter around the skull and registering the energy of the transmitted beam, a pattern of dark and light patches, somewhat like a television image, was built up on a photographic plate, producing what they called a "**hyperphonogram.**" These early images showed an area of decreased attenuation roughly corresponding to the shape of the lateral ventricles and stimulated interest in this technique, particularly by a group of researchers at the Massachusetts Institute of Technology. The Dussiks published their findings in 1942 and 1947. | Karl Dussik<br>Friedrich Dussick | Vienna, Austria | 2003_WFUMB HMU_04_08 |
| 1938~ | Since the earliest medical applications of ultrasound, beginning in 1938, were in physical therapy, to heat deep tissues in treating conditions such as sciatica and neuralgia, much of the early research focused on acoustic attenuation and absorption in mammalian tissues. Much of this early work was done in Germany by Reimar Pohlman, starting in the late 1930s, and by his student T. F. Hueter, starting in the late 1940s. | | | 2003_WFUMB HMU_04_32 |
| 1939~ | From that time onward, and especially after the World War II, papers describing the therapeutic effects of ultrasound were given at Physical Medicine meetings. | | | 1990_White |
| late 1930s | The efforts of Austrian physician Karl T. Dussik were somewhat more successful. Beginning in the late 1930s, he worked with his brother, physicist Friederick Dussik, using through transmission and instruments to produce an image based on the differential attenuation of the sound through the head. | | | 2003_WFUMB HMU_05_5 |
| 1940s | A very little known fact is that early work in medical ultrasound was done in South America in the late 1940s. RCA, a U.S. company, which was a major contractor for the military with special expertise in acoustics, had laboratories in their Buenos Aires, Argentina, subsidiary. They were charged during the early postwar years with looking for ways to apply and commercialize RCA's expertise in acoustics and electronics. Two of their researchers – R. P. McLoughlin and G. N. Gustavino – explored ways of using ultrasound to detect nonmetallic foreign bodies in human organs. They built a radar-like apparatus, which successfully produced traces of the forearm and an excised kidney in which a stone had been introduced, and they even speculated about an instrument that could produce actual images of internal organs using ultrasound. But there is no evidence that any further steps were taken. | | | 2003_WFUMB HMU_04_17 |
| 1940s | The Dussik brothers provided the earliest application of ultrasound to encephalic structures in the 1940s. Austrian physician Karl Dussik was interested chiefly in the diagnosis of intracranial tumors; he worked with his physicist brother and others between 1942 and 1947 to produce ultrasonic equipment capable of providing pictures of intracranial regions that would give enough information to diagnose tumors. The Dussiks, in 1947-48, introduced "**hyperphonography**," a through-transmission technique that produced what they believed were "ventriculograms," or echo pictures of the ventricles of the brain. They reasoned that if imaging the ventricles was possible, the technique was feasible for the detection of tumors as well. | Karl Dussik | Austria | 2003_WFUMB HMU_05_20 |
| 1940s~<br>early 1950s | Unsurprisingly, then, despite the great expansion in Europe of therapeutic ultrasonic devices and applications during the preceding decades, much of the pioneering diagnostic work with ultrasound in the late 1940s and early 1950s was based on direct or indirect transfer to the medical context of military or industrial technology involving both through transmission and echo principles. | | | 2003_WFUMB HMU_05_3 |

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| 1941 | In 1941, in England, engineer Donald Sproule and others working for Henry Hughes and Son, developed a **pulse-echo ultrasonic instrument with a second non-generating transducer to detect returning echoes** | Donald Sproule | England | 2003_WFUMB HMU_04_05 |
| 1941 | Concurrently and independently, American engineer Floyd Firestone, working at the University of Michigan, developed the "**reflectoscope**" which used the same reflection technique but with a **single transducer** as both generator and receiver. Both of these new techniques were kept secret until after the war. | Floyd Firestone | USA | 2003_WFUMB HMU_04_05 |
| 1942 | **Diagnostic ultrasound (DU) was officially introduced into the medical world** in 1942 by the Austrian Karl Th. Dussik, M.D., who had been working in the area since 1937. | Karl Th. Dussik | Austria | 1997_Levi |
| 1943 | Around 1943 there emerged non-destructive **ultrasonic flaw detection techniques** from marine sonar that, within a few years, led to medical applications using the diagnostic A-scan method as applied to midline shift measurements of the brain. | | | 2003_WFUMB HMU_17_02 |
| 1944 | In 1944 engineer Floyd Firestone, working at the University of Michigan (physicist) in the United States, took out a **patent on his "Reflectoscope**," in which the same transducer picked up the echoes returning in the interval between generated pulses. | Floyd Firestone | USA | 2003_WFUMB HMU_05_3 |
| 1945-1946 | In France, the physiotherapist Andre Denier, inspired by an account of the damaging effects of sound waves, tried to devise a through transmission technique which he called "**ultrasonoscopie**" to image the brain. He tried to build an instrument in 1945-46 that would function somewhat like a radar, but had difficulties producing useful images. Harsh criticism and rejection by a French authority on ultrasound made him stop. | Andre Denier | France | 2003_WFUMB HMU_04_08 |
| 1946 | The work of William Fry and his group was in the older tradition of ultrasound use in biophysical investigations and therapeutics as opposed to diagnostic applications and soft-tissue visualization. During World War II and until 1946, Fry worked on the design of piezoelectric transducers at the Naval Research Laboratory in Washington, D.C. After establishing the Bioacoustics Research Laboratory at the University of Illinois in Champaign, he **concentrated on the use of high-intensity ultrasound as a noninvasive surgical technique** to treat neurological or other brain-related disorders such as Parkinson's disease and brain tumors. The 1952, 1955, and 1962 conferences that his group sponsored at the University of Illinois were very important for the advancement of medical applications of ultrasound in the United States. | William Fry | USA | 2003_WFUMB HMU_04_13 |
| 1946 | When Fry and his group in Illinois began to experiment with focused ultrasound as a surgical technique in 1946, much attention was given to determining, as accurately as possible, the conditions for producing a lesion at a selected site in the brain or other part of the body, without damage to surrounding tissue. | William Fry | USA | 2003_WFUMB HMU_04_32 |
| 1947 | In 1947, after almost a decade's work, Dussik produced ultrasonically generated images, "hyperphonograms" of what he believed were the ventricles of the brain. During the same period, working during and after the war for the Siemens company, Theodor Heuter investigated basic biological effects of ultrasound. | Karl Dussik | Austria | 2003_WFUMB HMU_05_5 |

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| 1947-1949 | Dr. George Ludwig did his earliest work in medical ultrasound years before his collaboration with members of the Acoustic Laboratory at M.I.T. Ludwig spent part of the years 1947-1949 serving at the Naval Medical Research Institute in Bethesda, Maryland. Fresh from medical studies and an internship at the University of Pennsylvania, Ludwig and his collaborator F. W. Struthers conducted, for the Navy, experiments in the diagnostic capacities of ultrasound, using exclusively **A-mode presentation** of reflected echoes. This early naval work concentrated on detection of **gallstones and foreign bodies** embedded in tissues, in principle very much a "flaw detection" approach. Ludwig acknowledged both the military model of echoranging and underwater detection as well as industrial applications as sources for the original investigation. Ludwig continued ultrasound research with the Navi investigating some fundamental problems in the physical interaction of ultrasonic waves and tissues with the intent of elucidating the characteristic acoustic properties of tissues; his findings concerning the velocity of ultrasound in various animal tissues served as standards for later investigators. In this work he cooperated with Ivan Greenwood, an engineer employed at General Precision Laboratory, General Precision Inc., of Pleasantville, N.Y., and physicist R. H. Bolt of M.I.T.'s Acoustic Laboratory. | George Ludwig | USA | 2003_WFUMB HMU_05_6 |
| 1948-1949 | Bolt had already developed an interest in researching the diagnostic possibilities of utrasound in intracranial lesions, inspired by the apparent success of Dussik's imaging of the cerebral ventricles. In 1948, at a trade show in New York City, Bolt and colleague H. T. Ballantine, a physician, met Theodor Heuter, representing Siemens Company at the show. The M.I.T. researchers persuaded Heuter to join them on a visit to Dussik, and subsequently persuaded Heuter to come to the United States and join their research team in 1949. | Richard Bolt (physicist)<br>Thomas Ballantine (neurosurgeon) | USA (MIT) | 2003_WFUMB HMU_05_6 |
| 1948-1958 | During the decade 1948-1958, researchers in Japan, Europe, the Americas, China, and Australia worked mostly independently, with very little collaboration or exchange of information, to **adapt military and industrial ultrasonic equipment to medical uses**. In Japan, pioneering work was done by the physicist Rokuro Uchida at the research laboratories of Nihon Musen Company (now Aloka) and by physicians Kenji Tanaka and Toshio Wagai at Juntendo University School of Medicine in Tokyo. Using flaw detectors adapted for medical ultrasonic use they scanned the brain (to detect intracerebral hematomas and tumors), the gall bladder (to detect stones), and the breast (to detect tumors). These early machines displayed information (returning echoes of ultrasonic pulses) in one-dimensional A-mode as bright dots on an oscilloscope screen corresponding to points within the body | Rokuro Uchida<br>Kenji Tanaka<br>Toshio Wagai | Japan | 2003_WFUMB HMU_04_09 |
| 1948-1958 | In virtually all the early investigations involving diagnostic applications of ultrasound (1948~1958) direct contact and/or collaboration with military or industrial personnel and equipment facilitated the research . And, in each case, close collaboration between physicians and engineers produced technical adaptations of ultrasonic equipment with diagnostic applications in mind; in several cases, this collaboration led to fruitful commercial innovation . | | | 2003_WFUMB HMU_05_4 |
| 1949 | Dr. John Julian Wild, an Englishman who emigrated to the United States shortly after the Second World War to work at the University of Minnesota's medical school, first thought of using ultrasound to measure bowel thickness in the diagnosis of acute crises of the<br>bowel, his area of specialty. Familiar with the principles and practice of ultrasonic ranging, thanks to a broad British university education and his wartime experiences, Dr. Wild in 1949<br>gained access through several commercial contacts to the Wold-Chamberlain Naval Air Station. There he was given **permission to use a Navy Radar trainer, operating at 15 MHz**, in experiments to measure the thickness of excised tissue. | John J. Wild | John J. Wild | 2003_WFUMB HMU_05_7 |

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| 1949 | **John Wild began his work in 1949 using a Navy radar trainer operating at 15 MHz to measure the thickness of excised bowel tissue.** The discovery that echoes from tumor-invaded tissue could be distinguished from those produced by normal tissue in the same sample led him to apply ultrasound to cancer detection, particularly of the breast. Together with Reid he built a B-mode contact scanner, which provided a cross-sectional, twodimensional picture of the plane of the body scanned (and thus more accurate position information than one-dimensional A-mode) and whose electronics permitted real-time scanning (images appeared directly on the screen at the time of scanning without the necessity of intervening film development). | John J. Wild | John J. Wild | 2003_WFUMB HMU_04_11 |
| 1949-1951 | Unlike Wild, whose focus was "tissue characterization," Douglass Howry, with his training in radiology, was primarily interested in producing accurate cross-sectional anatomical images as the basis of medical diagnosis. Using surplus Air Force radar equipment in 1949, he built a pulse-echo electronic scanner in his basement and in 1950, using a 35 mm camera, recorded his **first cross-sectional pictures obtained with ultrasound**. However, with only a horizontal scanning motion, the kind of accurate anatomical pictures of living tissue he wanted were not possible. But by 1951, working with engineers Roderick Bliss and Gerald Posakony, he built scanners that utilized a **cattle watering tank** and later the **rotating ring gear from a B-29 gun turret** as a water immersion tank system to introduce multiposition, or compound, scanning, which resulted in the removal of "false" echoes and in better images. While one motor moved the transducer around the patient, another provided a second back-and-forth motion, resulting in compound scanning of the immersed subject. | Douglass Howry<br>Roderick Bliss<br>Gerald Posakony | USA | WFUMB HMU_04_12-13 |
| 1949 | The potential of ultrasound to provide diagnostic information was described for the first time at the **First International Congress on Ultrasound in Medicine held in Erlangen in 1949**. The focus of the Congress was therapeutic applications of ultrasound, but at the meeting Dr.K.Dussik an Austrian physician presented results obtained with ultrasound transmission imaging which, he claimed, allowed imaging of the ventricles of the brain. Unfortunately the aberrations introduced by transmission through the skull gave rise to artifacts that distorted and degraded the image and the method **did not gain clinical acceptance**. | Karl Dussik | Austria | 2013_Kossoff_01 |
| 1949 | Several groups of Japanese investigators began to explore the diagnostic capabilities of ultrasound shortly after the close of the Second World War. Industrial applications were crucial in inspiring interest in the modality. In Tokyo, at the research laboratories of Nihon Musen (Japan Radio) Company (now Aloka), physicist Rokuro Uchida built Japan's first model of ultrasonic equipment for **A-mode** presentation in 1949. Uchida used equipment with **15 MHz** transducers, as would Dr. John J. Wild in the United States. | Rokuro Uchida | Japan | 2003_WFUMB HMU_05_4 |
| 1949 | Working in collaboration with his wife, Dr. Dorothy Stott Howry, several engineers, including Roderick Bliss and Gerald Posakony, Douglas Howry produced in his basement in 1949 a pulsed echo ultrasonic scanner. | Douglas Howry<br>Dorothy Stott Howry<br>Roderick Bliss<br>Gerald Posakony | USA | 2003_WFUMB HMU_05_10 |
| late 1940s | Also in Tokyo, Dr. Kenji Tanaka, at Juntendo University School of Medicine, began to consider the possibility of detection of intracranial lesions in the late 1940s. Dr. Tanaka has cited both nondestructive testing in industrial settings and echo-location of fish by fishing fleets as inspirations for his ideas concerning medical applications | Kenji Tanaka | Japan | 2003_WFUMB HMU_05_4 |

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| 1949-1950s | When George Ludwig came to Massachussets General Hospital in July of 1949, collaboration with the nearby M.I.T. group continued. Until 1950, the group employed only through-transmission techniques, but in that year, again in collaboration with Greenwood at General Precision, the group developed and tested an instrument based on the principles of **echo-ranging**. Although finding that foreign bodies in tissues could be detected in this way (a fact which Ludwig had already demonstrated in his Navy work), the authors felt that the confusion of echoes returned from internal body structures, and specifically the "small amount of reflection at the interface between the tissue and the ventricular fluid" made the technique ultimately of less value in medical diagnosis, particularly in neurology, than **through transmission**.' | George Ludwig | USA | 2003_WFUMB HMU_05_7 |
| 1950 | in 1950 using a 35 mm camera Douglas Howry recorded his first cross-sectional pictures obtained with ultrasound. With only a horizontal scanning motion, however, accurate anatomical pictures of living tissue were not possible. | Douglas Howry | | 2003_WFUMB HMU_05_10 |
| late 1940s ~early 1950s | The earliest diagnostic applications of ultrasound to abdominal disease was the work of the young George Ludwig in the late 1940s and early 1950s on detection of gallstones embedded in the muscles of animals. John Wild designed his flexible and rigid transrectal scopes for imaging the bowel and deeper abdominal structures in the course of his ultrasonic research in the early 1950s. | George Ludwig<br>John Wild | | 2003_WFUMB HMU_05_36 |
| 1950 | About 1950, simple B-scans and compound B-scans were applied to the neck and breast. Also around this time the T-M mode technique was used. | | | 2003_WFUMB HMU_17_02 |
| 1950 | John Julian Wild, M.D. from the Department of Surgery, University of Minnesota in Minneapolis, is the pioneer of diagnostic ultrasound for gynecology, as well as for many other fields. He first lectured on "The use of ultrasonic pulses for the measurement of biologic tissues and the detection of tissue density changes" in 1949; the manuscript was received for publication on November 15, 1949, and appeared in 1950 in the Journal Surgery. | John J. Wild | USA | 1997_Levi_01 |
| 1950-1952 | The ability of reflected pulsed ultrasound to examine soft tissue was described for the first time in 1950 (Surgery 1950;27:183). Dr. John Wild, an English physician living in Minneapolis, used high frequency (15 MHz) ultrasound radar training equipment to examine a strip of bowel and noted that different echo patterns were obtained from different sections of the tissue. The change in appearance obtained from tissue invaded by tumor suggested that ultrasound could be used to distinguish benign from malignant processes (1). The following year he joined forces with Jack Reid, a recent graduate in engineering, and in 1952 they described the first real time B-mode scanner which they used on patients to examine the breast (2). | John Wild<br>Jack Reid | USA | 2013_Kossoff |
| 1951 | In 1951 a group of twenty-four specialists in physical medicine who were attending the American Congress of Physical Medicine in Denver formed **a group "to prove or disprove the validity of ultrasonic energy as a clinical tool"** (Aides 1963). | | Denver, USA | 1990_White |
| 1951~ | The **American Institute of Ultrasound in Medicine (AIUM)** traces its roots to a meeting of 24 physical medicine specialists in a hotel room in Denver, Colorado, in 1951, while **attending the American Congress of Physical Medicine and Rehabilitation**. Their purpose was to form a sub-group of that Congress devoted to the investigation of the efficacy of ultrasound in therapy. They did so and continued to meet each year, at least into the 1960s, at the time of this Congress. They adopted their name, constitution, and bylaws in 1952. | | Denver, USA | 2003_WFUMB HMU_04_37 |

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| 1951~1952 | In 1951 Tanaka and his assistant, Dr. Toshio Wagai, visited Yoshimitsu Kikuchi, who directed research in the basic physics of ultrasonic transducers at the Institute of Radar Science, Tohoku University at Sendai. In that year **Kikuchi developed a medical ultrasonic scanner, with A-mode presentation**, for Tanaka. Using this instrument, Tanaka and Wagai conducted some basic and clinical experiments and in 1952, following collaboration with many of Japan's early ultrasonic pioneers, reported detection of intracerebral hematoma and brain tumors. | Kenji Tanaka<br>Toshio Wagai<br>Yoshimitsu Kikuchi | | 2003_WFUMB HMU_05_4 | |
| 1951~1954 | By 1951 Howry, Posakony and Bliss had introduced multiposition, or compound, scanning to eliminate "false" echoes and produce better images. This incarnation incorporated an immersion tank system using a cattle watering tank with the ultrasonic transducer mounted on a wooden rail. The transducer, immersed in the tank with the object under study, moved horizontally along the rail. When this equipment produced improved pictures, the Howry team published for the first time in 1952 (J Lab Med 1952;40:579). A later version, introduced in 1954, included a transducer mounted on the rotating ring gear from a B-29 gun turret, which in turn was mounted around the rim of a large metal cup that served as the immersion tank. This permitted complete horizontal circling of the periphery of the tank, while a second motor produced back-and-forth motion as the transducer moved around the tank, resulting in compound canning of the immersed subject. | Douglas Howry<br>Roderick Bliss<br>Gerald Posakony | | 2003_WFUMB HMU_05_11 | |
| 1951 | John Wild and John Reid in 1951 produced the earliest ultrasonic pictures of breast tumors in the living subject. With transducers operating at 15 MHz, they were able to detect a tumor of approximately 2-3 mm. | John Wild<br>John (Jack) Reid | USA | 2003_WFUMB HMU_05_32 | is 1951 correct? |
| 1951 | Wagai began, in 1951, to apply ultrasound to the detection of cholelithiasis (the presence of stones in the gall bladder or bile ducts) and breast cancer as well, and by the end of the decade he was using the technique widely in clinical practice, investigating its diagnostic power for various parts of the body and disease conditions, particularly tumors. | Toshio Wagai | Japan | 2003_WFUMB HMU_05_4 | |
| 1951 | Constrained by restriction of access and limited permission to adjust the military equipment, which was still used for radar training, Wild moved his research from the base to his basement-although the project was funded, Wild's ultrasonic research was not welcome in his university laboratory. Consultation with the Electrical Engineering Department of the University of Minnesota brought John M. Reid as a collaborator. Reid, just completing an engineering baccalaureat and contemplating graduate school, brought his engineering skills to the service of Wild's medical and inventive skills. Together they built in Wild's basement, using spare electronic parts and adapting mechanical parts from various other kinds of machinery, their first B-scan echoscope, in prototype and then in a second version that was ultimately used to visualize cancers in patients scheduled for surgery. Wild's transducer design incorporated a water column that bathed the transducers and was sealed at the tip with condom rubber, providing the water-delay that other researchers accommodated with immersion baths or enclosed water tanks. Thus. Wild produced the **earliest handheld "contact" scanners** for clinical use. Furthermore, the ultrasonic echoes were pictured on the scope in real time, allowing rapid generation and interpretation of clinical information. With their second-generation B-mode equipment, Wild and Reid were able to visualize tumors in excised tissue and in living subjects, and made "diagnoses" that in a significant number of cases were later confirmed by biopsy. | John Wild<br>John M. Reid | USA | 2003_WFUMB HMU_05_7-8 | |

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| 1951 | In 1951 a group of physical medicine physicians formed a group to examine the validity of ultrasonic energy as a clinical tool. The group met the following year and formed itself into the American Institute of Ultrasound in Medicine **(AIUM)** which has met annually since. Initially the activities of the Society were sponsored by a manufacturer of therapeutic ultrasound equipment and the emphasis of its annual conferences was on therapeutic applications and bio-effects of ultrasound. In the early sixties, thanks to the efforts of Dr. William Fry, the structure of the Society was reorganized into an independent scientific organization with gradual change in interest towards broader aspects of medical ultrasound and emphasis on diagnostic applications. | William Fry | USA | 2013_Kossoff |
| 1951~1954 | During 1951, Dr. Joseph Holmes, a senior physician who was then Acting Director of the Medical Research Laboratory of the Veterans Administration Hospital at which Howry was a resident, became associated with Howry's project. Holmes served as a liaison between Howry and the institutional support needed so badly if the project was to gain financial support and proceed further. Holmes functioned as a general administraton and financial planner during those early years. Through Holmes' intercession, laboratory space for the ultrasound project was found at Denver's Veterans Administration Hospital and a grant was obtained from the Veterans administration. Under these somewhat more secure conditions the Howry team constructed the **most suecessful to-date of their "home-built" scanners**, which incorporated the best of their transducer, amplification, and display systems. By 1951 Howry, Posakony and Bliss had introduced multiposition, or compound, scanning to eliminate "false" echoes and produce better images. This incarnation incorporated an immersion tank system using a cattle watering tank with the ultrasonic transducer mounted on a wooden rail. The transducer, immersed in the tank with the object under study, moved horizontally along the rail. When this equipment produced improved pictures, the Howry team published for the first time in 1952. A later version, introduced in 1954, included a transducer mounted on the rotating ring gear from a B-29 gun turret, which in turn was mounted around the rim of a large metal cup that served as the immersion tank. This permitted complete horizontal circling of the periphery of the tank, while a second motor produced back-and-forth motion as the transducer moved around the tank, resulting in compound canning of the immersed subject. | Joseph Holmes<br>Douglas Howry<br>Roderick Bliss<br>Gerald Posakony | USA | 2003_WFUMB HMU_05_10~11 |
| 1952 | Cecil Birtcher who owned a corporation that manufactured therapeutic ultrasonic equipment, provided each of these physiatrists with an ultrasonic therapy machine for this purpose and promised not to market his ultrasonic equipment until this group of investigators "confirmed European work" (Aides 1963). This group has met annually ever since and, at its second meeting formed itself into the American Institute of Ultrasound in Medicine (AIUM). The Birtcher Medical Foundation provided funding for the publication of the proceedings of these meetings. | Cecil Birtcher | USA | 1990_White |
| 1952 | It is thought that the US society having the longest history may be the American Institute of Ultrasound in Medicine **(AIUM)** in the United States, of which the origin goes back to 1952 | | | 2001_Watanabe |
| 1952 | The American Institute of Ultrasound in Medicine **(AIUM)** was officially established as a multidisciplinary organization in 1952 when the use of ultrasound for medical diagnosis was in its infancy. Medical pioneers recognized the potential of this fast-growing imaging modality and agreed on the need to advance the art and science of ultrasound in medicine and research. | | | 2013_AIUM website |
| 1952 | Alas, W. Guttner and colleagues in Erlangen, Germany, showed in 1952 that the "hyperphonogram" images resulted almost entirely from attenuation of the ultrasonic energy by the skull and not by the brain. Similar images could be made from just the skull. As a result this technique was abandoned, at least for brain imaging. | Guttner W | Germany | 2003_WFUMB HMU_04_09 |

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| 1952 | **The first scientific meeting devoted to medical ultrasound appears to have been the symposium organised by William J. Fry of the University of Illinois at Allerton Park in 1952.** No proceedings of this historic meeting were published but its success was such that it was followed by two further symposia at Allerton Park in June 1955 and June 1962 the proceedings of both of which were published (Kelly 1957; 1965) | William Fry | USA, University of Illinois at Allenpark | 1990_White |
| 1952~ | In the United States, important early scientific conferences on ultrasound, sponsored by William Fry and his colleagues, were held at the University of Illinois in 1952, 1955, and 1962. | William Fry | USA | 2003_WFUMB HMU_04_37 |
| 1952~ | Conferences hosted by the University of Illinois at Allerton House, which began in 1952 and continued until very recently, did much to stimulate interest in and to communicate information about the biological effects of ultrasound | | USA | 2003_WFUMB HMU_04_33 |
| 1952-1962 | Also in the mid fifties Dr. William Fry, a physicist, joined the faculty at the University of Illinois where he established a centre of excellence for the use of highly focused ultrasound to create lesions deep within the brain. Fry was interested in the broad spectrum of applications of medical ultrasound and proceeded to promote the field scientifically, clinically and politically. He encouraged the dissemination of ultrasound research, and in 1952, 1955 and 1962 staged important conferences that brought leading investigators to present their results. | William Fry | USA | 2013_Kossoff |
| 1952~1962 | In terms of the advancement of medical applications of ultrasound in the United States, the 1952, 1955, and 1962 conferences on ultrasound at the University of Illinois, sponsored by William Fry, were extremely important. The 1955 meeting was chiefly concerned with biophysical and therapeutic aspects of ultrasound, except for a presentation by John Wild and J. M. Reid on ultrasound breast examination and a presentation by Dr. Douglass Howry on his instrumentation for soft-tissue visualization. At the 1962 conference, lectures on diagnostic ultrasound were presented by speakers from the United States and from other parts of the world. The **1955 and 1962 conference proceedings were published in books edited by Elizabeth Kelly** | William Fry<br>John Wild and J. M. Reid<br>Douglass Howry | | 2003_WFUMB HMU_05_14 |
| 1952 | Independently and almost simultaneously two other groups began investigations into the technique. In Tokyo Drs. Kenji Tanaka and Toshio Wagai started to use ultrasonic industrial flaw detection equipment on patients at a lower frequency of 2 MHz and in 1952 reported detection of intracerebral hematoma and brain tumors. Wagai at that time also demonstrated the ability of ultrasound to detect gallstones and breast cancer. In 1952 Dr. Douglas Howry in Denver published the results of his studies where he used 2 MHz industrial flaw detection equipment to study abdominal masses. | | | 2013_Kossoff |

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| 1953 | In 1953 Dr. Lars Leksell, working at Lund University in Sweden, was almost certainly aware of the work of J. C. Turner and his colleagues at the London's Royal Cancer Hospital, and he had already experienced some disappointments attempting ultrasonic investigation of the brain with flaw detection equipment. But in that year Leksell borrowed the Siemens flaw-detection equipment used by Hertz and Edler in hope of aid in a clinical crisis-diagnosis of a 16-month-old boy in a coma. With this instrument he demonstrated the midline echo and showed that a shift of position in the echo was diagnostic evidence of a tumor, hemorrhage, or some other intracranial expanding<br>lesions-in the child's case, a life-threatening hematoma." Leksell's original work was more successful than others because many of his early subjects were children, with thinner skulls less likely to scatter the ultrasonic waves, and because he used transducers with 1 MHz frequency, which allowed deeper penetration with less scattering than did higher frequencies. Also in Sweden in the late 1950s, Drs. Stigg Jeppson and Brita Lithander developed interest in ultrasonic examination of the brain and applied the technique clinically. | Lars Leksell<br>J. C. Turner<br>Hertz and Edler | Sweden | 2003_WFUMB HMU_05_21 |
| 1953 | In 1953 Dr. Lars Leksell of Malmo demonstrated evidence of intracranial tumor or hemorrhage from shift in the midline echo. This gave rise to the field of echoencephalography | Lars Leksell | Sweden | 2013_Kossoff |
| 1953~ | In 1953, virtually simultaneously with the early Japanese work in Doppler echocardiography, Dr. lnge Edler, a physician at the University of Lund in Sweden, began a collaboration with physicist C. Hellmuth Hertz that launched clinical **echocardiography using the pulse-echo technique**. Dr. Edler was responsible for preoperative cardiologic diagnosis, and was interested in noninvasive diagnostic techniques, particularly for the diagnosis of mitral valve disease. Following a chance meeting at lunch in 1953, Hertz suggested to Edler (following Edler's speculations concerning radar) that ultrasonic pulses might provide a means of obtaining the desired information. Hertz was familiar with the physics of ultrasound and became very interested in applying the modality in diagnostic medicine. Hertz and Edler borrowed an A-mode Sperry flaw detector from a Malmoe shipyard and used it to demonstrate cardiac motion ultrasonically. Their work indicated the feasibility of obtaining echo reflections from the heart. After obtaining from Siemens the loan of a flaw detector that provided better echos. Hertz and Edler developed their "M-mode" technique to adapt B-mode presentation to the graphic depiction of motion. They used B-mode to project the echo information as a bright dot on the oscilloscope screen; the dot would move as the echo from the moving structure shifted position. They then employed a continuous moving film and special camera to display, in wave form, the motion of the echo dot reflected from the intracardiac structure. | lnge Edler<br>Hellmuth Hertz | Sweden | 2003_WFUMB HMU_05_16 |
| 1953-1954 | A chance meeting in Lund, Sweden, in 1953 by cardiologist Inge Edler, who was responsible for preoperative diagnosis at the University Hospital, and graduate student Hellmuth Hertz, who was studying physics and had done some work on ultrasound, led to the first attempts to study heart motion, primarily that of the mitral valve, using pulse-echo ultrasound. Edler wondered if a radar-like technique could be used to study the heart and, luckily, Hertz knew that an ultrasonic reflectoscope for flaw detection had just been delivered to a Malmo shipyard. They were able to borrow that instrument for a weekend and it convinced them that the pulse-echo method could become a valuable tool for heart diagnosis. They decided to carry out further studies, using a more advanced reflectoscope from Siemens, and published their first paper in 1954. This was the **beginning of echocardiography or cardiac ultrasound.** | lnge Edler<br>Hellmuth Hertz | Sweden | 2003_WFUMB HMU_04_15-16 |

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| 1954 | Edler and Hertz in Sweden improved upon A-mode by adding motion (M-mode) to examine the movement of tissue structures, such as those of the heart valves and heart wall. Their first echocardiogram in 1954 was an industrial A-scope flaw time-position (M-mode) recording made on continuously-moving 35 mm photographic film. | lnge Edler<br>Hellmuth Hertz | Sweden | 2003_WFUMB HMU_04_20 |
| 1954 | At about the same time Dr. Inge Edler, a cardiologist in Malmo, in collaboration with Dr. Hellmuth Hertz, a physicist, began to evaluate the potential of ultrasound to examine the heart. They also used low frequency industrial flaw detection equipment and in 1954 described the M-mode technique to study the movement of the walls of the heart and the mitral valve. | lnge Edler<br>Hellmuth Hertz | Sweden | 2013_Kossoff |
| 1954 | Meanwhile, at Osaka University, Dr. S. Oka applied ultrasonic diagnostic techniques first to the brain and later to the breast, abdomen, and uterus. His work with B-mode began in 1954. His scanner, despite an awkward water bath that often leaked, produced pictures good enough for diagnostic purposes. | Oka S | Japan | 2003_WFUMB HMU_05_4 |
| 1954 | In 1954 John Wild journeyed to England and Ian Donald heard him give a talk about his success with the technique. Inspired by Wild, Donald became enthusiastic about applying the technique in obstetrics and gynecology. Donald tried to pursue this interest after going to Glasgow in 1954, but his efforts to develop applications in obstetrics were slowed by fears at grant giving institutions that ultrasound might possibly have toxic effects on the fetus and mother. | Ian Donald | England | 2003_WFUMB HMU_05_23 |
| 1955 | Howry joined Dr. Joseph Holmes and together they developed compound scanning and published spectacular cross-sectional images of the limbs and neck which have not been equaled in detail until recently. | Douglas Howry<br>Joseph Holms | USA | 2013_Kossoff |
| 1955 | At first these meetings were devoted almost exclusively to the therapeutic use of ultrasound and the Institute was slow to recognise the importance of ultrasound as a diagnostic tool even though Wild and Reid gave a paper titled **"Echographic Tissue Diagnosis**" in 1955. | John Wild<br>John Reid | USA | 1990_White |
| 1955~ | The first diagnostic paper on “Echographic Tissue Diagnosis” was given by Wild and Reid in 1955. Even so, according to D.N. White, at the seventh meeting of the Institute in New York in 1962 every one of the ten papers was on ultrasonic therapy. | John Wild<br>John Reid | USA | 2003_WFUMB HMU_04_37 |
| 1955~ | In China, Dr. Hsu Chih-chang read of Edler's and Hertz's work in 1955, and built his own equipment (as did so many other early pioneers) for A-mode examination of the heart. Dr. Hsu first conducted experiments on animals and cadavers, and by the early 1960s was undertaking clinical studies of ultrasound's effectiveness in diagnosis of heart disease, noting changes in the echo patterns between healthy subjects and those with mitral stenosis present. Dr. Hsu also designed his own M-mode equipment. | Hsu Chih-chang | China | 2003_WFUMB HMU_05_17 |
| 1955 | Ian Donald became familiar with sonar and radar as a decorated pilot in the Royal Air Force and heard about the early applications of ultrasound to medicine from John Wild, whom he met in London in the early 1950s. But Donald’s work with ultrasound was launched in 1955, when he was invited by a director of the boilermakers Babcock & Wilcox at Renfrew, outside Glasgow, to see their industrial flaw detector (an A-scope, Kelvin Hughes Mk4). He arrived at the plant with the trunk of his car full of recently removed pathological specimens of fibroids and ovarian cysts. After seeing A-scan images of these tissues, he described the results as “beyond my wildest expectations. I could see boundless possibilities in the years ahead.” | Ian Donald | England | 2003_WFUMB HMU_04_14 |
| 1955 | In 1955, smaller and better transducers started to be made using **new piezoceramic materials** such as barium titanate and lead zirconate-titanate. | | | 2003_WFUMB HMU_04_22 |

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| 1955~1956 | Another crucial pioneering group in Japan crystallized around Shigeo Satomura and Dr. Yasuharu Nimura at Osaka University. This group pioneered the application of **Doppler ultrasound to cardiovascular investigation** several years earlier than its application as a medical technique in other parts of the world. Satomura had designed an ultrasonic Doppler technique and, in 1955, proposed applying it to examine physical motion in living bodies. Dr. Nimura immediately began to apply this work to the cardiovascular system, and results of the research were published in 1956. | Shigeo Satomura<br>Yasuharu Nimura | Japan | 2003_WFUMB HMU_05_04 |
| 1956 | Another important group in Japan formed around Shigeo Satomura and Yasuharu Nimura at the University of Osaka's Institute of Scientific and Industrial Research. They discovered that the Doppler effect could be applied to ultrasonic energy and used it in their cardiovascular investigations, particularly of moving heart valves and blood flow. They published their first results with Doppler ultrasound in 1956 | Shigeo Satomura<br>Yasuharu Nimura | Japan | 2003_WFUMB HMU_04_09 |
| 1956 | Engineering technician Shigeo Satomura and and physician Yasuharu Nimura pioneered this work at Osaka University. Nimura, Satomura, and T. Yoshida first published their work in 1956, identifying three kinds of Doppler signals returned from the heart: a low-pitched signal of about 100 Hz; a high-pitched signal of about 1000 Hz; and background noise. In a subsequent 1956 publication, Nimura and his colleagues identified the high-pitched signals as based upon the motion of the heart valves. **Because of Hertz and Edler's early misinterpretation of the mitral valve echo, Ninura's work can be seen as the fiist recognized noninvasive examination of the cardiac valves, using Doppler.** After Edler corrected the earlier misinterpretation, Nimura was able to show, using new equipment designed by K. Kato, that his high-pitched Doppler signal and Edler's M-mode echo were different representations of the same target. | Shigeo Satomura<br>Yasuharu Nimura | Japan | 2003_WFUMB HMU_05_17 |
| 1956 | In 1956 Drs. Henry Mundt and William Hughes from Chicago showed that echo patterns were received from an **ocular** tumor, while in Sweden Dr. Folke Jansson described the use of ultrasound to measure ocular distances. | Henry Mundt<br>William Hughes<br>Folke Jansson | USA<br>USA<br>Sweden | 2013_Kossoff |
| 1956 | Their colleague, neurologist Lars Leksell, used their equipment to **successfully image the cerebral midline** in 1956 – an important breakthrough in neurosonology because the midline becomes displaced in the presence of space-occupying lesions. | Lars Leksell | Sweden | 2003_WFUMB HMU_04_16 |

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| 1956~1957 | Ian Donald persevered and, after reading of Douglas Gordon's work in echoencephalography, he visited Gordon in London. With Gordon's help he was able to secure for his own use the **A-mode Kelvin Hughes equipment** from the Royal Cancer Hospital, where work on ultrasound had lapsed. Soon afterward Donald obtained, from the Kelvin Hughes Co., a **Mark IV flaw detector** which incorporated many improvements and enabled him to launch a series of clinical investigations. His earliest successes were with gynecologic diagnosis. He ultimately was able to use the A-mode equipment diagnostically in 1956 and 1957 to distinguish between ascites, ovarian cvsts. and fibroid tumors on the basis of their echo patterns. Several crucial diagnostic techniques were introduced by Donald's group. First was the use of **A-mode equipment for measuring fetal biparietal diameter**. This is essentially in utero echoencephalography, possible because of the nonreflective quality of the fluid-filled uterus and the thin skull of the fetus. This technique allowed obstetrical personnel to evaluate the rate of fetal growth, to estimate fetal weight at time of measurement, to screen for certain abnormalities such as hydrocephaly, and to assess fetal head size close to delivery to determine possible fit through the birth canal. The second innovation, very effective and still used today, was introduction of the full bladder technique for scanning of the uterine contents. With a full bladder, the position and contents of the displaced uterus are more clearly visualized. Drs. James Willocks and John MacVicar and physicist Tom Duggan worked with Donald on the implementation of these techniques. The history of the Donald research team highlights several of the crucial themes already identified in the development of diagnostic ultrasound, specifically the close cooperation of physicians and engineers and the relationship between the clinical and the industrial settings. Donald's collaboration with Tom Brown, an engineer in the employ of Kelvin Hughes, is a classic study in the cooperation between commercially employed engineers and physicians working in a clinical setting. The two built the first compound contact scanner in 1957. They then constructed a mechanical compound scanner, with the goal of visualizing the contents of the pregnant uterus anatomically in B-mode, which they hoped would produce better pictures and be more efficient to use. Although this equipment produced fine ultrasonic pictures, experience proved that the echograms obtained with this mechanical scanner were not, in fact, superior to those produced by their original manually controlled contact scanner. | Ian Donald<br>Douglas Gordon | England | 2003_WFUMB HMU_05_23~24 |
| 1956 | In 1956, two Chicago-based physicians, C. Henry Mundt and Willlam F. Hughes, reporting on a single case in the American Journal of Ophthalmology produced the **first published account of the application of ultrasound in ophthalmology**. | Henry Mundt<br>William Hughes | USA | 2003_WFUMB HMU_05_29 |
| 1956-1964 | In Finland, Arvo Oksala adapted an A-mode flaw detector in 1956 to ocular diagnosis and in 1957 reported on the localization of foreign bodies in the eye. A series of papers that he and his collaborators wrote between 1957 and 1964 laid important foundations for ultrasonic diagnosis and measurement in eye diseases. This work paralleled the pioneering contributions being made in ophthalmology in the U.S. during this same period by ophthalmologist Gilbert Baum and engineer Ivan Greenwood. They went beyond A-mode to introduce B-mode scanning into ophthalmology. | Arvo Oksala | Finland | 2003_WFUMB HMU_04_16-17 |
| 1957 | It was the success of these three symposia that convinced Fry of the necessity of an organisation which could hold regular meetings in the field of medical and biological ultrasound. He believed that such a purpose could be most easily achieved with an existing organisation rather than by founding a new society. It seemed to him that the American Institute of Ultrasound in Medicine might be such a suitable society providing that it could be re-organised into an independent scientific society devoid of commercial affiliations. For this purpose he accepted a position on the Executive Board of the American Institute in 1957. | AIUM<br>William Fry | USA | 1990_White |

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| 1957 | In Europe, Douglas Gordon had an exhibit entitled "Echo-encephalography by Ultrasonic Waves" at the First International Congress of Neurological Sciences in Brussels in July 1957 a year after Leksell published his discovery. | Douglas Gordon | England | 1990_White |
| 1957 | At the University of Pennsylvania in Philadelphia, cardiologist Claude Joyner and engineer John Reid (who had left Wild's laboratory in Minnesota to pursue a doctoral degree at the university of Pennsylvania) took up Edler's lead in 1957. Reid was responsible for constructing Joyner's equipment, which could display both the **EKG and echocardiogram simultaneously**. Joyner confirmed the diagnosis of mitral valvular disease based on ultrasound echoes, identified the tricuspid valve, and began clinical treatments based on the echocardiogram. | Claude Joyner<br>John Reid | USA | 2003_WFUMB HMU_05_17 |
| 1957~ | In 1957, Dr. Marinus de Vlieger was prompted to take up work with ultrasound by two neurological specialists at his university in Rotterdam, who had just returned from a visit to Leksell and Jeppson in Sweden. They were impressed with Leksell's ability to image midlines with industrial flaw-detection equipment. De Vlieger's early work, also done with industrial A-mode equipment, included scanning through the intact skull and scanning with a surgically opened skull to accurately correlate echo pattern with anatomical structures. In the early 1960s, he designed and constructed his own B-mode equipment, based on modification of his A-mode instrument to an intensity-modulated display on the oscilloscope screen. De Vlieger recognized that reflection and absorption of ultrasound by the adult skull seriously interfered with the procurement of informative echoes from within the brain and accordingly, like Leksell, did much of his research and clinical work on infants and young childen. But the clinical success of ultrasonic detection of shifts in the midline echo inspired many other investigators and clinicians. A tremendous expansion in **echoencephalography** took place in the late 1950s and early 1960s, thanks to its ease as an immediate noninterventionist screening technique. Investigators the world over took up the work, including Robert Ford and James Ambrose in the United Kingdom, H. R. Muller in Switzerland, D. N. White and David Makow in Canada, William Mckinney in the United States, and Toshio Wagai and colleagues in Japan. | Marinus de Vlieger<br>Robert Ford<br>James Ambrose<br>H. R. Muller<br>D. N. White<br>avid Makow<br>William Mckinney<br>Toshio Wagai | Netherlands<br>UK<br>UK<br>Switzerland<br>Canada<br>Canada<br>USA<br>Japan | 2003_WFUMB HMU_05_21 |
| 1957~ | Oksala's greatest accomplishment was the adaptation and interpretation of **A-mode presentation in ophthalmic diagnosis**. He first reported on the diagnostic use of A-mode in 1957 using echoes of ultrasonic pulses to locate foreign bodies in the eye. Brtween 1958 and 1964 he produced a series of papers with a number of colleagues, chlefly his scientific collaborator Antti Lehtinen, elaborating on his A-mode diagnostic techniques, which he applied to the diagnosis of retinal and choroidal detachment. diagnosis of intraocular tumors, and measurement of sound velocity in various parts of the eye. | Arvo Oksala | Finland | 2003_WFUMB HMU_05_29 |
| 1957~ | **lnterscience Research Institute,** a not-for-profit research institute located in Champaign, lll., was founded in 1957 by William J. Fry, Francis J. Fry, and Reginald C. Eggleton. In the 1960s, Elizabeth Kelly became Associate Director and later Vice President of that institute. In the field of medical ultrasound, the work at lnterscience Research lnstitute was concentrated in two areas: 1) development and application of high-intensity ultrasound instrumentation specifically designed to treat neurological or other brain-related disorders of human subjects, and 2) development of computer-based, low-intensity ultrasound instrumentation for visualization of the soft tissue. The work on the high-intensity ultrasound was remarkably successful. In cooperation with Dr. Russell Meyers, Chief of Neurosurgery at the University of Iowa School of Medicine, this instrumentation was used to treat a number of human patients suffering from various brain pathologies, and in particular Parkinson's disease. | William J. Fry<br>Francis J. Fry<br>Reginald C. Eggleton<br>Elizabeth Kelly<br>Russell Meyers | USA | 2003_WFUMB HMU_05_14 |

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| 1957-1961 | The **AIUM** also played a role in the international organization of ultrasound by sponsoring international meetings of ultrasound in medicine in conjunction with the international meetings of Physical Medicine and Rehabilitation in 1957, 1960, and 1961. | | USA | 2003_WFUMB HMU_04_38 | |
| 1958~1959 | Professor Ormerod was Chairman and Gordon Vice-Chairman at one of the sessions of the **First International Congress on Bio-Medical Engineering** held in the uncompleted UNESCO building in Paris in 1958. During this session a number of papers on medical ultrasound were read as was the case at the Second International Conferences in 1959 which was also held in Paris | Ormerod<br>Douglad Gordon | | 1990_White | |
| 1958 | And in the years ahead, Donald worked closely with engineer Tom Brown of the Kelvin & Hughes Scientific Instrument Company, physician John MacVicar, and others to investigate the value of ultrasound in differentiating between cysts, fibroids and other abdominal tumors, primarily in women; to measure with ultrasound the fetal head as a way of assessing fetal size and growth; and to build better instruments. Their seminal paper on the "Investigation of abdominal masses by pulsed ultrasound" appeared in The Lancet in 1958. That same year, Tom Brown patented the first compound B-mode contact scanner, which, unlike the early Howry models, did not need a water bath. | Ian Donald<br>Tom Brown<br>John MacVicar | England | 2003_WFUMB HMU_04_15 | |
| 1958 | In China, ultrasound diagnosis began in 1958 with the establishment of the Ultrasonic Medical Research Group at the Sixth People's Hospital in Shanghai. The group was led by Shih An. At first they used metal flaw detectors. | Shih An | China | 2003_WFUMB HMU_04_17-18 | |
| 1958 | **Doppler instruments were introduced into medicine** about 1958. | | | 2003_WFUMB HMU_17_02 | |
| 1958-1965 | The development of **Doppler** ultrasound paralleled that of 2D imaging. The earliest work, as already mentioned, was done in Japan. Another important research group emerged in the **U.S.** in 1958, at the **University of Washington in Seattle**. Led by pediatrician and physiologist Robert Rushmer the group included engineers Donald Baker, Dean Franklin and Dick Ellis, and focused on the development of cardiovascular instrumentation. Their work on continuous wave Doppler was transferred to Smith Kline Instruments, who used it to produce a popular fetal monitor, the Doptone, in 1965. | Robert Rushmer<br>Donald Baker<br>Dean Franklin<br>Dick Ellis | USA | 2003_WFUMB HMU_04_25 | |
| 1959~ | The Ultrasonic Research Section of the Commonwealth Acoustic Laboratories was established in Sydney in 1959. The Director of the Laboratories at that time was Norman E.Murray. George Kossoff, a recent graduate in Physics and electrical engineering, was appointed to head the section and direct its research. This was in contrast to other centres that were headed by clinicians. Kossoff attracted a very productive and inventive group of ultrasound researchers and under his direction they introduced new diagnostic methods, constructed new instruments that incorporated new and improved technologies and contributed to many areas of of medical ultrasound, especially fetal anatomy. The world's third (second?) clinical obstetrical center was established in conjunction with the Royal Hospital for Women also in 1959. All clinical research was undertaken under the auspices of Dr William Garrett at that Hospital. In 1975 the Section was formed as an independent Ultrasonics Institute of the Commonwealth Department of Health. The research of the Institute touched on applications of ultrasound within most medical applications through the investigation of engineers David Robinson, David Carpenter, Jack Jellins and Michael Dadd. Kossoff devoted much of his own effort to the development of clinical equipment, andan early project was the design of a compound scanning system for examining obstetric patients. The result was the UI Mark 1 scanner (called in publications the CAL Commonwealth Acoustic laboratories Echoscope), a compound water bath scanner completed in 1962. | George Kossoff<br>Norman E. Murray<br>David Robinson<br>David Carpenter<br>Jack Jellins<br>Michael Dadd | Australia | 2003_WFUMB HMU_04_18<br>2003_WFUMB HMU_05_26<br>2014_George Kossoff (personal communication) | Is this third or secons? |

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| 1959 | In 1959, they convened the first National Ultrasound Conference in Wuhan, where the broader medical community of China was informed about the usefulness of ultrasonics. | | China | 2003_WFUMB HMU_04_18 |
| 1959 | By 1959, **Polaroid film** was available for faster image retrieval. | | | 2003_WFUMB HMU_04_22 |
| 1950s | During the 1950s a number of Japanese pioneers had presented papers at the biennial meetings of the Acoustical Society of Japan. Unlike the papers presented by the Americans at the meetings of the American Congress of Physical Medicine, these papers were largely devoted to the use of ultrasound in diagnosis as well as its bioeffects. From 1956 onwards many papers also described the ultrasonic Doppler effect which was first discovered by Satomura of Osaka University. | | Japan | 1990_White |
| 1950s | In the fifties a number of Japanese pioneers presented papers on medical and biological ultrasound at the biennial meetings of the Acoustical Society of Japan. | | Japan | 2013_Kossoff |
| 1950s | Two pioneering workers, Dr. Arvo Oksala in Finland and Dr. Gilbert Baum in the United States, greatly expanded the use of **ultrasound in ophthalmology** cluring the 1950s. | Arvo Oksala<br>Gilbert Baum | Finland<br>USA | 2003_WFUMB HMU_05_29 |
| mid 1950s | In the mid fifties Dr. Ian Donald of Glasgow started to use industrial flaw detection equipment to examine the abdomen and was able to distinguish between ascites, ovarian cysts and fibroids. Shortly thereafter he began collaboration with Tom Brown, an engineer, and they built a mechanical compound scan scanner that provided encouraging images of the abdomen and pregnant uterus thus launching the use of diagnostic ultrasound in obstetrics and gynecology | Ian Donald<br>Tom Brown | England | 2013_Kossoff |
| mid 1950s~ mid 1960s | At the University of Illinois at Champaign a major research team emerged in the 1950s under Professor William J. Fry, a physicist with a strong interest in biophysical problems. During the Second World War, Fry worked on design of piezoelectric transducers at the Naval Research Laboratory (NRL) Underwater Sound Division in Washington, D.C. He left the NRL in 1946 to accept a professorship at the University of Illinois at Champaign, where he founded the Bioacoustics Laboratory. There he and his brother, Francis J. Fry, carried out research on various aspects of ultrasound with particular attention to applications in biology and medicine. From the mid-1950s to the mid-1960s, a number of young individuals who are currently working in the field of medical ultrasound (or in some aspect of health care) were part of the research team of the Bioacoustics Research Laboratory. These included. in addition to Francis J. Fry, Reginald C. Eggleton, Joseph Pankau, Elizabeth Kelly, and Floyd Dunn. | William J. Fry<br>Francis J. Fry<br>Reginald C. Eggleton<br>Joseph Pankau<br>Elizabeth Kelly<br>Floyd Dunn | USA | 2003_WFUMB HMU_05_14 |
| late 1950s-mid 1960s | In the late fifties and mid- sixties several meetings were held in England to discuss medical applications of ultrasound. Initially these were held as sessions in Bio-Medical Engineering Congresses and later as dedicated symposia. Dr. Douglas Gordon was an enthusiastic promoter of these meetings, his interest being primarily ehoencephalography. Several other similar medical ultrasound meetings were also held throughout Europe during this period. Although all of these meetings attracted reasonable interest no specific societies were formed as follow-up. | Douglas Gordon | England | 2013_Kossoff |
| late 1950s | However, ill patients could not reasonably be immersed for the long periods then required for scanning. A final incarnation, the **pan-scanner**, was developed at the University of Colorado Medical Center in the late 1950s under a Public Health Service Grant. This scanner, in which a transducer carriage rotated on a semicircular water-filled pan that was strapped to the patient's body, was developed specifically to eliminate the need for total immersion of ill patients. | | USA | 2003_WFUMB HMU_05_11 |
| 1960 | When the Third International Congress on Medical and Biological Engineering was held at Olympia in London in 1960, Roger Warwick of Guy's Hospital, held a satellite symposium on the Biological Uses of Ultrasound at the Ciba Foundation on July 22 and this appears to have been the **first meeting wholly devoted to medical ultrasound held in Europe.** | Roger Warwick | UK | 1990_White |

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| 1960 | Aloka produced their first commercial medical A-scanner, the SSD-2, in 1960. | | Japan | 2003_WFUMB HMU_04_19 |
| 1961 | In Japan, the ultrasound pioneers presented their papers at the biennial meetings of the Acoustical Society of Japan. Unlike the papers presented at the meetings of the American Congress of Physical Medicine, they dealt mostly with the diagnostic uses of ultrasound, bioeffects, and the Doppler effect. The Japan Society of Ultrasonics in Medicine was formed in 1961. | | Japan | 2003_WFUMB HMU_04_39 |
| 1961 | Following this meeting Douglas Gordon organised an Ultrasonic Diagnostic Discussion Group which held its first meeting at the Royal Society of Medicine in November 1961. He reported on this meeting in a Bulletin of which 15 subsequent issues were printed at irregular intervals during the following six years | Douglas Gordon | England | 1990_White_04 |
| 1961 | the Japan society founded in 1961 | | Japan | 1990_White |
| 1961 | The second oldest US society in the world is the **JSUM** established in 1961. It focused mainly on diagnosis from the very beginning. | | Japan | 2001_Watanabe |
| 1961 | In 1961 a Symposium on the Present State of the Application of Ultrasound in Medicine was held in Kyoto as a satellite meeting of the Association of Japanese Electro-Engineering Research. Twenty-seven of the persons attending agreed to form a small society to discuss Ultrasonics in Medicine at regular intervals. Drs. Toshio Wagai of Juntendo University and Masunao Oka of Osaka University were elected to explore this possibility. As a consequence the **first meeting of the Japan Society of Ultrasonics in Medicine was held at Juntendo University in Tokyo on May 10, 1961**. This meeting was attended by 209 registrants and 29 papers were presented. | Toshio Wagai<br>Masunao Oka | Japan | 1990_White |
| 1961 | In 1961 a group of investigators met at a Symposium on the Present State of Applications of Ultrasound in Medicine held in Kyoto and agreed to form the **Japan Society of Ultrasonics in Medicine (JSUM)**. Dr. Toshio Wagai was elected President and the first meeting of the Society was held in Tokyo in 1961. The Society met biannually at first and has continued to meet annually. The proceedings of these meetings have been published regularly in Japanese, and selected papers in English. The growth of the Society has been most impressive. In 1974 it proceeded to establish its journal “Japanese Journal of Medical Ultrasonics” which continues to be published today. | Toshio Wagai | Japan | 2013_Kossoff |
| 1961 | The **Diasonograph**, as it became to be called, was manufactured commercially by Smith Industries of UK, which had taken control of Kelvin and Hughes in 1961. Work on the fetal biparietal diameter began to be published in 1961. Thanks in large part to the work of this group, the application of ultrasound to obstetrics began to expand and gain world-wide recognition. | | England | 2003_WFUMB HMU_04_15 |
| 1961 | Although the idea for 3-D imaging goes back to Gilbert Baum, who together with Ivan Greenwood produced **3-D images of the eye** in 1961, the application of the computer to image processing in the mid 1980s and early 1990s made 3-D imaging a clinical reality. | Gilbert Baum<br>Ivan Greenwood | USA<br>USA<br>Sweden | 2003_WFUMB HMU_04_26 |

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| 1961~1964 | Howry's team recognized the problems inherent in the water-bath coupling system; furthermore, by this time several other investigators, including Wild and Reid and Ian Donald's group in Glasgow, had published on their work with direct contact scanners.<br>Engineers William Wright and EdMeyer, who collaborated with Howry's multidisciplinary research team beginning in 1960, constructed a compound contact scanner between 1961 and 1962 in which a transducer was mounted within a scanning head which in turn was positioned by an operator. In 1961 Wright and Meyer left the project to form Physionics Engineering, Inc., a commercial enterprise that in 1962 produced the prototype of the porta-arm scanner, the **first articulated-arm handheld scanner commercially available in the United States**; **Physionics** marketed this scanner from 1964. The three-jointed scanning arm incorporated positioning potentiometers at each joint. | William Wright<br>EdMeyer | USA | 2003_WFUMB HMU_05_12 |
| 1962-1963 | The second and third meetings were held in May 1962 and 1963 following which it was decided that future meetings would be biennial as they have been ever since. At the fourth meeting in November 1963 the Constitution of the Society was agreed. The Japan Society of Ultrasonics in Medicine therefore was, from the **first a scientific society devoid of commercial affiliations**. It is the Japanese therefore, that have the honour of being the first to hold regularly recurring scientific meetings devoted to ultrasonic diagnostic techniques. At the same time the Japanese published regularly the proceedings of these early meetings in English in a journal called Japanese Medical Ultrasonics which also appeared twice yearly. | JSUM | Japan | 1990_White |
| 1962 | In December 1962 he (Gordon) organised a symposium on Ultrasound as a Diagnostic and Surgical Tool at The Royal College of Surgeons in London (Gordon 1964; and Fig. 8). This meeting was held during the last "pea soup" fog that was ever to afflict London and one wonders if this was symbolic and, if so, what it symbolised. | Douglas Gordon | England | 1990_White |
| 1962 | Even at the seventh meeting of the Institute in New York in August 1962 every one of the ten papers read at the meeting was concerned with ultrasonic therapy. | | USA | 1990_White |
| 1962 | The medical physicist Peter Wells developed his version of the multi-joint articulated arm scanner based on Diasonograph electronics and put it to clinical use in Bristol, England in 1962. | Peter Wells | England | 2003_WFUMB HMU_04_22 |
| 1962 | In 1962, the Radio and Electrical Division of the NRC received an application from Dr. D. N. White, a physician who had emigrated to Canada to work at Queens University, Kingston, Ontario, after training and eight years of clinical experience in his native England. White's application proposed development of an ultrasonic brain scanner, with the goal of imaging intracranial structures. Collaboration began, and Makow and White decided to attempt a compound B-mode machine employing a water bath. Two-dimensional images of metal test objects within cadaver skulls were obtained and some success at imaging ventricular structures in human subjects was later achieved. When collaboration with White ended, Makow turned to other avenues of clinical studies, and ultimately the machine was used clinically in studies at the Montreal Neurological Institute. These studies prompted improvements to the scanning system; in the end, Makow's chief technical contributions were development and construction of a **complete brain scanner system**, which incorporated water bath coupling, two transducers scanning simultaneously from either side of the head, and gaindepth circuit control initiated by the first reflected pulse to the transducer | Denis White<br>Makow | Canada | 2003_WFUMB HMU_05_22 |
| 1962 | The first meeting on medical and biological ultrasound which had **substantial international participation** was organised. The proceedings of this meeting were published through the editorship of Dr. E. Kelly by the University of Illinois Press in 1965 | Prof. W. Fry | Allerton Park, USA | 1984_Kossoff |

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| 1963 | M-mode was also widely used to confirm fetal life by detecting early fetal heart movements. Smith Kline-Precision of Tarrytown, NY, working in collaboration with Branson Instruments of Stamford, CT, introduced the **Ekoline 20**, an A-mode and B-mode instrument for echoencephalography, in 1963 | | USA | 2003_WFUMB HMU_04_20 | |
| 1964 | In 1964 a group of Eastern European ophthalmologists formed the **Societas Internationalis pro Diagnostica Ultrasonica in Ophthalmologia (SIDUO)**, a society dedicated to ophthalmology. The Society held its first international symposium in East Berlin that year. The second meeting of the Society was held two years later in Brno, Czechoslovakia. All topics at the meeting were related to ophthalmic applications with the exception of the one presented by Dr. Denis White, a neurologist from Kingston, Canada, who spoke on echoencephalography. White strongly encouraged the Executive of SIDOU to open its membership to every aspect of diagnostic ultrasound. This was agreed to and White was appointed as Head of the International Committee for the next meeting. At the Brno meeting it was agreed that the third meeting of the society would be held in 1969 in Vienna even though, because of the Iron Curtain, this would represent difficulty for physicians from Eastern Europe to attend. Dr. Karl Ossoinig was appointed Secretary to organize the meeting at which Dr. J. Bock was to be president. | Denis White | | 2013_Kossoff | |
| 1964 | Ophthalmic applications of ultrasound were developing rapidly during this period and a relatively small but active group of mostly European ophthalmologists established in 1964, the third ultrasound organisation, Societas Internationalis pro Diagnostica Ultrasonica in Ophthalmologia (SIDUO) | SIDUO | | 1984_Kossoff | |
| 1964 | SIDUO founded in 1964. | SIDUO | | 1990_White | |
| 1964 | The first international organization for US was the Societas Internationalis pro Diagnostica Ultrasonica in Ophtalmologia (SIDUO). Although US in the field of ophthalmology has not been very active in recent years, this was the leading field in the early days. Its first congress was organized in 1964 in Berlin, and the third one in 1969 in Vienna. | SIDUO | | 2001_Watanabe | |
| 1964 | The problems inherent in this kind of water-bath coupling system for ill patients were obvious. So engineers William Wright and Ed Meyer, working with Howry's research team, built a scanner that utilized the principle of compound scanning, came in direct contact with the skin, had an articulated arm to which the transducer was attached and could be easily manipulated and moved. This **Porta-arm scanner,** marketed by Physionics, enjoyed **wide-spread clinical use beginning in 1964**. | William Wright<br>EdMeyer<br>Howry | USA | 2003_WFUMB HMU_04_13 | |
| 1964 | Furthermore, in 1964, a group of Eastern European Ophthalmologists joined to conceive an organization committed to diagnostic ultrasound in opthalmology. This organization, the Societas Internationalis pro Diagnostica Ultrasonica in Opthalmologia (SIDUO), was to become the forerunner of WFUMB | SIDUO | | 2003_WFUMB HMU_18_01 | |
| 1964 | Other researchers, like Howry and Holmes and their group in Denver, who were primarily interested in producing pictures of soft-tissue structures, started as early as the late 1940s to build instruments which would produce a two-dimensional 'slice' picture of reflecting tissue interfaces in the flat plane being scanned. In order to do this they had to move the transducer around the body. After experimenting with various water bath systems and seeing their limitations, two of Howry's engineers – William Wright and Ed Meyer (Ralph Edward Meyerdirk??) – left the project to form their own company, **Physionics Engineering**, Inc., where they built a manually-operated, articulated-arm contact scanner using B-mode display, and **began marketing it in 1964.** | William Wright<br>Ralph Edward Meyerdirk | | 2003_WFUMB HMU_04_21 | Is this name 'Ralph Edward Meyerdirk' correct? |

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| 1964 | Donald, Brown, and technical collaborators John E. E. Fleming and A. J. Hall therefore dedicated themselves to producing better mechanical scanners in which the sectoring motion depended upon the action of the operator. Several subsequent models incorporated various improvements, followed by the Diasonograph, introduced commercially by Nuclear Enterprises in 1964, representing the major commercial innovation resulting from this fruitful collaboration. | | | 2003_WFUMB HMU_04_25 |
| 1964~1966 | Furthermore, in 1964, a group of Eastern European Ophthalmologists joined to conceive an organization committed to diagnostic ultrasound in opthalmology. This organization, the Societas Internationalis pro Diagnostica Ultrasonica in Opthalmologia **(SIDUO)**, was to become the forerunner of WFUMB. SIDUO had its first international symposium, organized by Dr. Werner Buschman and Prof. Dr. Karl Velhagen residing as the first president, in 1964 at the Augenklinik of Humboldt University in East Berlin, East Germany. This symposium was so successful that they scheduled another for 1966 at the University of Purkyne in Brno. Dr. Juliana Presova and Prof. Dr. Jan Vanysek, president, organized this symposium. At this point, all of the members of SIDUO were opthalmologists and all topics of discussion related to diagnostic ultrasound in opthalmology with one exception. | Werner Buschman<br>Karl Velhagen<br>Juliana Presova<br>Jan Vanysek | Germany | 2003_WFUMB HMU_18_01 |
| 1964~ | The first meeting of this proposed society was held in East Berlin under the presidency of Professor Dr. Karl Velhagen and was organised by Dr. Werner Buschmann. Like Douglas Gordon, Buschmann also deplored the segregation of Eastern and Western European scientists and his difficulties in attending meetings and collaborating with colleagues in the West made him determined to try and make this society, its membership and its meetings international and divorced from politics. He therefore used a pseudo-Latin title for the first meeting which was called the Symposium Internationale de Diagnostica Ultrasonica in Ophthalmologia. The symposium was held from June 3-5, 1964 in the Augenklinik of Humboldt University. It was truly international with a number of foreigners represented on the Praesidium as well as presenting papers (Buschmann and Hildebrandt 1965). Everyone who attended voted the symposium a resounding success. Apart from the interest of the scientific communications, the happy and harmonious atmosphere between the Eastern and Western participants who had previously found it hard to meet, was enhanced by the hospitality of the hosts. They arranged a performance of Fledermaus at the State Opera which was followed the next day by a boat trip down the River Spree on a glorious summer afternoon while the registrants drank white wine and discussed many matters. It was natural that this symposium should be repeated three years later at the University of Purkyne in Brno under the presidency of Prof. Jan Vanysek and organised by Dr. Juliana Preisova. Eightyseven registrants attended this meeting which retained its international representation. The good fellowship that has marked all these symposia was continued at Brno where relaxed conversation and discussion took place, not in the afternoon on a river, but in the evening in a famous restaurant situated in a wine cellar outside Brno! It was at this meeting that Dr. Buschmann's conception was brought into being and the Societas Internationalis pro Diagnostica Ultrasonica in Ophthalmologia (SIDUO) was formed with Prof. Dr. Jan Vanysek as its first President and Arvo Oksala as Vice-president and Hermann Gernet as Secretary. Prof. Vanysek was a very eminent ophthalmologist who made the mistake of strongly backing the reforms then being brought to Czechoslovakia by Alexander Dubcek after his elevation to First Secretary of the Czeck Communist Party in January 1968. When the USSR invaded Czechoslovakia in August of that year and replaced Dubcek, Vanysek was forced to resign from his academic appointments. SIDUO however, refused to replace him as president and he was able to attend their next meeting even though it was held in Vienna in 1969. At Brno it was also decided that future SIDUO meetings would be held at two-yearly instead of three-yearly intervals and that the Vienna meeting | Werner Buschman<br>Karl Velhagen<br>Juliana Presova<br>Jan Vanysek<br>Boeck<br>Karl Ossoinig<br>Arvo Oksala<br>Hermann Gernet | Germany | 1990_White |

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| 1964~ | In May 1964 Gordon organised a second symposium at the Royal Society of Medicine in London. Following this Iliffes, the Publishers, asked Basil Brown of Salford College of Advanced Technology to edit a book on **Ultrasonic Techniques in Biology and Medicine**. During the preparation of this book Brown organised a Symposium on Ultrasonic Techniques in Biology and Medicine at Salford in May 1966. Shortly afterwards he accepted an appointment at Istanbul so Douglas Gordon, who had contributed three of the thirteen chapters, took over as joint editor (Brown and Gordon 1967). The British were not the only nation to organise such meetings and in April 1963 Professor Dr. ter Braak of the Netherlands organised a discussion group in Rotterdam, while, in 1967, the neurosurgeons held an International Symposium on Echo-Encephalography in Erlangen, Germany (Kazner et al. 1968). The great interest, at that time, in echoencephalography was further demonstrated in 1970 when Carlo Alvisi founded the Italian Society of Echoencephalography, some three years before he founded the Italian Society for Ultrasound in Medicine. | Basil Brown<br>Gordon | | 1990_White |
| 1964-1967 | **The first international organization for ultrasound was formed by European ophthalmologists**. It was called by the pseudo-Latin name of Societas Internationalis pro Diagnostica Ultrasonica in ophthalmologia (SIDUO) and reflected both the early interest in and application of ultrasound to the study and treatment of the eye as well as the political realities of the Cold War. The goal of the society was to make its membership and meetings truly international and divorced from politics. Their first congress was in East Berlin in 1964 and their second in Brno, Czechoslovakia, in 1967. | SIDUO | | 2003_WFUMB HMU_04_40 |
| 1965 | When the B-mode was converted to the M-mode in 1965, the **Ekoline 20** became the dominant instrument for echocardiography as well and often was the first instrument available for many start-up clinical diagnostic ultrasound laboratories. | | USA | 2003_WFUMB HMU_04_21 |
| 1965 | The **first commercial real-time scanner, the Vidoson**, was developed by Richard Soldner and manufactured by Siemens Medical Systems of Germany in 1965. It sold well in West Germany but because it used a water bath it did not sell well in the U.S. | Richard Soldner | Germany | 2003_WFUMB HMU_04_23<br>Personal communication with Harald Lutz |
| 1965 | the First International Conference on Diagnostic Ultrasound which was held in 1965 and was organised and held with the sponsorship of the University of Pittsburgh. The proceedings of this meeting were published by Plenum Press in 1966. | Dr. C. Grossman<br>Dr. J. Holmes<br>Dr. C. Joyner<br>Dr. E. Purnell | University of Pittsburgh. | 1984_Kossoff |

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| 1965 | Dr. Harvey Feigenbaum, working at the University of lndiana at Indianapolis, was a crucial pioneer in the clinical application of ultrasound in cardiography. Becoming intrigued by ultrasound after reading a commercial advertisement and examining for himself some of the available equipment, he obtained a Smith Kline A-mode machine from a neurologist at the university who had originally purchased the machine to do midline determinations. Using this instrument. supplemented by an M-mode attachment provided by Smith Kline Instruments, Feigenbaum began studies of pericardial effusion that resulted in his first publication in ultrasound in 1965. Feigenbaum's research in pericardial effusion demonstrated a valuable and relatively simple diagnostic application for ultrasound, and greatly stimulated interest in ultrasound among cardiologists in the United States. In addition, like many clinical pioneers in various specialties, who often had to teach themselves scanning and interpretive techniques on commercial equipment virtually abandoned by other researchers, Feigenbaum committed himself to education and training in ultrasonic techniques. He developed courses and provided training fellowships in echocardiography at the University of lndiana at a time when such training was "catch-as-catch-can." | Harvey Feigenbaum | USA | 2003_WFUMB HMU_05_18 |
| 1965~1968 | Presumably Dr. Joseph Holmes was one of those who doubted the ability of Fry to convert the American Institute into an independent scientific society because, he and the three colleagues who organised the conference on Diagnostic Ultrasound in Pittsburgh in 1965 (Figs. 2 and 3), announced at the conference the formation of the American Society for Diagnostic Ultrasound. Its purpose was to organise future conferences with Dr. Holmes as the first President (Grossman et al. 1966). A schism amongst American ultrasonologists was avoided when, after William Fry's unfortunate death in 1968 during his Presidency of the American Institute, Holmes was elected as the next President and the American Society was disbanded. | Dr. C. Grossman<br>Dr. J. Holmes<br>Dr. C. Joyner<br>Dr. E. Purnell | USA | 1990_White |
| 1966~1969 | One member of the society, Dr. Denis White from Canada and also a member of AIUM, was not an ophthalmologist and, consequently, spoke of non-opthalmological topics in diagnostic ultrasound. Regardless, White was still appointed the Scientific Consultant to the Brno meeting. However, White was not comfortable with the strict selectivity of the society; thus, he explained to the presidium that he could no longer remain a member of the society since he was not an opthalmologist. The result was a major turning point in the field of ultrasound; **the society opened its membership to every aspect of diagnostic ultrasound** and appointed White as the Head of the International Committee for the next meeting to be held in 1969 in Vienna at the Hofburg Palace in the Hapsburg Austro-Hungarian Empire. Due to these changes, **the 1969 meeting in Vienna would customarily be called the Third international symposium of SIDUO but it would also be the First World Congress on Diagnostic Ultrasound** organized by Dr. Karl Ossonig with Prof. Dr. Brock as president. | Denis White | Canada | 2003_WFUMB HMU_18_01 |
| 1968 | Another important meeting was held in the United States in May 1968 when Ray Brinker of the University of Washington at St. Louis, organised the first Symposium ever devoted entirely to the medical applications of ultrasonic Doppler techniques. | Ray Brinker | USA | 1990_White |
| 1968 | In the United States, Congress passed in 1968 the **Radiation Control for Health and Safety Act**, empowering the regulation of manufacture of all radiation-emitting electronic products including those which emit ultrasonic energy. The major government regulatory agency was the U.S. Food and Drug Administration (FDA). | | USA | 2003_WFUMB HMU_04_33-34 |

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| 1968 | After the death of William Fry in 1968, Francis Fry became Director of Research of lnterscience Research Institute. In that position, he worked with Dr. Robert Heimburger, Chief of Neurosurgery in the Department of Surgery of Indiana University School of Medicine, in demonstrating that high-intensity ultrasound could be used for the destruction of brain tumors. During that same period, Elizabeth Kelly became Chief Investigator under a National Cancer lnstitute contract to carry out a three-year study on the use of ultrasound for the detection of breast cancer | Francis Fry<br>Robert Heimburger<br>Elizabeth Kelly | | 2003_WFUMB HMU_05_14 |
| 1968 | The use of contrast media, a crucial innovation in echocardiographic diagnosis, was pioneered successfully by Dr. Ray Gramiak. In 1965, after many years in private practice as a radiologist, Gramiak joined the staff of the University of Rochester School of Medicine in Rochester, N.Y., and began working with a Physionics M-mode contact scanner purchased by the medical center's radiology department. A central problem in echocardiography was the accurate identification of echoes from the various cardiac structures. In 1968 the Gramiak team published their contrast technique for echocardiographic recognition of the aortic root and aortic valve. The technique involved intracardiac injection of indocyanine green dye; the microbubbles formed by cavitation<br>at the needle's tip provided a strongly echoic contrast medium, and location of imaged cardiac structures could be directly correlated with the site of injection | Raymond Gramiak | USA | 2003_WFUMB HMU_05_18 |
| 1968 | In 1968 Jan C. Somer of the Netherlands developed a prototype of a **phased-array transducer** for two-dimensional imaging. | Jan C. Somer | Netherlands | 2003_WFUMB HMU_05_19 |
| 1968-1972 | Seminal papers by Jan Somer of the Netherlands on phased array sector scanning (1968), by Nicolaas Bom, also of the Netherlands, on linear array real-time scanning (1971), and by George Kossoff of Australia on the use of gray scale (1972) spurred the development of a new generation of real-time scanners with much greater resolution and more applications. | Jan C. Somer<br>Nicolaas Bom | | 2003_WFUMB HMU_04_24 |
| 1969-1973 | Discussions to publish a **WFUMB journal** commenced immediately after the first Vienna Congress. Between 1969 and 1973 Drs. de Vlieger and White visited a number of publishers to discuss the proposal. These discussions were complicated by the fact that **WFUMB at that time did not exist and had no funds**. It was therefore essential that the publication not incur any financial loss. **Pergamon Press** was the only publisher willing to concede ownership of the journal and the list of subscribers to WFUMB, to meet all potential losses, and to share profits with the Federation. Marinus de Vlieger and Denis White recommended that Pergamon Press be accepted as publisher of the journal and that it be named **Ultrasound in Medicine and Biology (UMB)**. This was agreed to at the Rotterdam Congress in 1973. | de Vlieger<br>Denis White | Netherlands<br>Canada | 2013_Kossoff_20 |
| 1969~1973 | This First World Congress was a major watershed. It inspired the idea that there should be a permanent organization responsible not only for the organization of future congresses but also a central body for setting standards and safeguarding the interests of ultrasonographers around the world. This idea gave birth to the world federation. Denis White of Canada was given the task of drafting a tentative Constitution for this new organization, which would be discussed at the next planned world congress in Rotterdam, Holland, in 1973. As a model he used the Constitution of the Alliance for Engineering in Medicine and Biology. | | | 2003_WFUMB HMU_04_40 |
| 1969-1978 | The Ul's Mark II equipment, which also employed a water bath echoscope, was in use from 1969 until 1978. This instrument also incorporated aspects of gray scale, greatly enhancing Garrett's imaging capabilities in his clinical practice. | | | 2003_WFUMB HMU_05_27 |

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| 1969 | Practical exigencies of needing to get more registrants and the wish to enlarge the scope of future meetings to encompass all the fields of diagnostic ultrasound resulted in the **First World Congress on Ultrasonic Diagnostics in Medicine and SIDUO III**, which was held in Vienna in 1969. | | Vienna | 2003_WFUMB HMU_04_40 |
| 1969 | The international composition of this organisation and the very rapid growth in interest in ultrasound which was occurring in the late sixties encouraged the Council of this SIDUO to alter the structure of its proposed third meeting to include internationally all aspects of ultrasound diagnosis. Under the secretariatship of Dr. C. Ossoinig and the chairmanship of Prof. D. White of the International Committee, the First World Congress on Ultrasound Diagnostics in Medicine was held in Vienna in June 1969. The proposed SIDUO III was incorporated in the Congress and a special session of the AIUM was held at the meeting. The Congress was a resounding session attended by over seven hundred registrants representing twenty-six nationalities and at which two hundred and sixteen papers were presented. The proceedings of the Congress were published by Verlag der Wiener Medizinischen Akademie in 1970 under the editorship of Prof. J. Bock and Dr. C. Ossoinig. During the course of the Congress representatives from SIDUO, Japan, North America, Europe and Australia met and discussed the possibility of forming the Federation. A working committee was set up composed of Drs. de Vlieger and White and was charged both with the task of preparing a draft Constitution and By-Laws for the Federation as well as the task of exploring with various publishers the terms under which it would be possible to inaugurate the publication of a scientific journal for the Federation. It was also decided that the Second World Congress would be held in Rotterdam in 1973 under the Presidency of Dr. de Vlieger. | Dr. D. White<br>Dr. C. Ossoinig | Vienna | 1984_Kossoff |
| 1969 | When Karl Ossoinig started to organise the third SIDUO meeting in Vienna he was faced with a difficulty which was to play a vital part in the formation of the World Federation. He found that the Austrian Government was unwilling to give any financial assistance to small meetings such as the first two SIDUO meetings had been. Moreover living in Vienna he was anxious to hold the conference amidst some of the historical and beautiful buildings of that city. However the authorities would not allow the Hofburg Palace to be used for any conferences of less than 300 registrants. He therefore decided to enlarge the scope of the Vienna SIDUO meeting and make it into a truly World Congress encompassing all aspects of diagnostic ultrasound. Since Denis White had been an advocate of enlarging the scope of future meetings to encompass all the fields of diagnostic ultrasound when the matter was discussed by the Praesidium in Brno, Ossoinig called upon him to head the International Committee which was composed of Anna Bertenyi, Ian Donald, Inge Edler, Hermann Gernet, Helmuth Hertz, Joseph Holmes, George Kossoff, Arvo Oksala, Jacques Poujol, Jan Vanysek and Marinus de Vlieger. Thus the First World Congress on Ultrasonic Diagnostics in Medicine and SIDUO III was held in Vienna from June 2-7, 1969 under the presidency of Prof. Dr. Boeck amidst the splendours of the Habsburg Austro-Hungarian Empire in the Hofburg Palace. It was widely attended by registrants from all over the world and 190 scientific papers were presented (Bock and Ossoinig 1971). It was voted a huge success, in no small part due to the magnificent hospitality of the Viennese hosts. The pattern established in East Berlin was followed with a "Heuriger" evening when the participants drank the new wine in the Viennese woods. Subsequently there was a visit to the State Opera and an evening buffet at the Auersperg Palace. | | Vienna | 1990_White |

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| 1969 | Anticipating the advantages of being part of such a World Federation, the **British Medical Ultrasonics Group which was sponsored by the British Institute of Radiology**, was formed in December 1969. This group, which had no constitution, officers or dues and did not wish to become lost in the European Federation when it was later formed, was to give rise to difficulties in calculating the dues they should pay to the World Federation. | | | 1990_White | |
| 1969 | Under the circumstance of its origins, it was only natural that, at some stage, discussions on US at an international level would eventually be necessary, when results of developments made by the early pioneers were disclosed between them. The first World Congress of Ultrasonic Diagnostics in Medicine was organized in Vienna in 1969, by mutual agreement. The above-mentioned first World Congress was actually formed as a part of this SIDUO III, and with the intensive support of SIDUO itself. **The World Congress thus owed a debt to SIDUO; hence, this organization was included as a member society of WFUMB when WFUMB was formed later**, in spite of the nature of SIDUO, which was not a geographic federation but rather a specialty group. The WFUMB Constitution, Article 4.3.2, states that: "Not more than one international specialty organization may become affiliated for any specialty". This sentence conflicts with the basic policy of WFUMB, consisting of geographic federations, but is a remaining trace of the history with regard to SIDUO, which now has, in fact, almost dissolved. **It must be noted that participants in the World Congress in Vienna gathered not as national delegates, but as individuals.** The idea was created among them, however, that a joint international organization, to consist of national or federational units, should be established as a matter of urgency because, even at that period, several national bodies had already been set up in the United States, Japan, Germany and Australia. Thus, a tentative plan was mooted that the detailed rules for the organization would be completed before the next World Congress to be held in Rotterdam 3 years later. | | | 2001_Watanabe | |
| 1969 | In March 1969 Dr. H.-R. Muller of Basel organised an International Symposium on Ultrasonic Tomography | Hans Muller | Switzerland | 1990_White | |
| 1969 | Responding to this, the **European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB)**, made up of the national US societies in Europe, was established in 1969 (1972?) and became the first geographic federation to be affiliated to WFUMB when it was later formed. | | | 2001_Watanabe | EFSUMB established in 1972. Correct? |
| 1969 | Around 700 international experts met in Vienna to discuss the latest advancements in ultrasound, such as a new technique called real time imaging, and of approximately 200 scientific papers. That was back in 1969 when for the first time physicians and scientists from around the world came together in Austria's capital to share their knowledge of the use of ultrasound waves in medicine. The success of the meeting led to the founding of the World Federation of Ultrasound in Medicine and Biology, WFUMB, four years later. | | Vienna | 2013_ICUS website | |
| 1969 | In 1969 The Societas Internationalis pro Diagnostica in Ophtalmologia, SIDUO organized its Third International Symposium in Vienna, and an International Congress on Diagnostic Ultrasound was included in this Symposium. Based upon efforts to expand the cooperation on an international basis it was decided to create a non-profit scientific organization as a Federation of Organizations with interest in Diagnostic Ultrasound. A Working Committee adopted by SIDUO and chaired by Dr. Vlieger, member of SIDUO and president of EFSUMB, Netherlands, Dr. Brown, USA, Dr. Wagai, Japan, Dr. Oksale, Finland, Dr. Kossoff, Australia and Dr. White, USA was formed and a constitution for the Federation, now called the World Federation for Ultrasound in Medicine and Biology, WFUMB was formulated. Dr. Vlieger was the President. | | | 2013_WFUMB website | |

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| 1969 | The first “World Congress of Ultrasound” was held in Vienna in 1969. At that time, 700 international participants presented over 190 scientific papers. | | Vienna | 2011_ECHOES_Summer |
| 1969 | The Organizers of the Vienna Congress had anticipated that discussions would be held at the meeting to form a World Society of Ultrasonics Diagnostics in Medicine and formally set up an Organizing Committee to consider this task. The First Meeting of the Organizing Committee of the “World Federation of Ultrasound in Medicine and Biology” was held on the last day of the Congress. The Organizing Committee consisted of twelve members: A. Oksala, J. Vanysek and J. Francois representing SIDUO; Y. Kukuchi, T. Wagai and M. Oka representing Japan; M. de Vleiger, I. Edler and A. Kratochwil representing Europe; D. White and R. Brown representing the AIUM; and G. Kossoff representing Australia.<br>The Organizing Committee:<br>1. Elected M. de Vlieger and R. Brown as Chair and Secretary for their meeting,<br>2. Agreed that the Vienna Congress was an overwhelming success and endorsed staging the next World Congress under the auspices of WFUMB that would be held four years later in Rotterdam (in 1973) with M. de Vlieger as Chairman,<br>3. Set up a Working Group to formulate the Constitution and the By-laws for the new Federation. The representatives to this Committee were M. De Vlieger representing Europe; R. Brown representing the AIUM; T. Wagai representing Japan; A. Oksala representing SIDUO; G. Kossoff representing Australia; and D. White as Consultant to the Group. The Group was charged to prepare a draft of the Constitution and By-laws, distribute these to the Organizing Committee for comment and prepare the final document for approval at the Rotterdam Congress.<br>4. Commissioned M. de Vlieger and D. White to begin negotiations to publish a WFUMB journal,<br>5. Elected M. de Vlieger and R. Brown President and Secretary of the Administrative Committee until the 1973 meeting in Rotterdam.<br>Because 1) the concept for WFUMB was anticipated before the Vienna Congress, 2) the first meeting of the Organizing Committee of WFUMB was held at that Congress, and 3) M. de Vlieger was elected President of that Committee and Chairman of the Rotterdam Congress, **some refer to the Vienna Congress as the first WFUMB Congress and consider M. de Vlieger to be the first President of WFUMB. This interpretation is not correct**, as WFUMB did not exist as an entity until after it was approved by the General Assembly at the Rotterdam Congress. | | Vienna | 2013_Kossoff |
| 1969 | But continuous wave Doppler had its limitations because it did not provide information about the distance between the transducer and the moving target. The introduction of **pulsed Doppler** in 1969, by Donald Baker in the U.S., Peter Wells in England, and Pierre Peronneau in France, corrected that problem and allowed for much more accurate measurements of blood velocity. | Donald Baker<br>Peter Wells<br>Pierre Peronneau | | 2003_WFUMB HMU_04_25 |
| 1969 | In Europe, national ultrasound societies began to form in the late 1960s and continued throughout the 1970s. For example, the British Medical Ultrasound Group, which in 1977 became the British Ultrasound Society, was formed in 1969. In parallel with the formation of national societies in Europe, Asia, Australia, and elsewhere came the formation of regional federations and a world federation. | | | 2003_WFUMB HMU_04_39 |
| 1969 | The tremendous growth of ultrasound worldwide in the late 1960s and the 1970s saw the number and kinds of practitioners expand to include **technical and non-physician personnel**. In these early days sonographers in the U.S. were known as **ultrasound technical specialists**, and in 1969 they formed the **American Society of Ultrasound Technical Specialists (ASUTS)**, which also included Canadian practitioners. This was done under the aegis of the AIUM. | | | 2003_WFUMB HMU_04_42 |

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| 1969 | Initially the third meeting of SIDUO was to be entitled 'Ultrasound: 3rd International Symposium on Ultrasonic Diagnostics in OPHTHALMOLGY SIDUO III and International Meeting on Ultrasonic Diagnostics in MEDICINE. For the first time for a SIDUO sponsored meeting, an International Program Advisory Board of nine clinicians was included to encourage participation by other specialties. Dr. D. White (Fig. 2) was appointed Head of this Board. The other eight members were Drs. H. Gernet, A. Oksala, J. Poujol and J. Vanysek all ophthalmologists, I. Donald an obstetrician, J. Holmes an internal medicine physician, H. Hertz a scientist and M. de Vlieger (Fig.3) a neurologist from Rotterdam, Holland. The first two SIDUO meetings, although international in participation, attracted less than one hundred registrants. In order to attract a larger number of delegates as well as government support, a decision was made to change the scope of the meeting to an International Congress that would cover all aspects of clinical, biological and technical ultrasound. To satisfy SIDUO requirements, a meeting of SIDUO III was incorporated within the Congress. A meeting of the AIUM was included in the Congress to encourage participation by international delegates. Thus only months before the meeting, the Congress was renamed **'Ultrasound 1969: 1st World Congress on Ultrasonic Diagnostics in Medicine Vienna, June 2 including meetings of SIDUO III and AIUM'.** It was a bold move which turned out to be most successful. The Congress was attended by over 700 international participants who presented over 190 scientific papers. | 2013_Kossoff |
| Early 1960s | In the early sixties only two national ultrasound societies were in existence, the Japan Society of Ultrasound in Medicine (JSUM) and the American Institute of Ultrasound in Medicine (AIUM). Both of these societies were established in the early fifties and by the sixties held regular yearly meetings. | 1984_Kossoff |
| 1960s | None of these varied meetings in North America, Japan or Europe however led to the formation of the World Federation. This honour appears to belong to a group of European ophthalmologists and to have resulted from two main events. Firstly in the early 1960s, the use of ultrasound for ophthalmological diagnosis was one of the two most active areas for its clinical application. The other area was neurology and neurosurgery whose practitioners were to play an important part in the early organisation of the World and European Federations as will be described. Secondly, the erection of the Berlin Wall had a profound effect in separating European scientists. Douglas Gordon had been dismayed at this scientific segregation and it was as a result of his efforts that Dr. Werner Buschmann was allowed to attend the meeting he organised in May 1964, the only representative from Eastern Europe since Dr. N. D. Selesneva, a Russian gynaecologist, was unable to attend. Dr. Buschmann was not allowed to attend the Salford meeting later in 1966 and Dr. W. A. Mastrjukow, Chief of the All Union Scientific Research Institute for Medical Instruments and Instrumentation in Moscow together with a junior colleague and Professor Leszek Filipczynski of the Institute of Fundamental Technological Research in Warsaw were the only representatives from the East. In order to meet this scientific need and to circumvent these political restrictions a number of engineers and clinicians, mostly ophthalmologists from Eastern Europe but including Oksala from Finland, working in the field of diagnostic ultrasound had met at various medical meetings between 1960 and 1963 to describe and discuss their findings. By 1963 it was felt that there was a need for an organisation which would hold meetings devoted largely to the use of ultrasound for ophthalmic diagnosis. It was as a result of the efforts of this group that the World Federation eventually was formed. | 1990_White |

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| mid 1960s-1970s | Thanks in large part to the efforts of William J. Fry and Joseph Holmes the orientation of AIUM began to change in the mid-sixties and early seventies. The financial dependence on the Birtcher Foundation was ended. Membership was broadened – first to engineers and physicists in addition to physicians and physiologists and then to technologists. AIUM became a true scientific society and the dominant forum for ultrasound in biomedicine in the United States. | AIUM | USA | 2003_WFUMB HMU_04_38 |
| 1970 | The **Australian Society for Ultrasound in Medicine (ASUM)** was established in March 1970 and held their first scientific meeting in August 1971 | ASUM | Australia | 1984_Kossoff<br>1990_White |
| 1970~ | In 1970 Prof. L. Filipczynski of Poland together with Prof. R. Millner of East Germany and Hrazdira of Czechoslovakia organised the **Ultrasound in Biology and Medicine (UBIOMED)** society which held its first meeting in 1970 at Warsaw-Jablonna. It was attended by about 80 scientists from Austria, Czechoslovakia, England, East and West Germany, The Netherlands, Poland, Sweden, Switzerland and the USSR who presented 41 papers. The second meeting was held in Eisenach in East Germany (1975), then Nowe Mesto in Czechoslovakia (1977), Vysegrad, Hungary (1979), followed by Puschino in the USSR ( 1981 ), Warsaw-Jablonna in Poland again (1983), Eisenach in East Germany (1986) and Brno, Czechoslovakia(1989). | UBIOMED | | 1990_White |
| 1970 | Because Europe was still divided by the Cold War, Poland, East Germany, and Czechoslovakia had organized the Ultrasound in Biology and Medicine society **(UBIOMED)** in 1970. That year the Australians also formed their national society. | UBIOMED | | 2003_WFUMB HMU_04_41 |
| 1970 | **ASUTS** held its first organizational meeting at the 1970 AIUM annual meeting in Cleveland, Ohio. Education, training, and credentialing have been the major concerns of the society, which in 1980 changed its name to the Society of Diagnostic Medical Sonographers **(SDMS)** in order to be more inclusive. | | | 2003_WFUMB HMU_04_42 |
| 1970 | The development of international standards for medical ultrasound was begun by the International Electrotechnical Commission (IEC) in 1970. | | | 2003_WFUMB HMU_04_36 |
| 1970-1973 | **Picker** and **Unirad** in the U.S. were the biggest manufacturers of fast B-scanners, as the real-time scanners were called then. **Kretz** in Austria, **Organon-Technika** in The Netherlands, and **Aloka, Toshiba, and Hitachi** in Japan were the other large manufacturers. Industry sales in the period 1970-73 grew to nearly $10 million. | | | 2003_WFUMB HMU_04_23 |

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| 1970-1972 | The interim period between the Vienna and the Rotterdam Congresses was a busy gestational period for the proposed WFUMB organization and for national interest groups. The Working Group led by Denis White prepared the draft Constitution to be voted on at the Rotterdam Congress. White was familiar with the **Constitution** for the **International Federation for Engineering in Medicine and Biology**. The Working Group felt that the objectives of that Federation and of WFUMB were similar and the WFUMB draft Constitution closely resembled their constitution. Drs. de Vlieger and White visited a number of publishers regarding the publication of a journal. After an extensive search Marinus de Vlieger and Denis White recommended at the Rotterdam Congress that **Pergamon Press** be accepted as publisher and that the journal be named "**Ultrasound in Medicine and Biology" (UMB)**. The forthcoming establishment of WFUMB spurred national interest groups to form national ultrasound societies. The Swiss formed the Swiss Society for Diagnostic Ultrasound at the conclusion of the Vienna Congress. The Australians followed shortly and the **Australian Society for Ultrasound in Medicine and Biology** was formed in 1970. In 1971 the East Germans formed their national society and the Hungarians their Society in 1972. WFUMB encouraged the establishment of Federations of societies within a common geographical location and with common shared values. In this way the interest of small societies in those Federations would not be overwhelmed in the voting process of larger societies such as the AIUM and the JSUM. | | | 2013_Kossoff |
| 1971 | The East Germans formed their own national society on November 20, 1971 | | | 1990_White |
| 1971 | The proceedings of the Congress, entitled ULTRASONO GRAPHIA MEDICA, were published in 1971 by Verlag der Wiener Medizinischen Akademie, with K. Ossoinig and J. Bock as editors. It was a monumental task as these proceedings, published in three volumes, containing all of the presented papers with images and exceeding 900 pages in length. These proceedings are the best and most complete description of the state of art of ultrasound in the sixties and an excellent resource for anyone interested in the history of diagnostic ultrasound. Unfortunately not many libraries have these proceedings in their collections. It is anticipated that the WFUMB Secretariat will also soon acquire a copy in its collection. | | | 2013_Kossoff_04 |
| 1971-1973 | In 1971, the **FDA and the National Science Foundation** sponsored an internationally attended workshop in Seattle, Washington, on ultrasound bioeffects and acoustical characterization of diagnostic ultrasound equipment. That same year, the FDA established its bioeffects laboratory, and its dosimetry laboratory the following year. The American Institute for Ultrasound in Medicine **(AIUM)** also took an early lead in helping to establish safety standards by establishing its **Bioeffects Committee (1973)** and its Technical Standards Committee. | | USA | 2003_WFUMB HMU_04_34 |
| 1972 | The Vienna congress also spurred the formation of numerous national societies, especially in Europe. In addition to the British, another eight societies were formed in the next two years, and in 1972 the delegates of 13 European societies met in Basel, Switzerland, to found the **European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB)**. | EFSUMB | Switzerland | 2003_WFUMB HMU_04_41 |

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| 1972 | In 1972 a group of physicians consisting of representatives from Hungary, Spain east and West Germany, Sweden, Yugoslavia, Austria, Belgium, France, Finland and Holland elected to form the European Federation of Societies for Ultrasound in Medicine and Biology **(EFSUMB).** The group elected Marinus de Vlieger as Foundation President of the Federation. A few year's later United Kingdom, Denmark, Greece, Italy, Norway and Poland also joined the European Federation. This important achievement spurred the Japanese investigators to form the Asian Federation of Societies for Ultrasound in Medicine. Those interested in issues associated with the establishment of the European and the Asian Federations are referred to references (14) and (15). | Marinus de Vlieger | | 2013_Kossoff_05 |
| 1972 | The European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) were established | | | 1984_Kossoff |
| 1972~ | At the same time as all these preparations for the Rotterdam Congress and the putative World Federation and its journal were proceeding, de Vlieger, with the assistance of Muller who had formed the first European national society, were responsible for stimulating the formation of national medical ultrasonic societies in 13 European countries and bringing together their representatives at the Fourth Annual Meeting of the Swiss Society for Diagnostic Ultrasound (Fig. 20; White 1972) in Basel on February 11, 1972 where they founded the European Federation of Societies for Ultrasound in Medicine and Biology and signed its Constitution (Fig. 21). The names of the signatories were: Dr. A. Berteny (Budapest), Dr. F. Bonilla-Musoles (Valencia), Dipl. Ing. H. Grossman (Dresden), Prof. Inge Edler (Lund), Angus Hall (Glasgow), Prof. V. Hudolin (Zagreb), Dr. E. Kazner (Munich), Dr. A. Kratochwil (Vienna), Dr. S. Levi (Brussels), Prof. T. Planiol (Tours), Ing. J. C. Somer (Utrecht), Dr. P. Ylostalo (Oulu) and Dr. M. de Vlieger (Rotterdam). Dr. de Vlieger (Fig. 18) was elected President of the new Federation, Dr. Werner Buschmann (Fig. 10) Vice-president and Dr. H-R. Muller (Fig. 9) Secretary. There were two treasurers, Dr. Anna Bertenyi for East European countries with blocked currencies, and Dr. Salvator Levi for West European countries with their free currencies. The constitution of the European Federation was officially adopted at its second meeting held in Munich in May 1975 by which time Denmark, Greece, Italy, Norway and Poland had also joined the federation while the British had changed their group into a regular society. The scientific societies in the USSR lack hard currencies and this has restricted their representation in meetings outside the Soviet Union. It also has prevented them, up to the present from participating in multinational organisations such as WFUMB and FASE, with the exception of the East European UBIOMED meetings which they hosted in 1981. However they plan to affiliate in the future with the World Federation and possibly also the European Federation. | EFSUMB | | 1990_White |
| 1972 | In the USSR the Academy of Sciences has a Scientific Council on Acoustics which is headed by Prof. L. M. Lyamshev and has more than 20 sections. The section on Ultrasound in Medicine and Biology was organised in 1972 by Profs. L. R. Gavrilov, A. P. Sarvazyan and V. B. Akonian. Gavrilov is the chairman of this section which has about 60 active members from all over the Union and almost every year organises All-Union conferences, symposia and workshops on various problems in biomedical acoustics. | | USSR | 1990_White |
| 1972 | Hungarian Biophysical Society on January 10, 1972. | | | 1990_White |

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| 1972~ | The European Federation has held triennial **(EUROSON) Congresses** since the inaugural meeting in 1972 (Fig. 22). The second was held in Munich (1975), the third in Bologna (1978), then Dubrovnik (1981), followed by Strasbourg (1984), Helsinki (1987) and Jerusalem (1990). **The formation of the European Federation simplified the formation of the World Federation in the following year.** It would have been difficult for the World Federation, with a relatively small Administrative Council and number of officers, adequately to represent the varying interests of the many different national societies in America, Japan, Australia and both the Eastern and Western blocs in Europe. It was felt that if the size of the Administrative Council was enlarged to represent all these various national interests as well as the specialist societies, it would become most unwieldy. The advantages of having individual national interests represented in a regional or continental federation which could then take them to the parent body, proved so great that the World Federation has encouraged the formation of other continental federations. | | | 1990_White | |
| 1973 | The planned organization was realized at the second World Congress in Rotterdam in 1973. Its official name was decided as the WFUMB, and the **first General Assembly with the first congress was set for 3 years later in San Francisco.** In addition, a basic concept of WFUMB, that it would unite each geographic federation to be established throughout the **five continents** of the world in the future, was also approved. | | | 2001_Watanabe_02 | |
| 1973 | The **Constitution of WFUMB was adopted in 1973**, took effect in 1988 and was revised in 1997. In 1973 Dr. Baum, ophtalmologist and Past-President of AIUM became President. | WFUMB Constitution | | 2013_WFUMB website | Why there is a long interval between adoption and take off? |
| 1973 | Rohe and Unirad introduced the **first commercial analog scan converters with gray scale in the U.S. in 1973**. | | USA | 2003_WFUMB HMU_04_24 | |
| 1973 | The **Journal of Clinical Ultrasound**, which was first published in 1973, was the society's journal, until it began publishing its own journal, the Journal of Ultrasound in Medicine. | | | 2003_WFUMB HMU_04_38 | Is this description correct? |
| 1973 | It was obvious to the Council that Denis White should be appointed as the first editor-in-chief of the journal. The first issue was published late in 1973 (September): it consisted of 108 pages and included articles on echocardiography, power measurement and bio-effects, as well as the proceedings of meetings in Belgium, France, The Netherlands and the USA, and the Constitution of the Federation. | Denis White | | 2013_Kossoff_20 | |
| 1973 | Together with SIDUO, JSUM and the AIUM these five societies adopted the Constitution at the Rotterdam Congress in June 1973, thus forming the Federation. The first General Assembly elected Dr. G. Baum as President for the ensuing three years whilst Prof. D. White was appointed Editor of UMB, the first issue of which appeared in September 1973. It was agreed that, because of the rapid developments in ultrasound technology and clinical practice, Federation meetings would be held on a tri-annual basis. **To amalgamate Federation meetings with the two first World Congresses it was decided that the meetings be entitled WFUMB and be identified by the year in which they were held.** | WFUMB | | 1984_Kossoff | |

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| 1973 | When a group of European workers met to discuss the possible formation of a European Federation, Marinus de Vlieger was elected as their chairman. He then met with representatives from the American Institute, the Japan Society and SIDUO to discuss the next World Congress, the possible formation of a World Federation and the founding of a journal. At this meeting de Vlieger was elected the president of the next World Congress which was to be held in Rotterdam. de Vlieger and White, who had been energetically promoting the idea of a World Federation and a journal, were elected as an Organising Committee and were charged with the responsibility of drawing up a tentative Constitution for the World Federation and finding a publisher for the journal as well as organising the Rotterdam Congress. Rotterdam Congress. These two individuals faced a number of difficulties, de Vlieger was not very happy with the responsibility of hosting the next Congress in Rotterdam because he was aware that, although the Vienna Congress had been a great success scientifically and socially, it had resulted in a large financial deficit which Karl Ossoinig had difficulty in meeting. He was therefore relieved when **Erasmus University promised him financial backing, in return for which K. T. Liem a representative of the treasurer of the University was added to the Organising Committee**. The university also required that the Rotterdam Congress should be organised by a professional firm. On the advice of this firm and White it was decided that only papers of high scientific standard would be accepted for presentation at the Congress. As a result those workers whose papers were rejected did not attend the Congress and the final attendance was only 700 instead of the 1000 expected. The **resulting deficit was $5000 which was luckily covered by the grant from Erasmus.** | | 1990_White |
| 1973 | The responsibility of drawing up a tentative Constitution fell to White. It appeared that the type of organisation that was needed was **similar to that of the Alliance for Engineering in Medicine and Biology** with which White had had dealings in his capacity as President of the American Institute for Ultrasound in Medicine. As a result, the Constitution proposed for the World Federation was based upon that of the Alliance. It seemed to provide a viable starting point from which alterations could be made at a later date in the light of need and experience. In the event, it was accepted and adopted at Rotterdam without change (Ultrasound Med Biol 1:103-108; 1973). | WFUMB Constitution | 1990_White |
| 1973 | de Vlieger and White visited a number of publishers during White's annual visits to the Netherlands. In view of the non-existence of any funds belonging to the proposed World Federation, it was essential that the publication of the journal should incur no financial risk. Medical and Biological Engineering was the official journal of the International Federation for Medical and Biological Engineering and Dennis Hill was its editor. Hill gave White several invaluable suggestions regarding the type of contract that it was desirable to negotiate with the publisher of a scientific journal which was to remain the property of an international scientific organisation but which, having no funds, wished to avoid any financial risk or loss. Only **Pergamon Press** was willing to concede ownership of the journal and its list of subscribers to the Federation as well as agreeing to meet any financial losses themselves while sharing any profits with the Federation (Fig. 19). Thus Pergamon was accepted as the publisher of the Federation's official journal at Rotterdam and White was appointed the editor. | | 1990_White |

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| 1973 | The situation had been complicated by the fact that, because of the long time between the Vienna and Rotterdam Congresses and the absence of any definite evidence that the World Federation and its Journal would come into being, the Germans proposed to start their own journal. White persuaded them not to do this and prejudice the success of the World Federation journal which he hoped would be approved at Rotterdam. The **Germans agreed and did not start their own journal, Ultraschall in der Medizin, until 1982**. However White was placed in an awkward situation when, a few months before the Rotterdam Congress, the **Journal of Clinical Ultrasound was brought out by the Americans.** Joseph Holmes, a former President of the American Institute for Ultrasound in Medicine, was the Editor and the Editorial Board was composed almost entirely of members of the Institute of which it later became the official journal. White had had no prior knowledge of the Americans' intentions despite the fact that he had succeeded Holmes as President of the Institute. | JCU<br>Joseph Holmes | 1990_White |
| 1973 | In 1973 (March) the first issue of the **Journal of Clinical Ultrasound** appeared with Holmes as its Editor and many members of the Institute on its Editorial Board. Soon afterwards it became the official journal of the Institute. | JCU<br>Joseph Holmes | 1990_White |
| 1973 | Prior to this, **SIDUO**, with its tradition of biennial meetings, arranged its fourth meeting in Paris in May 1971 (Massin and Poujol 1973). Since SIDUO, the organisers of the Vienna Congress, had been rather overwhelmed by the non-ophthalmological participants at that Congress, their **fifth meeting was arranged to precede rather than coincide with the Rotterdam Congress** and was held in the nearby town of Ghent from May 30-June 2, 1973. Abstracts in three languages of the 51 papers presented were provided by the University Eye Clinic (SIDUO V, Abstracts 1973). | SIDUO | 1990_White |
| 1973 | Thus, the World Federation for Ultrasound in Medicine and Biology and its official journal, Ultrasound in Medicine and Biology, were both born somewhat tentatively during the Rotterdam Congress (Fig. 23; de Vlieger et al. 1974) in June 1973. By no means was everyone enthusiastic at these new creations. The Russians were most interested in the effects that ultrasound had upon tissues and its use as a therapeutic agent; they had little interest in ultrasound as a diagnostic tool, the East Europeans had enthusiasm but, with their blocked currencies, did not see how they could pay their dues to the Federation; the British felt there were "too many meetings" and "too many journals." The Americans, who were becoming irritated by the behaviour of their United Nations guests in New York, were suspicious of another international organisation for which they would be expected to pay the lion's share of the expenses. In any case they were well served by the annual meetings of the American Institute which were being attended by increasing numbers of registrants and exhibitors. Moreover they had their own journal and could see no need for another. | | 1990_White_344 |
| 1973 | The World Congress in Rotterdam saw the birth of the World Federation for Ultrasound in Medicine and Biology (WFUMB) and of its official journal Ultrasound in Medicine and Biology. | | 2003_WFUMB HMU_04_41 |

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| 1973 | **The Rotterdam Congress held in 1973 was advertised as the Second World Congress on Diagnostic Ultrasound.** It **did not include the biannual meeting of SIDUO**. The ophthalmologists in Vienna felt overwhelmed by the nonophthalmology presentations at that meeting and held their **own meeting in Ghent a few days before the Rotterdam Congress**. This allowed interested participants to attend both meetings. The meeting was a large success scientifically and politically. It was attended by over 750 participants who presented over one hundred lectures. The **proceedings of the meeting "Ultrasonics in Medicine", Ed. M. de Vlieger, D. White and V. Mc Ready were published by Excerpta Medica, Amsterdam, in 1974**. The volume contains all the presentations and images and is more than 380 pages in length. **WFUMB was officially formed at the General Assembly by the association of five societies** - AIUM, JSUM, EFSUMB, SIDUO and ASUM. Even though SIDUO is a specialty group and not a geographical federation it was included in the association as WFUMB felt it had a historical debt to that Society. The Assembly approved the Constitution and accepted Pergamon Press as publisher for its journal. | | | 2013_Kossoff | |
| 1974 | The first issue of this journal (Japanese Journal of Medical Ultrasonics) appeared in 1974, shortly after the first issue of the World Federation journal, Ultrasound in Medicine and Biology, and the first issue of the American Institute's Journal of Clinical Ultrasound. | | Japan | 1990-White | |
| 1974 | They even established their own certifying organization in 1974 (1975?), the **American Registry of Diagnostic Medical Sonographers (ARDMS)**. | ARDMS | USA | 2003_WFUMB HMU_04_42 | 1975 in ARDMS website |
| 1974 | In 1961 a group of investigators met at a Symposium on the Present State of Applications of Ultrasound in Medicine held in Kyoto and agreed to form the Japan Society of Ultrasonic in Medicine **(JSUM)**. Dr. Toshio Wagai was elected President and the first meeting of the Society was held in Tokyo in 1961. The Society met biannually at first and has continued to meet annually. The proceedings of these meetings have been published regularly in Japanese, and selected papers in English. The growth of the Society has been most impressive. In 1974 it proceeded to establish its journal "Japanese Journal of Medical Ultrasonic" which continues to be published today. | JSUM | Japan | 2013_Kossoff | |
| 1974 | A successful approach to thc problem of **rapid imaging of cardiac motion via phased transducer arrays** ultimately was implemented by F. L. Thurstone's engineering research group at Duke University, which brought Somer's phased-array concept to fruition, after years of effort, in 1974. The Thurstone machine took advantage of the recent development of microprocessors that could sequentially activate the piezoelectric crystals at much higher frequencies than were ever before possible. Wiith the advent of successful two-dimensional imaging echocardiography achieved more widespread clinical acceptance and application. | Frederick Thurstone | USA | 2003_WFUMB HMU_05_19 | |
| 1974~1976 | In 1974, the UI began work on the **Octoson,** and a prototype was completed in November of that year. Many features of Jellins' most recent breast equipment were incorporated into the Octoson. The patient was placed over a water-filled tank covered by a cellophane window; the scanning transducers were situated below the window within the water tank. The scanning system incorporated **eight individual transducer elements** (hence the name). A commercial model of the Octoson was available in 1976, and was used for scanning the breast, as well as the heart, abdomen, testes, and other areas. | Octoson<br>Jack Jellins | Australia | 2003_WFUMB HMU_05_34 | |
| 1975~ | The second meeting **(UBIOMED)** was held in Eisenach in East Germany (1975), then Nowe Mesto in Czechoslovakia (1977), Vysegrad, Hungary (1979), followed by Puschino in the USSR (1981), Warsaw-Jablonna in Poland again (1983), Eisenach in East Germany (1986) and Brno, Czechoslovakia (1989). | UBIOMED | | 1990_White | |

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| 1975~ | The Federation of Acoustical Societies of Europe **(FASE)** held its first Congress in Paris in 1975. It holds both Congresses or Symposia at intervals of one or two years. The Paris Congress was followed by two Symposia in Budapest (1976) and London (1977). Its meetings, like those of the acoustical societies also were largely devoted to non-medical subjects and only the Second Congress organised by Professor L. Filipczynski in Warsaw in September 1978, was largely devoted to medical and biological ultrasonic papers. | FASE | | 1990_White | |
| 1976 | Since the formation of the World Federation for Ultrasound in Medicine and Biology in 1976 (1973) | WFUMB | | 2003_WFUMB HMU_03_01 | 1973 is correct |
| 1976~ | In 1976 the Deutsche Gesellschaft fur Ultraschall in der Medizin, the Osterreichische Gesellschaft fur Ultraschall in der Medizin and the Schweizerische Gesellschafl fur Ultraschall in Medizin und Biologie organized, for the German speaking countries in Europe, but excluding East Germany, the first Drei-Lander-Treffen in Heidelberg, followed in 1977 by a meeting in Vienna and, in 1979, in Davos. Thereafter the meetings rotated between the three founding countries and were held yearly in Boblingen, Graz, Bern, Erlangen, Innsbruck, Zurich, Bonn, Salzburg, Lugano and, in 1989, in Hamburg. | | | 1990_White | |
| 1976 | In 1976 the French founded the **Doppler Club de France** which has held annual meetings ever since to be followed in 1981 by the New England series of Doppler Conferences held every second year usually in New Hampshire but at Bath in Olde England in 1989 | | France | 1990_White | |
| 1976 | Dr. T. Wagai was elected as President at the conclusion of the Congress and guided the affairs of the Federation up to and including WFUMB ‘79 meeting which was held in Miyazaki. | T. Wagai | | 1984_Kossoff | |
| 1976 | In 1976, Congress passed the Medical Device Amendments to the Food, Drug and Cosmetic Act, empowering the **FDA to regulate the manufacture of all medical devices including medical ultrasound**. Under these Amendments, diagnostic ultrasound was categorized as a Class 2 device, which meant that, for a new device to be marketed, a premarket notification or a “510(k)” had to be submitted to the FDA. In this submission, the manufacturer had to show that the device was substantially equivalent in terms of safety and efficacy to devices marketed before May 28, 1976, the date of the Amendments. In order for the manufacturers to demonstrate and for the FDA to evaluate equivalent safety, there had to be a way to measure the output exposure levels of preAmendment devices. The development of piezoelectric polymer hydrophones, which were able to make accurate measurements of the acoustic pressures produced by diagnostic ultrasound devices, allowed them to do this. | FDA | USA | 2003_WFUMB HMU_04_34 | |
| 1976 | The first WFUMB Congress was successfully held in San Francisco in 1976 (WFUMB'76), hosted by AIUM and with the mutual cooperation of AIUM, EFSUMB, JSUM, the Australian Society for Ultrasound in Medicine (ASUM), SIDUO and others. | | | 2001_Watanabe | |
| 1976 | WFUMB ‘76 was held in San Francisco and comprised a joint meeting with SIDUO VI and Twenty-first meeting of the AIUM. | | | 1984_Kossoff | |

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| 1976~ | At the Rotterdam Congress it was also felt that, since the field was changing so rapidly, the four years between the Vienna and Rotterdam Congresses was too long, and so it was decided to hold the next Congress and the sixth SIDUO Symposium three years after Rotterdam in the United States in Boston (1976) in conjunction with the annual meeting of the American Institute for Ultrasound in Medicine. The venue was subsequently changed, firstly to New Orleans and again, shortly before the meeting, to San Francisco. Thereafter the World Federation met triennially. **The San Francisco Congress (White and Brown 1977) was advertised as the First Meeting of the World Federation for Ultrasound in Medicine and Biology rather than the Third World Congress** and this gave rise to feelings on the part of the Europeans that their pioneer work in initiating these Congresses, which were the forerunners of the World Federation, was being ignored. These feelings resulted, at the time of the Congress, in the name Third World Congress being added to the name tags (Fig. 22). Thus the next Congress in Miyazaki in July 1979 (Wagai and Omoto 1980) was advertised as both the Second Meeting of the World Federation and the Fourth World Congress. This gave rise to **numerical confusion** when referring to any specific Congress, so the **Brighton Congress in July 1982 (Lerski and Morley 1983) adopted the nomenclature of WFUMB '82 which has been used since.** | WFUMB nomenclature | 1990_White | |
| 1976~ | As mentioned above, the formation of the European Federation was so vital for the formation of the World Federation that the formation of other continental and regional federations has always been strongly encouraged by the World Federation. **South America** was the first continent to follow the lead of the Europeans. There the first two countries to form national societies for medical ultrasound were **Argentina** in 1976 and **Brazil** in 1977. | | 1990_White_346 | |
| 1978 | By 1978, Dr. Kelly-Fry and associates at the Indianapolis Center for Advanced Research completed their work on fabrication of a relatively simple, automated breast scanner. Subsequently Kelly-Fry and Dr. A. Patricia Harper initiated a clinical study to determine the effectiveness of applying this instrument to symptomatic patients, as an adjunct to x-ray mammography. Dr. John Wild has continued to work privately, planning to produce a system for mass screening for breast cancer based on the principles of his earlier work. | | 2003_WFUMB HMU_05_35 | |
| 1979 | In Europe, safety issues were the provenance of the European Committee for Ultrasound Radiation Safety (the "Watchdog Committee," also called the **European Committee on (for?) Medical Ultrasound Safety, ECMUS**). This committee was formed in 1979 by the European Federation of Societies for Ultrasound in Medicine (EFSUMB). | | 2003_WFUMB HMU_04_35 | for' is correct at EFSUMB website. Name changed? |

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| 1976-1979 | The Miazaki Congress was advertised as both the Second Meeting of WFUMB and the Fourth World Congress. The name for Future Congresses was again discussed by Council and it was agreed that future Congresses be simply named as a WFUMB Congress followed by the year the Congress was held. Because of work load considerations, the **Council separated the offices of Secretary and Treasurer**. Separate **Committees on the Constitution, Education, Safety and Standardization were formed and terms of reference for these Committees set**. The policy to **ban the use of live models** to demonstrate the imaging performance of equipment was introduced for the first time. After considering issues on Interdisciplinary Collaboration in Investigative Ultrasound, the Council resolved that the practice of diagnostic ultrasound is **open to a variety of specialties** none of whom have any exclusive rights to work in a specific area. **The primary criteria for consideration were the well-being of the patient and cost effectiveness.** WFUMB also resolved that it was the organization whose recommendations were authoritative on matters of safety. The Congress was attended by over 800 registrants and the proceedings were published as a book entitled Ultrasound in Medicine and Biology, edited by T. Wagai and R. Omoto and published by Excerpta Medica, Amsterdam, 1980. The text is 280 pages in length and includes many detailed images. | | 2013_Kossoff_9 |
| mid 1970s | Linear-array, **real-time scanners** began to be manufactured starting in the mid-1970s. **Advanced Diagnostic Research Corporation (ADR)** in the U.S., **Organon Technika** in the Netherlands, and **Toshiba** in Japan were some of the early manufacturers. **Mechanical sector scanners** were introduced by **Hoffrel and SmithKline Instruments**. | | 2003_WFUMB HMU_04_24-25 |
| 1970s | **Duplex scanners**, which started appearing in the late 1970s, were designed to provide both **2D and Doppler signals**. **Color Doppler**, which depicts blood flow in different directions in different colors, was pioneered by Marco Brandestini and his group at the University of Washington in the mid-1970s, but was only made practical after the innovations of Chihiro Kasai and his team at **Aloka** in Japan in the mid-1980s. | Chihiro Kasai | 2003_WFUMB HMU_04_25-26 |
| 1979-1982 | Under Mueller's chairmanship and the Secretary skills of Dr. Kit Hill, accurate minutes of the Administrative Council meetings were placed on record. During the ensuing three years applications for membership were received and approved from the **Brazilian, South African and Malaysian societies**. **Publications, Standardization, Safety and Guidelines for Planning Congresses were added to the list of Committees advising the Council**. The Council also elected a **cardiologist** to the Administrative Council to encourage participation by cardiologists in the Federation. The Journal UMB began to flourish. It **started to be published bi-monthly** and the **profits began to add reasonable** funds to the treasury. The Publication Committee recommended that the journal award an annual prize for the best papers on Clinical and on Technical issues and this practice was implemented at the Congress. The Council also approved Washington as the venue for the WFUMB 88 Congress. With increased funds in treasury, the Federation **began activities to promote international cooperation and to disseminate information on diagnostic ultrasound**. With these as aims it **sponsored a symposium held during the Congress on "Ultrasound in Developing Countries"**. At the Symposium speakers from Kenya, India, Egypt, and Korea discussed their experiences and came forward with recommendations to help them in the production of simplified equipment, advice on equipment service and purchase, and in the training of personnel. The Congress was attended by over 1200 participants. The proceedings of the Congress were published as a book – Ultrasound '82, ed. R. Lerski and P. Morley. Pergamon Press, Oxford 1983. It is 640 pages in length and contains many detailed images. | Hans Muller<br>Christopher R Hill | 2013_Kossoff_10 |

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| 1980 | **ASUTS** held its first organizational meeting at the 1970 AIUM annual meeting in Cleveland, Ohio. Education, training, and credentialing have been the major concerns of the society, which in 1980 changed its name to the Society of Diagnostic Medical Sonographers **(SDMS)** in order to be more inclusive. | | USA | 2003_WFUMB HMU_04_42 | |
| 1981 | In those early days, it was sometimes difficult for the editor to assemble sufficient numbers of papers to justify the regular publication of the journal. The survival of the journal was never in doubt, however, and it grew in scientific stature and commercial success. In 1981 to enhance the stature of the journal the Council agreed to set up **two prizes for the best clinical and technical manuscript** submitted to the journal that calendar year. The award of these prizes was maintained **until 1998**. | UMB | | 2013_Kossoff_20 | |
| 1982 | Dr. H. R. Müller is our immediate Past President and presided over the WFUMB '82 meeting which was held in **Brighton** and hosted by the British Medical Ultrasound Society. The proceedings of all of the meetings have been published and attest the high standard of papers presented at the Congresses. | Hans Muller | UK<br>Brighton | 1984_Kossoff | |
| 1982 | The Germans agreed and did not start their own journal, **Ultraschall in der Medizin**, until 1982 | | | 1990_White | |
| 1982-1985 | During his three years in office the Administrative Council approved a) the establishment of the **History/Archives Committee**, b) set the term of office of the Editor as three years, c) initiated discussions with World Health Organization **(WHO)** to coordinate activities to encourage and promote the use of diagnostic ultrasound in developing countries, d) accepted membership within WFUMB of the **Egyptian, Indian, Indonesian, Taiwanese and Mexican societies** and e) received application for membership from the Latin American Federation. The Council received and endorsed a report from the Education Committee that the provision of ultrasound diagnostic services can be carried at two levels of expertise, at basic level 1 by clinicians on their own patients after a shorter training period and at expert level 2 by clinicians seeing patients on a referral basis who require full training. Discussions were also held on the relationship of WFUMB to sonographers. **It was agreed that WFUMB should support the professional development of sonographers** and undertook action to encourage the staging of the First World Congress of Sonographers to be held immediately prior to the Sydney WFUMB 85 Congress. | | | 2013_Kossoff_11 | |
| 1982 | The Brighton WFUMB 1982 Congress generated a good profit for the Federation. This increase in funds allowed the Council to **sponsor the First WFUMB Seminar on Safety and Standardization of Ultrasound in Obstetrics** that was held for three days immediately after the Congress. Fifty of the world experts on the subject were invited to attend. The outcome was a report that described the current knowledge and recommended specific action to obtain international agreement on methods to specify indices relating to the safety of the ultrasonic irradiation. The proceedings of this seminar were published in 1986 as special issues of UMB. | | | 2013_Kossoff_11 | No special issue in 1986 in UMB |
| 1983~ | With the application of computer technology – namely, high-speed digital electronics - to beam formation and signal processing, which began with Sam Maslak and his **Acuson 128** in 1983, scanner engineering and development began to shift from clinical and academic settings to the commercial laboratories. By the 1990s, the entire signal processing chain - from the transducer to the beamformer, to the signal processor, to the scan converter, to the monitor – had become digital. | Samuel Maslak | USA | 2003_WFUMB HMU_04_26 | |
| 1983 | The standard that was accepted in 1983 – the **AIUM/NEMA standard** – was developed as a joint effort by individuals from the FDA, the Bioeffects and Standards Committees of the AIUM, and from the Ultrasound Committee of the National Electrical Manufacturers Association (NEMA). | | USA | 2003_WFUMB HMU_04_35 | |

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| 1983 | As mentioned above, the formation of the European Federation was so vital for the formation of the World Federation that the formation of other continental and regional federations has always been strongly encouraged by the World Federation. South America was the first continent to follow the lead of the Europeans. There the first two countries to form national societies for medical ultrasound were Argentina in 1976 and Brazil in 1977. Together with Paraguay, Peru and Uruguay whese two national societies formed the **Latin American Federation for Ultrasound in Medicine and Biology** in September 1983 with Dr. Alberto Belinsky as President. Chile and Mexico joined the Federation in 1985 and Cuba and Venezuela in 1987. In that same year the Federation brought out the first issue of its **journal--Revista Latinoamericana de Ultrasonografia en Medicina y Biologia.** | FLAUS | 1990_White | whese?<br>Mistyping? |
| 1983 | The Federation has now admitted affiliation of the Sociedade Brasileira de Ultrasom en Medicina e Biologia (SUSEM), the South Africa Medical Ultrasound Society (SAMUS) and the Malaysian Society of Ultrasound in Medicine (MSUM). As in October 1983 the membership of the Federation stood at 13,564 comprising:<br>3400 members of AIUM<br>358 members of ASUM<br>3862 members of EFSUMB<br>5015 members of JSUM<br>23 members of MSUM<br>190 members of SAMUS<br>286 members of SIDUO<br>425 members of SUSEM | WFUMB Membership | 1984_Kossoff | MSUM (Malysia)?<br>23 or 28?<br>28 at 1983_1016-18_AC_Minutes_amended |
| 1983 | The Constitution and the By-Laws have been recently revised and were published in the July/August 1983 issue of UMB. | | 1984_Kossoff | |
| 1985 | The Australian Society for Ultrasound in Medicine will be hosting the WFUMB '85 meeting which will be held in Sydney on 14-19 July 1985. Arrangements are well in hand and all indications point that it too will be a highly successful meeting. | WFUMB Congress_1985 | 1984_Kossoff | |
| 1985 | After EFSUMB, AFSUMB came on the stage in 1985. AIUM joined Canada to become the North American federation. The ASUM changed its name to the "Australasian Society", which was inclusive of Australia and New Zealand. In South America, the Latin-American Federation of Societies for Ultrasound in Medicine and Biology (FLAUS) was formed, while in Africa, the Mediterranean and African Society for Ultrasound (MASU) was established, to which Italy and Turkey joined, in consideration of the unique situation in Africa with many developing countries | | 2001_Watanabe | |
| 1985 | The **first WFUMB Symposium on Safety and Standardizatio**n was held in Sydney in 1985. Dr. Barnett was co-convenor together with Dr. George Kossoff. This initiative set the scene for future meetings, although there have been changes and refinements in the process which has led to the publication of WFUMB policy on issues relating to Thermal and Mechanical Bioeffects. | WFUMB 1985 | 2004_ECHOES_05 | |
| 1985 | **The inaugural WFUMB Safety Symposium** established in 1985 is a forum for global scientific interaction that continues today with the objective of creating international recommendations and guidelines for the safe use of all applications of ultrasound in medicine. | WFUMB 1985 | 2009_ECHOES_05 | |
| 1985 | The WFUMB World Congress has been hosted in Australia only once before. That was the occasion of the highly successful 6th (4th??) World Congress combined with the 1st Congress of World Federation of Sonographers and the 1st WFUMB Safety Symposium, held in Sydney in 1985. | WFUMB 1985 | 2009_ECHOES_05 | 4th correct? |

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| 1985 | The development of international standards for medical ultrasound was begun by the International Electrotechnical Commission (IEC) in 1970. This work was also taken up by the World Federation for Ultrasound in Medicine and Biology in 1985, when it sponsored its first **symposium on safety and standardization.** A second symposium was held in 1988 and a third in 1991 | | 2003_WFUMB HMU_04_36 | |
| 1985 | The Sydney Congress was attended by over 1100 registrants including about 300 sonographers from 40 countries. The proceedings were published as a book "WFUMB '85 Ed. R. Gill and M. Dadd. Pergamon Press, Sydney 1985. Each paper was published as a one page abstract with images. The Sonographers Congress also attracted large attendance. Unfortunately no proceedings of these Congresses were ever published. The record of **membership of the affiliated societies** in 1985 shows AIUM 5261, ASUM 358, SAMUS 407, SUSEM 580, JSUM 5830, MALASIA 22, SIDUO 300, Indonesia 92, EFSUMB 4157 a WFUMB total of 17007, an increase of 3700 in membership. At the conclusion of the Congress Dr. H. Thompson (Fig. 8) was elected President. | WFUMB Membership | 2013_Kossoff_11 | Malaysia society, name? MSUM or MALSUM? |
| 1985 | Up till then, the selection of the President-Elect was influenced to some extent by the location of the Congress when that person was to be President. In a **change in policy the Council decided not to elect the President-Elect on the basis of the location of future WFUMB Congresses**. | | 2013_Kossoff_13 | |
| 1985-1986 | A major achievement in 1985 was the establishment of the Asian Federation of Societies for Ultrasound in Medicine and Biology **(AFSUMB)** and in 1986 of the Latin-American Federation of Societies for Ultrasound in Medicine and Biology **(LAFSUMB)**. The founding societies for AFSUMB were Japan, China, India, Indonesia Malaysia and South Korea, while for LAFSUMB they were Argentina, Brazil, Mexico, Paraguay and Uruguay. In 1986 the affiliated societies of WFUMB consisted of the AIUM, ASUM, EFUSMB, ISMU (India), ISUMB (Indonesia), JSUM, MALSUM (Malaysia), MAUM (Mexico), SUSEM (Brazil), SIDOU and SAMUS (South Africa). | WFUMB Membership | 2013_Kossoff_12 | Malaysia society, name? MSUM or MALSUM? |
| 1985-1988 | During his term in office the Administrative Council proposed the publication of a **Newsletter** to complement the material published by UMB. As Editor, Denis White wanted UMB to be essentially only a scientific and clinical journal. The Council felt that there was a need for a Newsletter to provide information on the functions, purposes and goals of WFUMB as well as on general activities of WFUMB and the international community. It was suggested that the Newsletter be published twice yearly and Dr. Thompson was appointed Editor of the Newsletter. The first two issues of the Newsletter were published in May and September 1988. The first issue described the purpose, objectives and structure of WFUMB while the second discussed factors affecting the use of ultrasound in developing countries and provided information on forthcoming international meetings. | Thompson | 2013_Kossoff_12 | |
| 1987 | While the Japanese had had their own national society since 1961 and the **Australians had founded their national society in March 1970 and held their first scientific meeting in August 1971**, there was no interest in an Asian Federation until Dr. Toshio Wagai began to promote the idea during the Brighton Congress in 1982. Formation of the Federation was delayed because of difficulties due to the membership of the Chinese societies representing the Peoples Republic of China and the Republic of China. The impasse was resolved when the former society became part of the Chinese Medical Association and the latter society was reformed as the Chinese Taipei Society. The first meeting of the putative **Asian Federation of Societies for Ultrasound in Medicine and Biology** under the presidency of Dr. Toshio Wagai was held in Tokyo in June 1987. The societies represented at this initial meeting were from the Chinese Medical Association of the Peoples Republic of China, the Ultrasound Society of India, Indonesia, Japan, Malaysia, and The Taipei Society for Ultrasound in Medicine. | AFSUMB | 1990_White | |

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| 1988 | In 1988 the **Asian and the Latin Federations joined WFUMB** and this reduced to six the number of federations and societies within WFUMB. | | 2013_Kossoff_12 | |
| 1988 | The **Washington WFUMB 1988** Congress was co-sponsored by the AIUM and was attended by a large number of participants who presented over two thousand papers. In keeping with AIUM policy, the proceedings of the Congress published only abstracts of the presented papers. Unfortunately this has since remained WFUMB's publication policy and the rich material of the previous Congresses is no longer in the public domain. **The Second World Congress of Sonographers** was also held in association with the WFUMB Congress. At the conclusion of the Congress Dr. F. Weill was elected President of WFUMB. | WFUMB 1988 | 2013_Kossoff_12 | |
| 1988 | The History and Archives Committee took advantage of the large number of experts attending the Washington Congress. It staged a **two day Historical Symposium on Diagnostic Ultrasound** to which they invited over two hundred experts who presented their experiences in developing new technologies and introducing them clinically in the field. **Kodak Health Sciences published the proceedings** of this meeting entitled **"Medical Diagnostic Ultrasound: A Retrospective on its 40th Anniversary".** The proceedings give a thorough, well-illustrated history of diagnostic ultrasound and are highly recommended to those interested in the subject. | WFUMB 1988 | 2013_Kossoff_12 | |
| 1988 | In keeping with its policy to support development of international consensus on safety, WFUMB, through its Safety and Standardization Committee, sponsored its **Second Seminar on Safety and Standardization in Medical Ultrasound** at a conference venue close to Washington. The proceedings of the Seminar were published in 1989 in a special issue of UMB. | WFUMB 1988 | 2013_Kossoff_13 | Only listed in 1989 UMB index. Cannot find special issue in UMB website |
| 1988-1991 | WFUMB sponsored two seminars on Safety and Standardization in Medical Ultrasound. The first, held in **Geneva in 1990**, was limited to twenty participants who prepared WFUMB Statements on Thermal Effects in Clinical Applications in B-Mode Imaging and Doppler. These stated that B-mode was not contraindicated for any application, but Doppler held the potential to produce a significant temperature rise. The next seminar was held **in Denmark immediately prior to the Copenhagen 91 WFUMB Congress**. The Seminar was attended by fifty delegates who, prior to the meeting, submitted proposals for modifications of the Geneva statements and at the meeting voted on the final recommendations. The proceedings of the two Symposia were published by **UMB in 1992** and form the basis of the Thermal and Mechanical Indices used as Output Display on current equipment. | | 2013_Kossoff_13 | Cannot find the proceedings in UMB website |
| 1989 | The second meeting of the proposed Asian Federation which South Korea had also joined, was held in Bali, Indonesia in July 1989 under the presidency of Dr. Willyarto Wibisono. Since the Constitution of the World Federation forbade the representation of any single country by more than one national society, the **affiliation of the Asian Federation with the World Federation was delayed by the prior affiliation of the Indian Society of Medical Ultrasound directly with the World Federation while the Ultrasound Society of India had later affiliated with the Asian Federation.** | AFSUMB | 1990_White | |
| ~1989 | Kazunori Baba at Tokyo University's Institute of Medical Electronics, Donald King and his group at Columbia University, and H.C. Kuo and his colleagues at the National Cheng Kung University Hospital in Taiwan did some of the important early work with this technology. **Kretztechnik of Austria began to market the first commercial 3-D scanner, the Combison 330, in 1989.** | | 2003_WFUMB HMU_04_26 | |

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| ~1980s | Innovations have not been limited to just the body of the scanner and the display modes but involved transducers as well. New materials for the transducer crystals were introduced in the mid-1950s, as already mentioned, but improvements to transducer material design and fabrication has continued apace throughout the last fifty years. The number of transducer crystals or channels has increased tremendously from one or a few to 64, 128, 256, 512, and even 1024, providing a very wide aperture for both signal transmission and reception. Improvements in crystal technology allowed them to go into broad-band and high dynamic range. By the late 1980s, the linear configuration of transducer elements was replaced by curvilinear phased arrays, which were able to generate dynamically focused beams that could be steered, thereby increasing lateral resolution. | | 2003_WFUMB HMU_04_27 |
| 1991 | The **Copenhagen Congress** was attended by over 1500 participants from 60 countries and the abstracts of the presented papers were published in five booklets on the topics of General Ultrasound, Cardiology, Technical, Obstetrics and Other Fields. The opening address was an honorary lecture by Dr. John Wild in recognition of his pioneering work and the **award of the Japan Prize**. The Third World Congress of Sonographers was also held in association with the WFUMB congress. The total membership of WFUMB at the General Assembly in 1991 was 23,189, an increase of 6182 members over the last three years. At the conclusion of the Congress Dr. M. Fukuda was elected President. | WFUMB 1991<br>John Wild | 2013_Kossoff_13 |
| 1991-1994 | A major initiative during his term in office was emphasis on provision of **education particularly in developing countries**. Two educational workshops were held at which provision of guidelines for ultrasound examinations was identified as a fundamental need and means to construct and disseminate these were discussed. Two members of the Administrative Council (a radiologist and an obstetrician) visited **Patan Hospital in Kathmandu** and presented a report on the visit. Ultrasound was introduced in that hospital four years previously by a well-trained sonographer who proceeded to train physicians and sonographers on ways to undertake ultrasound examinations. The majority of diseases in the population are amenable to ultrasound diagnosis and the technique was in widespread use in the hospital. The two Council members assessed the level of proficiency by the staff and found that it matched that in their own hospitals. The results obtained at Patan hospital were considered to fit the objectives of WFUMB and the methodology used there was considered a good way to start WFUMB based training. | F Weil<br>W Wibisono | 2013_Kossoff_14 |
| 1992 | The WFUMB statements on thermal effects of Doppler ultrasound have created widespread international interest. Following extensive review by the international scientific and medical community, the consensus of the first bioeffects meeting was published in a report on "**Issues and recommendations regarding thermal mechanisms for biological effects of ultrasound" (WFUMB 1992)**. Since the original set of policy statements were published in 1992, the WFUMB Safety Committee has published scientific review papers. | | 2004_ECHOES_05 |
| 1992 | As a result of illness, Dr. Denis White had to resign in 1992 and Dr. Peter Wells from Bristol, United Kingdom, assumed the position of Editor-in-Chief. | Denis White<br>Peter Wells | 2013_Kossoff_14 |
| 1992 | The 1990s also saw a new standard for diagnostic ultrasound equipment in the USA, which was developed by the AIUM and NEMA. This **1992 AIUM/NEMA standard** was more than just a revision of the 1983 standard. It incorporated such new ideas as an **"output display standard" (ODS)**, which displays safety information in real-time on diagnostic ultrasound equipment. Concern with bioeffects and work on safety continues even though all studies until now have shown that ultrasound is one of the safest medical diagnostic imaging modalities. | | 2003_WFUMB HMU_04_36 |

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| 1992-2006 | In 1992 Denis White suffered a stroke. Before then, however, he had persuaded the Council to appoint Dr. Peter Wells, a well-known physicist from Bristol, United Kingdom, as editor-elect and the transition was accomplished without any disruption in the publication. In 2008 the United Kingdom Government honored Peter Wells by the award of CBE (Order of Commander of the British Empire). **Peter Wells served as editor-in-chief until the end of 2006**. The relationship between the Federation and the publisher – whose name had changed from Pergamon to Elsevier in 1996 – was one of longstanding mutual trust. UMB had more than doubled in size from 1992 to 2006 and had gained an impact factor of 2.221 – then the highest of any journal devoted to the whole field of ultrasound in medicine and biology. As the official WFUMB journal, **UMB** had become not only a very visible token of the scientific excellence of the Federation, but also one of its principal sources of revenue. | Denis White<br>Peter Wells | 2013_Kossoff_20 | |
| 1993 | By 1993 SDMS membership had grown to over 10,000. Other countries, such as Australia and Japan, also formed sonographers' societies and the first World Congress of Sonographers was held in conjunction with the WFUMB congress in Sydney, Australia, in 1985. | | 2003_WFUMB HMU_04_42 | |
| 1994 | The **Sapporo 94 WFUMB Congress** was held in conjunction with the 4th Congress of World Federation of Sonographers. More than 1500 delegates from 45 countries attended the Congress. In 1994 the Federation had eight affiliated organizations with a total of 43,325 members, a large increase over the last three years. At the end of the Congress Dr. B. Goldberg was elected next President. | WFUMB 1994 | 2013_Kossoff_14 | Eight affiliated organizations? What are two other than current 6 federations? |

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| 1994-1997 | The **Administrative Council held in Beijing in 1995** began on a sad note with the death in that city of one of the Councilors who came to attend the meeting. The Council considered applications for association with WFUMB from the Egyptian, Turkish, Russian, and Ukraine societies. At the meeting the President informed the Council that **SIDUO no longer wished to remain member of WFUMB**. A significant change to the Council was the establishment of **two Vice-President positions** that were filled at the conclusion of the Sapporo Congress. Through its **close collaboration with WHO**, WFUMB was being invited to various WHO organizational meetings. In return WHO was invited to specially arranged education and safety meetings. This close contact insured good collaboration between these two organizations on matters of interest to both, such as safety and education. At a WHO sponsored meeting held in Philadelphia in 1996, a joint Scientific Group prepared a report on Training in Diagnostic Ultrasonography – Essentials, Principles and Standards. The report was submitted for formal WHO approval later that year. The Council considered new developments such as color imaging, multi-planar and 3-D imaging, endoluminal ultrasound and contrast agents and the changes to education that would have to be made to accommodate that these advances. Establishment of a permanent WFUMB Website was considered and a budget was allocated to the Secretary to provide a report on this matter. The Council also decided that the format for naming future Congresses be changed for example, **FLORENCE WFUMB 2000 CONGRESS**. The Federation sponsored **two Seminars on Safety of Ultrasound in Medicine** held in Utsunomiya, Japan and Kloster-Banz in Germany. The proceedings of the Seminars resulted in recommendations that were published in one issue of UMB in 1998. Recommendations on thermal effects were that a 1.5 degrees Celsius rise was safe but a temperature rise above 41 degrees for five minutes was potentially hazardous. Recommendations on nonthermal effects were more general and specified cautious use. The recommendations also stated that ultrasound could be considered safe if the acoustic amplitude did not exceed 1 MPa. | | 2013_Kossoff_15 | Who is that councilor?<br><br>Congress name guideline?<br>In bylaws 8.6, "WFUMB '82," or "WFUMB 2000," |
| 1997? | The Federation sponsored a **two-day conference on ultrasound in Hammamet, Tunisia**. Over 200 participants from eight African countries attended. A round table meeting was held on education and the representatives from the various countries discussed forming an African Federation. Two members of WFUMB Council represented WFUMB at the Conference. The Council also considered a request for the next conference to be held in Turkey. A new federation of ultrasound societies entitled **Mediterranean and African Society for Ultrasound (MASU) joined WFUMB that year**. MASU had at that time a delegation of over 400 members. | MASU | 2013_Kossoff_15 | |
| 1997 | Over the years, the Newsletter had an uneven publication record and the last issue was published in July 1997. | Nwesletter | 2013_Kossoff_15 | |
| 1997 | As with previous Congresses the proceedings consisted of abstracts of the 450 papers presented at the meeting. A Syllabus of the 27 presentations (text and echograms) submitted by the invited speakers was also provided. At the conclusion of the Congress the Dr. H. Lutz was elected President. | | 2013_Kossoff_15 | |
| 1997 | WFUMB website was established in September, 1997 and is hosted by an Internet service provider called “Midcoast”, based in Port Macquarie, NSW, Australia. The website address is http://www.wfumb.org.au. | | 1998_WFUMB website report at AC_Robinson | When webhosting moved to USA? |

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| 1997-2000 | During his tenure, the Council felt that education, particularly in developing countries, should be a major activity for WFUMB. With this aim Dr. Lutz initiated the African project of WFUMB. In cooperation with MASU planning began to establish a WFUMB African Partnership in which WFUMB would support sending teachers to ultrasound courses, establish scholarships for young persons and prepare suitable education material. WHO was at that time planning the establishment of centers of excellence in radiology in the third world. The previously established contacts, reinforced by extensive discussions, swayed WHO to accept WFUMB as the organization to be responsible for this task in diagnostic ultrasound. The first center of excellence (COE) was established in Kampala (Uganda) in 2004. This center has been a very active institution for ultrasound education for the whole region. WFUMB also proceeded to sponsor diagnostic ultrasound courses that were held in Gambia and Uganda. Representatives of WFUMB attended WHO meetings on Training and Education in Diagnostic Ultrasound and agreement was reached that WFUMB would be responsible for editing the next edition of **WHO's "Manual of Diagnostic Ultrasound"**. The **WFUMB website went online during this period**. The current address is www.wfumb.org. | Harald Lutz | 2013_Kossoff_16 |
| 1998 | By 1998, the growth in membership had stabilized and six federations of societies were affiliated with WFUMB. The federations and their membership were: AFSUMB (17,365), EFSUMB (12,522), AIUM (7,005), FLAUS (4,840), ASUM (1,232) and MASU (511), a total of 43,475 members. | WFUMB Membership | 2013_Kossoff_16 |
| 2000 | Responding to this need, WFUMB organized the **African Cooperation Group on Education** in 2000, giving courses in Nairobi (Kenya), Kampala (Uganda) and Moshi (Tanzania). | | 2002_ECHOES_10_Watanabe |
| 2000 | The **Florence Congress** was the last Congress to be co-shared with the Congress of Sonographers. Over 1500 delegates presented more than 400 papers at the Congress. At the conclusion of the Congress Dr. H. Watanabe was elected President. | WFUMB 2000 | 2013_Kossoff_16 |
| 2000 | The WFUMB educational activities, the **"African and Asian projects"**, which were launched on 2000, are being profitably continued. In this context a new continental project, the **Latin American Education Project**, has just been started. | | 2005_ECHOES_05 |
| 2000-2003 | A major challenge facing WFUMB during this period was the structure of **AFSUMB**. This federation, initially organized by Dr. Wagai, was facing two issues. The first concerned application for affiliation from **two societies in India**. The rules of WFUMB stipulate that only one society from one country, whose focus is clinical and medical ultrasound and which admits all specialties, can be affiliated with WFUMB. This rule solved the issue. The other was the matter of **"One China"** with application from Mainland China and Taiwan. Dr. Watanabe's political acumen allowed successful resolution of this potential conflict. The President and the Council continued their support for the establishment of Centers of Excellence (COE). During this three-year period **four COE's** were established: in **Kampala (Uganda), Nairobi (Kenya), Moshi (Tanzania)** and, with Asian Cooperation Group, **Dhaka (Bangladesh)**. The project **"History of WFUMB"** was completed. Initially proposed as a book by Council three years previously, it was decided instead that the history be published on a CD and be given to participants at the Montreal Congress. | AFSUMB<br>WFUMB 2003 | 2013_Kossoff_17 |
| 2002 | Also the Training for the Trainers program was held by the Asian Cooperation Group in Dhaka (Bangladesh) in 2002. | | 2002_ECHOES_10_Watanabe |
| 2002_10 | **First issue of ECHOE**S published | ECHOES | 2002_ECHOES_10_Hancke |

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| 2002_02 | The **first WFUMB Basic Course on Ultrasonography was held in Moshi, Tanzania,** February 4th-8th, 2002. The course was a result of cooperationbetween the Kilimanjaro Christian Medical Center (KCMC), Dr . Oneko, Dept. of Gyn/Obst. and the WFUMB Education Committee chaired by Dr. H.Lutz. About 80 participants were registered. These were medical doctors, nurses, midwives and others within medical care. Most participants came from Tanzania, but participants from Kenya and Uganda were also present. The five-day course consisted of didactic lectures and hands-on training in general medical ultrasound. The topics were numerous, including examinations of the head, neck, thorax, abdomen, breast, small part scanning of musculoskeletal structures, as well as gynecological and obstetrical examinations. The participants were divided into two groups, depending on their interest in gynecology/obstetrics or other specialty areas. Lectures were given by the members of the WFUMB African Cooperation Group on Education: Dr. H.Lutz (Germany), Dr. Elisabetta Buscarini (Italy), Dr. Hassen Gharbi (Tunisia), Dr. Søren Hancke (Denmark), and Dr. Kittipong Vairojanavong (Thailand). Lectures were also given by Dr. Azza Hammou, Tunisia (supported by HG); Dr. Klaus Dirks, Germany (supported by HL); Dr. Diefenthal, Head of Radiol. Dept., KCMC; Dr. Sizer, KCMC; and Dr. Voltz and Dr. Fruhauf, Germany. KCMC has two modern ultrasound machines, one for gynecological/obstetrical use and one for general abdominal imaging, etc. An Acuson ultrasound machine was donated to the KCMC from Bayreuth, Germany, and a B-K Medical portable ultrasound machine was brought from Denmark for hands-on training during the course. In all, four ultrasound machines were used for the practical hands-on training procedures. The great interest and enthusiasm of the participants and the Chairman of the KCMC impressed the WFUMB teachers. This first WFUMB course on basic ultrasonography was very successful. | 2002_ECHOES10 |
| 2002_06 | **The first WFUMB Training for the Trainers Ultrasound Workshop was held in Dhaka, Bangladesh**, June 6th-8th, 2002. The course was a result of cooperation between the Bangladesh Institute of Ultrasound in Medicine and Research, the Bangladesh Society of Ultrasonography, Dr. Kanu Bala and WFUMB Education Committee, Dr. K. Vairojanavong, and Dr. H. Lutz. Chairman of the project was Dr. K. Vairojanavong. The Honorary Lecturer team was Dr. H. Lutz, WFUMB Immediate Past President; Dr. H. Watanabe, WFUMB President; Dr. H. Gharbi, WFUMB Vice President 2; Dr. K. Vairojanavong, WFUMB Vice President 1, and Dr. J.K. Han, Seoul, Korea. Thirty-seven medical doctors, 35 from Bangladesh and 2 from Sri Lanka, with at least one year of experience in the field of medical ultrasound, participated actively in the course. The course was held in the auditorium of the Bangladesh Society of Ultrasonography in Dhaka. The program included a wide variety of diagnostic medical ultrasonographical items such as abdominal, gynecological, obstetrical, urological, pediatric, tropical and interventional ultrasound, as well as an important workshop on How to Organize an Ultrasound Workshop. In the panel discussion on how to organize an ultrasound workshop, each panelist presented his or her personal experience, and an open discussion followed. Finally, the aim of this education workshop, Training for the Trainers, was discussed. Three participants from the provinces announced that they will run hands-on training at their institutes to teach junior doctors who are not able to attend courses in Dhaka. | 2002_ECHOES_10 |
| 2002_06 | WFUMB Asian Education Project, Training for the Trainers Ultrasound Workshop: June 6-8, 2002. Dhaka, Bangladesh. Auditorium of the Bangladesh Society of Ultrasound | 2008_ECHOES_10 |

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| 2002 | After a dormant period of five years, the Newsletter started to be published again in 2002. The name of the newsletter was changed to **"Echoes"** and Dr. Sorens Hanke from Copenhagen, Denmark, was appointed as Editor. He remained in that position **until the editorship was passed to the WFUMB office in 2009.** Dr. Hanke was also responsible for restructuring and running the WFUMB Web-site until that date. | ECHOES | 2013_Kossoff_17 |
| 2003.04 | **EUROSON 2003** was organized as the first joint Scandinavian meeting and was held in Copenhagen, April 27-30, 2003. The local organizing committee under the presidency of Michael Bachmann Nielsen presented an outstanding program, both from a scientific and a social point of view. More than 80 invited speakers gave a summary of the actual state of the art in ultrasonography, and in about 300 free communications, researchers from all over Europe presented the newest results of their excellent work. | | 2002_ECHOES_05 |
| 2003 | A **CD-Rom on "History of Medical Ultrasound"** has been compiled under the supervision of the committee, and the CD-Rom was given to each of the participants of the WFUMB 2003 World Congress in Montreal. | | 2004_ECHOES05 |
| 2003_05 | Because of an increasing demand for education and training for ultrasonic techniques in medical practice, WFUMB has, during the WFUMB Administrative Council Meeting held in Montreal on May 31, 2003, **decided to establish so called WFUMB Centers of Excellences (COE)** at certain places in developing countries of the world. | | 2005_ECHOES_05 |
| 2003_ | WFUMB Lectures, which are lectures on the "state of the art" given by WFUMB Council members, were given in Europe, Latin America and Australia. | WFUMB Lecture | 2003_ECHOES_10 |
| 2003_06 | The American Institute of Ultrasound in Medicine (AIUM) was honored to have hosted WFUMB's 10th World Congress, held in Montreal, Canada, June 1-4, 2003. The combined meeting was a success, attracting thousands of ultrasound professionals from 31 countries around the world. The congress boasted an outstanding lineup of educational programs, with courses in 18 different specialty areas and more than 275 abstract presentations on the newest research and discoveries in ultrasound. Attendees loved the Meet-the-Professor roundtable sessions where they were able to discuss specific ultrasound topics in a small group setting with world-renowned experts. The debate sessions, where experts took either a "pro" or "con" stance on a controversial topic in ultrasound and debated the merits of the issue, were also a favorite. With more than 100 exhibitors featuring the latest in ultrasound technology, the exhibit hall drew crowds and offered great networking opportunities for all ultrasound professionals. Other educational offerings included "Just Images" sessions, daily case-of-the-day studies, film panel discussions, and scientific poster exhibits. The combined congress was rewarding for all involved, and the AIUM looks forward to working together with WFUMB on many other fronts to advance the development of ultrasound in medicine. | WFUMB 2003 | 2003_ECHOES_10 |
| 2003_ | During the WFUMB 2003 Congress in Montreal, the previous WFUMB Presidents Dr. H. Thompson, Dr. G. Kossoff, Dr. F. Weill and Dr. B. Goldberg, were honored as Life Members of WFUMB. An official ceremony took place during a WFUMB dinner in connection with WFUMB/AIUM 2003. | Honorary Life Member | 2003_ECHOES_10 |

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| 2003 | For 2003 two applicants were selected: Dr. Myriam Sayed from Tunisia, who had a stage in Paris, France, for an advanced course on interventional US , and Dr. Rosemary Byanima from Uganda who had a stage in Crema, Italy, for an advanced course on diagnostic and interventional abdominal Doppler US. Both these young radiologists confirmed in their final report that **WFUMB fellowship** gave them a great opportunity of deepening their US knowledge; Dr. Byanima who is an US trainer in her hospital prepared also some presentations to share this experience with colleagues of her country. | Fellowship | 2004_ECHOES_05 | Name different (vs #301) |
| 2003 | WFUMB Scholarships were awarded to two of the eleven applicants, Dr. Zhou of China and Dr. Sayed of Tunisia. | Scholarship | 2003_ECHOES_10 | Name different (vs #300) |
| 2003 | As with previous meetings the proceedings of the Montreal Congress consist of over 275 abstracts of the submitted papers. The format of the Congress was enlarged to include Meet-the-Professor sessions as well as debate sessions, where experts took a “pro” and “con” position on controversial topics. Other educational sessions included “just images”, daily case-of-the-day and film panel discussions. At the conclusion of the Congress Dr. M. Ziskin was elected next President. | WFUMB 2003 | 2013_Kossoff_17 | |
| 2003 | WFUMB is fortunate that it had the foresight to establish early a History/Archives Committee. This committee has held a close watch on historical papers written by individuals associated with the establishment of societies and Federations, as well as on papers dealing with developments of ultrasound in various specialties. At the Montreal 2003 Congress WFUMB released a CD that contains a comprehensive collection of papers published until then, and the interested reader is referred to this CD that is available from the WFUMB Secretariat | WFUMB 2003 | 2013_Kossoff | |
| 2003-2006 | In a major change in policy Council agreed to decrease the term of office of the Council from three years to two. Correspondingly the interim period between the Congresses was decreased to two years. The Council also decided to create a Secretariat Office to assist the professional management of WFUMB. The Secretary, Dr. Stan Barnett, was asked to undertake the massive task of transferring all existing documents from paper to electronic form. He managed to achieve that task in 120 hours and the electronic version of these documents is now kept by the Secretariat. A **scholarship** program that provided financial support to young investigators for three to six months training was initiated, and scholarships were awarded to applicants from Tunisia, China, Bangladesh, Romania and Venezuela. Short training courses were continued and WFUMB Councilors together with local physicians held training courses in Manilla (Philippines) and Freetown (Sierra Leone). At WFUMB request, our past president Dr. Lutz and Dr. Gharbi published a book on “Ultrasound in Tropical Diseases”. The authors wrote this book specifically to be used for teaching in developing countries. Two new CEOs were set up, one in Timisoara, Romania, the other in Caracas, Venezuela. | Scholarship | 2013_Kossoff_17-18 | vs #300, 301 |
| 2004 | The Education Committee, under the very able chairmanship of Dr. Elisabetta Buscarini, has a particularly large and active agenda. Short Ultrasound Training Courses are being offered in many areas of the world. A particularly successful course was held in January in Manila, Philippine Islands. Another course was conducted in Freetown, Sierra Leone. In each case, WFUMB Expert Teachers joined with one or more local teachers to present a week of training in practical ultrasound diagnosis. Comments about the courses from both the students and teachers have been excellent. | Elisabetta Buscarini | 2004_ECHOES_05 | |

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| 2004 | Dr. Hiroki Watanabe, Immediate Past-President of WFUMB was the driving force behind the formation of the first WFUMB Centre of Excellence, **officially opened in Bangladesh in February 2004.** Dr. Kanu Bala, Bangladesh Institute of Ultrasound in Medicine and Research is the primary link in this WFUMB initiative | WFUMB COE | 2004_ECHOES_05 | |
| 2004 | Centers of Excellence have been recognized: Bangladesh Society of Ultrasonography in Dhaka, Bangladesh in 2004 (AFSUMB) | WFUMB COE | 2007_ECHOES_10 | |
| 2004 | Centers of Excellence have been recognized: Uganda Association of Sonography in Kampala, Uganda in 2004 (MASU) | WFUMB COE | 2007_ECHOES_10 | |
| 2004 | For 2004 one candidate has been selected so far for WFUMB fellowship: Dr. N'Draman Assoa from Benin who will study in Tours, France. | Fellowship | 2004_ECHOES_05 | Fellowship definition? |
| 2004_03 | The meeting of WHO Global Steering Group for educational projects was held on March 8th 2004 in Wien and H Lutz and E Buscarini attended. The position of the WFUMB as experts for ultrasound and educational activities was appreciated by the other members of WHO steering group | WHO-related | 2004_ECHOES_05 | |
| 2004 | In addition to the WFUMB Educational Courses, we have established two Ultrasound **Centers of Excellence**: One in Dhaka, Bangladesh and the other in Kampala, Uganda. These centers were selected after a lengthy and detailed evaluation of their expertise and their ability to train physicians to practice diagnostic ultrasound where it is most needed. We have also established a program of WFUMB Scholarships to enable physicians from less developed countries to train for periods of three to six months at an excellent international hospital under the mentorship of a recognized leader in ultrasound. Two **scholarships** have been awarded this year: one to Dr. M. Sayed of Tunisia, and the other to Dr. Xiang Zhou of China. Further details and application information can be obtained from the WFUMB web site (www.wfumb.org). | WFUMB COE<br>Scholarship | 2004_ECHOES_05 | |
| 2004 | Candidates selected for the WFUMB Scholarship 2004 are: Dr. N. Draman Assoa from Benin, Africa who has completed a stage in Tours, France, and Dr. Nasreen Sultana from Bangladesh, who is starting her stage in Caracas,Venezuela. Revised and implemented rules for the WFUMB Scholarship have been published on the WFUMB website | Scholarship | 2005_ECHOES_05 | |
| 2004 | A WFUMB Scholarship was successfully completed and an excellent report received from Dr. Xiang Zhou describing ultrasound development in China. Dr. Zhou offered to be a "good connector between WFUMB and China" and suggested being "an ultrasound transmission gel" for China and WFUMB. It is very pleasing to see such examples of international collaboration and support offered by WFUMB | Scholarship | 2004_ECHOES_05 | |
| 2004 | Our last Administrative Council Meeting was held in June immediately following EUROSON 2004, the annual meeting of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB). The **EUROSON 2004** meeting, held in Zagreb, was very well attended. The organizers are to be congratulated for having put together an excellent program. Holding the WFUMB administrative meeting in conjunction with a major ultrasound meeting allows WFUMB Officers to more efficiently participate in the meeting | | 2004_ECHOES_10 | |
| 2004 | With a busy 2004 the **Education Committee** met in February (Quito, Ecuador during the WFUMB Council Meeting), in June (Zagreb, Croatia during the Euroson 2004), in October (Kampala, Uganda during the African Project Course) and in November (Beijing, China during the Asian project Course) | | 2005_ECHOES_05 | |

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| 2004 | **Education Program Sponsoring (Sponsorship) Committee:** The committee has been seeking input from our collegues in order to prepare revised goal and objectives. The longstanding benefits of WFUMB has been the educational programs for which it has provided. Over the course of the next 2-3 years some members have expressed their desire to see a WFUMB sponsored or Co-sponsored post graduate course occur at least monthly somewhere in the world. In order to better facilitate the desired outcome the committee will meet at the next councilor meeting to divide the tasks going forward. It remains an objetcive of this committee to create a **template for a "sponsored" meeting**. In this regard the educational requirements along with the financial obligations of the "hosting" organization will be defined. Whether these courses follow the traditional lines of postgraduate education remains to be seen. Ideally, new and innovative means to reach all parts of the world is essential for this committee. The committee welcomes your suggestions | 2004_ECHOES_05 |
| 2004_01 | Members of this project are B. Choi, C. Chiang, M. Kudo. A very successful **WFUMB "Training for the Trainers" Ultrasound Workshop** was organized by B, Choi on January 21-23, 2004 at the Philippine Children's Medical Center in **Quezon City, Philippines**. The purpose of this "Training for the Trainers" program was to provide ultrasound training knowledge, the techniques of scanning and interpretation, to those who become the trainers, and are competent to train others who are new in the field of diagnostic ultrasound. Six faculty members (B. Choi , H. Watanabe, G. McNally , M. Kudo, L. Fernandez, K. Vairojanavong) conducted the program and the Local Organizers cooperated whole heartedly; 22 lectures on different topics of ultrasound and handson training were conducted. Selected trainers from the different training institutions and regions of the Philippines attended the three day workshop in a very academic atmosphere. | 2004_ECHOES_05 |
| 2004_01 | WFUMB Asian Education Project, **Training for the Trainers Ultrasound Workshop:** January 21-23, 2004. **Quezon City, Philippines.** Philippine Children's Medical Center | 2008_ECHOES_10 |
| 2004_02 | The first **Center of Excellence** was realized in **Dhaka, Bangladesh** by a contract with the Bangladesh Society of Ultrasonography (BSU). **The first workshop in Advanced Ultrasound** was held on February 24-26, 2004, in BIAM Auditorium in Dhaka. This was followed by the second workshop for breast, renal and prostatic ultrasound held on February 22-24, 2005 in the same place. Both events were very successful with a full audience. | 2005_ECHOES_05 |
| 2004_02 | On February 13-15 th 2004, in Freetown, **Sierra Leone**, a Course of the **WFUMB African Project** was held, in collaboration with local radiologist Dr. Gordon Harris and three speakers - H. Gharbi, H. Lutz, I. Bellagha. Sierra Leone is just recovering from a devastating war, and side effects of this war are still heavy, implying also many difficulties to travel inside the country. We are convinced that our efforts for a country in such poor and lonely conditions, also from the scientific point of view (250 physicians, 12 US equipments, for 5 million inhabitants in the whole country), are worth, and so was to teach the colleagues very motivated. In the three days course 20 lessons and hands-on sessions were done, both lively participated by the attendants. A further course of WFUMB African Project will be held in Uganda and Kenya, in October. African project members (E. Buscarini H. Gharbi, H. Lutz) intend to prepare a course both in Kampala and in Nairobi (3-4 days each, in the same week); in that occasion it will be also officially launched the WFUMB Center of Excellence of Kampala with an ultrasound workshop organised by the team of Mulago Hospital and Uganda Society of Ultrasound (UGASON) headed by doctor Michael Kawoya. Thereafter the Kenya course will further corroborate relationships within local teams. | 2004_ECHOES_05 |

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| 2004_10 | The second WFUMB **Center of Excellence** was established in **Kampala, Uganda** by a contract with the Uganda Society of Ultrasound (UGASON). The first workshop was conducted on October 16-20, 2004 in Uganda. | 2005_ECHOES_05 | Date different (vs #322) |
| 2004_10 | A Course of the **WFUMB African Education Project** was held in Uganda on October 17-20, 2004. The theme of the course was "Integrating ultrasound into curative services". The local organizing committee was the excellent team of Mulago Hospital and Uganda Society of Ultrasound (UGASON) headed by Dr. Michael Kawoya . As part of the activities was the official Launching of the WFUMB Centre of Excellence (COE) in Kampala Uganda. Harald Lutz, Hassen Gharbi, and Elisabetta Buscarini were the WFUMB representatives. Prof. Harald Østensen, who is in charge of the World Health Organization (WHO) Imaging Department, attended the Course as well as the official launching of the WFUMB Center of Excellence together with local WHO representative. Course speakers came also from the neighboring countries namely Kenya (Henry Wanga, Arnold Rodrigues, Angeline Aywak), Tanzania (Helmut Deifenthal) and Rwanda (James Sennoga). Attendance to the course was, as in the past editions in Kampala, ample and highly participatory (119 attendees from Uganda, Kenya, Tanzania, Zambia and Rwanda). The occasion of launching the WFUMB Centre of Excellence was officiated upon by the Minister of Health of Uganda, Dr Jim K. Muhwezi. It was a momentous and joyous occasion crowning the long-standing efforts of the team of Mulago Hospital and Makerere University for ultrasound teaching in collaboration with WFUMB. | 2005_ECHOES_05 | Date different (vs #321) |
| 2004_11 | A **WFUMB Training of Trainers Workshop** was held in **Beijing, China,** November 13-15, 2004. Beijing, China. Peking Union Medical College Hospital. | 2005_ECHOES_05<br>2008_ECHOES_10 | |
| 2004_11 | A **WFUMB "Training for the Trainers Course"** in Asia was held in **Beijing, China,** November 13-15, 2004 at the Peking Union Medical College Hospital in Beijing. Eight faculty members conducted the program: Dr. Byung Ihn Choi, Dr. Elisabetta Buscarini and Dr. Masatoshi Kudo from WFUMB, together with Dr. Kittipong Vairojanavong, Dr. Seung Hyup Kim, and the local organizing team led by Dr. Yu-Xin Jiang, and including Dr. Bao-Wei Dong and Dr. Min-Hua Chen. Faculty members delivered twenty three lectures on different topics of ultrasound. They also conducted hands-on training. A total of 100 selected trainers from different training institutions and regions of China attended the three-day workshop. Since there was a clamor for expansion of capacity of participants for the workshop among those who wished to attend, the organizing committee decided to open an observer ship status with the consent of WFUMB . A total of 141 participants were thereafter enrolled as observers for the workshop. Closing Ceremonies were held on November 15th, 2004 at the Peking Union Medical College Hospital Audio Visual Room. A workshop banquet in conjunction with WFUMB night was held at the Jianguo Garden Hotel in the evening of November 15th, 2004. More than two hundred specialists including lecturers, local organizers and participants were attending. Dr Jiang announced the results of the evaluation questionnaire for the education program from the participants, which were very satisfactory. | 2005_ECHOES_05 | |
| 2005_03 | A new continental education project has just been launched in Latin America. **The first WFUMB Latin American Education Project Course was held in Lima, Peru** on March 10-13, 2005. The very successful meeting had 364 attendees. Speakers included the FLAUS President, FLAUS President Elected, FLAUS Secretary and two former Presidents of FLAUS, as well as speakers from Costa Rica, Venezuela, Ecuador, Puerto Rico and Argentina. Best congratulations to Dr. Leandro Fernandez and Dr. Giovanni G. Cerri for having started this effective educational project. | 2005_ECHOES_05 | |

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| 2005_03 | Dr. H. Østensen, WHO, has recently issued an invitation to the WFUMB to nominate WFUMB representatives to the Steering Group at the next meeting to be held during the European Congress on Radiology (ECR) in Vienna, March 2005. WFUMB Vice President 1 and 2 and the WFUMB Secretary will attend the meeting of the **WHO Global Steering Group** in Vienna in March 2005. The WFUMB representatives will work for high quality education and training in global medical ultrasound and will recommend sufficient education and training programs within the frames of WHO. | | 2005_ECHOES_05 |
| 2005_03 | The **Global Steering Group for Education and Training** in Diagnostic Imaging Meeting was held in Vienna March 7th, 2005 upon invitation of Dr. Harald Østensen from WHO. Dr. H. Lutz attended as a WFUMB representative and presented the WFUMB educational policy and activities. Additionally he has proposed the creation of a network of information on educational activities in the context of the Global Steering Group. | | 2005_ECHOES_05 |
| 2005_05 | The **WFUMB Safety Committee** will hold a meeting on the **Safety of Contrast Agents in Diagnostic Ultrasound** in May, 2005 in Vancouver, Canada. This meeting will be in conjunction with the annual meeting of the American Acoustical Society, in which Wesley L. Nyborg, Ph.D. will be honored in a special day long session. | | 2005_ECHOES_05 |
| 2005_06 | The third **WFUMB Center of Excellence** was established in **Caracas, Venezuela**, by a contract with the Venezuela Society of Ultrasound. The first workshop in Venezuela has been scheduled on June 22-25, 2005 in Guayana, Venezuela. | | 2005_ECHOES_05 |
| 2005_09 | The WFUMB has a close relation with the **World health Organization (WHO)** and cooperates in several **joint programs**. One will be a joint session on Education in Developing Countries to be held at the EUROSON 2005 meeting this September in Geneva, Switzerland. | | 2005_ECHOES_05 |
| 2005 | Another activity is the publication of a textbook on the use of **Ultrasound in Tropical Diseases, edited by Harald Lutz and Hassen Gharbi**. This is an excellent book and should be of much help in developing countries where tropical diseases are endemic. | | 2005_ECHOES_05 |
| 2005 | A WFUMB Symposium, **Safety of Ultrasound in Medicine: Conclusions and Recommendations on Biological Effects and Safety of Ultrasound Contrast Agents**, was held in Vancouver, Canada in 2005. The proceedings were published in UMB in 2007. | | 2013_Kossoff_18 |
| 2005_10 | The next Full WFUMB Council Meeting will be on October 10 – 11, 2005 in Santiago, Chile in conjunction with the annual FLAUS meeting. | | 2005_ECHOES_05 |
| 2005 | In connection with the recently held WFUMB Executive Council Meeting in Panama the chairman of the Public Relations Committee, S. Hancke went to Guatemala to meet colleagues with potential interest in the formation of a Guatemalan Society of Medical Ultrasound. A meeting with Dr. Juan Francisco de Leon, Past President of Guatemalan Association of OB-Gyn, Past President of Central American Federation of OB-Gyn and member of the American College of OB-Gyn, with Dr. Armando Zamora, President-elect of Radiology Association of Guatemala and with the President of FLAUS, Dr. Miguel Angel Jimenez Taboada, Mexico was established resulting in most valuable bilateral information. The meeting was not only very informative but seems also to be constructive for the creation of a National Guatemalan Ultrasound Society. Through such sonologists, sonographists and others with interest in Medical Ultrasound may join the FLAUS and via this membership join the WFUMB. I would like to thank the above mentioned colleagues for their great hospitality and professional enthusiasm and express my sincere hope for a fruitful outcome of a Guatemalan Society of Medical Ultrasound. | S. Hancke | 2005_ECHOES_05 |

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| 2005 | A book, sponsored by WFUMB entitled **"Manual of Diagnostic Ultrasound in Infectious Tropical Diseases"** has been published. It was very ably edited by Harald Lutz, M.D., and Hassen Gharbi, M.D.. They are true experts in this field and have done a remarkable job in creating something that will be of great value in areas of the world where these diseases are common. In fact, I am not aware of any other text that treats this topic as thoroughly as this book. We have been told that the World Health Organization (WHO) will be purchasing copies to supply to students in developing countries. | | 2005_ECHOES_10 | |
| 2005 | A number of important issues will be examined in detail and it is possible that some may even require reassessment and review of the **WFUMB Constitution**. (In addition to the WFUMB Constitution each affiliated society has its own constitution, some of which limit membership only to medical professionals, while others have a significant sonographer membership.) As Chair of the Constitution Committee, Dr. Barnett S. will ensure that any proposed changes will be brought to the attention of members prior to the Annual General Meeting in Seoul, Korea, 2006. | S. Barnett | 2005_ECHOES_10 | |
| 2005 | **Centers of Excellence** have been recognized: Society of **Venezuela Ultrasound in Medicine Society** in Caracas, Venezuela in 2005 (FLAUS) | | 2007_ECHOES_10 | |
| 2006_01 | **WFUMB Asian Education Project, Training for the Trainers Ultrasound Workshop**: January 27-29, 2006. **Jakarta, Indonesia**, Menara Peninsula hotel | | 2008_ECHOES_10 | |
| 2006 | Dr. P.N.T. Wells, the current Editor-in-Chief of Ultrasound in Medicine and Biology will be stepping down from this position in June following the WFUMB 2006 meeting. Dr. Wells has done an absolutely superb job as Editor-in-Chief and these past 12 years, and we are very grateful for his many significant contributions. He will be duly honored at the WFUMB 2006 meeting, and I hope that you will be able to attend this ceremony. | Peter Wells | 2005_ECHOES_10 | |
| 2006_05 | At the time of the 11th World Congress, May 2006, the award of **WFUMB Honorary Life Member** was bestowed upon Dr. Peter N.T. Wells for uniquely valuable service to the Federation. Dr. Wells has contributed considerably in many ways, not the least of which is his apparently tireless commitment as Editor-in-Chief of the WFUMB Journal, UMB. | Honorary Life Member | 2006_ECHOES_10 | |
| 2006_05 | In addition, the President of WFUMB, Dr. Marvin Ziskin presented Dr. Wells and members of the WFUMB Council with awards acknowledging their contributions to WFUMB. Dr. Ziskin also introduced a **"President's Award for extraordinary service in the performance of tasks promoting WFUMB activities".** The recipients for this award were Dr. Elisabetta Buscarini and Dr. Stan Barnett. | Elisabetta Buscarini<br>Stan Barnett | 2006_ECHOES_10 | |
| 2006_05 | Reduced Term of Office for WFUMB Officers. The meeting of the General Assembly in June 2006 approved **changes to the Constitution and Bye-Laws** that allowed for the term of office for President and Board Members to be reduced **from three to two years**, to commence at the time of the General Assembly, during the 12th WFUMB world congress to be held in September 2009 in Sydney, Australia. An important implication of this is that the period between congresses of the WFUMB will decrease from three to two years | | 2007_ECHOES_10 | C/B change history? Only last revision date seen in the current C/B |
| 2006 | **Centers of Excellence** have been recognized: **Romanian Society of Ultrasound in Timisoara**, Romania in 2006 (EFSUMB) | | 2007_ECHOES_10 | |
| 2006 | After serving as Editor for 14 years Dr. Peter Wells resigned in 2006. Dr. Christie Holland, a well-regarded scientist from the Department of Biomedical Engineering and Radiology, University of Cincinnati, USA was appointed Editor of UMB that year. | | 2013_Kossoff_18 | |

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| 2006 | More than 2500 participants presented over 400 papers at the Congress. Other educational sessions similar to those held at the Montreal Congress proved popular with the participants. At the conclusion of the Congress Dr. G. Cerri was elected President. | WFUMB 2006 | 2013_Kossoff_18 |
| 2006-2009 | The Council continued its emphasis on the provision of continuing **education in Africa, Asia and Latin America.** Apart from sponsoring training courses it continued its support of existing Centers of Excellence, and the provision of scholarships to applicants from Bangladesh, Ecuador and Venezuela. A new initiative was the **donation of four ultrasound units, two to Nigeria and one each to Bangladesh and Moldavia.** WFUMB also sponsored the publication of a second book that was an update of the first volume "Ultrasound in Tropical Diseases" by Lutz and Garbi. The second book included new applications such as musculoskeletal ultrasound. A new major initiative was to improve relationship with its affiliated societies and initiate contacts with other organizations with interest in diagnostic ultrasound. With this as aim, members of the Council met in 2007 with representatives of the AIUM at their annual meeting in New York and AFSUMB in Bangkok. A meeting was also held that year in Florence with the Council of the International Society for Ultrasound in Obstetrics and Gynecology (ISUOG). A meeting of representatives from the two bodies convened a mini-symposium on the Safety of Non-Medical Ultrasound such as to provide 3-D video clips to expectant parents. The proceedings of this Symposium were published by UMB in 2010. Meetings were also held with members of the International Society of Radiologists (ISR) to explore ways to establish closer co-operation. The first meeting was held in 2008 in Marrakesh, Morocco, during the ISR Congress held there. It was agreed there that three WFUMB speakers would participate at the next ISR meeting to be held in Shanghai, China, in 2010. Contact was also made with the Society of Radiologists in Ultrasound (SRU) to identify areas of mutual interest. At the meeting with the AIUM held in 2007 in New York it was agreed that, commencing in 2009, the AIUM office would be responsible for the provision of secretarial services to WFUMB and that the office would be co-located with the AIUM in Washington, DC. The Council explored ways to streamline the selection process of cities to host future WFUMB meetings and a committee charged with providing recommendations was formed. | | 2013_Kossoff_18 |
| 2007 | The agreement between the WFUMB and the **Romanian Society of Ultrasound in Medicine** and Biology (SRUMB) to establish a **Centre of Excellence (COE)** in Timisoara, Romania was officially signed during the inaugural WFUMB/SRUMB Workshop on 1st June 2007. The WFUMB Secretary S. Barnett signed the agreement on behalf of the WFUMB President G. Cerri. | | 2007_EHOES_10 |
| 2007_01 | As mentioned in ECHOES NO 6, Prof. Peter N. T. Wells will retire as Editor in Chief of the WFUMB Journal: Ultrasound in Medicine and Biology (UMB). Dr. Christy K. Holland and Prof. Peter N.T.Wells, Editors in Chief, UMB. At the WFUMB Administrative Council Meeting in Santiago, October 2005 Dr. Christy Holland, USA was formally appointed as Editor in Chief for UMB for a period of 6 years in the fi rst instance with effect from January 1st, 2007. (See also under "Message from the President" p. 2). | | 2005_ECHOES_10 |

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| 2007_01 | WFUMB Executive Council has recommended to the WFUMB Administrative Council that Dr. Christy Holland has accepted to be the new Editor in Chief of UMB for a three year period with effect from January 1st, 2007. Dr C. Holland will participate in the next WFUMB Administrative Council Meeting in October 2005 to make a presentation of her vision of the future of the journal prior to confirmation of her formal appointment. Following a careful and thorough international search, Christie Holland, Ph.D. was selected to be the next Editor-in-Chief. She is an Associate Professor in the Departments of Biomedical Engineering and Radiology at the University of Cincinnati. She is highly respected by her peers, and is eminently qualified. I, for one, am very pleased that she has accepted this position, and I know that she will do a great job. | Christie Holland | 2005_ECHOES_05<br>2005_ECHOES_10 |
| 2007_02 | WFUMB Executive Working Party: After careful consideration of submitted proposals, the WFUMB Executive Bureau established a dedicated **Executive Secretariat Working Party** that met with members of the AIUM Executive Board and CEO in February 2007 to establish terms of agreement for presentation to the WFUMB Council in New York in March 2007. This group was given the responsibility of meeting, interviewing, renegotiating draft contractual arrangements and reporting to the WFUMB Executive Bureau. The composition of the Executive Working Party being; Drs. G. Cerri (Chair/President), M. Claudon (President-elect), S. Barnett (Secretary), B. Benacerraf (Treasurer), M. Ziskin (Immed. Past-President), B. Goldberg (Past-President). Formal minutes of the meeting were submitted to the WFUMB Council together with a separate report from the WFUMB Secretary | | 2007_ECHOES_10 |
| 2007_05 | During the last WFUMB **Administrative Council Meeting in New York in May 2007 a contract on a new WFUMB Executive Secretariat under the wings of AUIM, was signed.** The ceremony took place after the council meeting, and the contract was signed by the AIUM President Dr. Greenbaum and the WFUMB President Dr. Cerri. | | 2007_ECHOES_10 |
| 2007_05 | Inaugural workshop of the **Romanian Centre of Excellence** in Craiova, May 2007. | | 2007_ECHOES_10 |
| 2007 | The WFUMB Safety Committee work on the **Safe Use of Ultrasound Contrast Agents** is completed and a document is published in Ultrasound in Medicine and Biology, UMB, Vol. 33, No. 2, pp. 171-234, 2007. | | 2007_ECHOES_10 |
| 2007~ | In January 2007 Dr. Christy Holland, an eminent bio-medical engineer at the University of Cincinnati, USA, succeeded Peter Wells as editor-in-chief. She spearheaded the modernisation of the journal in the new era of electronic publication – and, most importantly and with a 2010 impact factor increase to 2.493, an ever increasing number of annual submissions (550 in 2011), 472 submissions on a rapidly-rising trajectory, a rejection rate of 59 per cent and a fourth-place ranking amongst all the journals devoted to acoustics. She has more than sustained UMB's pre-eminence in leading and recording the international development of ultrasound in medicine and biology | Christy Holland | 2013_Kossoff_20 |
| 2007 | Following approval by WFUMB Council, a new project: **"Use of Ultrasound for Non-Clinical Scanning"** will be a major effort of the WFUMB Safety Committee for 2007. Executive Committee members of WFUMB and ISUOG who are responsible for preparation of the program and the document is: S. Barnett, WFUMB Safety Committee Chairman, M. Claudon, WFUMB Safety Committee, M. Ziskin, WFUMB Safety Committee, J. Abramowicz, ISUOG Safety Committee Chairman, K. Marsal, ISUOG Safety Committee. | | 2007_ECHOES_10 |

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| 2007_11 | The WFUMB Executive Bureau scheduled a committee meeting in conjunction with the 8th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB) in Bangkok, November 2007. At the invitation of the AFSUMB/Thailand Organizing Committee, members of the WFUMB Executive Bureau presented 19 invited lectures and chaired many sessions in the scientific program over the five-day congress. During the program, the WFUMB Executive Bureau held a joint meeting with the Executive Board of AFSUMB to discuss common strategic issues. The spirit of true scientific and professional collaboration was very rewarding. The AFSUMB/Thailand congress official opening ceremony was highlighted by the presence of the Royal Prince, Rear Admiral Dr. Prince Pusarn Swasdiwat. The Prince is also a recognized radiologist. On behalf of the WFUMB, I wish to extend sincere thanks to the AFSUMB/Thailand Organizing Committee for providing both a stimulating scientific congress and an entertaining cultural event. | | 2008_ECHOES_05 |
| 2007_11 | The WFUMB has begun a process to demonstrate its activities, goals and achievements, particularly in areas of education and improved skills and standards for the safe and effective use of ultrasound in medicine. With the support of its member Federations, the WFUMB plans to establish promotional booths at selected major international congresses. The booths are to be operated by a dedicated staff member of the WFUMB Executive Secretariat while the host congress provides support in terms of booth space. As part of the new proactive approach, the **inaugural WFUMB Promotion booth** was demonstrated at the AFSUMB Congress in Bangkok, Nov. 2007. The prime purpose is to promote the activities of WFUMB and to encourage closer working relationships amongst organizations in the medical imaging field. The next major effort will be at the meeting of the ICR in Marrakech in June 2008. One of the major activities of the WFUMB is its World Congress and this will also be promoted through the WFUMB booth. | AFSUMB 2007 | 2008_ECHOES_05 |
| 2007_11 | WFUMB Executive Bureau with AFSUMB Congress, Bangkok in November 2007 | AFSUMB 2007 | 2008_ECHOES_10 |
| 2008_02 | **WFUMB Asian Education Project, Training for the Trainers Ultrasound Workshop**: February 15-17, 2008. **Agra, India**, Jaypee Palace & International Convention Center | | 2008_ECHOES_10 |
| 2008_06 | WFUMB Administrative Council and International Congress of Radiology (ICR) in Marrakech in June 2008. During the congress in Marrakech, jointly convened by the International Society of Radiology (ISR) and the Mediterranean African Society of Ultrasound (MASU), a joint meeting of the WFUMB Council and Board members of ISR was held. Both organisations have similar educational objectives and it was agreed that there are many opportunities for collaboration on projects on training and safety issues in the development of standards of practice. | ICR 2008 | 2008_ECHOES_10 |
| 2008_07 | **WFUMB Asian Education Project, Training for the Trainers Ultrasound Workshop**: July 24-26, 2008. **Ulaanbaatar, Mangolia**, The State Central Clinical Hospital | | 2008_ECHOES_10 |
| 2008 | In addition, in the last year, **WFUMB has donated 4 ultrasound machines** to developing/emerging countries, such as Nigeria, Moldova, and Tanzania, and has provided scholarship opportunities for several individuals from areas such as Bangladesh, Tanzania, Equador, and Venezuela. | | 2009_ECHOES_05 |
| 2009 | The Sydney Congress continued in the tradition of successful WFUMB meetings. More than 2400 participants from 70 countries attended the Congress, no mean achievement in the difficult economic climate of that time. Abstracts of the presented papers were published as proceedings. In keeping with WFUMB interest in education a special mini-symposium was held on ways to **"train health care practitioners in developing countries".** The symposium drew a large audience showing interest in the subject by the participants. At the Conclusion of the Congress Dr. M. Claudon was elected next President. | WFUMB 2009 | 2013_Kossoff_19 |

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| 2009-2011 | In his farewell remarks published in Echoes, Dr. Claudon stated that the primary focus of his shorter (two years) presidency was on **collaboration**. He continued " In an age where global community has so many opportunities to interact, I am confident that WFUMB's educational endeavors are continuing to the development of strong clinical practices of ultrasound worldwide". As example WFUMB expanded its **collaboration with ISR** and both agreed to send their respective representatives to speak at each other's meetings starting in 2010. The two organizations also agreed to expand their joint education programs in Africa. Another example is the joint release by **WFUMB and ISUOG** "Statement on Safe Use of Doppler Ultrasound During 11-14 Week Scans". This statement has been endorsed by the AIUM. In cooperation with EFSUMB and AFSUMB, WFUMB revised the existing guidelines for "International Guidelines and Good Clinical Practice Recommendations for Contrast Enhanced Ultrasound (CEUS) of the Liver". Educational support was high on the agenda. The Council approved funding for visiting professorships in three developing countries, for five scholarships from applicants from Africa and Asia and the supply of three equipment to Mombasa, Kenya, Cambia, Sierra Leone and Omnogabi Province, Mongolia. It also supported the setting up of a new COE in Indonesia, and funding for three representatives to inaugurate the center. Evidence of local interest was seen in the joint WFUMB/MASU meeting held in Lusaka, Zambia in 2010. Over 130 participants from Zambia, Congo and Uganda attended the Congress. Future meetings were planned in Kigali, Zambia in 2010, and in Bangkok, Thailand in 2011. The membership of WFUMB during this period was six affiliated societies with a total **membership of 54,000 participants from 80 countries**, a truly international representation. | Claudon M | 2013_Kossoff_19 |
| 2010 | **African Education Project**: Three courses have been held in Lusaka-Zambia (8-12th Feb 2010), Tripoli-Libya (25th to 27th June 2010), and Kigali-Rwanda (12-16th Dec 2010). | | 2011_ECHOES_Summer |
| 2010_12 | On December 3-4, 2010, the World Federation for Ultrasound in Medicine and Biology (WFUMB) and the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) brought together a panel of 36 European (UK, Germany, Italy, France), North American (USA, Canada) and Asian (China, Japan, Korea, and India) experts to facilitate the revision of EFSUMB's current contrast guidelines into an **"International Guidelines and Good Clinical Practice Recommendations for Contrast-Enhanced ltrasound (CEUS) of the Liver**." | | 2011_ECHOES_Summer |
| 2011_02 | The 2011 World Federation for Ultrasound in Medicine and Biology (WFUMB)-Medical Ultrasonic Society of Thailand (MUST) **Asian Educational Course** was held February 16 – 18, 2011, in **Thailand**. The course was organized by Wilaiporn Bhothisuwan, who was president of the MUST at that time. The meeting was held in the 50 year Royal Jubilee Building, which belongs to the Thai Medical Association, and in conjunction with MUST Annual Scientific Meeting. The program included lectures, live demonstrations, and post tests. Masatoshi Kudo, WFUMB's president-elect, and WFUMB Administrative Councilors Byung Ihn Choi and Seung Hyup Kim lectured on behalf of WFUMB. There were 320 participants including 150 residents from Thailand, Indonesia, Laos, and the USA | | 2011_ECHOES_Summer |

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| 2011_02 | **The WFUMB Education Committee and officers participated in a brainstorming session** on February 24-26, 2011 in **San Jose, Costa Rica.** Leaders from several WFUMB Centers of Excellence, as well as educators from various parts of the world contributed to the success of the meeting, providing a first-hand accounting of the challenges faced every day in performing ultrasound education with minimal resources. The generous hospitality of the Latin American Federation of Ultrasound in Medicine's (FLAUS) leadership was outstanding. FLAUS joined with WFUMB for a portion of the time to discuss plans for WFUMB 2013. | | 2011_ECHOES_Summer |
| 2011 | WFUMB 2011, the 13th World Congress of the WFUMB, was held in conjunction with the 35th Dreilandertreffen-ULTRASCHALL 2011, the 35th joint meeting of the Austrian, German and Swiss Societies for Ultrasound in Medicine and EUROSON 2011, the 23rd Congress of EFSUMB, one of the foremost gatherings of ultrasound experts in the history of ultrasound. | WFUMB 2011 | 2011_ECHOES_Summer |
| 2011 | The WFUMB Vienna 2011 Congress recognized that the proposal to set up WFUMB arose at the Vienna Congress in 1969. It highlighted this by holding a special morning session entitled **"How Everything Started - Meet the Pioneers"**. Ten of the early users of ultrasound (five Past Presidents and a Past Editor) described their experiences in starting to use ultrasound in an initial environment of skepticism and distrust that slowly changed to acceptance on achievements of diagnostic successes and with technical improvements. The slides shown at that session are available by request to the WFUMB Secretariat Office. Over 1500 participants attended the Congress presenting more than 300 papers. At the Conclusion of the Congress Dr. Masatoshi Kudo was elected President for 2011 to 2013. | WFUMB 2011 | 2013_Kossoff_20 |