

社団法人日本超音波医学会
第2回特別学会賞受賞者

Ultrasound Prize of Japan Society of Ultrasonics in Medicine



井出正男 (1929-)

井出正男氏は多年にわたり超音波医学の研究に従事され、超音波治療器の定量化、超音波細菌破壊装置の開発、集束超音波を用いた生体破壊装置、階調性超音波法(グレースケール表示)、多層・多周波超音波診断装置の開発、超音波音場の計測法及び測定装置の開発、超音波尿路結石破壊装置等の研究を行ってきました。また、超音波医学の基礎におけるバイブルともいえる「超音波便覧」の製作に関与し、超音波の安全性の確保についてもWFUMBをはじめ内外の各種委員会を通じて、大きな貢献をしてきました。超音波医学の診断領域における最大の功績は、現在では当たり前の事となっている「階調性超音波法(グレースケール表示)」(1967)をオーストラリアのGeorge Kossoff氏(1972)に先駆けて開発し、日本超音波医学会において発表され、日本はもとより世界の超音波医学の発展に

貢献されたことである。

井出正男氏は1929年1月24日東京都にて出生(父信三郎、母つるよ)し、ご家族は妻弘子、長男信正、次男正弘の4名であります。1953年に武蔵工業大学電気工学科電気通信コースを卒業、同年4月に助手採用となり、1958年講師、1970年武蔵工業大学教授となる。その間、1969年には東京工業大学において工学博士の学位を取得されている。

社団法人日本超音波医学会における活躍は著しいものがあり、学会長(理事長)を1期(1976から1978)副会長(副理事長)を2期、理事を7期、第23回学術集会長(1973)等の要職を務められた。この他にも各種委員会委員長、委員、学会監事等をも務められた。また、他の学会における活躍も大きく、日本音響学会、電子情報通信学会、WFUMB標準化安全委員、IECTC

87 委員, JIS 委員会委員, USE93 運営委員長, 通産省産業技術審議会研究開発部会委員, 通産省福祉機器技術研究開発調査委員会委員長など, その活動は広範囲にわたり, 現在も WFUMB 超音波安全委員, IECTC 87 (超音波) 委員である。日本音響学会第 4 回佐藤論文賞 (1946), 米国超音波医学会功績賞 (1976) を受賞されており, 武蔵工業大学名誉教授で, 我が日本超音波医学会の名誉会員の称号をも得ております。

井出氏の業績は広範多岐にわたり, 主なものは以下に示すようなものであります。

- * 超音波技術便覧, 日刊工業新聞社, 1960, 共著
超音波技術全般にわたる基礎から応用まで幅広く展望, 基礎, 応用, 資料の構成
- * 超音波医学, 医学書院, 1966, 共著
超音波の医学への応用を基礎編と応用編で構成している
- * Ultrasonic Walking Guide for the Blind, Japan Electronic Engineering, May, 1970
盲人が歩行する際の障害物を検知するために開発した装置「SONORDAR-I, II, III型」の動作原理, 機能, 性能について解説している。
- * 超音波治療器の定量化
実効的な超音波の照射量を定めるために有用な人体表面の音響インピーダンスを測定する方法, 超音波治療器の照射量を定量化するための発振器と照射ベットの間にいれる出力表示計, 定量的な治療が行える超音波治療器を開発した。1955

* 超音波細菌破壊装置の開発

数十 KHz の超音波を用いて機械作用により細胞膜を破壊し, 効率的な細菌破壊を行う装置の開発を行った。1957

* 集束超音波を用いた生体破壊装置

超音波を集束させる種々の方法を検討して実用に供することのできる集束超音波を用いた生体破壊装置を開発した。1963

* 階調性 (グレースケール) 表示超音波診断装置の開発

体内からのエコー信号を十分表示するために, 診断装置の受信部増幅器と表示部 CRT のダイナミックレンジを広くする目的に, 対数増幅器と階調特性の良い CRT を用いて階調性 (グレースケール) 表示の超音波診断装置を開発した。1967

* 超音波音場の計測法及び測定装置の開発

超音波を用いた各種医用装置が発生する音場, 音圧, 強度等を測定する装置を開発した。1958

* 超音波尿路結石破壊装置

先端に装着したバスケット型の補足装置で結石を補足し, 28 KHz の強力超音波をワイヤで伝達し破壊する装置を開発した。1966

井出氏の門下から日本超音波医学会において活躍されている増沢信義 (評議員), 大平悦三 (評議員), 入江喬介 (評議員, 理事) 等をはじめとして, 多くの超音波関係の技術者が輩出している。

Masao Ide

Pioneer in Ultrasound Safety & Standardization and Gray Scale Echography (1929-)

Masao Ide was born in the city of Yokohama, Kanagawa prefecture, Japan, on January 24, 1929, the son of Shinzaburo Ide. The maiden name of Masao's mother was Turuyo. The name of Masao's wife is Hiroko, and Masao has 2 sons, Nobumasa and Masahiro. Masao Ide graduated from the Musashi Institute of Technology in 1953 and received the B.S. degree (1953) in electrical communication engineering from the Musashi Institute of Technology, Tokyo, Japan, and the PhD degree in electrical engineering from Tokyo Institute of Technology, Japan, in 1969.

In 1953, Masao Ide joined Musashi Institute of Technology and became an Associate Professor in 1961. Since 1970 he has been a Professor of the Department of Electronics and Communication Engineering. He has been engaged in research on both industrial and medical applications of Ultrasound.

Dr. Ide received the Best paper award in May 1964 from the Acoustical Society of Japan. In 1976, he received a recognition award from the American Institute of Ultrasound in Medicine. From 1976 to 1978, he was the president of the Japan Society of Ultrasonics in Medicine and currently he is a member of the board of directors and the Chairman of the Standardization Committee of the Society. Since 1977, he has been a member of the International Electrotechnical Commission and now he is the Secretary of the WG10 in TC 87. He was an Editor of the Acoustical Society of Japan from April 1971 to March 1978 and

currently he is a Councilor of the Society. From April 1969 to March 1973 he was the Secretary of Technical Committee on Ultrasound of the Institute of Electronics and Communication Engineers of Japan. He was the President of the AIUM-JSUM Joint conference on Ultrasonics in Medicine held in 1978, He was the Vice-president of the WFUMB 4th World Congress on Ultrasonics in Medicine which was held in 1979, and now he is a member of the Standardization Committee of the World Federation of Ultrasound in Medicine and Biology. Since 1975 he has been the Chairman of Drafting Committee for Ultrasonic Diagnostic Equipment JIS and since 1982 he has been the Chairman of the Committee for Development Program Decision in Technology Research Association of Medical and Welfare Apparatus in the Ministry of International Trade and Industry of Japan. In 1987, he has been elected the chairman of Technical Committee on Ultrasound of the Institute of Electronics, Information and Communication Engineers. He is a member of the Japan Society of Ultrasonics in Medicine, the Japan Society of Medical Electronics and Biological Engineering, the Institute of Electrical Engineers of Japan, the Acoustical Society of Japan, and the Institute of Electronics, Information and Communication Engineers of Japan. Dr. Ide is a professor emeritus of Musashi Institute of Technology and a honorary member of JSUM.

References ;

*Quantification of Ultrasonic Therapeutic Apparatus

Ultrasonic therapeutic apparatus is an equipment which irradiates ultrasound into the body to perform various therapy. In this case, it is necessary to know the amount of the irradiated ultrasound quantitatively. However, apparatuses used at that time has no indicator of the dose. Dr. Ide developed a measuring method of the acoustic impedance of the surface of the human body, which is useful to determine the effective amount of ultrasound. Also, he developed an output power indicator which is used for the quantification of the dose of ultrasound of ultrasonic therapeutic apparatus. The indicator is a through type and is inserted between generator and irradiation head. Ultrasonic therapeutic apparatus, with which quantitative therapy can be performed was developed.

1. Measurement of acoustic impedance of the surface of human body in 1 MHz ultrasound, Proc. Acous. Soc. Jpn. pp81-82, Oct. 1955
2. Output power indicator (display meter) for 1 MHz ultrasonic therapeutic apparatus, Proc. Acous. Soc. Jpn, Oct. 1955

*Ultrasonic Bacteria Destroying Apparatus

1. Ultrasonic Bacteria Destroying Apparatus, Proc. Acous. Soc. Jpn, pp197-198, May 1957
2. Magnetostrictive ultrasonic bacteria destroying apparatus with a metallic horn, Journal Acous. Soc. Jpn, vol.14, No.4, pp327-337, 1958
3. Magnetostrictive ultrasonic bacteria destroying apparatus with a metallic horn, Proc. Four Elec. Soc, Joint Congress, p 815, 1958
4. Observation of bacteria destroying process with ultrasound, Tech. Rep. IEICE, pp1-14, 1958

*Stereotaxic Encephalotomy Instrument with Focused Ultrasound

Ultrasound waves can be focussed. Using the focused ultrasound, internal tissue of the body can be destroyed without damaging the intermediate tissues. By studying the methods of focussing the ultrasonic waves, stereotaxic encephalotomy instrument with focussed ultrasound for practical use was developed.

1. Instrument with Stereotaxic encephalotomy instrument with focussed ultrasound, Proc. Jpn. Ultrason. in Med. & Biol. (JSUM), pp17-18, Nov. 1963
2. Stereotaxic Encephalotomy Instrument with Focussed Ultrasound, Proc. Acous. Soc. Jpn., pp121-122, May 1964
3. Instrumentation for Stereotaxic Encephalotomy for Animal Experiment with 3 Megacycle Ultrasound, Tech. Rep. IEICE, pp1-18, Dec 1965
4. Instrumentation for Stereotaxic Encephalotomy for Animal Experiment with 3 Megacycle Focussed Ultrasound, Digest of the 6th International Conference on Medical Electronics and Biological Engineering, pp259-260, 1965

*Development of Grey-Scale Display Ultrasonic Diagnostic Equipment

Gradation of display images obtained by ultrasonic diagnostic equipment of early age was so poor that the echoes from the internal body could not be displayed in sufficient quality. This is because of the narrow dynamic ranges of the amplifier of the receiving unit and CRT of the display unit. Accordingly, it is necessary to obtain several images of different sensitivities to even one cross section. Dr. Ide developed a grey scale display equipment, so-to-speak, by which images full of gradation can be obtained. This equipment employed logarithmic amplifier in the receiving unit and CRT with good gradation in the display unit. Thus, wide amplitude range of echoes can be displayed as images with gradation without losing amplitude information. This type equipment is also useful in the recording of the diagnostic images. Nowadays most of ultrasonic diagnostic equipment utilize this type of display.

1. Improvement of gradation of the display image of ultrasonic diagnostic equipment, Proc. JSUM, pp49-50, Nov 1967
2. Electrical recording and reproduction of Ultrasono-Tomograms with VTR, Proc. JSUM, pp33-34, Oct 1968

3. Improvement of display characteristics of ultrasonic diagnostic image, Proc. JSUM, pp21-22, May 1969
4. Improvement of power of expression of ultrasono-Tomograms, Medical Ultrasonics, vo.17, pp10-11, 1969
5. Ultrasonic diagnostic equipment with high power of expression, Proc. Four Elec. Soc. Joint congress, pp1457-1458, Apr. 1970

*Development of the Measuring Method and Apparatuses of Ultrasonic Field

It is significant to know ultrasonic fields, sound pressure, intensity, etc, generated from various kind of ultrasonic equipment for medical use. Concerning this, Dr. Ide developed several measuring methods and measuring apparatuses. The plate was made of plastic plate and thermo-paint.

1. On the focusing of ultrasound with parabolic concentrator, Proc Acoust. Soc Jpn, pp23-24, Oct 1958
2. Measurement of ultrasonic field distribution focused with parabolic concentrator, Proc Acoustic Soc Jpn, pp19-20, May 1959
3. Measurement of ultrasonic field distribution focused with parabolic concentrator, Tech. Rep. IEICE, pp1-13, May 1959
4. On the measurement of focused ultrasound field, Proc Joint congress Four Elec. Soc. p1081, 1960
5. Acoustic field indicating (visualizing) plate, Proc. Acousti. Soc Jpn, pp15-16, Oct 1962
6. Measurement of acoustic output power of ultrasonic diagnostic equipment, Proc JSUM pp71-72, Dec 1964
7. Ultrasonic sound pressure measuring device and an example of its medical use, Digest of the 6th international conference on medical electronics and biological engineering, pp263-264, 1965
8. Wide frequency calibrated probe microphones for ultrasound in liquid, Ultrasonics, pp64-66, Apr 1966

*Ultrasonic Urinary Calculi Disintegrator

Urinary calculi disintegrator using intense ultrasound for clinical use was developed. This equipment destroys calculi grasped by a bucket type grasping device with intense 28 KHz ultrasound transurinarily induced by thin wire vibrating system.

1. Urinary calculi disintegrator using ultrasound. Proc JSUM pp64-65, Oct 1966