

Haim Azhari- List of Publications

Refereed Papers in Professional Journals

- ❖ Azhari H, Sideman S, Beyar R, Grenadier E, Dinnar U: An analytical descriptor of three-dimensional geometry: Application to the analysis of the left ventricle shape and contraction. *IEEE Trans. on Biomed. Eng.* 34(5):345-355, 1987.
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- ❖ Grenadier E, Azhari H, Beyar R, Dinnar U, Markiewicz W, Sideman S: Echocardiographic determination of left ventricular stroke volume index: Comparison to three-dimensional computer reconstruction. *J. of Cardiovasc. Tech.* 8(1):5-14, 1989.
- ❖ Azhari H, Grenadier E, Dinnar U, Beyar R, Adam D, Marcus ML, Sideman S: Quantitative characterization and sorting of three-dimensional geometries: Application to left ventricles in-vivo. *IEEE Trans. on Biomed. Eng.* 36(3):322-332, 1989.
- ❖ Azhari H, Sideman S, Weiss JL, Shapiro EP, Weisfeldt ML, Graves WL, Rogers WJ, Beyar R: Three dimensional mapping of acute ischemic regions using MRI: wall thickening versus motion analysis. *Am. J. Physiol.* 259:H1492-H1503, 1990.
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- ❖ Azhari H, Gath I, Beyar R, Marcus ML, Sideman S: Discrimination between healthy and diseased hearts by spectral decomposition of their left ventricular three dimensional geometry. *IEEE Trans. Medical Imaging* 10(2): 207-215, 1991.
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- ❖ Azhari H, Buchalter M, Sideman S, Shapiro E, Beyar R: A conical model to describe the non-uniformity of the left ventricular twisting motion. *Ann. Biomed. Eng.* 20:149-165, 1992.
- ❖ Lessick J, Sideman S, Azhari H, Shapiro E, Beyar R: Evaluation of regional load in acute ischemia by three dimensional curvatures analysis of the left ventricle. *Ann. Biomed. Eng.* 21:147-161, 1993.
- ❖ Azhari H, Weiss JL, Rogers WJ, Siu C, Zerhouni EA, Shapiro EP: Non-invasive quantification of principal strains in normal canine hearts using tagged MRI images in 3D. *Am. J. Physiol.* 264(Heart Circ. Physiol. 33): H205-H216, 1993.

- ❖ Azhari H, Weiss JL, Rogers WJ, Siu C, Shapiro EP: A Non-invasive comparative study of myocardial strains in ischemic canine hearts using tagged MRI in 3D. *Am. J. Physiol.* 268 (Heart Circ. Physiol. 37): H1918-H1926, 1995.
- ❖ Azhari H, Olikier S, Rogers WJ, Weiss JL, Shapiro EP: Three dimensional mapping of acute ischemic regions using Artificial neural networks and Tagged MRI. *IEEE Trans. on Biomed. Eng.* 43(6): 619-626, 1996.
- ❖ MacGowan GA, Burkhoff D, Rogers WJ, Salvador D, Azhari H, Hees PS, Zweier JL, Halperin HR, Siu CO, Lima JAC, Weiss JL, Shapiro EP: Effects of afterload on regional left ventricular torsion. *Cardiovasc. Res.* 31: 917-925, 1996.
- ❖ Lessick J, Fisher Y, Beyar R, Sideman S, Marcus M, Azhari H.: Regional three-dimensional geometry of the normal human left ventricle using Cine-CT. *Ann. of Biomed. Eng.* 24: 583-594, 1996.
- ❖ Azhari H, Denisova OE, Montag A, Shapiro ED: Circular sampling: Perspective of a time-saving scanning procedure. *Magnetic Resonance Imaging* 14(6): 625-632, 1996.
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- ❖ McGowan GA, Shapiro EP, Azhari H, Siu CO, Hees PS, Grover MH, Wiess JL Rademakers FE: Noninvasive measurement of shortening in the normal human left ventricle and in idiopathic dilated cardiomyopathy. *Circulation* 96: 535-541, 1997.
- ❖ Goldberg-Zimring D, Achiron A, Miron S, Faibel M, Azhari H: Automated detection and characterization of multiple sclerosis lesions in brain MR images. *Magnetic Resonance Imaging* 16(3):311-318, 1998.
- ❖ Berdugo B, Doron MA, Rosenhouse J, Azhari H: On direction finding of an emitting source from time delays. *Journal of the Acoustics Society of America (JASA)*, 105(6), pp. 3355-3363, 1999.
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- ❖ Goldberg-Zimring D, Achiron A, Guttmann CRG, Azhari H: "3-D Analysis of Individual Multiple Sclerosis Lesions' Geometry: Detection of Shape Changes Over Time Using Spherical Harmonics", *Journal of Magnetic Resonance Imaging*, 18(3), pp.291-301, 2003.
- ❖ Azhari H, Rosenthal S, Montag A. Implementation of Helical Computed Tomography in Magnetic Resonance Imaging. *Journal of Magnetic Resonance Imaging*, 18(4), pp.478-486, 2003.
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- ❖ John A. Kennedy, Ora Israel, Alex Frenkel, Rachel Bar-Shalom, Haim Azhari: “The reduction of artifacts due to metal hip implants in CT-attenuation corrected PET images from hybrid PET/CT scanners.”, *Med. Biol. Eng. Comput.*, vol. 45, no. 6, 553-562, 2007.
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- ❖ Gil Kovalski, Zohar Keidar, Alex Frenkel, Jonathan Sachs, Shai Attia, Haim Azhari: “Dual 'Motion-Frozen Heart' Combining Respiration and Contraction Compensation in Clinical Myocardial Perfusion SPECT Imaging”, *Journal of Nuclear Cardiology (JNC)*, 16:396–404, 2009.
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- ❖ Diana Gaitini, Tamara Rothstein, Zahava Gallimidi and Haim Azhari: "Feasibility study of breast lesion detection using computerized contrast enhanced through-transmission ultrasonic imaging", *Journal of Ultrasound in Medicine (JUM)*, 2013 ,May;32(5):825-33. doi: 10.7863/ultra.32.5.825.
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- ❖ Ilana Katz-Hanani, Tamara Rothstein, Diana Gaitini, Zahava Gallimidi and Haim Azhari: "Age Related Ultrasonic Properties of Breast Tissue In-vivo", *Ultrasound in Medicine and Biology*, Volume 40 issue 9, pages 2265-2271, 2014.

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- ❖ Lilach Yeshurun, Haim Azhari: "Noninvasive Measurement of Thermal Diffusivity Using High Intensity Focused Ultrasound (HIFU) and Through Transmission Ultrasonic Imaging". *Ultrasound in Medicine and Biology*, (42):243-256, 2016. DOI: 10.1016/j.ultrasmedbio.2015.09.004
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- ❖ I. S. Weitz, O. Perlman, H. Azhari, and S.S. Sivan: “In vitro evaluation of copper release from MRI-visible, PLGA-based nanospheres”. *Journal of Materials Science*, 2020. doi 10.1007/s10853-020-05296-w
- ❖ Roana N Schiopu Aresteanu, Alexander Borodetsky, Haim Azhari, Iris S. Weitz: “Ultrasound-Induced and MRI Monitored CuO Nanoparticles Release from Micelle Encapsulation”. *Nanotechnology*, 2020; <https://doi.org/10.1088/1361-6528/abc1a1>.
- ❖ Inbal Maor, Somayeh Asadi, Sanzhar Korganbayev, Daniel Dahis, Yosi Shamay, Emiliano Schena, Haim Azhari, Paola Saccomandi and Iris Sonia Weitz (2021): “Laser-induced thermal response and controlled release of copper oxide nanoparticles from multifunctional polymeric nanocarriers”, *Science and Technology of Advanced Materials*, 2021, DOI: 10.1080/14686996.2021.1883406
- ❖ Daniel Dahis, Noy Farti, Tomer Romano, Natalie Artzi and Haim Azhari: “Ultrasonic Thermal Monitoring of the Brain Using Golay Coded Excitations – Feasibility Study”, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC)*, 2022. DOI 10.1109/TUFFC.2021.3132094
- ❖ Lilach Barkat, Moti Freiman, Haim Azhari: “Image translation of Ultrasound to Pseudo Anatomical Display Using Artificial Intelligence”. arXiv:2202.08053v1. Feb. 2022. <https://doi.org/10.48550/arXiv.2202.08053>

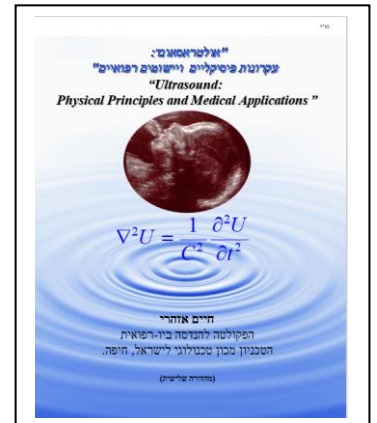
Text Books

2006 "Ultrasound: Physical Principles and Medical Applications"

" אולטראסאונד: עקרונות פיסיקליים ויישומים רפואיים "

by: Haim Azhari

Synopsis: This book provides the basic physical and engineering principles of ultrasound in the context of medical applications. The book starts with a basic description of waves and their mathematical description. It then analyzes the propagation of mechanical waves in rods, strings, fluids and solids. Attenuation reflection and transmission are then described. Then, the design principles of acoustic lenses and mirrors are outlined followed by the description of ultrasonic transducers and the calculation of their acoustic fields. Three chapters are then dedicated to the various imaging techniques (including also Doppler measurements). And finally safety and therapeutic applications are discussed.



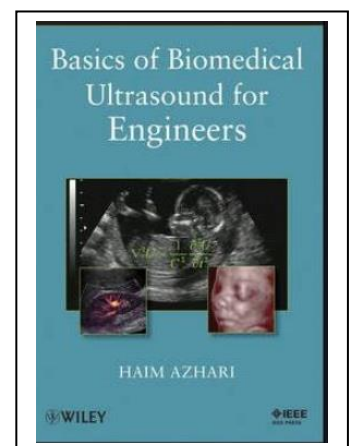
Soft cover: 301 pages,
 Publisher: Michlol Inc.
 ; 1st edition (July 2006)
 ; 2nd edition (May 2007)
 Language: **Hebrew**
 Publisher Code: 11122842

2010 "Basics of Biomedical Ultrasound for Engineers"

by: Haim Azhari

Synopsis: Basics of Biomedical Ultrasound for Engineers is a structured textbook that leads the novice through the field in a clear, step-by-step manner. Based on twenty years of teaching experience, it begins with the most basic definitions of waves, proceeds to ultrasound in fluids and solids, explains the principles of wave attenuation and reflection, then introduces to the reader the principles of focusing devices, ultrasonic transducers and acoustic fields, and then delves into integrative applications of ultrasound in conventional and advanced medical imaging techniques (including Doppler imaging) and therapeutic ultrasound. Demonstrative medical applications are interleaved within the text and exemplary questions with solutions are provided on every chapter. Readers will come away with the basic toolkit of knowledge they need to successfully use ultrasound in biomedicine and conduct research.

Hardcover: 371 pages



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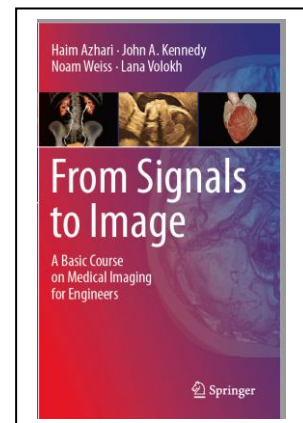
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2020 "From Signals to Image"

by: **Haim Azhari, John A Kennedy, Noam Weiss, Lana Volokh**

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Synopsis: This textbook, intended for advanced undergraduate and graduate students, is an introduction to the physical and mathematical principles used in clinical medical imaging. The first two chapters introduce basic concepts and useful terms used in medical imaging and the tools implemented in image reconstruction, while the following chapters cover an array of topics such as: physics of x-rays and their implementation in planar and computed tomography (CT) imaging; nuclear medicine imaging and the methods of forming functional planar and single photon emission computed tomography (SPECT) images and Clinical imaging using positron emitters as radiotracers. The book also discusses the principles of MRI pulse sequencing and signal generation, gradient fields, and the methodologies implemented for image formation, form flow imaging and magnetic resonance angiography and the basic physics of acoustic waves, the different acquisition modes used in medical ultrasound, and the methodologies implemented for image formation and for flow imaging using the Doppler Effect.

By the end of the book, readers will know what is expected from a medical image, will comprehend the issues involved in producing and assessing the quality of a medical image, will be able to conceptually implement this knowledge in the development of a new imaging modality, and will be able to write basic algorithms for image reconstruction. Knowledge of calculus, linear algebra, regular and partial differential equations, and a familiarity with the Fourier transform and its applications is expected, along with fluency with computer programming. The book contains exercises, homework problems, and sample exam questions that are exemplary of the main concepts and formulae students would encounter in a clinical setting.

Chapters in Books

- **Azhari H**, Beyar R, Barta E, Dinnar U, Sideman S: 3-D simulation of left ventricular contraction combining myocardial mechanics and electrical activation. In: Activation, Metabolism and Perfusion of the Heart, Sideman S and Beyar R, editors. Martinus Nijhoff Publishers, Dordrecht, 1987, pp. 313-339.
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