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A. Educational Qualification:

- 2001 Received Doctor of Philosophy (Ph.D) in Physiology from Department of Instrumentation Engineering, Tokyo Medical and Dental University, Tokyo, Japan.
Specific field of research: Thermal properties of skin.
- 1993 Received Master of Science (M.S) from Physics department, University of Dhaka, Bangladesh. Major Field of study: Medical Physics.
Research dissertation: 3D visualization using a two-dimensional electrical impedance tomography (EIT) system for clinical use.
- 1991 Received Bachelor of Science (B.S) from Physics department, University of Dhaka, Bangladesh.
Major Field of study: Physics

B. Academic and Professional experience:

- Nov 2006 to present Research Fellow. Working as a federal employee in National Institute of Child Health and Human Development (NICHD), National Institutes of Health (NIH), Department of Health and Human Services (DHHS), Bethesda, Maryland, USA.
- Nov 2001 to Nov 2006: Post-doctoral fellow. Lab of Integrative and Medical Biophysics, National Institute of Child Health and Human Development (NICHD), National Institutes of Health (NIH), Department of Health and Human Services (DHHS), Bethesda, Maryland 20892, USA.

Job description: Clinical study on patient and in vivo study on mouse model to assess angiogenesis of tumor. Research includes multi-spectral imaging, medical application of laser technology, thermal imaging and fluorescent imaging.

April 1997 to March 2001: Research and Teaching assistance in charge of Infrared Imaging Laboratory for medical students, Department of Instrumentation Engineering, Tokyo Medical & Dental University, Japan.

Jan 1996 to Mar. 1997: Research student in the department of Instrumentation Engineering, Tokyo Medical & Dental University, 2-3-10 Kanda Surugadai, Chiyoda-Ku, Tokyo 101-0062, Japan. Specific field of research: Infrared imaging technique to visualize thermal properties of skin by reflection measurement.

July 1994 to May 1995: Senior research fellow in a project of Ministry of Science and Technology, Government of Bangladesh. The project entitled "3D visualization using a two dimensional Electrical Impedance Tomography (EIT) system and its application in clinical use.

Oct. 1993 to June 1994: Research fellow in a project entitled "Development of non-invasive test to assess gastric acid output in children" of International Center for Diarrheal Disease and Research, Bangladesh (ICDDR,B).

C. Honor:

2005: First place in matrix biology, first annual competition for fellows, National Institutes of Child Health and Human Development, NIH, Bethesda, MD, USA.

1998: Prize for the winner of the student paper competition of JpCOMPEmbs98 organized by IEEE Tokyo Chapter. Japan

Jan 1996 to March 2001: Scholarship awarded from Ministry of Education, Science, Sports and Culture, Japan for Ph.D. in Tokyo Medical &

Dental University, Department of Instrumentation Engineering. Tokyo, Japan.

July 1994 to May 1995 NST Fellowship—Fellowship awarded from Ministry of Science and Technology, Bangladesh.

1991 to 1993: Student merit scholarship recipient for Master of Science (MS), University of Dhaka, Bangladesh.

D. Professional Societies: Member, the Institute of Electrical and Electronics Engineers (IEEE).
Member, International society of optical engineering (SPIE)

E. Investigator—On-going research protocol at NIH

NICHD, ASP # 05-008 Noninvasive *in-vivo* optical imaging to quantify integrin in tumor.

NCI, ASP # ROB-117 Targeting of external receptors (HER1-4, IGFR) in mice bearing tumor xenografts.

NCI, 01-C-0158 To assess vascularity in Kaposi's sarcoma lesions utilizing non-invasive imaging technique.

F. Reviewer (peer reviewed journal):

1. International society of optical engineering journal (Journal of Biomedical Optics)
2. Optical society of American journal (Applied Optics)
3. The Institute of Electrical and Electronics Engineers, (IEEE Transaction on Biomedical Engineering)
4. Lab Animal

G. Invited lectures:

April 2007 Pharma MedDevice 2007 conference at the Jacob K. Javits Convention Center in New York City, New York.

August 2006 Infrared Imaging Workshop. 28th Annual International Conference of IEEE EMBS IEEE EMBS, New York, USA

June 2005 Infrared imaging seminar, MD Anderson Cancer Center,

September 2004

University of Texas, Houston, Texas, USA.

Infrared Imaging Workshop. 26th Annual International Conference of IEEE EMBS, San Francisco, California, USA

H. Other activities:

1. Co-Chair, Regular session on Infrared Imaging, 28th Annual International Conference of IEEE EMBS, 2006, New York, USA.
2. Co-Chair, Mini symposia on Infrared Imaging, 26th Annual International Conference of IEEE EMBS, 2004, San Francisco, California, USA.
3. Co-Chair, Technical program, 1st International Conference of Thermal Texture Map, Technology in Medicine and Engineering, 23-25 Sept. 2003. Houston, TX, USA.

I. Publications:

Book Chapter (Invited)

1. **Hassan M**, Chernomordik V., Vogel A., Hattery D., Gannot I., Yarchoan R. and Gandjbakhche A. "Infrared imaging for functional monitoring of disease processes". Chapter 16, Medical Infrared Imaging, Edited by Nicholas Diakides and Joseph Bronzino. July 2007. CRC press, Florida, USA. Florida, USA.
2. **Hassan M**, Chernomordik V., Vogel A., Hattery D., Gannot I., Yarchoan R. and Gandjbakhche A. "Infrared imaging for tissue characterization and function". Chapter 30, Medical Devices and System, third edition, 2006, Edited by Joseph Bronzino, CRC press, Florida, USA.

Review Papers

1. Gandjbakhche A, Chernomordik V, Hattery D, **Hassan M** and Gannot I. "Tissue characterization by quantitative optical imaging methods" Technol Cancer Res Treat Vol. 2 (6), pp537-551, 2003.
2. **Hassan M.**, Klaunberg B., "Biomedical application of fluorescence imaging in vivo", Comparative Medicine, Vol 56(6), pp 635-644, 2005.

List of Original Scientific Papers and Conference Proceedings:

1. Lee SB, **Hassan M**, Fisher R, Chertov O, Chernomordik V, Marek GK, Gandjbakhche and Capala J. "Affibody Molecules for In Vivo Characterization of HER2-Positive Tumors by Quantitative Near-Infrared Imaging". Submitted. 2007
2. Riley J, **Hassan M**, Chernomordik V and Gandjbakhche A. "Choice of Data-Types in Fluorescence Enhanced Diffuse Optical Tomography". Medical Physics. 2007. In press.

3. **Hassan M**, Riley J, Chernomordik V, Smith P, Pursley R, Lee S B, Capala J and Gandjbakhche A. "Fluorescence lifetime imaging system for in-vivo studies", *Molecular Imaging*. 2007. In press.
4. **Hassan M**, Riley J, Chernomordik V and Gandjbakhche A. "*In-vivo* fluorescence lifetime imaging system based on time-correlated single photon counting" *Photonic west*, San Jose, 6430B-63, California, January 2007.
5. Vogel A, Dasgeb B, **Hassan M**, Amyot F, Chernomordik V, Tao Y, Demos SG, Wyvill K, Aleman K, Little R, Yarchoan R, and Gandjbakhche AH. "Using Quantitative Imaging Techniques to Assess Vascularity in AIDS-Related Kaposi's Sarcoma," Invited oral presentation at the IEEE 2006 International Conference of the Engineering in Medicine and Biology Society, 232-235 (2006).
6. Vogel A, **Hassan M**, Amyot F, Chernomordik V, Demos S, Little R, Yarchoan R and Gandjbakhche A. "Using multi-modality imaging techniques to assess vascularity in AIDS-related Kaposi's sarcoma" *Biomedical optics tropical meeting*, Fort Lauderdale, Florida, March 2006.
7. Sviridov A, Ulissi Z, Chernomordik V, **Hassan M**, Boccara A, and Gandjbakhche A. "Analysis of biological tissue textures using measurements of backscattered polarized light", *Biomedical optics tropical meeting*, Fort Lauderdale, Florida, March 2006.
8. Riley J, **Hassan M**, Chernomordik V and Gandjbakhche A. "Life-time fluorescence imaging—an inverse model based on analytic solution" *Fort Lauderdale, Florida, March 2006*.
9. Sviridov A, Ulissi Z, Chernomordik V, **Hassan M**, Gandjbakhche A. "Visualization of biological texture using correlation coefficient images" *Journal of Biomedical Optics*, Vol 11(6), 2006.
10. Riley JD, **Hassan M**, Chernomordik V, Gannot I and A.H. Gandjbakhche, "Time-Resolved Lifetime Fluorescence Imaging – an Inverse Model Based on Analytical Solutions," *Proceedings of the OSA Biomedical Optics Topical Meeting, MH6* (2006).
11. **Hassan M**, Riley J, Chernomordik V, Smith P, Pursley R, Gannot, I and A. Gandjbakhche A. "A scanning system for fluorescence lifetime imaging" *Photonic west*, San Jose, California, January 2006
12. Sviridov A, Chernomordik V, **Hassan M**, Russo A, Smith P and Gandjbakhche A. "Enhancement of hidden structures of early skin fibrosis using polarization degree patterns and Pearce correlation analysis". *Journal of Biomedical Optics*, Vol 10(5), pp 0517006 (1-6), 2005.
13. Sviridov A, Chernomordik V, **Hassan M**, Russo A, Eidsath A, Smith P, and Gandjbakhche A." Intensity profiles of linearly polarized light backscattered from skin and tissue-like phantoms" *Journal of Biomedical Optics*, Vol 10(1), pp 14012, 2005.
14. Sviridov A, Chernomordik V, **Hassan M** and Gandjbakhche A, "Potentials of skin diagnostic with digital photometry patterning of backscattered polarized light" in *Coherent Optics of Ordered and Random Media*, D. A. Zimnyakov, Eds., **5772** pp.

105-113, Proceeding of SPIE, 2005.

15. Sviridov A, Chernomordik V, **Hassan M** and Gandjbakhche A, "Visualization of tissue structures using polarization degree patterning and correlation analysis", NATO Advanced Research Workshop "Optics of Biomedical Particles", Novosibirsk, October 3-6, 2005.
16. Hattery DW, Gannot I, **Hassan M**, and Gandjbakhche AH "Oxygen-sensing fluorescent lifetime-based probe for in vivo tumor assessments," Proceedings of Optical Diagnostics and Sensing V, BIOS 2005, (San Jose, 2005).
17. **Hassan M**, Little R, Vogel A, Aleman K, Wyvill K, Yarchoan R and Gandjbakhche A " Use of noninvasive imaging techniques to assess tumor vasculature and response to therapy in Kaposi's sarcoma" Technol Cancer Res Treat, Vol. 3(5), pp 451-457, 2004.
18. **Hassan M.**, Hattery D, Vogel A, Chernomordik V, Demos S, Aleman K, Little R, Yarchoan R and Gandjbakhche A, "Noninvasive infrared imaging for quantitative assessment of tumor vasculature and response to therapy". Proceedings of 25th annual international conference of IEEE EMBS, San Francisco, California, USA, pp 1200-1202, 2004
19. **Hassan M**, Hattery M, Vogel A, Chernomordik V, Demos S, Aleman K, Little R, Yarchoan R and Gandjbakhche A. "Multi-modality imaging techniques to assess angiogenesis associated with Kaposi's sarcoma". Proceedings of OSA Biomedical Optics Tropical Meeting, Maimi, Florida, USA, CDROM, Abstract no. FG 5, 2004
20. **Hassan M**, Hattery D, Chernomordik V, Toda K, Fukuhara K, Mittal D, Rowan J, Shah J, Gerber L, Dionne R, Kopin I, and Gandjbakhche A. "Infrared thermographic imaging for the assessment of temperature asymmetries in reflex sympathetic dystrophy". Proceedings of 25th annual international conference of IEEE EMBS Cancun, Mexico, pp 1102-1104. 2003
21. **Hassan M**, Hattery D, Vogel A, Chernomordik V, Hekmat F, Aleman K, Wyvill K, Merced L, Little R, Yarchoan R and Gandjbakhche A. "Multi-modality imaging techniques to assess Kaposi's sarcoma associated with angiogenesis". Proceedings of 7th International Conference on Malignancies in AIDS and Other Immunodeficiencies: Basic, Epidemiologic and Clinical Research, Bethesda, MD, USA, 2003. pp 22, 2003
22. Hattery D, **Hassan M**, Demos S and Gandjbakhche A. "Hyperspectral Imaging of Kaposi's Sarcoma for Disease Assessment and Treatment Monitoring". *Applied Imagery Pattern Recognition* 124-132, 2002.
23. **Hassan M**, Hattery D, Vogel A, Chernomordik V, Hekmat F, Aleman K, Wyvill K, Merced L, Little L, Yarchoan R and Gandjbakhche A. "Multi-modality imaging techniques to study angiogenesis associated with Kaposi's sarcoma". Second joint meeting EMBS/BMES conference, Houston, TX, USA pp 1139-40, 2002
24. Hattery D, **Hassan M**, Chernomordik V, Mulshine J and Gandjbakhche A. "Measuring oral inflammation in vivo with diffuse reflectance spectroscopy". Second joint meeting EMBS/BMES conference, Houston, TX, USA, pp 2243-44, 2002

25. Otsuka K, Okada S, **Hassan M** and Togawa T, "Imaging of skin thermal properties with estimation of ambient radiation temperature", IEEE EMBS magazine, Vol 21(6), pp 49-55, 2002.
26. Togawa T, Otsuka K, **Hassan M**, "Measurement of thermal properties of skin", Biocybernetics and Biomedical Engineering, Vol 22(4), pp 55-68, 2002.
27. **Hassan M** and Togawa T. "Observation of skin thermal inertia distribution during reactive hyperaemia using a single-hood measurement system, Physiological Measurement". Vol. 22, pp 187-200, 2001.
28. **Hassan M**, Otsuka K, Shimase A, Okada S, and Togawa T. "Imaging of thermal inertia to visualize reactive hyperemia in the forearm skin after arterial occlusion". Proceedings of IEEE EMBS/ BMES World Congress, Chicago, USA. Vol.2000., 2000
29. **Hassan M**, Otsuka K, Shimase A, Okada S, and Togawa T. "Wavelength dependence of in-vivo skin emissivity". Proceeding of the 39 conference of the Japan society of Medical electronics and Biological engineering, pp 469, 2000.
30. **Hassan M**, Kimura Y, Asai A, Shimase A, Okada S, Tsuchiya K and Togawa T, "Application of thermalgraphy for the imaging of thermal properties of skin", Bio-medical thermology. Vol. 19(4), pp 2-6, 1999.
31. Kimura Y, **Hassan M**, Saito S, Otsuka K and Togawa T. "Imaging system of emissivity and thermal inertia". Proceedings of the Japanese Society for Non-Destructive Inspection (JSNDI) No. 010-040.pp 23-27. 1999.
32. Otsuka K, **Hassan M**, Shimase S, Saito H, Kimura Y and Togawa T. "Imaging of skin thermal properties by step change in ambient radiation". Report of the institute of Biomaterials and Bioengineering. Vol. 33, pp 50-55, 1999
33. **Hassan M**, Kimura Y, Asai A, Shimase A, Okada S, Tsuchiya K and Togawa T. "Application of thermalgraphy for the imaging of thermal properties of skin", 2nd Conference of the Asia Pacific Federation of Thermaology, pp.9. 1999.
34. Kimura Y, Asai A, **Hassan M**, Shimase A, Okada A, Tsuchiya K and Togawa T. "Imaging of skin thermal properties by step change in ambient radiation temperature ---Proposing new electrical control system of ambient radiation temperature". Proceeding of the 38 conference of the Japan society of Medical electronics and Biological engineering, pp 145, 1999.
35. **Hassan M**, Kimura Y, Asai A, Shimase A, Fukuoka A and Togawa T, "Imaging of skin thermal properties by changing ambient radiation temperature --An electrical control system for stepwise change in ambient radiation temperature". Proceedings of 20th Annual International Conference of IEEE/EMBS (HongKong), Vol. 20, No.2 pp.936-939. 1998.
36. Asai A, Kimura Y, Shimase A, **Hassan M**, Tsuchiya K and Togawa T, "Imaging of skin thermal properties by changing ambient radiation temperature --Electrical control system for stepwise change of ambient radiation temperature". Proceedings of the 37th SICE annual conference, pp 139-140, 1998.
37. **Hassan M**, Kimura Y, Asai A, Shimase A, Saito H and Togawa T, "Imaging of skin thermal properties by step change in ambient temperature--Technique for simultaneous measurement of skin properties and ambient temperature". Proceeding of the 37 conference of the Japan society of Medical electronics and

Biological engineering, pp 636, 1998.

38. Asai A, Kimura Y, Seshimo H, **Hassan M**, Saito H, Togawa T and Tsuchiya K. "Noninvasive measurement of skin thermal properties by using capacitor discharge system". Proceedings of the 36 conference of the Japan society of Medical electronics and Biological engineering, pp 602, 1997
39. Sarkar S A, Mahalanabis D, Bardhan P K, Alam N H, Rabbani K S, Kiber A, **Hassan M**, Islam S, Fuchs G J and Gyr K, " Noninvasive assessment of gastric acid secretion in man. Application of Electrical Impedance Tomography (EIT).", Digestive Diseases & Science, Vol 42(8), pp 1804-1809, 1997.
40. Rabbani KS, **Hassan M** and Kiber A, "3D object localization using EIT measurements at two levels" Physiological. Measurement, Vol. 17 pp. 189-199, 1996.
41. **Hassan M**, Kimura Y, Seshimo H, Asai A and Togawa T. " Measurement of skin thermal properties using stepwise change in ambient temperature by capacitor system". Proceeding of the Seventeenth Japan Symposium on Thermo-physical Properties, pp. 159-162. 1996.
42. Rabbani KS, **Hassan M**, Hossain F, Kiber A, Kabir A B M H, Ahmed M and Nahar S. "Electrical impedance imaging of the human body". Research publication of the Bose Center for advance study and research in nuclear science. Dhaka University. Vol. 1. pp 74-91. 1995.
43. Rabbani KS, **Hassan M**, Kabir ABMH, Ahmed M and Nahar S. "Electrical Impedance Tomography (EIT) in frontal plane using ring electrode configuration", Proceedings of RC IEEE/EMBS & 14th BMESI (India). pp. 1.43-1.44, 1995.