

## Zahra M. Kazem-Moussavi -- Curriculum Vita

*Current Positions:* Director, Biomedical Engineering Program<sup>1</sup>  
Professor, Electrical & Computer Engineering Department<sup>1</sup>  
Professor, Department of Psychiatry, Faculty of Medicine  
Canada Research Chair in Biomedical Engineering  
Research Affiliate, Riverview Health Center<sup>2</sup> AND Center of Aging Manitoba

*Offices:* <sup>1</sup>E3-517, Dept. of Electrical & Computer Engineering,  
University of Manitoba, Winnipeg, MB R3T 5V6  
<sup>2</sup>PE458, Admin Bldg, Riverview Health Center,  
1 Morley Ave, Winnipeg, MB, R3L 2P4

*Phone:* (204) 474-7023 Fort Gary campus, U of Manitoba  
(204) 478-6163 Riverview Health Center,

*Fax:* (204) 261-4639

*Email:* Zahra.Moussavi@Umanitoba.ca

*Web-site:* <http://home.cc.umanitoba.ca/~mousavi/>

*Research Page:* <http://bme.eng.umanitoba.ca/labs/bme/>

### EDUCATION

Postdoctoral, Biomedical Engineering, Johns Hopkins University, 1999  
Ph.D., Electrical & Computer Engineering, University of Manitoba, Oct. 1997  
M.Sc., Electrical & Computer Engineering, University of Calgary, Oct. 1993  
B.Sc., Electronics Engineering, Sharif University of Technology, Tehran, Iran, June 1987

### EMPLOYMENT HISTORY

<b>July 2012 - Present</b>	<b>Director</b> , Biomedical Engineering Program, University of Manitoba
<b>May 2010 - Present</b>	<b>Professor</b> , Dept. of Elect. & Comp. Eng., University of Manitoba
<b>May 2011 - Present</b>	<b>Professor</b> , Dept. of Psychiatry, University of Manitoba
<b>May 2009 - Present</b>	<b>Canada Research Chair in Biomedical Engineering, Tier II</b> , University of Manitoba
<b>Jan 2011 – Present</b>	<b>Research Affiliate</b> , Riverview Health Center, Winnipeg, Manitoba
<b>Jan 2015 – Present</b>	<b>Research Affiliate</b> , Center of Aging, Winnipeg, Manitoba
<b>Jan 2008 – Present</b>	<b>Adjunct Professor</b> , Dept. of Elect. & Comp. Eng., University of Texas at El Paso
<b>Sept 2003 – Aug 2015</b>	<b>Adjunct Scientist</b> , Telecommunication Research Lab (TRLabs), Winnipeg, Manitoba
<b>May 2006 - April 2010</b>	<b>Associate Professor</b> , Dept. of Elect. & Comp. Eng., University of Manitoba
<b>July 2005 – May 2006</b>	<b>On Leave</b> , Dept. of Elect. & Comp. Eng., University of Manitoba
<b>Jan 2005 – May 2006</b>	<b>Associate Professor</b> , Dept. of Elect. & Comp. Eng., University of Texas at El Paso
<b>July 1999 – April 2005</b>	<b>Assistant Professor</b> , Dept. of Elect. & Comp. Eng., University of Manitoba
<b>Jan 1999 – Oct 1999</b>	<b>Postdoctoral Fellow</b> , Dept. of Biomedical Engineering, Johns Hopkins University.
<b>July 1997 – Dec 1998</b>	<b>Research Associate</b> , Children’s Hospital, Dept. of Pediatrics, U of Manitoba

- Sept 1996 – Dec 1998** Lecturer, Dept. of Elect. & Comp. Eng. University of Manitoba
- Sept 1993 - May 1997** **Research & Teaching Assistant**, Dept. Elect. & Comp. Eng., U of Manitoba
- Oct 1994 - May 1997** **Computer Advisor**, Computer Services, University of Manitoba .
- Sept 1992 - Aug 1993** **Research & Teaching Assistant**, Dept. Elect. & Comp. Eng., University of Calgary
- Sept 1987 - July 1989** **System Designer and Instructor**, Farzanegan Institute of Tehran
- Sept 1979 - Dec 1982** **Physics Teacher**, Ayat High-School, Tehran, Iran
- May 1979 - Sept 1979** **Journalist of a weekly women magazine, “Zan-e Rooz”**, Tehran, Iran

### AWARDS & Distinctions

- “2018 Technical Excellence Award,” Engineers Geoscientists Manitoba, Oct. 2018.
- Top rank in 1-minute pitch at Science Leadership Workshop of University of Toronto (April 2017)
- Science Leadership Fellow (April 2017)
- “The Friends of Riverview” award, Oct. 2016
- The Canadian Academy of Engineering Fellow, (May 2015)
- “Most Powerful Top 100 Women in Canada” in Trailblazers and Trendsetters Category, (Nov 2014)
- “Women in Distinction in Science and Technology” Award, YM-YWCA, Manitoba, (May 2014)
- IEEE Engineering in Medicine and Biology Society Distinguished Lecturer Award, (2013-2014)
- Featured in Recognized Women in Engineering, University of Manitoba, (Oct. 2013)
- Nominated for the "Women in Distinction" award of YM-YWCA (March 2010)
- Postdoctoral fellowship, Johns Hopkins University (Oct. 1999)
- Nominated as one of Canada’s most promising women engineering students by Canadian Engineering Memorial Foundation (Oct. 1996)
- Open competition Finalist in the EMBS Whitaker Foundation Student Paper Competition (1996)
- University of Manitoba Fellowship (1996)
- Elizabeth Anne Memorial Scholarship (1995)
- Excellence teaching award, from Farzanegan Institute (1988-89)

### RESEARCH GRANTS HELD

PI	Agency	Title of the Project	Amount	Duration
Z. Moussavi	CIHR – Project Grant	Acoustical Device for Obstructive Sleep Apnea Severity Prediction during Wakefulness	\$367,200	Aug 2018- July 2021
Z. Moussavi	MITACS – Accelerate	Investigating vestibular changes in patients with post-concussion syndrome (PCS) in relation to the comorbid depression	\$45,000	Apr 2018- Mar 2019
Z. Moussavi	MITACS –	Visual Enhancement in normal and	\$30,000	Sept

	Accelerate	abnormal visual system		2017-Dec 2018
Z. Moussavi	AGE-WELL	Brain Fitness APP for Aging with a Healthy Brain and Detecting Cognitive Declines	\$44,250	May 2017-Apr 2018
Z. Moussavi	NSERC-Discovery	Modeling, Signal Processing and the Design of Novel Instruments and Algorithms Applicable to the Respiratory System	\$185,000	April 2017 – April 2022
Z. Moussavi	NSEREC-RTI	Acoustic Modeling of the Upper Airway and Novel Medical Devices Development	\$94,300	2017
M. Ng	MITACS-Accelerate	Transitional REM sleep brain connectomes and seizure susceptibility	\$30,000	Jan 2017- Dec. 2017
Z. Moussavi	MITACS-Accelerate	Feasibility study of a TV-based video chat technology for elderly with dementia	\$15,000	Sept-Dec. 2016
Z. Moussavi	NSERC - Engage	Development of a non-invasive hand artery occlusion detection using PPG signals	\$25,000	Aug 2016- Feb 2017
Z. Moussavi	Weston Brain Institute	Investigating the efficacy of high-frequency rTMS treatment for Alzheimer's disease	\$1,850,581	Sep 2016- Aug 2020
Sylvain Boet	AHSC-AFP Innovation Fund	Evaluating tracheal breath sound analysis and STOP-Bang in screening and diagnosis of OSA	\$100,000	Jun 2016- May 2018
Z. Moussavi	NSERC - Engage	Developing a prototype 3D printed smart mouth guard with embedded SpO2 recorder	\$25,000	Jan 2016- July 2016
Z. Moussavi	NSERC - Engage	Feasibility study of developing a smart face mask to monitor and record respiratory flow	\$25,000	June2015 - Dec2015
Z. Moussavi	MITACS-Cluster Accelerate + MPI	Concussion Treatment and Monitoring	\$240,000	June2015 -May2017
Z. Moussavi	MITACS-Accelerate	EVestG analysis for diagnosing concussion	\$45,000	July 2014- Dec. 2015
Z. Moussavi	UofM - URGP	Advance Signal processing and machine learning of respiratory sounds in relation to OSA	\$7500	July 2014- June 2015
Z. Moussavi	NSERC - Engage	Feasibility of detecting SpO2 signal inside the mouth	\$25,000	Jan 2014- Jun 2014
Z. Moussavi	NSERC - CRC Tier II	Biomedical Signal Analysis to aid early Diagnosis and Rehabilitation	\$500,000	2014- 2019
Z. Moussavi	MITACS- Accelerate	EVestG Optimization as a diagnostic tool for Meniere's disease	\$30,000	Nov 2012 -Oct 2013
Z. Moussavi	MITACS - Accelerate	Design and Validation of an Ear Canal Simulator for EVestG	\$15,000	Oct 2012- Feb 2013

		Evaluation		
Z. Moussavi	Phillips-Respironics	Acoustical detection of sleep apnea during wakefulness	\$60,000	Aug 2012- Nov 2012
Z. Moussavi	NSERC - Engage	Correlation analysis of the sleep EEG characteristics with sleep apnea daytime symptoms	\$25,000	Aug 2012- Jan 2013
Z. Moussavi	MITACS – Accelerate	Acoustical detection of swallowing aspiration	\$30,000	July 2012- Jan. 2013
Z. Moussavi	NSERC – Discovery	Novel Acoustic Technologies for Obstructive Sleep Disorders Diagnosis	\$125,000	2012- 2017
Z. Moussavi	NSERC-Engage	Scheduled usage optimization of Sunnex light and eyewear technologies to avoid jet lag	\$25,000	2012
Z. Moussavi	MITACS-Accelerate	Investigating the Non-linear characteristics of EVestG signals in healthy controls and those of Meniere's Disease	\$15,000	2012
Z. Moussavi	Innovation Tech. Center	Developing Psychophysical Virtual Reality Experiments and Tools for Early Diagnosis of Alzheimer Disease	\$50,000	2011
Z. Moussavi	NSERC- IG	Stop-snoring device compliance measurement	\$3000	2011
Z. Moussavi	Neural Diagnostics Canada, Ltd.	Investigating mental disorder biomarkers using EVestG	\$28,000	2011
Z. Moussavi	Riverview Health Center	Acoustic aspiration detection	\$10,000	2011
Z. Moussavi	Thorlakson Foundation	Plasticity of the spinal neural circuitry after injury	\$20,719	2010- 2011
Z. Moussavi	NSERC - CRC Tier II	Biomedical Signal Analysis to aid early Diagnosis and Rehabilitation	\$500,000	2009- 2014
Z. Moussavi	NSERC - CFI	Brain Function Laboratory	\$325,000	2011
Z. Moussavi	TRLabs - Manitoba	Snore Source Detection by Non-Invasive Acoustic Analysis	\$16,000	2010- 2011
Z. Moussavi	NSERC-IPS	Snore Source Detection by Non-Invasive Acoustic Analysis	\$30,000	2010- 2011
Z. Moussavi	NSERC (Discovery)	Modeling & Analyzing the Acoustic signatures of human swallowing mechanism	\$109,150	2007- 2012
Z. Moussavi	TRLabs	Acoustic Sleep Apnea Diagnosis during Wakefulness	\$39,000	2009- 20011
Z. Moussavi	Neural Diagnostics, Ltd.	Biomarker extraction of the EVestG Signals (in kind contribution)	\$190,000	2010- 2014
Z. Moussavi	MITACS - Accelerate	Statistical Modeling for clinical outcome adherence to therapy	\$15,000	2009
Z. Moussavi	TRLabs - Manitoba	Portable Acoustic Sleep Apnea Detection	\$262,000	2006- 2011
Z. Moussavi	NSF, Advance Program	Development of a Tool for Investigating Human Motor Learning	\$8,000	2006

Z. Moussavi	U Texas at El Paso	Modular BME Lab Development	\$40,000	2005-2006
Z. Moussavi	MHRC	Graduate student fellowship modeling the balance system	\$17,000	2004
Z. Moussavi	UTS (University Teaching Services)	Development of an Interactive Education Tool for 1st Year Electric Circuit Course	\$ 3,938	2004
Z. Moussavi	TRLabs	Automated Swallowing Sound Detection and Diagnosis	\$39,000	2004-2007
Z. Moussavi	NSERC (Discovery)	Respiratory and Swallowing Sounds Analysis	\$ 88,000	2003-2007
Z. Moussavi	NSERC (Discovery)	Acoustical and EMG analysis of swallowing	\$ 88,200	1999-2003
Z. Moussavi	URGP, University of Manitoba	Computerized Respiratory Phase and Airflow Estimation by Acoustical Means	\$ 4,750	2000
N. Sepehri (co-PI)	U of Manitoba	Robot-Aided Tele-physiotherapy	\$ 5,375	2002
Z. Moussavi	U of Manitoba	Start up Grant	\$ 40,000	1999

## PROFESSIONAL ACTIVITIES

- Consultant, Respi, Ltd., 2015-present
- Consultant, iSonea, Ltd., 2008-2014
- Associate Editor of Annals in Biomedical Engineering Journal, impact factor=3.195, 2011-2017
- Associate Editor of Medical & Biological Engineering and Computing Journal, 2013-present
- Associate Editor of Journal of Medical Engineering, 2012-present
- Associate Editor of Journal of Respiratory Medicine (Hindawai Publishing), 2012-present
- Board Member of Heart and Stroke Foundation, Manitoba, 2015- 2017
- Member of Professional Engineering of Manitoba (APEGM)
- Senior Member IEEE and Engineering in Medicine & Biology Society (EMBS), 2005 - present.
- Member of American Society for Engineering Education, 2010-present
- Member of American Thoracic Society, 2010-present
- Member of American Academy of Sleep Medicine, 2010-2014
- Secretary, IEEE Winnipeg Section, 2002.
- Chapter Chair, IEEE EMBS Chapter of Winnipeg, 2002 –2010
- Member, Canadian Medical & Biological Engineering Society (CMBES), 1993 - 2004.
- Member (Advisory committee) of the International Lung Sound Society (ILSA), 2002 - 2008.
- Member, Women in Engineering Programs & Advocates Networks (WEPAN), 1999-2002.
- Chair and reviewer, IEEE EMBS08, EMBS09, EMBS11, EMBS12 conferences
- Technical Program Committee, IEEE CCECE08 Conference
- Chair and organizer of special session in Respiratory Acoustics, IEEE EMBS06 conference,
- Chair and organizer of special session in Respiratory Acoustics, IEEE EMBS04 conference,
- Chair of Student Activities Committee and paper reviewer of 2002 IEEE/CCECE02 conference. Attended by about 340 scientists across Canada, US and overseas countries.

- Reviewer & Session Chair of the 2000 World Congress on Medical Physics and Biomedical Engineering
- Student paper competition judge in several conferences such as 2000 CMBES, 2000 ICS, 2001 & 2002 IEEE/EMBS conferences.

## PATENTS

1. Acoustic System and Methodology for identifying the risk of obstructive sleep apnea during wakefulness, Moussavi Z. and Karimi D., US 20140142452 A1, May 2014.
2. System and Methods for estimating respiratory airflow, Moussavi Z. and Yadollahi A, US 20140330095 A1, Nov 2014, Licensed to Bresotec, Ltd.
3. System and Methods of Acoustical Screening for Obstructive Sleep Apnea during Wakefulness, Moussavi Z. and MontazeriPouragha A., US 20130253357 A1, Filed Sept. 2013, Approved Dec. 2017.
4. Breathing Sound Analysis for detection of sleep apnea/hypopnea events, Moussavi Z., Yadollahi A, and Camorlinga, TRILabs, US , 7559903, July 2009 (issued), Licensed to Bresotec, Ltd.

## PUBLICATIONS

*Note: In all cases where my graduate students have contributed to the research reported in a paper, they are listed as the first author.*

### **Books and Chapters**

1. "Breath Sounds : From Basic Science to Clinical Practice", Chapter 9: "Current techniques in Breath Sounds Analysis", Authors: L. Hadjileontiadis and Z. Moussavi, Ed 1, *Springer International Publishing AG, Switzerland*, April 2018. <https://www.bookdepository.com/Breath-Sounds-Kostas-N-Priftis/9783319718231>
2. Z. Moussavi (author and editor), E. Shwedyk, L. Hadjitiadialis, A. Azarbarzin, S. Sarraf, A. Yadollahi, "Modern Applications of Signal Processing to Pathophysiology and Pathophatology for Diagnosis and Symptomology with Focus on Respiratory System,". 1(1): 500. *The Institute of Engineering and Technology, United Kingdom*, In progress.
3. Moussavi, Z. "Fundamentals of Respiratory Sounds and Analysis," Morgan & Claypool Publishers, Feb. 2007.
4. Betker AL, Szturm T, and Moussavi Z, "Interactive Video Game-Based Tool for Dynamic Rehabilitation Movements," in *Encyclopaedia of Healthcare Information Systems*, N. Wickramasinghe and E. Geisler, Ed.: Idea Group, Inc, pp. 785-791, June 2008.

### **Full Papers Published in Refereed Journals**

1. Lithgow. B., Moussavi Z., Gurvich C., Maller J, and Fitzgerald P., "Bipolar Disorder in the Balance", *European Archives of Psychiatry and Clinical Neuroscience*, Accepted July 2018.
2. Elwali A. and Moussavi Z., "A novel diagnostic decision making procedure for screening obstructive sleep apnea using anthropometric information and tracheal breathing sounds during wakefulness," *Scientific Reports (Nature)*, Accepted Aug. 2018.
3. Suleiman A., Lithgow B., Mansouri B. and Moussavi Z., "Investigating the validity and reliability of Electrovestibulography (EVestG) for detecting post-concussion syndrome (PCS) with and without comorbid depression," *Scientific Reports (Nature)*, Article #: 14495, Sept. 27 2018. <https://www.nature.com/articles/s41598-018-32808-1>
4. Saha S., Moussavi Z., Hadi P., Bradley D. and Yadollahi A. "Effects of Increased Pharyngeal Tissue Mass due to Fluid Accumulation in the Neck on the Acoustic Features of Snoring Sounds," *J. Clinical Sleep Medicine*,

14(10):1653-1660, Oct. 2018.

5. Kimura K., Reichert J.F., Ranjbar Pouya O., Byagowi A., Wang X., Kelly D. and Moussavi Z., "Simultaneous Localization and Mapping (SLAM) for Route Reversal Learning," submitted to journal OBM Geriatrics, special issue of Health Modifiers of Neurocognitive aging, Accepted July 2018.
6. Ranjbar Pouya O., Kelly D. and Moussavi Z., "Predicting Cognitive Status of Older Adults using Interval Reproduction: a Virtual Reality Paradigm," *Journal of Medicine and Biological Engineering (JMBE)*, May 2018 <https://doi.org/10.1007/s40846-018-0417-7> . Print ISSN: 1609-0985
7. Ranjbar Pouya O., Kelly D. and Moussavi Z., "Comparisons of Target Localization Abilities during Physical and Virtual Rotating Scenes by Cognitively-Intact and Cognitively Impaired Older Adults," *J Experimental Neuroscience*, Accepted.
8. Ashiri M., Lithgow B., Suleiman A., Moussavi Z. and Mansouri B., "Visio-vestibular interaction in humans: changes in the vestibular response following visual stimuli of different colors," *Journal of Medicine and Biological Engineering (JMBE)*, Accepted March 2018.
9. Suleiman A., Lithgow B., Mansouri B. and Moussavi Z., "Using EVestG assessment for detection of symptomology consequent to a lateral-impact concussion," *Journal of Medicine and Biological Engineering (JMBE)*, <https://doi.org/10.1007/s40846-018-0405-y> , April 2018.
10. Hajipour F. and Moussavi Z., "Spectral and Phasic Characteristics of Expiratory Tracheal Breathing Sounds during Wakefulness and Sleep in People with Different Levels of Obstructive Sleep Apnea," *Journal of Medicine and Biological Engineering (JMBE)*, Accepted, March 2018.
11. Elwali A. and Moussavi Z., "The effects of anthropometric parameters on the breathing sound features while screening obstructive sleep apnea during wakefulness," *Journal of Medicine and Biological Engineering (JMBE)*, in press 2018.
12. Blakley B., Sulieman A., Rutherford G., Moussavi Z. and Lithgow B., "EVestG recordings are Vestibuloacoustic signals," *Journal of Medicine and Biological Engineering (JMBE)*, Apr. 2018, DOI 10.1007/s40846-018-0398-6.
13. Kimura K., Reichert J., Olson A., Ranjbar Pouya O., Wang X., Moussavi Z. and Kelly D., "Orientation in Virtual Reality Does Not Fully Measure Up to the Real-World," *Scientific Reports (Nature)*, 7(1):18109, 2018. <https://www.nature.com/articles/s41598-017-18289-8>
14. Lithgow B.J. and Moussavi Z., "Physiological differences between Follicular, Luteal and Menses phases of Healthy Women using Electrovestibulography; Depression, Anxiety or other?" *J Neuropsychology*, 76 (2):72–81 <https://doi.org/10.1159/000487771>, 2017.
15. Soltanzadeh R., Afsharipour E., Shafai S, Ansari N., Mansouri B. and Moussavi Z., "Molybdenum Coated SU-8 Microneedle Electrodes for Transcutaneous Electrical Nerve Stimulation," *Biomedical Microdevices*, 20(1), Nov 2017.
16. Sulieman A., Lithgow B., Dastgheib Z., Mansouri B., and Moussavi Z., "Quantitative measurement of post-concussion syndrome (PCS) using Electrovestibulography (EVestG)," *Scientific Reports (Nature)*, 7 (1):16371, 2017. <https://www.nature.com/articles/s41598-017-15487-2>
17. Elwali A. and Moussavi Z., "Obstructive Sleep Apnea Screening and Airway Structure Characterization during Wakefulness Using Tracheal Breathing Sounds," *Annals in Biomedical Eng*, 45(3):851-858, 2017, DOI: 10.1007/s10439-016-1770-8.
18. Ranjbar-Pouya O., Byagowi A., Kelly D. and Moussavi Z., "Introducing a New Age-and-Cognition-sensitive Measurement for Assessing Spatial Orientation using a Landmark-less Virtual Reality Navigational Task," *Quarterly J of Experimental Psychology*, 70(7):1406-1419, 2017. [DOI: 10.1080/17470218.2016.1187181](https://doi.org/10.1080/17470218.2016.1187181)

19. White P. and Moussavi Z., "Neuro-Cognitive Treatment for an Alzheimer's Patient using a Virtual Reality Navigational Environment," *J Experimental Neuroscience*, 2016:10, 129-135, Nov. 2016. DOI: [10.4137/JEN.S40827](https://doi.org/10.4137/JEN.S40827)
20. Saha S., Bradley D., Taheri M., Moussavi Z. and Yadollahi A., "A subject-specific acoustic model of the upper airway for snoring sounds generation," *Nature Scientific Reports*, 6:25730, May 2016. doi: 10.1038/srep25730
21. Dastgheib Z., Lithgow B., Blakley B. and Moussavi Z., "Application of Vestibular Spontaneous Response as a Diagnostic aid for Meniere's Disease," *J Annals of Biomed Eng.*, 44(5), 1672-1684, 2016. DOI: 10.1007/s10439-015-1441-1
22. Kumaraganage C., Lithgow B. and Moussavi Z., "Investigation of a New Weighted Averaging Method to Improve SNR of Electrocochleography Recordings," *Trans. IEEE Biomed Eng.*, DOI: 10.1109/TBME.2015.2457412, 63(2):340-7, Feb 2016.
23. Soltanzadeh R. and Moussavi Z., "Sleep Stage Detection using Tracheal Breathing Sounds: A Pilot Study," *J Annals of Biomed Eng.*, 43(10):2530-7. doi: 10.1007/s10439-015-1290-y., 2015.
24. Lithgow B., Garrett A., Moussavi Z., Gurvich C., Kulkarni J., Maller J. and Fitzgerald P., "Major Depression and Electrovestibulography," *World Journal Biological Psychiatry*, 16(5):334-50, 2015. doi:10.3109/15622975.2015.1014410
25. Modirrousta M., Shams E., Katz Cara, Mansouri B., Moussavi Z, Sareen J. and Enns M., "The efficacy of deep repetitive transcranial magnetic stimulation over the medial prefrontal cortex in Obsessive Compulsive Disorder," *J Depression and Anxiety*, 32(6):445-50. 2015.
26. Kumaraganage C., Lithgow B. and Moussavi Z., "A new Low Noise Signal Acquisition Protocol and Electrode Placement for Electrocochleography (ECOG) Recordings," *J Med Biol Eng Comp*, 53(6):499:509, doi: 10.1007/s11517-015-1251-5, 2015.
27. Rutherford G., Lithgow B. and Moussavi Z., "Short and Long-Term Effects of rTMS Treatment on Alzheimer's Disease at Different Stages: A Pilot Study," *J Exp Neurosci*, 3(9):43-51, doi: 10.4137/JEN.S24004, June 2015.
28. Dastgheib Z., Lithgow B., Blakley B. and Moussavi Z., "A New Diagnostic Vestibular Evoked Response," *J. Otolaryngology - Head & Neck Surgery*, 44 (1):14, 2015. DOI: 10.1186/s40463-015-0065-7
29. Blakley B., Dastgheib Z., Lithgow B. and Moussavi Z., "Preliminary report: neural firing patterns specific for Meniere's disease," *J. Otolaryngology - Head & Neck Surgery*, 43: (52) Dec. 2014.
30. Kumaraganage C., Lithgow B. and Moussavi Z., "Development of an Ultra-Low Noise, Miniature Signal Conditioning Device for Vestibular Evoked Response Recordings," *BioMedical Engineering Journal OnLine*. 13(1) Jan. 2014. <http://www.biomedical-engineering-online.com/content/13/1/6>
31. Byagowi A., Mohades D. and Moussavi Z. "Design and Application of a Novel Virtual Reality Navigational Technology (VRNChair)," *J Experimental Neuroscience*, 8:7-14, 2014. doi: [10.4137/JEN.S13448](https://doi.org/10.4137/JEN.S13448)
32. Sarraf S., Birjandi A., Moussavi Z., "Non-invasive and Automatic Diagnosis of Patients at High Risk of Swallowing Aspiration," *J Med Biol Eng Comp (MBEC)*, 52(5):459-65 May 2014. DOI: 10.1007/s11517-014-1151-0
33. Garcia-Campuzano M., Virus-Ortega J., Smith S., and Moussavi Z., "Effect of cognitive training targeting associative memory in the elderly: A small randomized trial and a longitudinal evaluation," *J American Geriatrics Society*, 61(12):2252-2254, Dec. 2013.
34. Rutherford G., Gole R., and Moussavi Z., "rTMS as a treatment of Alzheimer's disease with and without comorbidity of depression: a review," *Neuroscience Journal*, Volume 2013, Article ID 679389, Jan. 2013. DOI: [10.1155/2013/679389](https://doi.org/10.1155/2013/679389), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4437275/>
35. Azarbarzin A., Ostrowski M., Moussavi Z., Hanly P. and Younes M., "Contribution of Arousal from sleep to



post-event tachycardia in patients with obstructive sleep apnea," *Sleep*, 36(6):881-889, 2013.

36. Hemami H. and Moussavi Z., "A Model of the Basal Ganglia in Voluntary Movement and Postural Reactions," *Comput Methods Biomech Biomed Engin*, 17(13):1432-46, 2014. doi: 10.1080/10255842.2012.751983
37. Azarbarzin A. and Moussavi Z., "Snoring Sounds Variability as a Signature of Obstructive Sleep Apnea," *J Med Eng Phys*, DOI:10.1016/j.medengphy.2012.06., 35(4):479-85, 2013.
38. Yadollahi A., Azarbarzin A., Montazeri A. and Moussavi, Z., "Respiratory flow-sound relationship during both wakefulness and sleep and its variation in relation to sleep apnea," *J. Ann Biomed Eng.*, 41(3):537-546, DOI: 10.1007/s10439-012-0692-3, 2013.
39. Azarbarzin A. and Moussavi Z., "Snoring Sounds' Intra-Subject Variability in Relation to Body Position, Sleep Stage, and Blood Oxygen Level," *J Med Biol Eng Comp*, 51(4):429-439, DOI: 10.1007/s11517-012-1011-8, 2013.
40. Sarraf-Shirazi S., Caitlin Buchel, Reesa Daun, Laura Lenton, and Moussavi Z. "Acoustic Detection of Silent Aspiration using swallowing and breath sound analysis," *J Med Biol Eng Comp*, DOI: 10.1007/s11517-012-0958-9, 50(12):1261-1268, 2012.
41. Sarraf-Shirazi S., Baril J. and Moussavi Z. "Characteristics of the Swallowing Sounds Recorded in the Ear, Nose and on Trachea," *J Med Biol Eng Comp*, 50(8):885-90, Aug. 2012.
42. Azarbarzin A. and Moussavi Z., "Snoring Sounds' Statistical Characteristics Depend on Anthropometric Parameters", *J Biomedical Sciences & Engineering*, 5(5):245-254, May 2012.
43. Dastgheib Z., Lithgow B., and Moussavi Z., "Diagnosis of Parkinson's Disease using Electrovestibulography", *Med Biol Eng Comp*, 50(5):483-91 (DOI: 10.1007/s11517-012-0890-z), May 2012.
44. Huq S. and Moussavi Z., "Acoustic Breath Phase Detection Using Tracheal Breath Sounds", *Med Biol Eng Comp*, 50(3):297-308, March 2012.
45. Montazeri A., Giannouli E. and Moussavi Z., "Assessment of Obstructive Sleep Apnea by Respiratory Sound Analysis during Wakefulness," *J. Annals on Biomed. Eng.*, Vol 4, No.4, PP:916-924, (doi:10.1007 /s10439-011-0456-5) 2012.
46. Szturm T., Betker A., Moussavi Z., Desai A. and Goodman V., "Effects of the Interactive Computer game Exercise Regime, Effects on Balance Impairment in Frail Community-Dwelling Older adults; A Randomized Pilot Trial," *Physical Therapy J.*, Vol 91 No. 10 pp:1449-62, 2011.
47. Yadollahi A. and Moussavi Z. "The effect of anthropometric variation on acoustical flow estimation," *J IEEE Trans. BME*, Vol 58, No. 6, PP: 1663-1670, June 2011.
48. Azarbarzin A. and Moussavi Z., "Automatic and Unsupervised Snore Sound Extraction from Respiratory Sound Signals," *IEEE Trans. Biome. Eng.*, Vol 58, No. 5, PP: 1156-1162, May 2011.
49. Sarraf-Shirazi S. and Moussavi Z., "Acoustical Modeling of Swallowing Mechanism," *IEEE Trans. Biomed. Eng.*, Vol 58, No 1, pp: 81-87, Jan. 2011.
50. Yadollahi A., Giannouli E. and Moussavi Z., "Sleep Apnea Monitoring and Diagnosis based on Pulse Oximetry and Tracheal Sound Signals", *J. Med. Biol. Eng. Comput.*, Vol 48, No 11, PP:1087-97, Nov. 2010.
51. Yadollahi A. and Moussavi Z., "Automatic Breath and Snore Sounds Classification from Tracheal Sounds Recordings, *J. Medical Engineering & Physics*, Vol 32, No 9, PP:985-990, Nov. 2010.
52. Betker A., Moussavi Z., Szturm T., Estimation of 2D center of mass movement during trunk flexion-extension movements using body accelerations, *J IEEE, Trans. Neural Sys & Rehab. Eng.* Vol. 17, NO. 6, pp. 553-559, Dec. 2009.
53. Aboofazli M., Moussavi Z., Swallowing Sound Detection using Hidden Markov Modeling of Recurrence Plot Features, *Journal of Chaos, Solitons and Fractals*, Vol. 39, No. 2, PP. 778-783, 2009.

54. Betker A., Moussavi Z., Szturm T., Ambulatory Center of Mass Prediction using Body Accelerations and Center of Foot Pressure, *J IEEE, Trans. Biomed. Eng.* Vol. 55, No. 11 pp. 2491-2498, 2008.
55. Betker A., Szturm T. and Moussavi Z, Staying in Tune – How Our Muscles Adapt to New Motor Tasks, *IEEE BME magazine*, Vol. 27, No. 5, pp. 91-98, Sept. 2008.
56. Yadollahi A. and Moussavi Z., Respiratory Sounds Compression, *J IEEE, Trans. Biomed. Eng.*, Vol. 55, No. 4, pp. 1336-43, April 2008.
57. Aboofazli M., Moussavi Z., Comparison of Recurrence Plot features of Swallowing and Breath Sounds, *Journal of Chaos, Solitons and Fractals*, Vol. 37, No. 2, pp. 454-464, July 2008.
58. Aboofazli M., Moussavi Z., Analysis of Swallowing Sounds using Hidden Markov Models, *J. Med. Biol. Eng. Comput.*, Vol. 46, No. 4, pp. 307-314, Nov. 2007.
59. Gnitecki J., Moussavi Z. and Pasterkamp H., Diagnostic Potential in State Space Parameters of Lung Sounds, *J Med. & Biol. Eng.*, Vol. 46, No. 1, pp. 93-99, 2007.
60. Floras D., Moussavi Z., Thomas G., Heart Sound Cancellation Based on Multiscale Product and Linear Prediction, *J IEEE, Trans. Biomed. Eng.*, Vol. 54, No. 2, 234-243, Feb. 2007.
61. Moussavi Z., Introduction for Special Issues: Respiratory Sound Analysis, *IEEE Engineering in Medicine & Biology Magazine*, Vol. 26, No. 1, pp. 15, Jan. 2007.
62. Yadollahi A. and Moussavi Z., Acoustical Flow Estimation: Review and Validation, *IEEE EMB Magazine*, Vol. 26, No. 1, pp. 56-61, Jan. 2007.
63. Gnitecki J., and Moussavi Z., Review: Cancellation of Heart Sounds from Lung Sounds, *IEEE, EMB magazine*, Vol. 26, No. 1, pp. 20-29, Jan. 2007.
64. Yadollahi A., Moussavi Z., Shamsollahi M.B. and Ahmadinejad Z., Heart Sound Localization using Lung Sounds Entropy, *International Journal of Scientific Research (IJSR)*, Vol. 16, pp. 107-111, 2006.
65. Betker A., Szturm T., Moussavi Z. and Nett C., "Video game-based interactive motivating tool for rehabilitation movements: case study," *Arch Phys. Med. Rehab.*, Vol. 87, No. 8, pp. 1141-9, August 2006.
66. Betker A., Moussavi Z. and Szturm T., Center of mass approximation and prediction as a function of body acceleration, *J IEEE, Trans. Biomed. Eng.*, Vol. 53, No. 4, pp. 686-693, 2006.
67. Yadollahi A. and Moussavi Z., A Robust Method for Estimating Respiratory Flow Using Tracheal Sounds Entropy, *J IEEE, Trans. Biomed. Eng.*, Vol. 53, No. 4, pp. 662-668, 2006.
68. Yadollahi A. and Moussavi Z., A Robust Method for Heart Sound Localization using Lung Sounds Entropy, *J IEEE, Trans. Biomed. Eng.*, Vol. 53, No. 3, pp. 497-502, 2006.
69. Pourazad M., Moussavi Z., Thomas G., Heart Sound Cancellation from Lung Sound Recordings Using Time-Frequency Filtering, *J Med. & Biol. Eng.*, Vol. 44, No. 3, pp. 216-225, 2006.
70. Rempel G and Moussavi Z, The effect of altering the consistency of food on the breath and swallow pattern of young people with cerebral palsy, *J Dysphagia*, Vol. 20, No. 2. pp. 108-112, 2005.
71. Gnitecki J., Hossein I., Moussavi Z. and Pasterkamp H., Qualitative and quantitative evaluation of heart sound reduction from lung sound recordings, *J IEEE, Trans. Biomed. Eng.*, Vol. 52(10), pp. 1788-1792, Oct. 2005.
72. Gnitecki J. and Moussavi Z., The fractality of lung sounds: a comparison of three waveform fractal dimension algorithms, *Journal of Chaos, Solitons and Fractals*, Vol. 26(4), pp. 1065-1072, 2005.
73. Betker A., Moussavi Z. and Szturm T., On Modeling Center of Foot Pressure Distortion Through a Medium, *Journal of IEEE, Trans. Biomed. Eng.*, Vol. 52, No. 3, pp. 345-52, 2005.
74. Lazareck L. and Moussavi Z., Classification of Normal and Dysphagic Swallowing Sounds by Acoustical Means, *J*

*IEEE, Trans. Biomed. Eng.*, 51(12): 2103-2112, 2004.

75. Shadmehr R. and Moussavi Z.K., Spatial Generalization from Local Learning of Reaching Movements in Force Fields, *J. Neuroscience*, 20:7807-7815, 2000.
76. Moussavi Z.K., Leopando M.T. Pasterkamp H. and Rempel G., Computerized Acoustical Respiratory Phase Detection without Airflow Measurement, *J Med. & Biol. Eng.*, 38 (2):198:203, 2000.
77. Leopando M.T., Moussavi Z.K. and Rempel G., The Effect of a Soft Boston Orthosis on Pulmonary Mechanics in Severe Cerebral Palsy, *Pediatric Pulmonology*, 28 (1):53-8, July 1999.
78. Moussavi, Z., Rangayyan R.M., Frank C. et al., Screening and Adaptive Segmentation of Vibroarthrographic Signals, *J IEEE Trans. on Biomed. Eng.*, Vol. 43 (1), 15-23, 1996.

#### **Brief Technical Papers Published in Refereed Journals**

1. Soltanzadeh R. and Moussavi Z., "Design of an Oral Photoplethysmogram for deriving peripheral oxygen saturation level," *J Med Devices*, 9(2):020922 (2 pages), doi: 10.1115/1.4030134, Jun 2015.
2. Fatmehsari Y. R. and Moussavi Z., "Designing and Implementing a Portable Near-Infrared Imaging System for Monitoring of Human's Functional Brain Activity," 9(2):020921 (2 pages), doi: 10.1115/1.4030133, June 2015
3. Byagowi A., Singhal S., Lambeta M., Aldaba C. and Moussavi Z., "Design of a naturalistic navigational virtual reality using oculus Rift 1," *J. Med. Devices*, 8(3):030946 (2 pages), 2014. doi: 10.1115/1.4027114
4. White P., Byagowi A. and Moussavi Z., "Design of a wireless Biological Signal Conditioning System," *J. Med. Devices*, 7(2):020933 (2 pages), April 2013. doi: 10.1115/1.4024318
5. Nemez K., Byagowi A., Sarraf S. and Moussavi Z., "Design of a signal conditioning device for remote breath and swallowing sounds recording," *J. Med. Devices*, 7(2):020929 (2 pages) April 2013. doi: 10.1115/1.4024317
6. Byagowi A., Garcia M., MacGregor C. and Moussavi Z., "Virtual Reality Psychophysical Tests to Investigate Human Temporal and Spatial Processing Ability," *J. Med. Devices*, 6(1):017519, April 2012. doi: 10.1115/1.4026697
7. Sarraf S. and Moussavi Z., "Silent Aspiration Detection by Respiratory Sound Analysis", *J. Med. Devices*, 6(1):017551 April 2012. doi: 10.1115/1.4026745
8. Annakkage U., Azarbarzin A. and Moussavi Z., "The feasibility of Implanting a microphone into mouth guards for sleep apnea assessment," *J. Med. Devices* April 2012.
9. Morovati M. and Moussavi Z., "Development of a NeuroMechani Stimulator for rehabilitation of people with incomplete spinal cord injury, *J. Med. Devices*, 6(1):017572, April 2012. doi: 10.1115/1.4026750
10. Kumaragamage C., Lithgow B and Moussavi Z., "A portable biological amplifier for electrovestibulography", *J. Med. Devices*, 6(1):017513, April 2012. doi: 10.1115/1.4026691

#### **Full Papers Published in Refereed Conference Proceedings**

1. Aldaba C., White P., Byagowi A. and Moussavi Z., "Virtual reality body motion induced navigational controllers and their effects on simulator sickness and pathfinding," *Proc IEEE-EMBC conf*, July 2017.
2. Dastgheib Z., Ranjbar O., Lithgow B. and Moussavi Z., "Comparison of a new ad-hoc classification method with Support Vector Machine and Ensemble classifiers for the diagnosis of Meniere's disease using EVestG signals", *IEEE CCECE*, May 2016.
3. Suleiman A., Lithgow B., Mansouri B. and Moussavi Z., "Investigating the feasibility of EVestG Assessment for screening concussion," *IEEE EMBC*, pp:3375-3378, doi: [10.1109/EMBC.2015.7319116](https://doi.org/10.1109/EMBC.2015.7319116), 2015.
4. Pouya O., Kelly D. and Moussavi Z., "Tendency to overestimate the explicit time interval in relation to aging and cognitive decline," *IEEE EMBC*, pp: 4692-4695, DOI: [10.1109/EMBC.2015.7319441](https://doi.org/10.1109/EMBC.2015.7319441), 2015.

5. Soltanzadeh R. and Moussavi Z., "Upper airway resistance changes from inspiration to expiration during wakefulness is a predictor of sleep apnea: a pilot study," *IEEE EMBC*, pp: 2231-2234, DOI: [10.1109/EMBC.2015.7318835](https://doi.org/10.1109/EMBC.2015.7318835), 2015.
6. Moussavi Z., Elwali A., Soltanzadeh R., MacGregor A. and Lithgow B., "Breathing sounds characteristics correlate with structural changes of upper airway due to obstructive sleep apnea," *IEEE EMBC*, pp: 5956-5959, DOI: [10.1109/EMBC.2015.7319748](https://doi.org/10.1109/EMBC.2015.7319748), 2015.
7. White P., Byagowi A. and Moussavi Z., "Effect of viewing mode on pathfinding in immersive virtual reality," *IEEE EMBC*, pp: 4619-4622, [10.1109/EMBC.2015.7319423](https://doi.org/10.1109/EMBC.2015.7319423), 2015.
8. MacGregor C. and Moussavi Z., "A Novel Classified Approach to Pre-Screening Obstructive Sleep Apnea during Wakefulness," *IEEE EMBES*, Aug. 2014.
9. Soltanzadeh R. and Moussavi Z., "Breathing Sounds Spectral and Higher Order Statistics Changes from Wakefulness to Sleep in Apneic and non-Apneic People," *IEEE EMBES*, Aug. 2014.
10. Mortaza N., Moussavi Z. and Glazebrook C., "Test-Pretest Reliability of Center of Pressure and Electromyograph Measures in Bipedal Quiet Standing in Healthy Adults," *IEEE Canadian Med Biol Eng conf*, May 2014.
11. Kimura K. and Moussavi Z., "Co-Activation of Leg Muscles Differs while Ascending and Descending Stairs," *IEEE Canadian Med Biol Eng conf*, May 2014.
12. Lithgow B. and Moussavi Z., "A pilot evaluation of vestibular performance using EVestG following mTBI," *IEEE EMES on Neural Engineering Conf*, Nov. 2013.
13. Zen D., Byagowi A., Garcia M., Kelly D., Lithgow B. and Moussavi Z., "The perceived orientation in people with and without Alzheimer's," *IEEE EMBS on Neural Engineering Conf*, Nov. 2013.
14. Ranjbar Pouya O., Byagowi A., Kelly D. and Moussavi Z., "The effect of physical and virtual rotations of a 3D object on spatial performance," *IEEE EMS on Neural Engineering Conf*, Nov. 2013.
15. MacGregor C., Karimi D., Azarbarzin A. and Moussavi Z., "Statistical analysis of tracheal breath sounds during wakefulness for screening obstructive sleep apnea," *IEEE EMBS conference*, July 2013.
16. Kumaragamage C., Edwards R., Moussavi Z., Lithgow B., "Implementation of a gelatin model to simulate biological activity in the inner ear for Electrovestibulography validation," *IEEE EMBS conference*, July 2013.
17. Garcia M.T., Shams E., Ortega J. and Moussavi Z., "The Effect of Associative Memory Exercises in Older Adults," *Social and Behavioral Journal (ISSN: 1877-0428)*, 82: 707-712, 2013.
18. Byagowi A. and Moussavi Z., "Design of a Virtual Reality Psychophysical Experiment for Assessment of Egocentric Spatial Cognition," *Proc IEEE EMBS*, Aug. 2012.
19. Dastgheib Z., Lithgow B. and Moussavi Z., "Vestibular Spontaneous Response as a Signature for Parkinson's Disease," *Proc IEEE EMBS*, Aug. 2012.
20. Sarraf S. and Moussavi Z., "Silent Aspiration Detection by Breath and Swallowing Sound Analysis," *Proc IEEE EMBS*, Aug. 2012.
21. Yadollahi Z., Montazeri A., Azarbarzin A. and Moussavi Z., "Acoustical Flow Estimation in Patients with Obstructive Sleep Apnea during Sleep," *Proc IEEE EMBS*, Aug. 2012.
22. Garcia M.T. and Moussavi Z., "The Effect of Aging on Brain Temporal Perception using Virtual Reality Psychophysical (VRP) Experiments," *Proc IEEE EMBS*, Aug. 2012.
23. Shams E., Karimi D. and Moussavi Z., "Bispectral Analysis of Tracheal Breath Sounds for Obstructive Sleep Apnea," *Proc IEEE EMBS*, Aug. 2012.

24. Samadani A. and Moussavi Z., "The Effect of Aging on Human Brain Spatial Processing Performance," *Proc IEEE EMBS*, Aug. 2012.
25. Azarbarzin A. and Moussavi Z., "A Comparison between Recording Sites of Snoring Sounds in Relation to Upper Airway Obstruction," *Proc IEEE EMBS*, Aug. 2012.
26. Lithgow, B.J. and Moussavi, Z., "Dementia and EVestG", *3rd World Congress of Asian Psychiatry, Melbourne, Australia*, Asian Journal of Psychiatry Vol. 4 Supplement 1, Page 56, August 2011.  
[http://dx.doi.org/10.1016/S1876-2018\(11\)60214-1](http://dx.doi.org/10.1016/S1876-2018(11)60214-1)
27. Yadollahi A. and Moussavi Z., "Detailed Analysis of the Relationship between Tracheal Breath Sounds and Airflow in relation to OSA during wake and sleep," *Proc. IEEE EMBS Conf., Sept. 2011.*
28. Montazeri A. and Moussavi Z., "Acoustical Screening for Obstructive Sleep Apnea during Wakefulness", *IEEE EMBS conf.*, Sept. 2011.
29. Sarraf S. and Moussavi Z., "Investigating the statistical properties of the swallowing sounds", *Proc IEEE EMBS conf.*, Sept. 2011.
30. Azarbarzin A. and Moussavi Z., "Do Anthropometric parameters change the characteristics of snoring sounds?", *Proc IEEE EMBS conf.*, Sept. 2011.
31. Dastgheib Z., Lithgow B. and Moussavi Z., "Application of fractal dimension on vestibular response singles for diagnosis of Parkinson Disease," *Proc IEEE EMBS conf.*, Sept. 2011.
32. Azarbarzin A. and Moussavi Z. "Nonlinear properties of snoring sounds", *Proc. ICASSP*, PP. 4316-4319, 2011.
33. Sarraf S. and Moussavi Z., "Acoustical Analysis of Swallowing Mechanism", *Proc Comput & Math Biomed Eng (CMBE)*, pp. 339-342, March 2011.
34. Huq S. and Moussavi Z., "Automatic Acoustic Breath Sound Detection using Only Tracheal Sounds", *IEEE EMBS conf.*, pp. 272-275, Sept. 2010.
35. Montazeri A. and Moussavi Z., "Acoustical Screening for Obstructive Sleep Apnea during Wakefulness", *IEEE EMBS conf.*, pp. 3663-3665, Sept. 2010.
36. Azarbarzin A. and Moussavi Z., "Unsupervised Classification of Respiratory Sound Signal into Snore/No-Snore classes", *IEEE EMBS conf.*, pp. 3666-3669, Sept. 2010.
37. Yadollahi A. and Moussavi Z., On Arithmetic Misconceptions of Spectral Analysis of Biological Signals, in Particular Respiratory Sounds, *Proc. IEEE EMBS (EMBC'09)*, Minneapolis, pp. 388-391, Sept. 2009.
38. \*Yadollahi A. and Moussavi Z., Acoustic Obstructive Sleep Apnea Detection, *Proc. IEEE EMBS (EMBC'09)*, Minneapolis, pp. 7110-7113, Sept. 2009.
39. \*Yadollahi A. and Moussavi Z., Formant Analysis of Breath and Snore Sounds, *Proc. IEEE EMBS (EMBC'09)*, Minneapolis, pp. 2563-2566, Sept. 2009.
40. Samadani A. and Moussavi Z., Human Brain Performance in Learning Complex Temporal Patterns, *Proc. IEEE EMBS (EMBC'09)*, Minneapolis, pp. 3967-3970, Sept. 2009.
41. Betker A. Moussavi Z, and Szturm T, "Effect of a Visual-based Sensory Motor Task on Muscle Tuning During A Dynamic Balance Task," *Proc. IEEE EMBS (EMBC'08)*, pp. 5077-5080, Aug. 2008.
42. Yadollahi A. and Moussavi Z., Comparison of Flow-Sound Relationship for Different Features of Tracheal Sound, *Proc. IEEE EMBS (EMBC'08)*, pp. 805-808, Aug. 2008.
43. Yadollahi A. and Moussavi Z., A Model for Normal Swallowing Sounds Generation Based on Wavelet Analysis, *Proc. IEEE CCECE*, pp. 827-830, May 2008.

44. Betker A, Maharjan P, Yaduvanshi C, Szturm T, and Moussavi Z, "Automated Quantification and Comparison of Spatio-temporal Gait Parameters During Treadmill and Overground Walking," *Proc. IEEE CCECE*, pp. 165-168, May 2008.
45. Saif Huq, A. Yadollahi and Z. Moussavi, "Breath Analysis of Respiratory Flow using Tracheal Sounds", *Proc. IEEE ISSPIT*, Dec. 2007.
46. Chad MacDonald, Zahra Moussavi, and Thompson Sarkodie-Gyan, "Formation of an Internal Model of Environment Dynamics During Upper Limb Reaching Movements: A Fuzzy Approach," *Proc. 29<sup>th</sup> IEEE EMBS*, pp. 4862-4865, Aug. 2007.
47. Yadollahi A. and Moussavi Z., "Feature selection for swallowing sounds classification," *Proc. 29<sup>th</sup> IEEE EMBS*, pp. 3172-3175, Aug. 2007.
48. Betker A., Szturm T. and Moussavi Z., "Visual-based Sensory Motor Learning During Dynamic Balance Tasks Viewed in a Virtual Environment," *Proc. 29<sup>th</sup> IEEE EMBS*, pp 6109-6112, Aug. 2007.
49. Betker A., Szturm T. and Moussavi Z., "Center of Mass Approximation During Walking as a Function of Trunk and Swing Leg Acceleration," *Proc. 28<sup>th</sup> IEEE EMBS*, pp. 3435-3438, Sept. 2006.
50. \*Yadollahi A. and Moussavi Z., "Apnea Detection by Acoustical Means," *Proc. 28<sup>th</sup> IEEE EMBS*, pp. 4623-4626, Sept. 2006.
51. \*Yadollahi A. and Moussavi Z., "Adaptive Compression of Respiratory and Swallowing Sounds," *Proc. 28<sup>th</sup> IEEE EMBS*, pp. 517-520, Sept. 2006.
52. Han J., Betker A., Szturm T. and Moussavi Z., "Estimation of the Center of Body Mass During Forward Stepping Using Body Acceleration," *Proc. 28<sup>th</sup> IEEE EMBS*, pp. 4564-4567, Sept. 2006.
53. \*Aboofazeli M. and Moussavi Z., "Automated Extraction of Swallowing Sounds Using a Wavelet-Based Filter," *Proc. 28<sup>th</sup> IEEE EMBS*, pp. 5607-5610, Sept. 2006.
54. \*Aboofazeli M. and Moussavi Z., "Analysis of Temporal Pattern of Swallowing Mechanism," *Proc. 28<sup>th</sup> IEEE EMBS*, pp. 5592-5595, Sept. 2006.
55. MacDonald C., Balakrishnan S. and Moussavi Z., "Development of a Low-Cost Robot Manipulator and its Application to Human Motor Control Studies," *Proc. 8<sup>th</sup> Int. IASTED conf. on Control and Applications*, pp. 24-29, May 2006.
56. Betker A., Szturm T., Moussavi Z. and Nett C., "Game Based Interactive Motivating Tool for Rehabilitation Movement: Case Study," *IASTED Int Conf Adv Comp Sci Tec.*, Vol. 1, pp. 157-162, Jan. 2006.
57. Golabbakhsh M, Moussavi Z. and Aboofazeli M, "Respiratory Flow Estimation from Tracheal Sound by Adaptive Filters," *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
58. Farahmand F. and Moussavi Z., "An Intelligent Assistive Robotic Manipulator," *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
59. Yadollahi A. and Moussavi Z., "Measuring Minimum Critical Flow for Normal Breath Sounds," *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
60. Yadollahi A. and Moussavi Z., "Robust Respiratory Flow Estimation using Statistical Properties of Tracheal Sounds," *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
61. Pourazad M., Moussavi Z., Farahmand F. and Ward R., "Heart Sounds Separation From Lung Sounds Using Independent Component Analysis," *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
62. Moussavi Z., "Assessment of Swallowing Sounds' Stages with Hidden Markov Model," *27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.

63. Betker A., Szturm T. and Moussavi Z., Development of an Interactive Motivating Tool for Rehabilitation Movements, *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
64. Han J., Moussavi Z., Szturm T., and Goodman V., Application of Nonlinear Dynamics to Human Postural Control System, *Proceeding of 27<sup>th</sup> IEEE EMBS conference*, Sept. 2005.
65. Gnitecki J., Moussavi Z., and Paskterkamp H., Geometrical and Dynamical State Space Parameters of Lung Sounds, *5<sup>th</sup> Int. Workshop on Biosignal Interpretation (BSI)*, pp. 113-116, Sept. 2005.
66. Yadollahi A, Moussavi Z., Shamsollahi M. and Ahmadinejad Z., Heart Sound Localization using Lung Sounds Entropy, *UAE Int. Conf. on Biolog. & Med. Physics*, March 2005.
67. Aboofazeli M. and Moussavi Z., Analysis and Classification of Swallowing Sounds Using Reconstructed Phase Space Features, *Int. IEEE Conf. Acoustics, Speech & Signal Processing (ICASSP)*, pp. V421-V424, March 2005.
68. Moussavi Z., Flores D. and Thomas G., Heart Sound Cancellation Based on Multiscale Products and Linear Prediction, *Proc.26<sup>th</sup> IEEE EMBS*, pp. 3840-43, Sept. 2004.
69. Aboofazeli M. and Moussavi Z., Analysis of Normal Swallowing Sounds using Nonlinear Dynamics Metric Tools, *Proc. 26<sup>th</sup> IEEE EMBS*, pp. 3812-15, Sept. 2004.
70. Aboofazeli M. and Moussavi Z., Automated Classification of Swallowing and Breath Sounds, *Proc. IEEE EMBS*, pp. 3816-19, Sept. 2004.
71. Lazareck L. and Moussavi Z., Swallowing Sound Characteristics in Healthy and Dysphagic Individuals, *Proc. 26<sup>th</sup> IEEE EMBS*, pp. 3820-23, Sept. 2004.
72. Hossain I. and Moussavi Z., Finding the Lung Sound-Flow Relationship in Normal and Asthmatic Subjects, *Proc.26<sup>th</sup> IEEE EMBS*, pp. 3852-55, Sept. 2004.
73. Gnitecki J., Moussavi Z. and Pasterkamp H., Classification of Lung Sounds during Bronchial Provocation using Waveform Fractal Dimensions, *Proc.26<sup>th</sup> IEEE EMBS*, pp. 3844-47, Sept. 2004.
74. Betker A., Moussavi Z., and Szturm T., Center of Mass Function Approximation, *Proc. 26<sup>th</sup> IEEE EMBS*, pp. 687-90, Sept. 2004.
75. Betker A., Moussavi Z., and Szturm T., On Classification of Simulated Sensory Deficiency, *Proc. IEEE CCECE*, pp 1211-14, May 2004.
76. Golabbakhsh M., and Moussavi Z., Relationship between Airflow and Frequency-Based Features of Tracheal Respiratory Sounds, *Proc. IEEE CCECE*, pp. 751-4, May 2004.
77. Aboofazeli M., Thomas G. and Moussavi Z., A Wavelet Transform Based Digital Image Watermarking Scheme, *Proc. IEEE CCECE*, pp. 823-6, May 2004.
78. Pourazad M.T., Moussavi Z.K., and Thomas G., Heart Sound Cancellation from Lung Sound Recordings using Adaptive Threshold and 2D Interpolation in Time-Frequency Domain, *Proc. IEEE Eng. Med. Biol Soci. (EMBS)*, pp. 2586-89, Sept. 2003.
79. Hossain I. and Moussavi Z., An Overview of Heart-Noise Reduction of Lung Sound using Wavelet Transform Based Filter, *Proc. IEEE Eng. Med. Biol Soci. (EMBS)*, pp.458-461, Sept. 2003.
80. Gnitecki J, Moussavi Z., and Pasterkamp H., Recursive Least Squares Adaptive Noise Cancellation Filtering for Heart Sound Reduction in Lung Sounds Recording, *Proc. IEEE Eng. Med. Biol Soci. (EMBS)*, pp.2416-19, Sept. 2003.
81. Gnitecki J and Moussavi Z., Variance Fractal Dimension Trajectory as a Tool for Heart Sound Localization in Lung Sounds Recording, *Proc. IEEE Eng. Med. Biol Soci. (EMBS)*, pp.2420-23, Sept. 2003.

82. Betker A., Szturm T. and Moussavi Z.K., Application of Feedforward Backpropagation Neural Network to Center of Mass Estimation for Use in a Clinical Environment, *Proc. IEEE Eng. Med. Biol. Soc. (EMBS)*, pp.2714-17, Sept. 2003.
83. Lazareck L. and Moussavi Z., Adaptive Segmentation of Swallowing Sound using Variance Dimension Method, *Proc. European Med. Biol. Eng. Conference (EMBEC)* Dec. 2002.
84. Lazareck L. and Moussavi Z., Automated Algorithm for Swallowing Sound Detection, *Proc. Canadian Med. Biol. Eng. Soci. (CMBES)*, Nov. 2002.
85. Gnitecki J., and Moussavi Z., EMG Sings of Fatigue in Anterior and Posterior Deltoid Muscles: Questioning the Role of RMS during Fatigue, *Proc. Canadian Med. Biol. Eng. Soci. (CMBES)*, Nov. 2002.
86. Reske D. and Moussavi Z., Design of a Web-Based Remote Heart-Monitoring Device, *Proc. IEEE/EMBS*, pp 300, Oct. 2002.
87. Hossain I. and Moussavi Z., Respiratory Airflow Estimation by Acoustical Means, *Proc. IEEE/EMBS*, pp 264-269 Oct. 2002.
88. Hossain I., and Moussavi Z., Relationship Between Airflow and Normal Lung Sounds , *Proc. IEEE CCECE* , TA7.1, May 2002.
89. Yap, Y. and Moussavi Z., Acoustical Airflow Estimation From Tracheal Sound Power , *Proc. IEEE CCECE* , pp. 1073-76, May 2002.
90. Moussavi Z., Vocal Noise Cancellation from Respiratory Sounds, *Proc. IEEE/EMBS*, pp 137, Oct. 2001.
91. Yap Y. and Moussavi Z., Respiratory Onset Detection Using Variance Fractal Dimension, *Proc. IEEE/EMBS*, pp. 118, Oct. 2001.
92. Moussavi Z. Detection of Respiratory Phases, *proc of OSEE*, Sept. 2000.
93. Moussavi Z., Coactivation Pattern of Arm Muscles in Reaching Movements, *Proc. CMBEC*, pp. 14-15, Oct. 2000.
94. Moussavi Z. and Shadmehr R., Motor Task Learning Generalization, *proc. SCI*, July 2000, pp 367-370.
95. Chuah J.S. and Moussavi Z.K., Automated Respiratory Phase Detection by Acoustical Means, *Proc. SCI*, pp 228-231, July 2000.
96. \*Moussavi Z. K., Leopando M.T. and Rempel G., Automated Detection of Respiratory Phases by Acoustical Means, *Proc. of IEEE/EMBS conference*, pp 238., Oct. 1998.
97. Ehtiati, T., Kinsner., W., and Moussavi, Z.K., Multifractal Characterization of the Electromyogram Signals in Presence of Fatigue, *Proceeding of IEEE ICEC'98 Conference*, vol. 2, pp. 866-869, May 1998.
98. Cooper J.E., Ripat J., Moussavi Z.K., Rennie W. and Shwedyk E., Effect of Glenohumeral Arthroplasty for Osteoarthritis on Functional Upper Limb Kinematics, Pain and Disability, *Proc. Of World Fondation of OT's Congress*, Montreal, May 1998.
99. Moussavi, Z.K., Cooper, J.E. and Shwedyk, E., The Effect of Treatment for Myofascial Trigger Points on the EMG Fatigue Parameters of Shoulder Muscles, *Proceeding IEEE/EMBS Conference*, Oct. 1997 pp. 1082-85.
100. Moussavi, Z.K. and Cooper, J.E. Fatigue Pattern of Normal and Fiber Myalgic Shoulder Muscles, *Proc. CMBES conference*, May 1997, pp. 101.
101. \*Moussavi, Z. K., Cooper, J.E. and Shwedyk, E. Fatigue Pattern of Trapezius in Relation to its Functional Role, *Proc 18th IEEE EMBC Conf*, pp. 107-109, Nov. 1996.
102. Moussavi, Z.K., Cooper, J.E. and Shwedyk, Dynamic Pattern of Clavicle: Development of a Three-Dimensional Model for Shoulder girdle, *Proc. IX<sup>th</sup> Bi Canad Soc Biomech*, pp. 356-57, Aug. 1996.



103. Moussavi, Z.K., Cooper, J.E. and Shweddyk, Measurement of Head-Neck Motion in Patients with Shoulder Myalgia, *Proc. IX<sup>th</sup> Bi Canada Soc Biomech*, pp. 234-35, Aug. 1996.
104. Moussavi, Z.K., Rangayyan R.M., Frank C. and et al., Statistical Analysis of Vibroarthrographic Signals Using Adaptive Least Squares Methods, *Proc. Canadian Med & Biol Eng. Soc (CMBES) Conf.* pp. 96-97, May 1993.

### **Abstracts (Peer Reviewed)**

1. Elwali A., Vargaz S. and Moussavi Z., "The effects of anthropometric parameters on acoustic screening OSA during wakefulness," *American J of Respiratory and Critical Care Medicine*, 2017.
2. Hajjipour F., and Moussavi Z., "Spectral changes of breathing sounds from wakefulness to sleep in people with different severity of sleep apnea," *American J of Respiratory and Critical Care Medicine*, 2017.
3. Saha S., Moussavi Z., Hadi P., Bradley T.D. and Yadollahi A., "Investigating the effects of pharyngeal tissue content on snoring sounds features," *American J of Respiratory and Critical Care Medicine*, 195:A2610, 2017.
4. Suleiman A., B. Lithgow, B. Mansouri and Moussavi Z., "Using EVestG assessment for detection of symptomology consequent to lateral-impact concussion," *Canadian Medical and Biological Engineering Society (CMBES) conf*, May 2017.
5. Elwali A. and Moussavi Z., "The effect of anthropometric parameters on the breathing sounds features while screening obstructive sleep apnea during wakefulness," *IEEE-CMBEC conf*, May 2017.
6. Hajjipour F. and Moussavi Z., "Expiratory breathing sounds characteristics during wakefulness and sleep in mild and severe apneic groups," *IEEE-CMBEC conf*, May 2017.
7. Rutherford G., Lithgow B., Mansouri B., Suleiman A., Ranjbar O., Dastgheib Z., Zhang W., Wang X., Salter J. and Moussavi Z., "rTMS as a treatment for post-concussion syndrome," *IEEE-CMBEC conf*, May 2017.
8. Kimura K., Reichert F., Kelly D. and Moussavi Z., "Reorientation in an immersive virtual reality," *IEEE-CMBEC conf*, May 2017.
9. Ashiri M., Lithgow B., Suleiman A., Mansouri B. and Moussavi Z., "Visio-Vestibular interaction in humans: changes in the vestibular response following visual stimuli of different colors," *IEEE-CMBEC conf*, May 2017.
10. Ranjbar O., Kelley D. and Moussavi Z., "Predicting cognitive status of older adults by using directional accuracy in explicit timing tasks," *IEEE-CMBEC conf*, May 2017.
11. Blakley B., Suliman A., Rutherford G., Moussavi Z. and Lithgow B., "EVestG recordings are vestibularoacoustic signals," *IEEE-CMBEC conf*, May 2017.
12. White P., and Moussavi Z., "Video-chat-mediated visits in a personal care home," *Canadian Medical and Biological Engineering Society (CMBES) conf*, May 2017.
13. Dastgheib Z., Suleiman A., Moussavi Z. and Lithgow B., "EVestG Diagnostic potentials for neurodegenerative disorders," *Canadian Medical and Biological Engineering Society (CMBES) conf*, May 2017.
14. Mortaza N., Moussavi Z., Salter J., Passmore S., Glazebrook C., "Effects of a Single Bout of Training with a Novel Mechano-sensory Rehabilitation Bike on Paired-reflex Depression of the Soleus H-reflex in Individuals With Incomplete Spinal Cord Injury" (accepted as poster presentation), ASNR (American Society of Neurorehabilitation) 2016 Annual Meeting, San Diego, United States, November 10-11, 2016. (Abstracts are published in *the Journal of Neurorehabilitation & Neural Repair*)
15. Mortaza N., Moussavi Z., Passmore S., Salter J., Glazebrook C., "Effect of Single Bout of a Novel Mechano-sensory Cycling Training on Soleus H-reflex Paired Depression: A preliminary Study" (accepted as oral presentation), SCAPPS (Canadian Society for Psychomotor Learning and Sport Psychology) 2016, Waterloo, ON, Canada, October 20-23, 2016.

16. Sokrollahi M., Saha S., Moussavi Z. and Yadollahi A., "Development and Validation of an Acoustic Model of the Upper Airway for Snore Sound Generation", *American J of Respiratory and Critical Care Medicine* 193:A5978, 2016.
17. Elwali A. and Moussavi Z., "Obstructive Sleep Apnea and Airway Structure Characterization during Wakefulness Using Tracheal Breathing Sounds", *American Thoracic Society conf*, May 2016.
18. G. Rutherford, and Z. Moussavi, "Long-term case studies of rTMS as a treatment for Alzheimer's disease," *Proc. International Brain Stimulation Conference*, May 2015.
19. Macgregor C., Moussavi Z., "Correlation of spectral and bispectral tracheal breath sounds features with apnea-hypopnea index during wakefulness," *Proceeding Sleep*, 2014.
20. Soltanzadeh R., and Moussavi Z., "Breathing sounds spectral and higher order statistics change significantly from wakefulness to sleep in people with severe obstructive sleep apnea," *Proceeding Sleep*, 2014.
21. G. Rutherford, C. Millikin, Z. Moussavi, "The effect of rTMS on Alzheimer's," *Proc. Alzheimer's conference*, July 2014.
22. Karimi D. and Moussavi Z., "Obstructive Sleep Apnea Severity estimation during wakefulness based on tracheal breath sounds analysis," *Sleep Conference*, June 2013.
23. Garcia M.T. and Moussavi Z., "Associative Memory Exercises as a means for Alzheimer's treatment: A case study," *European Psychiatry*, Vol 28, April 2013.
24. Karimi D. and Moussavi Z., "Effect of respiratory flow measurement with a pneumotachograph on tracheal breath sounds," *ILSA*, Oct. 2012.
25. Z. Moussavi and B. Lithgow, "Teaching Anatomy and Physiology to Engineers in the Biomedical Engineering Program," *Proc Canadian Eng Edu Assoc. Conf*, June 2012.
26. Azarbarzin A. Giannouli E. and Moussavi Z., " Relationship between obstructive sleep apnea and snoring type," *American Thoracic Society Conf.*, May 2012.
27. Karimi D. and Moussavi Z., "Diagnosis of OSA based on spectral features of Tracheal Breath sounds during wakefulness," *ILSA Conf*, Oct. 2012.
28. Moussavi Z. and Karimi D., "Obstructive Sleep Apnea Diagnosis during Wakefulness Based On Spectral Features of Tracheal Breath Sounds," *Am. J. Respir. Crit. Care Med*, Vol 185: A3840, May 2012.
29. Azarbarzin A., Moussavi Z., "Relationship between Obstructive Sleep Apnea and Snoring Type," *Am. J. Respir. Crit. Care Med*, Vol 185: A6433, May 2012.
30. Yadollahi A. and Moussavi Z., "Application Of Flow-Sound Relationship For Investigating The Upper Airway Collapsibility In OSA Patients," *Am. J. Respir. Crit. Care Med*, Vol 185: A6426, May 2012.
31. Yadollahi A. and Moussavi Z., "The relationship between Tracheal Respiratory Sounds and Flow in OSA patients during sleep," *Proc. Sleep Meeting*, P. A117 – 0332, June 2011.
32. Moussavi Z. and Montazeri A., "Obstructive sleep apnea prediction by breath sound analysis during wakefulness," *Proc. Sleep Meeting*, P. A116 - 0331, June 2011.
33. Azarbarzin A. and Moussavi Z. "Relationship between the higher order statistical features of snoring sounds and anthropometric factors of snorers", *Proc. Sleep Meeting*, p. A326 – 0952, June 2011.
34. Montazeri A. and Moussavi Z., "Evaluation of Tracheal Respiratory Sounds at Different Body Positions in Healthy and Patients with Obstructive Sleep Apnea during Wakefulness", *Proc. Sleep Meeting*, June 2010.
35. Yadollahi A. and Moussavi Z. "Formant analysis of snore sounds in simple snorers and OSA patients," *Annual Meeting of Sleep*, June 2010.

36. Yadollahi A. and Moussavi Z., "Automatic Classification of Breath and Snore Sounds," *Am. J. Respir. Crit. Care Med.*; 179: A2153, 2009.
37. Moussavi Z., and Samadani A., "Objective Measures of Human Brain Spatiotemporal Perception using Computer Games with Manipulandum", 6th Annual World Congress for Brain Mapping & Image Guided Therapy, Aug. 2009.
38. Moussavi Z. and Yadollahi A., A Robust Method for Classification of Breath and Snore Sounds, *Presented at ILSA Annual conference*, Oct. 2008.
39. Moussavi Z. and Yadollahi A., On Arithmetic Misconception of Spectral Analysis of Biological Signals, *Presented at ILSA Annual conference*, Oct. 2008.
40. Moussavi Z. and Yadollahi A., A Model for Normal Swallowing Sounds Generation Based on Wavelet Analysis, *Presented at ILSA Annual conference*, Oct. 2008.
41. Moussavi Z. and Huq S., Effect of Penumotach on Tracheal Breath Sounds, *Presented at ILSA Annual conference*, Oct. 2008.
42. Moussavi Z., Yadollahi A., Apnea Detection by Acoustical Means, *Presented at ILSA Annual conference*, Sept. 2006.
43. Moussavi Z., and Aboofazeli M., Automated Extraction of Swallowing Sounds Using a Wavelet-Based Filter, *Presented at ILSA Annual conference*, Sept. 2006.
44. Moussavi Z., Assessment of Swallowing Sounds' Stages with Hidden Markov Model, *Presented at ILSA Annual conference*, Sept. 2005.
45. Moussavi Z., Yadollahi A., Measuring Minimum Critical Flow for Normal Breath Sounds, *Presented at ILSA Annual conference*, Sept. 2005.
46. Gnitecki J., Moussavi Z. and Pasterkamp H., Classification of Lung Sounds during Bronchial Provocation using Waveform Fractal Dimensions, *Presented at ILSA Annual conference*, Sept. 2004.
47. Durzgalski C., Moussavi Z. and Reyna M.A., Cooperative Biomedical Engineering Courses/Programs' Augmentation for Enhanced Academic Credit Transferability and Degree Recognition in U.S./Canada/Mexico., *Proceeding of CONAHEC conference, Guadalajara, Mexico*, May 2004.
48. Pourazad M. and Moussavi Z., Heart Sound Cancellation from Lung Sounds, *Presented at ILSA Annual conference*, Sept. 2003.
49. Moussavi Z. and Hossain I., Respiratory Airflow Estimation by Acoustical Means, *presented at ILSA Annual conference*, Oct. 2002.

#### **Scientific Articles for Public (not refereed)**

1. "A war made me realize: the world needs biomedical engineers", *Conversation Canada*, <https://theconversation.com/a-war-made-me-realize-the-world-needs-biomedical-engineers-84759> , Oct. 5, 2017 – 3845 reads
2. Experimental brain technology can rewind Alzheimer's disease, <https://theconversation.com/experimental-brain-technology-can-rewind-alzheimers-disease-81886> Sept. 20, 2017 -- 6615 reads

#### **INVITED WORKSHOPS**

- "LabView with Application on Biomedical Signal Acquisition and Analysis" at *the IEEE/CCECE conference May 2002*.

- “Respiratory Sound - Measurement, Analysis, Diagnostic Relevance, and Clinical Application”, at 2<sup>nd</sup> *European Medical & Biological Engineering Conference*, Dec. 2002.
- “Introduction to LabView Programming with Application to Biological Signal Recording and Analysis” at *the IEEE EMBS Student Chapter Conference*, Feb. 28, 2003.
- “Biomedical Engineering: The Future of Medicine” at the Expanding Your Horizons conference, University of Texas at El Paso, Feb. 2005.

### INVITED & DELIVERED SCIENTIFIC TALKS

1. “Immersive Virtual Reality Designs for diagnostic and rehab purposes of dementia”, 3<sup>rd</sup> IoT, Big Data Healthcare Summit Western Canada, (Vancouver) Nov. 28, 2018
2. “Brain Fitness App for aging with a healthy brain and detecting cognitive declines,” AGE-WELL conference Oct. 17 2018.
3. “Virtual Reality Interactive Services for aging population to improve cognitive function,” Digital Media and Industry and Academic Forum, sponsored by TELUS, Athens, Greece Oct. 7 2018. <https://conferences.ece.ubc.ca/dmiaf2018/>
4. “The effect of rTMS as a treatment of concussion”, Manitoba Neuroscience Network, University of Manitoba, Sept. 2017.
5. “Medical Devices for Sleep Apnea Diagnosis; can we predict sleep apnea during wakefulness?”, Keynote speaker, IEEE-CMBEC Conf, May 24, 2017.
6. “Breathing sounds analysis during wakefulness to predict obstructive sleep apnea using support vector machine learning,” Department of Statistics, University of Manitoba, Dec. 1, 2016.
7. “Novel Technologies for Diagnosis and Treatment of Alzheimer’s”, Manitoba Neuroscience Networking Meeting, June 15, 2016.
8. “Early detection of Alzheimer’s and non-medication treatment options,” Center on Aging Symposium, May 2<sup>nd</sup>, 2016.
9. “Can Cognitive Training in a Virtual Reality Environment Help Individuals with Alzheimer’s Disease improve their Cognitive State?” Dementia Care Conference, Alzheimer’s Society, March 8, 2016.
10. “Early Onset Detection of Alzheimer’s by Spatial Orientation Assessment using Immersive Virtual Reality,” PCS Mental Health Forum, April 2016.
11. “Virtual reality and neurodegenerative disorders – from diagnosis to treatment”, Sindem 4 Juniors – 4<sup>th</sup> winter seminar on Dementia, Keynote speaker, Brixen, Italy, January 20<sup>th</sup>, 2016.
12. “How to write a scientific paper?” Biomedical Engineering Seminar, University of Manitoba, Sept. 15, 2015.
13. “Application of VR technologies in neuroscience and diagnosis of neurodegenerative diseases,” University of Brescia, Brescia, Italy, Sept. 2, 2015.
14. “Application of rTMS for treatment of patients with Alzheimer’s,” University of Brescia, Brescia, Italy, Sept. 3, 2015.
15. “The effect of rTMS on Alzheimer’s Treatment, A pilot study”, Dementia Care Conference, Alzheimer’s society, March 8, 2015.
16. “Application of Novel Virtual Reality Technologies in Neuroscience and Diagnosis of Neurodegenerative Diseases,” Computer Science Dept. Seminar Series, University of Manitoba, Feb. 25, 2015.

17. "Application of Novel Virtual Reality Technologies in Neuroscience and Diagnosis of Neurodegenerative Diseases," IEEE-EMBS Chapter of Auckland, Auckland, New Zealand, Dec. 15, 2014.
18. "Application of Novel Virtual Reality Technologies in Neuroscience and Diagnosis of Neurodegenerative Diseases," IEEE-EMBS Chapter of Melbourne, Melbourne, Australia, Nov. 28, 2014.
19. "Application of Novel Virtual Reality Technologies in Neuroscience and Diagnosis of Neurodegenerative Diseases," IEEE-EMBS Chapter of Oshawa, University of Ontario Institute of Technology, Nov. 28, 2014.
20. "Design of Expert Classifiers for Classification of Heterogeneous Data: Application on Detection of Obstructive Sleep Apnea during Wakefulness," IEEE-EMBS Chapter of Toronto, Nov. 26 2014.
21. "Sleep Apnea Prediction during wakefulness, challenges and future directions," IEEE-EMBS Chapter of Ottawa, Nov. 20 2014.
22. "Sleep Apnea Prediction during wakefulness, challenges and future directions," IEEE-EMBS Chapter of Quebec City, Nov. 21 2014.
23. "Application of Novel Virtual Reality Technologies in Neuroscience and Diagnosis of Neurodegenerative Diseases," Keynote Speaker, Annual Iranian Neuroscience Conference, Tehran, Oct. 28, 2014
24. "Application of Novel Virtual Reality Technologies in Neuroscience and Diagnosis of Neurodegenerative Diseases," Sharif University Annual Alumni of Sharif Graduates, Oct. 16, 2014
25. "Design of Medical devices for Sleep Apnea Detection: Challenges and Future Direction," Keynote Speaker, Baltic Electronics Conference, Tallinn, Estonia, Oct. 6, 2014.
26. "Novel Approaches in Early Alzheimer's diagnosis," IEEE-EMBS Chapter, Tallinn, Estonia, Oct. 6 2014.
27. "Design of Medical devices for Sleep Apnea Detection: Challenges and Future Direction," Keynote Speaker, one-day research symposium, Finnish Society of Medical Physics and Medical Engineering, Oct. 3, 2014.
28. "Novel Approaches in Early Alzheimer's diagnosis," one-day research symposium, Finnish Society of Medical Physics and Medical Engineering, Oct. 3, 2014.
29. "Application of rTMS for Treatment of Patients with Alzheimer's", The Alfred Hospital, Psychiatry Department, Melbourne, Australia, July 4, 2014.
30. "Design of Expert Classifiers for Heterogeneous Population: Obstructive Sleep Apnea Detection during Wakefulness," Keynote Speaker, 7<sup>th</sup> Conf of Elec & Comp Eng, Aristotle University, Thessaloniki, Greece, April 13, 2014
31. "Novel Assessment and Treatment Options in Alzheimer's Disease," Dementia Care Annual National Conference (Winnipeg), March 11, 2014.
32. "Detecting Alzheimer's disease at pre-clinical stages," Psychology Dept. Annual Forum, University of Manitoba, Jan. 2014.
33. "Obstructive Sleep Apnea Detection by Acoustical Means," Hashemian University of Jordan, Dec. 17, 2013.
34. "Detecting Alzheimer's disease at pre-clinical stages," Psychiatry Dept. Annual Forum, University of Manitoba, Nov. 2013.
35. "Acoustical OSA Detection during Wakefulness, Future Directions and Challenges," McGill University, IEEE EMBS Chapter, Oct. 2013.
36. "Innovative approaches in early diagnosis, treatment and monitoring of Alzheimer's disease," Manitoba Network of Psychogeriatric Program Specialists, Sept. 20, 2013.
37. "Naturalistic Virtual Reality: Industrial and Medical Applications," IndustryConnect Venue, Innovative Manitoba, Winnipeg, April 23, 2013. (<http://www.innovatemanitoba.com/researchers-industry-and-funders->

[collide-at-innovate-manitobas-industryconnects/](#))

38. "Obstructive Sleep Apnea Diagnosis during Wakefulness: Future Directions," Biomedical Engineering Dept. of Mayo Clinic, Rochester, MN, March 15, 2013.
39. "Diagnosis and treatment of Alzheimer's disease at early stages", Alzheimer Society of Manitoba, Annual Meeting Panel, Jan. 24 2013.
40. "New Trends in Biomedical Engineering", Gillan University, Iran, Dec. 10, 2012.
41. "Acoustical OSA Detection during Sleep and Wakefulness", Respiriology Section Seminars, Faculty of Medicine, University of Manitoba, Dec. 8, 2010.
42. "Innovative Approaches in Early Diagnosis, Treatment and Monitoring of Alzheimer Disease", keynote speaker seminar, International Biomedical Engineering Conference, Isfahan, Iran, Nov. 3<sup>rd</sup>, 2010.
43. "Objective Early Diagnosis of Alzheimer by Spatiotemporal assessment through Virtual Reality Psychophysical Experiments", Pharmacology Department Seminar Series, Health Science Centre, Winnipeg, Oct. 22, 2010.
44. "Sleep Apnea Syndrome Detection, Challenges and Future Directions", Simulation Grand Rounds, Faculty of Medicine, University of Manitoba, Oct. 4, 2010.
45. "Obstructive Sleep Apnea R&D, Challenges and Future Directions", eHealth Focus Group, TRILabs, Sept. 14, 2010.
46. "Objective Early Diagnosis of Dementia by EVestG and Interactive Experiments by a Manipulandum", Geriatrics Round, St. Boniface Geriatric Day Hospital, April 21, 2010.
47. "Electrical Micro and Macro Hazards in Hospitals", Grand Round Lecture, Faculty of Medicine, Critical Care Unit, March 2010.
48. "Objective Measures for Temporal and Spatial Perceptions of Human Brain and the Effect of Aging", Faculty of Eng., Monash University (Australia), Feb. 2010.
49. "Early Detection of Alzheimer Disease by Objective Measures for Temporal and Spatial Perceptions of Human Brain", Dept. of Psychiatry, Alfred Hospital, Australia, Feb. 2010.
50. "Scientific Biomedical Research Methods", IEEE, EMBS Chapter, Winnipeg, Dec. 2009.
51. "Objective Measures for Temporal and Spatial Perceptions of Human Brain", Dept. of Elec. & Comp. Eng., University of Manitoba, Nov. 2009.
52. "Acoustic Sleep Apnea Detection and Diagnosis," Sunny DownState Medical Center, New York, Oct. 2009.
53. "Acoustic Sleep Apnea Detection and Diagnosis with Live Demo", TRILabs & RANA Medical Care Group, June 17, 2009.
54. "Bridging Medicine with Engineering techniques: an overview on modeling and analysis of biological systems and rehabilitation", Isfahan University of Technology, Dept. of Electrical Engineering, April 2009.
55. "Automated Acoustic Sleep Apnea Detection", Respiriology Group, Dept. of Internal Medicine, University of Manitoba, Nov. 26, 2008.
56. "Bridging the Medicine with Engineering techniques; an overview on modeling and analysis of biological systems and rehabilitation", NRC Winnipeg, Feb. 9<sup>th</sup>, 2007.
57. "Swallowing Sound Analysis; Advances beyond the Stethoscope", Dept. of Biomedical Engineering, Oxford University, Nov. 25, 2005.
58. "Swallowing Sound Analysis, Advances beyond the Stethoscope", keynote speakers of the 12<sup>th</sup>

Iranian Conference on Biomedical Engineering, ICBME2005, Nov. 16, 2005.

59. "Application of Robotics in Medicine", Kherad Institute, Tehran, Iran, Nov. 23, 2005.
60. "Dynamics of Balance and Postural Control", Dept. Epidemiology, School of Public Health, University of Pittsburgh, August 22, 2005.
61. "Application of Digital Signal Processing on Biological Signals", CAIMS05 Conference, University of Manitoba, June 2005.
62. "Hands on Experience with Biological Signals", Expanding Your Horizon Conference, University of Texas at El Paso, Texas, March 2005.
63. "Application of Digital Signal Processing on Biological Signals", Kherad Institute, Tehran, Iran, July 27, 2004
64. "Respiratory airflow estimation and Swallowing Sound Analysis", Sharif University of Technology, Tehran, Iran, July 4, 2004.
65. "Human Control and Postural Balance", University of Texas in El Paso, Texas, May 2004.
66. "Respiratory and Swallowing Sound Analysis", University of Calgary, Calgary, Apr., 2003
67. "Respiratory and Swallowing Sound Analysis", University of Bradford, Bradford, UK, Dec. 2002.
68. "Spatial Generalization from Local Learning of Reaching Movements in Force Fields", Presented at the EMBS Chapter, Dept. of Electrical Engineering, University of Manitoba, Dec. 1999.

#### **INVITED PUBLIC TALKS – KNOWLEDGE TRANSLATION**

1. "Brain Exercises to improve cognitive decline: Fiction or Fact?", Carleton Breakfast Club, Oct. 19, 2018.
2. "Alzheimer's Early Diagnosis and its Treatment Options," LindenWood Retirement Home, Winnipeg, March 14, 2018.
3. "Memory, how it is formed and retrieved" Mennonite High School, Grade 11, Feb. 10, 2018.
4. "Alzheimer's disease: early detection and non-medication treatment options," Kenora Alzheimer's Society, May 28, 2016.
5. "The keys to success in a scientific journey," Let's Talk Science, 1<sup>st</sup> Annual Girls Day in Science, University of Manitoba, May 20, 2016.
6. "How to age with a healthy brain", TEDx Manitoba, March 24, 2016.
7. "The never-ending journey of scientific research", SET Talk (for high school students), University of Manitoba, Feb. 19, 2016.
8. "The keys to success", Kherad Institute for gifted female high school students, Tehran, Iran, Feb. 12, 2016.
9. "Achieving what you dream of", Prof. Reza High school, Rasht, Iran, Feb. 10, 2016.
10. "How to age with a healthy brain?" Café Scientific Panel talk and discussion, University of Manitoba, Nov. 16, 2015.
11. "Alzheimer's disease: can we avoid it?" Alumni of University of Manitoba, Nov. 5, 2015.
12. "Who is a Scientist", Keynote speaker of Sanofi Biogenius Challenge Canada, April 9, 2015.
13. "Turning Obstacles into Opportunities", World W.I.S.E., Spotlight speaker, March. 2015.
14. "How to avoid Alzheimer's?" Creative Retirement Group, Winnipeg, Manitoba, March 1, 2015.
15. "Applying Engineering skill to detect Alzheimer's", University of Manitoba Undergraduate Biomedical

Engineering Annual Outreach Forum, Feb. 21, 2014.

16. "How to age with healthy Brain," Canadian Society for Senior Engineers & IEEE Life Members at APGEM, Jan. 28, 2014.
17. "The Effect of Brain Exercises on Memory at Old Ages," LindenWood Retired home, Oct. 2013.
18. "Innovative approaches in early diagnosis, treatment and monitoring of Alzheimer's disease," Life Sciences of Manitoba, National Biotechnology Week, Sept. 24, 2013.
19. "Battling with Alzheimer's disease: ideas on early detection, treatment and prevention", TEDx Winnipeg Seminar, Sept. 13, 2012.

### TRAINING OF HIGH QUALIFIED PERSONEL

6 Ph.D. graduated and 10 current Ph.D. students  
17 M.Sc. graduated, and 4 M.Sc. current students  
4 M.Eng. graduated  
>20 graduate student advisory committee member  
>35 undergraduate student thesis advisory  
>40 summer student advisory

### COURSES TAUGHT

Introduction to Electric Circuits (1<sup>st</sup> year course)  
Circuits & T-Lines (2<sup>nd</sup> year course)  
Signal Processing I (3<sup>rd</sup> year course)  
Biomedical Instrumentation and Signal Analysis (4<sup>th</sup> year course)  
Digital Logic Circuits (2<sup>nd</sup> year course)  
Advance Topics in Biomedical Engineering (Graduate Level)  
Digital Signal Processing (Graduate Level)  
Biological Signal Processing for non-engineers (Graduate Level)  
Brain Functions: an engineering perspective (Graduate Level)  
Effective Writing and Presentation (Graduate Level)

*More information about the courses can be found on: <http://home.cc.umanitoba.ca/~mousavi/>*

### OTHER CONTRIBUTION

#### Initiatives of Community Services:

- Organizing and running a memory training program called "Soroor Memory Series" for the first time in Winnipeg for older adults (60+y) with memory concerns. The program is offered through University of Manitoba, Extended Lifelong Learning for 8 weeks at Riverview Health Center (March-April 2014).
- Developing memory exercises for older adults with memory problems; the exercises are available for public use free of charge.
- Giving educational public talks for older adults on how to age with a healthy brain (at Lindenwood retirement home and Riverview Health Center).



**Editorship:** Associate editor of Annals of Biomedical Engineering Journal (impact factor=2.5), as of Jan. 2011; Associate editor of Medical Engineering Journal as of 2012; Associate Editor of the Journal of Respiratory Medicine as of April 2013; Guest Editor of the special issue on Respiratory Sounds Analysis, IEEE, Engineering in Medicine and Biology Magazine, 2006.

**Interviews/Press Release:** Several interviews, Press releases in 2017, CBC Radio Interview Jan. 2016, Radio CJOB interview with Barb Bows, June 22 2013; FreePress Winnipeg newspaper interview, June 2012, Feb. 2013; Alzheimer's Society of Manitoba, Nov. 2012, Shaw TV Interview May 2012; American Academy of Sleep Medicine June 2011; ECE Newsletter June 2011; Winnipeg FreePress March 12, 2011; CTV local news April 25 2011; Technology Transfer Newsletter of U of Manitoba Feb. and July 2011; CTV News Dec. 13 2010; CBC Radio 1 (990 AM) Dec. 13 2010; Globe & Mail Dec. 2010; Riverview Health News, Fall 2010. U of Manitoba and U of Toronto's internal magazines as well as the McGraw Hill for Physics Text book, Chapter 16 under the title "Canadians in Physics", 2002.

**Scientific Paper/Book Reviewer:** The Journal of IEEE Transaction on Biomedical Engineering, IEEE Transaction on Neuroengineering & Rehabilitation, IEEE Sensors Journal, Journal of Medical & Biological Engineering and Computing, Elsevier Pattern Recognition, Signal Processing Journal, and the Scientia Iranica Journal; reviewed more than 40 papers since 2000. Nilsson and Riedel, (2008), Electric Circuits, 8th ed., O'Donnell & Associates, and George J. Wakileh, Western (2002), Electric Circuit: Fundamentals & Analysis, Marcel Dekker, Inc.

**Reviewer for Granting Agencies:** NSERC Strategic Panel member on Biomedical Engineering (2006 & 2009), NSERC external reviewer (2002, 2004, 2008, 2009, 2011, 2012), CFI reviewer (2011, 2012), External reviewer for the Canadian Institutes of Health Research (CIHR 2002, 2008), CHRP (2008), Israel Academy of Sciences and Humanities (2008), Innovation stimulation agency of the Flanders (Belgium) government (2012), Quebec Pfizer FRQS Innovation Fund panel reviewer (2012); and Workplace Safety & Insurance Board (WSIB) Research Advisory Council; reviewed more than 105 proposals since year 2000.

**Conference Organization:** Program Chair for IEEE CMBEC May 2017, Chair and reviewer, IEEE EMBS08, EMBS09, EMBS11, EMBS12 conferences; Technical Program Committee, IEEE CCECE08 Conference; Spatial Session Organizer for IEEE EMBS Conference, 2006; IEEE EMBS conference Track Chair, 2006; IEEE EMBS Session Chair, 2006, 07, 09, Student Award Committee member, 2000 and 2002; IEEE CCECE Session Chair and Student Award Committee Chair, 2002; World Congress on Medical Physics and Biomedical Engineering Session Chair, 2000; ILSA Symposium Session Chair, 2006, 2008.

**External Reviewer for Promotion and Tenure:** Harvard University, 2016, University of Ottawa, 2007 and 2012; Rush University Medical Center, Chicago, 2009.

**Canadian Accreditation Program Reviewer:** Biomedical Engineering Program at Ottawa and Carleton, 2014; Faculty of Engineering of McMaster University, Nov. 2015.

**Committee Services:** I have served in several committees including the following:

- Technology Advisory Committee, Riverview Health Center, 2016-present
- Tenure Committee, Engineering Faculty, 2015-present
- Graduate Studies Committee, 2009-present
- Center for Healthcare Innovation - Jan. 2009 - 2010
- EE curriculum committee - 2000 - present
- UMFA representative from ECE department (Jan. 2008 - Aug. 09)
- Graduate Study Committee at the department (2002-2004)
- Graduate Study Committee at the faculty (2002-202012)
- Faculty Award Committee (2001)
- Females in Engineering Committee (2004)
- Several search committees in the faculty for new positions hiring