

THE UNIVERSITY OF BRITISH COLUMBIA
Curriculum Vitae for Faculty Members

Date: 01 / Jan / 2023

1. **SURNAME:** WARD
FIRST NAME: Rabab
MAIDEN NAME: Kreidieh
2. **DEPARTMENT/SCHOOL:** Electrical and Computer Engineering, Office: KAIS 4054

Email address: rababw@ece.ubc.ca
3. **FACULTY:** Applied Science
4. **PRESENT RANK:** Professor Emeritus since July 2015
5. **POST-SECONDARY EDUCATION**

| University or Institution | Degree | Subject Area | Dates |
|------------------------------------|---------|---|-------|
| University of Cairo, Egypt | B.A.Sc. | Electrical Engineering | 1966 |
| University of California, Berkeley | M.Sc. | Electrical Engineering and Computer Science | 1969 |
| University of California, Berkeley | Ph.D. | Electrical Engineering and Computer Science | 1972 |

(a) **Special Professional Qualifications**

Professional Engineer, Association of Professional Engineers and Geoscientists of BC.

6. **EMPLOYMENT RECORD**

(a) ***Prior to UBC***

| University, Company or Organization | Rank or Title | Dates |
|--|-------------------------------|-------------|
| University of Zimbabwe | Lecturer then Senior Lecturer | 1975 – 1979 |
| Computer Science Dept., Univ. of British Columbia | Sessional Lecturer | 1973 – 1975 |
| Institute of International Studies, Berkeley, California | Research Assistant | 1970 – 1972 |
| Ministry of Hydro Electric Resources, Beirut, Lebanon | Electrical Engineer | 1966 – 1967 |

(b) ***At UBC***

| Rank or Title | Dates |
|---|-----------------------------|
| Office of the VP Research & International Coordinator of UBC Natural Sciences and Engineering Research | July 1, 2008 – July 1, 2014 |
| Director Pro Tem, Institute for Computing, information and Cognitive Systems | July 1, 2009 – Dec 1, 2009 |
| Director, Institute for Computing, Information and Cognitive Systems | July, 1996 - June 2007 |
| Professor Emeritus | July 2015 -present |
| Professor | July 1993 - 2015 |
| Associate Professor | July 1985 -1993 |
| Assistant Professor | July 1981 -1985 |

| Rank or Title | Dates |
|--------------------|-----------------------|
| Lecturer | July 1980 - June 1981 |
| Sessional Lecturer | Sept 1979 – June 1980 |

7. AWARDS AND DISTINCTIONS

Distinctions

VP Education of IEEE¹

IEEE Director, (Division 1X) 2020-2021

IEEE Director-Elect, (Division 1X) 2019

President of IEEE Signal Processing Society, 2016-2017.

President-Elect of IEEE Signal Processing Society, 2014-2015.

Fellowships

- Member of the USA National Academy of Engineers, since 2020
- Fellow of the Canadian Academy of Engineers, since 2001.
- Fellow of the Royal Society of Canada, since 1999.
- Fellow of the IEEE, since 1998.
- Fellow of the Engineering Institute of Canada, since 1997.

Awards

- The 2023 IEEE Fourier Award for Signal Processing (This is the highest award in signal processing worldwide)
- The Outstanding Mentor/Sponsor Award of Wendy McDonald Awards, 2017.
- The Centennial Gold Medal, UBC Applied Science, 2016.
- Killam Award for Excellence in Mentoring, UBC, 2013.
- Meritorious Service Award of IEEE Signal Processing Society, 2013.
- CUFA BC "Career Achievement Award," May 2011. (CUFA is the association representing all professors at all B.C. universities.) This is the highest of the 3 awards it gives each year.
- Paradigm Shifter Award of the Society for Canadian Women in Science and Technology, Nov 2011.
- Millennium Award, IEEE Vancouver Chapter, Aug 2011.
- WYCA Woman of Distinction Award, 2008.
- The Norbert Wiener Society Award of the IEEE Signal Processing Society, 2008. This is the highest and most prestigious award of this society, emphasizing technical leadership and achievements in the field.
- R.A. McLachlan Award of the Association of Professional Engineers and Geoscientists of British Columbia, 2007. Amongst its nine awards, this is the top and most prestigious, emphasizing education, research, innovation in engineering, and community service.
- Recipient of the UBC Killam Research Prize, 1998.
- Registered Professional Engineer (of the BC Professional Engineers Association).

Best Paper Awards

¹ IEEE is the largest technical professional Society in the world with around 420,000 members in 160 countries

- The 2018 IEEE Signal Processing Best Paper Award, "Deep Sentence Embedding Using Long Short-Term Memory Networks: Analysis and Application to Information Retrieval" by H. Palangi, Li Deng, Y. Shen, J. Gao, X. He, J. Chen, X. Song, and Rabab Ward.
- Best Paper Award of IS&T International Symposium on Electronic Imaging, "Fast Edge-Directed Single Image Super-resolution" by N. Rouf and R. K. Ward, 2016.
- Our paper "Conversion of H.264 Encoded 2D Video to 3D Format" received the Best Paper Award of the IEEE International Conference on Consumer Electronics, January 2010.
- A Best Student Paper Award went to my student, Shan Du, at the IEEE ICASSP 2005 for a jointly co-authored paper.
- The prestigious "Excellence in Neural Engineering Award", 2005, from the IEEE-EMBS Neural Engineering Conference and sponsored by the National Science Foundation, Office of Naval Research Global and IEEE-EMBS. This was the highest paper award given at the conference emphasizing innovative projects integrating engineering and neuroscience. The paper title is "A New Design of the Computer Interface Using the Knowledge of the Path of Features," coauthored by A. Bashashati, myself and G. Birch
- The Best Paper Award in the Inter. Conf. on Information Technology Research and Education, New Jersey, USA, August 2003, "A Robust Method for Fitting the (Sigma, Rho) Model to a Traffic Source."
- The Best Paper Award with my student P. Mousavi at the IEEE Engineering in Medicine and Biology International Conference, July 2000.
- Best Student Paper Award went to my student P. Mousavi for the paper "Feature Analysis and Classification of Homologous Chromosome Ibs Using Fluorescence Microscopy Images" co-authored by myself, and IEEE Canadian Conference on Electrical and Computer Engineering (CCECE) Conference 1999.
- Four Best Paper Awards of the, BC Advanced Systems Institute Exchange: These were:
March 2002 (co-authored with Alexandre Paquet)
March 1998 (co-authored with K. Barzykina and P. Nasiopoulos)
March 1998 (co-authored with P. Mousavi)
March 1997 (co-authored with K. Archer and D. Forsey)
- The Zimbabwe Institution of Engineers Award for 1978-1979 for the paper "Operations Research and Applications for Zimbabwe."

Distinction of Papers in Brain Computer Interface Area

- Our Paper "Comparing Different Classifiers in Sensory Motor Brain Computer Interfaces" in 2015 was among the top 10% most cited Plos One papers in 2015.
- Our paper on the design of a brain computer interface with a low false positive rate was selected for inclusion in the "Highlights of 2008" of the Journal of Neural Engineering. The selection was based on the number of citations and full text downloads the article has received, as well as the receipt of outstanding praise from the journal's referees.
- Our paper on surveying artifact processing algorithms in brain computer interface systems was selected amongst the Top 25 Hottest Articles in "Clinical Neurophysiology" three times (in 2007 and 2008).
- Our paper on surveying signal processing algorithms in brain computer interface systems was selected for inclusion in the "Highlights of 2007" of the Journal of Neural Engineering.

Scholarships and Early Distinctions Awards

- Full scholarship from the Lebanese Council for Scientific Research to do graduate work in Electrical Engineering in Berkeley, California (5 years).

- Won the Egyptian government scholarship award to study engineering or medicine (5 years).
- Won the American University of Beirut Scholarship award to study medicine (but declined it because I wanted to study engineering. Women were not allowed at that time to study engineering at the American University of Beirut in 1961).
- “Distinction Award” for being the first in Lebanon in the 1960 Scientific Baccalaureate National Exam. All students in Lebanon had to take this exam if they were in the science stream.

Awards for Service to UBC and the Profession

- UBC Engineering Co-op “Faculty of the Year” Award (2010)
- Meritorious Service Award of IEEE Signal Processing Society, (2013).

9. TEACHING

Courses

Taught various courses in the areas of digital signal processing, digital image processing, communication theory, coding, control theory, discrete structural design, optimization, operations research, numerical computations, electromagnetic theory, computer programming, electrical machines, and electronics.

Graduate Students Supervision:

I have supervised to completion 47 Ph.D. students, 50 Master (Research) students and 5 M. Eng. students. All these graduates hold excellent jobs in industry and 17 have been appointed as Professors, nine of them in Canadian universities.

I have received the Senior Killam Mentoring Award in 2013. This award is largely driven by students and all 8 required recommendation letters have to be submitted by students. Many of my Ph.D. students have also excelled in their research. For example:

- The Ph.D. thesis of Dr. Mehrdad Fatourechchi who finished his Ph.D. under my supervision was nominated by UBC for the NSERC best doctoral thesis award in 2008.
- The Ph.D. thesis of Dr. Michael Adams who finished his Ph.D. under my supervision was nominated by UBC for the NSERC best doctoral thesis award in 2005.
- The Ph.D. thesis of Dr. Parvin Mousavi who finished her Ph.D. under my supervision was recommended for nomination to the Canada Assoc. for Graduate Studies best doctoral thesis award (2002).
- The Ph.D. thesis of Dr. Steven Poon who finished his Ph.D. under my supervision was recommended for nomination to the Governor General’s Gold Medal (1998).
- The Ph.D. thesis of Dr. X. Shi who finished his Ph.D. under my supervision was nominated for the Governor General's Gold Medal (1994).
- The Ph.D. thesis of Dr. Q. Xie who finished his Ph.D. under my & Dr. Laszlo's supervision was nominated for the NSERC top thesis award (1994).
- The Ph.D. thesis of Dr. F. Aghdasi who finished his Ph.D. under my supervision was nominated for the NSERC top thesis award (1995).

Master and doctorate students I have supervised:

| Student Name | Program | Graduation date | Principal Supervisor | Co-Supervisor(s) |
|--------------------|---|-----------------|----------------------|------------------|
| Rey, Claudio | M.A.Sc. | 01/86 | R. Ward | |
| | Currently Deputy Director Reference Design & Standards at Intel Corporation, USA. | | | |
| Ting, Roger | M.A.Sc. | 12/86 | R. Ward | |
| | Financial services, private consultant. | | | |
| Revelant, Ivan | M.A.Sc. | 04/87 | R. Ward | |
| Nasiopoulos, Panos | M.A.Sc. | 08/88 | R. Ward | |
| | Professor, Electrical & Computer Eng., Dept., UBC, and Director of ICICS, UBC. | | | |
| Guan, Ling | Ph.D. | 01/89 | R. Ward | |
| | Professor at Ryerson University, Toronto, Canada | | | |
| Poon, Steven | M.A.Sc. | 08/89 | R. Ward | |
| | Senior Systems Engineer, STEMCELL Technologies Inc. Vancouver , Canada | | | |
| Chi, Lau Meng | M.Eng. | 04/90 | R. Ward | V. Leung |
| | Currently in Hong Kong | | | |
| Shi, Pingnan | Ph.D. | 04/90 | R. Ward | |
| | Director of System Engineering at JDS Uniphase Corporation and Director at Overcome Depression Ministry, Indiana, USA | | | |
| Burge, Ray | M.A.Sc. | 08/90 | R. Ward | |
| | Currently consultant at Brown Electronics, Squamish | | | |
| Lam, Edward | M.A.Sc. | 08/90 | R. Ward | |
| Smayra, Michael | M.A.Sc. | 08/92 | R. Ward | |
| Foster, Michael | M.A.Sc. | 06/1993 | R. Ward | M. Ito |
| | Current position: Client Platform at Telecommunication Systems (formerly Networks In Motion). | | | |
| Xie, Qiaobing | Ph.D. | 09/1993 | R. Ward | C. Laszlo |
| | Current position: Distinguished technologist at Adara Networks, Chicago, USA | | | |
| Shi, Xiaotian | Ph.D. | 10/1993 | R. Ward | |
| Gresseth, Reider | M.A.Sc. | 11/1993 | R. Ward | |
| Nasiopoulos, Panos | Ph.D. | 04/1994 | R. Ward | |
| | Professor at the University of British Columbia and Director of ICICS | | | |
| Darwish, Mohammad | M.A.Sc. | 08/1994 | R. Ward | Seeger |
| | CEO of AdvancedIO., Vancouver | | | |
| Aghdasi, Farzin | Ph.D. | 01/1995 | R. Ward | |
| | Current position: Director of Innovation at Schneider Electric, California, USA Previously , Professor at Witwatersrand University, Johannesburg, South Africa | | | |
| Lau, Albert | M.A.Sc. | 07/1995 | R. Ward | |
| Nesbitt, Daniel | M.A.Sc. | 08/1995 | R. Ward | |
| | Current position: Principal Architect at MobilQuest Systems Inc. | | | |
| Black, John | M.A.Sc. | 08/1997 | R. Ward | C. Laszlo |
| | Director - Client Service Management at TELUS | | | |

| Student Name | Program | Graduation date | Principal Supervisor | Co-Supervisor(s) |
|----------------------|--|-----------------|----------------------|------------------|
| Archer, Katerina | M.A.Sc. | 08/1997 | R. Ward | D. Forsey |
| | Currently at: Gener8 Digital Media, Vancouver | | | |
| Poon, Steven | Ph.D. | 12/1997 | R. Ward | |
| | Currently at: StemCell technologies Inc. Previously with Bc Cancer Agency Research | | | |
| Barzykina, Ekaterina | M.A.Sc. | 04/1998 | R. Ward | P. Nasiopoulos |
| | Current position: Manager, Investment Research at CPP Investment Board, Toronto | | | |
| Lee, Yuen-Wen | Ph.D. | 04/1998 | R. Ward | F. Kossentini |
| | Current position: Technical leader at Cisco Inc., San Francisco, USA | | | |
| Koo, Irene | M.A.Sc. | 08/1998 | P. Nasiopoulos | R. Ward |
| | Current position: Senior Software Engineer at Microsoft | | | |
| Sameti, Mohammed | Ph.D. | 11/1998 | R. Ward | |
| | Current position: Senior Project Manager at Motion Metrics, Vancouver, Canada | | | |
| Lou, Ying | M.A.Sc. | 08/1999 | R. Ward | |
| | Currently at: AMD Canada, Toronto | | | |
| Ahmed, Maher | Ph.D. | 08/1999 | R. Ward | |
| | Associate Professor at Wilfrid Laurier University, Waterloo, Canada | | | |
| Shirani, Shahram | Ph.D. | 04/2000 | F. Kossentini | R. Ward |
| | Professor at McMaster University, Hamilton, Canada | | | |
| Ismail, Ismail | Ph.D. | 08/2000 | R. Ward | F. Kossentini |
| | Principal Video Codec Engineer Magnum Semiconductor, Waterloo, Canada | | | |
| Murad-agha, Abdul | M.A.Sc. | 11/2000 | R. Ward | |
| | Current position: Sr Principal Engineer at Broadcom, Vancouver Previously with UBVideo Inc, Vancouver | | | |
| Shi, Hongjian | M.A.Sc. | 09/2001 | R. Ward | |
| | Current position: Senior Research Scientist at Danaher, USA Editor of Advances in Mathematics | | | |
| Mousavi, Parvin | Ph.D. | 09/2001 | R. Ward | |
| | Associate Professor at Queen's University, Kingston, Canada | | | |
| Li, Lilijun | M.Eng. | 11/2001 | R. Ward | |
| | Currently at: EATON, Guangzhou | | | |
| Duncan, Tracey | M.A.Sc. | 02/2002 | R. Ward | |
| | Currently: Ops Specialist – WIND | | | |
| Hussein, Faten | M.A.Sc. | 03/2002 | R. Ward | N.Kharma |
| | Currently at: IBM, Egypt | | | |
| Paquet, Alexandre | M.A.Sc. | 08/2002 | R. Ward | |
| | Director, Advance Engineering at Bombardier Transportation | | | |
| Subh, Amer | M.Eng. | 08/2002 | R. Ward | |
| Adams, Michael | Ph.D. | 11/2002 | R. Ward | |

| Student Name | Program | Graduation date | Principal Supervisor | Co-Supervisor(s) |
|----------------------|---|-----------------|----------------------|------------------|
| | Associate Professor at University of Victoria, Victoria, Canada | | | |
| Xiaoli, Li | M.A.Sc. | 12/2002 | R. Ward | |
| | CEO , Baustem Broadband Technologies, Ltd. Previously , co-founder of Roxus Inc , Vancouver | | | |
| Arya, Ali | Ph.D. | 04/2004 | B. Hamidzadeh | R. Ward |
| | Associate Professor at Carleton University, Ottawa, Canada | | | |
| Azimi, Mehran | Ph.D. | 04/2004 | R. Ward | P. Nasiopoulos |
| | Microsoft, Redmond, Washington | | | |
| Ugur, Kemal | M.A.Sc. | 08/2004 | P. Nasiopoulos | R. Ward |
| | Research Leader at Nokia, Findland | | | |
| Wang, Thomas | M.A.Sc. | 08/2004 | R. Ward | |
| Avanaki, Alireza | Ph.D. | 10/2004 | B. Hamidzadeh | R. Ward |
| | Current position: Sr. Software Engineer at Barco, Portland, USA Prviously , Assist prof at Amir Kabir University, Tehran | | | |
| Fu, Bin | M.A.Sc. | 10/2004 | M. Beddoes | R. Ward |
| | Currently: Guangzhou, China | | | |
| Khojasteh, Mehrnoush | M.A.Sc. | 12/2004 | R. Ward | |
| | Biomedical Imaging Specialist at Stemcell Technologies, Vancouver, Canada | | | |
| Farahmand, Fazel | M.A.Sc. | 01/2005 | Z. Moussavi | R. Ward |
| | Sr Controls Engineer at Capstone Turbine Corporation | | | |
| Wang, Qing | Ph.D. | 04/2005 | R. Ward | |
| | Currently at: Sigma Designs Inc, Toronto | | | |
| Deng, Hui Qun | Ph.D. | 04/2005 | R. Ward | |
| | Dolby, Beijing, China | | | |
| Su, Weizhong | M.A.Sc. | 08/2005 | R. Ward | |
| | TI engineer, UBC, Fac. of Medicine | | | |
| Abdel-Hadi, Marwa | M.Eng. | 04/2007 | R. Ward | |
| | Current position: RA , Qatar University | | | |
| Gadala, Marwa | M.A.Sc. | 05/2007 | R. Ward | J. Wang |
| | Lecturer at King Abdulaziz University | | | |
| Mai, Zicong | M.A.Sc. | 08/2007 | R. Ward | |
| | Research Engineer at Point Grey Research, Vancouver | | | |
| Wasniewski, Flavio | | 08/2007 | Ian Cumming | R. Ward |
| | MacDonald Dettwiler and Associates, Vancouver | | | |
| Bashashati, Ali | Ph.D. | 09/2007 | R. Ward | G. Birch |
| | Research Fellow at BC Cancer Agency, Vancouver, Canada | | | |
| Fatourechi, Mehrdad | Ph.D. | 01/2008 | R. Ward | G. Birch |
| | Chief Technology Officer at BroadbandTV Corp, Vancouver | | | |

| Student Name | Program | Graduation date | Principal Supervisor | Co-Supervisor(s) |
|----------------------|---|-----------------|----------------------|------------------|
| Mendoza, Lino Coria | Ph.D. | 04/2008 | R. Ward | P. Nasiopoulos |
| | Associate Teaching Professor, College of Computer Sciences, Northeastern University Vancouver, Canada Previously, Assoc. Professor ITESO Universidad Jesuita de Guadalajara, Mexico Also he is founder of Dos Tres Media, Vancouver | | | |
| Du, Shan | Ph.D. | 11/2008 | R. Ward | |
| | Assistant Professor, Computer Science Dept., University of British Columbia , Kelowna , B.C., Canada | | | |
| Majumdar, Angshul | M.A.Sc. | 07/2009 | R. Ward | |
| | Assistant Professor at Indraprastha Institute of Technology, India | | | |
| Ersahin, Kaan | Ph.D. | 11/2009 | I. Cumming | R. Ward |
| | Currently at: ASL Environmental Sciences, Victoria, BC. Previously with MDA , Vancver | | | |
| Tang, Qiang | Ph.D. | 04/2010 | R. Ward | P. Nasiopoulos |
| | Research Engineer at Point Grey Research, Vancouver, Canada | | | |
| Paurazad, Mahsa | Ph.D. | 06/2010 | P. Nasiopoulos | R. Ward |
| | Research Scientist at TELUS and Systems Consultant at ICICS, UBC, Vancouver, Canada | | | |
| Saab, Rayan | Ph.D. | 06/2010 | R. Ward | O. Yilmaz |
| | Assistant Professor at University of California, San Diego, USA | | | |
| Souhaib, Majzoub | Ph.D. | 08/2010 | R. Saleh | R. Ward |
| | Assistant Professor at King Saud University, Saudi Arabia | | | |
| Sun, Ning | M.A.Sc. (p/t) | 12/2011 | R. Ward | |
| | Current position: Computer Software Professional | | | |
| Chiu, Tommy Tzu Chan | M.A.Sc. (p/t) | 04/2012 | R. Ward | |
| | Stantec consulting ltd., Vancouver | | | |
| Atkins, Robin | M. A.Sc. (p/t) | 04/2012 | R. Ward | |
| | Dolby California | | | |
| Gu, Jia | M.A.Sc. | 04/2012 | R. Ward | |
| | Avanade (Accenture and Microsoft) | | | |
| Faradji, Farhad | Ph.D. | 06/2012 | R. Ward | G. Birch |
| | Assistant professor at KN Toosi University in Iran | | | |
| Mai, Zicong | Ph.D. | 07/2012 | R. Ward | P. Nasiopoulos |
| | Current position: Research Engineer at Point Grey Research, Vancouver, Canada | | | |
| Majumdar, Angshul | Ph.D. | 08/2012 | R. Ward | |
| | Assistant Professor at Indraprastha Institute of Technology, India | | | |
| Yong, Xin Yi | Ph.D. (p/t) | 08/2012 | R. Ward | G. Birch |

| Student Name | Program | Graduation date | Principal Supervisor | Co-Supervisor(s) |
|-----------------------|---|---|----------------------|------------------|
| | Metafore Software, Vancouver | | | |
| Naseri, Ghazal | B.M.E | 09/2012 | R. Ward | |
| | Biomedical Engineer, MEng. Program | | | |
| Khojasteh, Mehrnoush | Ph.D. | 12/2012 | R. Ward | C. MacAulay |
| | Biomedical Imaging Specialist at Stemcell Technologies, Vancouver, Canada | | | |
| Malekesmaeili, Mani | Ph.D. | 07/2013 | R. Ward | |
| | Rigid Robotics Inc, Vancouver | | | |
| Nezhadarya, Ehsan | Ph.D. | 07/2013 | R. Ward | |
| | Research Engineer, Magna Inc., Toronto | | | |
| Vahedi, Ehsan | Ph.D. | 08/2013 | R. Ward | I. Blake |
| | Research Engineer at BroadbandTV, Vancouver, Canada | | | |
| Guha, Tanaya | Ph.D. | 09/2013 | R. Ward | |
| | Postdoctoral fellow at University of California, as of October 2013 | | | |
| Aida Chehrazai | M.Eng. | 09/2013 | R. Ward | |
| | Biomedical Engineer, MEng. Program | | | |
| Fauvel, Simon | M.A.Sc. | 11/2013 | R. Ward | |
| | Now working as a research engineer at Nanyang Technological University | | | |
| Rmeily, Patrick | M.A.Sc. | 08/2014 | R. Ward | |
| | Pipeline Technical Director, Nitrogen Studios, Vancouver, BC, Canada | | | |
| Hiba Shahid | M. A. Sc. | 12/2015 | R. Ward | |
| | Software Engineer at NetApp, Vancouver, BC, Canada | | | |
| Karimi, Davood | Ph.D | 07/2016 | R. Ward | |
| | Post Doctoral Fellow, UCLA, California, USA | | | |
| Mahrous, Hesham | M.A.Sc. | 08/2016 | R. Ward | |
| | Data Scientist, SAMSUNG Research, Vancouver, BC, Canada | | | |
| Palangi, Hamid | Ph.D. | April 2017 | R. Ward | |
| | Microsoft, Deep Learning Research Scientist | | | |
| Bashashati, Hossein | Ph.D. | April 2017 | R. Ward | |
| | Machine Learning/Data Scientist, Electronic Arts, Vancouver, BC, Canada | | | |
| Sheikhzadeh, Fahimeh | Ph.D. | April 2018 | R. Ward | Martial Guillaud |
| | Research Officer, University of Technology, Sydney, Australia | | | |
| Rouf, Nasa | Ph.D. | June 2018 | R. Ward | |
| | Computer Vision Engineer, Ouster, San Francisco, California, USA | | | |
| Valizadeh, Sima | Ph.D | June 2017 | P. Nasiopoulos | R. Ward |
| | Data Analytics Researcher, | Researcher at Mobify, Vncouver | | |
| Ramy Hussein | Ph.D. | June 2019 | R. Ward | |
| | Research Scientist, Stanford University | | | |
| Aejalalai, AbdelMalik | Ph.D. | May 2021 | V Leung | R. Ward |
| Dana Bazazeh | M.Sc. | January 2019 Microsoft, Vancouver, Canada | R. Ward | Z. Jane Wang |

| Student Name | Program | Graduation date | Principal Supervisor | Co-Supervisor(s) |
|-------------------|----------------|-------------------------------------|----------------------|------------------|
| Jianzhe Lin | Ph.D. | May 2020 PDF New York University | Z. Jane Wang | R. Ward |
| Robin Atkins | Ph.D. Dolby | May 2020 DolBy California | L.Whitehead | R. Ward |
| Mazen AbdelFattah | MA.Sc | May 2020 | R. Ward | Z. Jane Wang |
| Yongwei Wang | Ph.D. | May 2021 PDF, NTU, Singapore | Z. Jane Wang | R. Ward |
| Mohsen Gholami | Ph.D. | On going | R. Ward | Z. Jane Wang |
| Peizhe Yan | Ph.D. | On going | R. Ward | Shan Du |
| Mazen AbdelFattah | Ph.D. | On going | R. Ward | Z. Jane wang |
| Anas Tahir | Ph.D. | JUST started | R. Ward | Z. Jane wang |

Other Supervision of Highly Qualified People

Post Doctoral Fellows:

- Shi, Pingnan, May 1991 - April 1992
- Zhang, Qin, September 1990 - June 1992
- Xie, Qiaobing, September 1993 - August 1995
- Shi, Xiaotian, March 1995 - May 1997
- Docef, Alen, September 1997 - June 1999
- Kharma, Nawwaf, January 1998 - July 1999
- Ma, Liying, August 2002 - January 2003
- Wang, Qing, September 2005 - September 2006
- Ghazel, Mohsen, September 2004 - October 2006
- Fatourech, Mehrdad, March 2008 – December 31, 2011
- Coria, Lino, June 2009 – Dec. 31, 2010
- Joyce Chiang, October 2012 till December 2014
- Xin Yi Yong, November 2012 till Feb 2013
- Xun Chen, June 2014 till March 2015
- El-Gendi, Mohamed, June 2016 – October 2020
- Sima Valizadeh, December 31, 2017- June 30, 2018
- Ramy Hussein, August 2019- June 2020
- Xinrui Cui, August 2020-present

Research Engineers Supervised and Employed:

- Dr. Pingnan, Shi, 1992-1995
- Dr. Zhang, Qin, 1992-1995
- Dr. Qiling Qin, Visiting Scholar, 1994-1995
- Dr. Kossentini, Faouzi, July 1995-December 1995
- Darwish, Mohammed, August 1995-August 1996

- Xu, Mei, May 1996-February 1997
- Ng, Andrew, September 1997-February 1998
- Du, Julong, November 1992-December 1998
- Barzykina, Ekaterina, May 1998-August 1999
- Dr. Aghdasi, Farzin, August 2000- February 2001
- Li, Xiaoli, January 1995-February 2002
- Dr. Shadaydeh, Maha,, August 2007- January 2008
- Xiong, Victor, July 2007- February 2008

Undergraduate Student Research Supervision

- Supervised the 4th year required system's laboratory projects of 6 to 18 students each year (until 1997). Since then, I have supervised 2-3 students on average each year, until 2016.
- Supervised one or two undergraduate research students in my lab, for many years.
- Supervised 1 or 2 co-op students each year until 2010.

10. SCHOLARLY AND PROFESSIONAL ACTIVITIES

Signal processing is the analysis, interpretation, and manipulation of signals that represent physical quantities. My research addresses several types of signals but mainly those related to the biological, medical and communication fields as captured by audio, video or images. My research activities involve the applications of signal processing theory and techniques to solve real-life problems. I had on most occasions to expand the theory so it can solve the specific engineering problems at hand.

My previous and on-going projects have resulted in several Best paper awards stated earlier and address:

Processing of Image signals:

Image restoration and enhancement: A major accomplishment here is my work on deblurring random time-varying blur and image restoration such as stellar images.

Measuring the biomass and swimming speed of fish such as salmon: this was achieved by processing underwater video images taken in fish hatcheries. It resulted in reaching the correct results without having to destroy the fish when measuring their mass.

Medical Images:

Mammography (breast X-ray images) to help radiologists detect cancer as early as possible.

Blood Cells: measuring the number of white or red blood cells from blood samples using microscope images.

Measuring the Length of Every Telomere in Every Chromosome: from biological cells using Fluorescence microscope-based systems. The lengths of telomeres indicate the longevity of humans.

MRI Imaging: reducing the time a patient has to endure during MRI imaging.

CT scans: reducing the (X-ray) radiation dose a patient is exposed to during image data capture.

Processing of Video (Data) Signals:

Automatic monitoring, measurement and testing of Cable television to enable cable operator to measure picture quality the viewers are receiving, without having to stop the TV program transmission during testing and measurement.

Digital video compression and encoding for transmission and storage, removing picture blockiness and other compression artifacts, enhancing video pictures so it is more appealing to viewers, image size enlargement and resizing video pictures; and enabling viewers to interact with live TV programs (interactive TV).

Information Management and Security in Internet Media-Sharing Social Networks to protect multimedia intellectual property rights and enhance security, manage digital media objects and support automated network-service monitoring.

Processing of Brain, PPG and Audio (Data) Signals:

Brain-Computer Interface Systems: To enable locked-in patients to carry a simple task such as moving a wheelchair forward or backward by using their brain signals only (i.e. by thinking only).

Automatic Detection and Prediction of seizures suffered by patients with epilepsy by using their brain EEG signals.

A system that **estimates the level of distress of a baby from his/her cry signal:** deaf parents must monitor their baby constantly, and take turns sleeping due to their inability to hear the cry; the system measures the amount of distress from baby's cry signals and only awakens the parent(s) when the distress level is above a threshold and not when the baby is happy, producing cooing sounds.

Estimating the glottal waves and the vocal-tract area functions: These estimates are needed in natural speech synthesis, pathology and recognition and in language training.

Developing foundational technology for understanding spoken language, Web search, information retrieval for Internet search engine.

Using photoplethysmogram (PPG) signals, to determine the stage of hypertension (high blood pressure): normotensive, prehypertensive, and hypertensive.

In the early days of my career, I worked on Modelling and Estimation of Systems and applied them to build an Econometric Model to **forecast the electricity demand in Zimbabwe.** My resulting program was adopted and used by the Zimbabwe Electrical Supply Commission.

Research or equivalent grants. (COMP indicates whether grants were obtained competitively (C) or non-competitively (NC))

| Granting Agency | COMP | \$ | Years | Principal Investigator | Co-Investigator(s) |
|--|------|------------------|----------------------|------------------------|-------------------------------------|
| NSERC Discover Grant | C | \$320,000 | 2018-2023 | R. Ward | |
| Qatar National Research Fund | C | \$100,000 | 2020-2021 | R. Ward | Z. Wang |
| NSERC ENGAGE | C | 24,000 per year | Nov/2016-Feb/2017 | R. Ward | Z. Wang |
| Qatar National Research Fund | C | 250,00 per year | 2015- 2018 | Amr Mohamad | R. Ward, Z. Wang |
| NSERC Discovery Grant | C | 255,000 | 2013- 2018 | R. Ward | |
| Qatar National Research Fund | C | 300,000 per year | 2012 - 2015 | Amr Mohamad | R. Ward, V. Leung, P. Nasiopoulos |
| NSERC ENGAGE | C | 22,000 | Jun – Nov/2012 | R. Ward | |
| Qatar National Research Fund | C | 290,000 per year | 2011 - 2013 | Amr Mohamad | R. Ward, Mahmoud Annaby |
| MITACS with BroadBand TV Inc. | C | 15,000 | Dec/2011-Mar./2011 | R. Ward | |
| MITCAS with BroadBand TV Inc | C | 15,000 | Jun/2010 – Nov/2010 | R. Ward | |
| MITCAS with Vericorder Technology Inc | C | 15,000 | Feb/2010 – July/2010 | R. Ward | |
| CFI/BCKDF | C | 12.4 million | 2009-11 | N.Rajapakse | R.Ward and eight others |
| NSERC Strategic Research Grant | C | 631,500 | 2009-11 | P. Nasiopoulos | R.Ward W.Heidrich |
| NSERC Discovery Grant | C | 46,000 per year | 2009-13 | R.Ward | |
| NSERC Strategic Research Grant | C | 470,000 | 2009-11 | R.Ward | J. Wang H. Zhao |
| NSERC Strategic Research Grant | C | 621,000 | 2006-09 | R. Ward | P. Nasiopoulos and V. Krishnamurthy |
| CFI, BCKDF & UBC | C | 22.14 million | 2001-05 | R. Ward | 124 other faculty members |
| NSERC Discovery Grant | C | 56,000 per year | 2004-08 | R. Ward | |
| NSERC Operating Grant | C | 34,650 per year | 1999-04 | R. Ward | |
| Canadian Cable Labs Fund (Rogers) | C | 187,000 | 1997-99 | F. Kossentini | R. Ward |
| BC Advanced Systems Institute | C | 120,000 | 1997-99 | R. Ward | F. Kossentini |
| MDSI & BC Advanced Systems Institute & NSERC-UIP | C | 320,000 | 1996-98 | S. Kallel | F. Kossentini R. Ward |

| Granting Agency | COMP | \$ | Years | Principal Investigator | Co-Investigator(s) |
|--|----------|--------------------|------------------|------------------------|--------------------|
| NSERC Discover Grant | C | \$320,000 | 2018-2023 | R. Ward | |
| Qatar National Research Fund | C | \$100,000 | 2020-2021 | R. Ward | Z. Wang |
| BC Science Council G.R.E.A.T. Award to M. Sameti | C | 34,000 | 1996-98 | R. Ward | |
| BC Advanced Systems Institute | C | 20,000 | 1996 | R. Ward | F. Kossentini |
| Canadian Cable Labs Fund | C | 58,000 | 1996 | R. Ward | F. Kossentini |
| BC Advanced Systems Institute | C | 20,000 | 1996 | R. Ward | |
| James Thompson & Assoc. (Contract) | C | 23,000 | 1996 | R. Ward | |
| Xillix, Inc. | C | 14,000 | 1995 | R. Ward | |
| Sierra Consulting Ltd., - BC Advanced Systems Institute | C | 24,000 | 1994 | R. Ward | |
| BC Science Council G.R.E.A.T. Award to Daniel Nesbitt | C | 34,000 | 1994-96 | R. Ward | |
| Rogers Cable TV Labs Fund Grant | C | 137,000 | 1994 | R. Ward | |
| NSERC Operating Grant | C | 27,000 per year | 1994-99 | R. Ward | |
| NSERC UIP Grant | C | 129,000 | 1993-95 | R. Ward | |
| Rogers Cable TV Labs Fund Grant | C | 137,000 | 1993 | R. Ward | |
| Rogers Cable TV Labs Fund Grant | C | 15,000 | 1993 | R. Ward | |
| Rogers Cable TV Labs Fund Grant | C | 129,000 | 1992 | R. Ward | |
| BC Advanced Ed. Training & Tech. | C | 4,000 | 1992 | R. Ward | |
| BC Science Council G.R.E.A.T. Award to Steven Poon | C | 34,000 | 1992-94 | R. Ward | |
| NSERC UIP Grant | C | 114,000 | 1992 | R. Ward | |
| BC Science Council | C | 86,500 | 1991 | B. Palcic | R. Ward |
| BC Science Council G.R.E.A.T. Award | C | 16,000 | 1991 | R. Ward | |
| Rogers Cable TV Labs Fund Grant | C | 22,500 | 1991 | R. Ward | |
| NSERC Operating Grant | C | 20,000 per year | 1991-94 | R. Ward | |
| Rogers Cable TV Labs Fund Grant | C | 50,000 | 1990 | R. Ward | |
| CICSR Equipment Grant | C | 12,480 | 1990 | R. Ward | |
| NSERC Equipment Grant | C | 142,568 | 1989 | R. Ward | |
| NSERC Operating Grant | C | 18,500 per year | 1989-91 | R. Ward | |

(c) **Research contracts. COMP whether grants were obtained competitively (C) or non-competitively (NC).**

| Granting Agency | COMP | \$ Per Year | Years | Principal Investigator | Co-Investigator(s) |
|-----------------------------|------|-------------|---------|------------------------|--------------------|
| Ward Lab Inc. (Contract) | C | 10,000 | 1999-00 | R. Ward | |
| Ward Lab Inc. (Contract) | C | 134,000 | 1998-99 | R. Ward | |

| | | | | | |
|------------------------------|---|---------|---------|---------|----------------|
| Daikin - Japan (Contract) | C | 182,000 | 1997-99 | R. Ward | P. Nasiopoulos |
| Ward Lab Inc. (Contract) | C | 165,600 | 1997 | R. Ward | |
| Ward Lab Inc. (Contract) | C | 145,000 | 1996 | R. Ward | |

Invited Lectures/Presentations to Academic Institutions and Industry

I have been invited to give talks, courses and demos in four continents, on technical, engineering, professional and women topics. Examples are:

- Invited Lecture at the PROGRESS (Promoting Diversity in Signal Processing) Workshop In Abu Dhabi November 2020, Toronto June 2021, and Anchorage Sept 2021.
- Invited Lecture about Women in engineering at the IEEE Board of Governors meeting, Feb. 2019
- Invited Lecture "Multimedia, Brain-Computer Interfaces and Medical Instrumentation: Dispatches of a Pioneer Woman in Engineering Across Continents" UBC Senior Scholars Lecture Series, December 2017.
- Keynote speaker: The Fifth International Conference on Electronic Devices, Systems and Applications, RAK, United Arab Emirates, Dec 6-8, 2016
- Keynote speaker: Skills for women success in Engineering, Women in Engineering Luncheon Event, ICASSP 2015, Brisbane, Australia, ICIP 2015 (Quebec City), ICIP 2016 (Phoenix), ICASSP 2016 (Shanghai), ICASSP 2017(New Orleans) CASSP 2018(Calgary), ICASSP 2019(Brighton)
- Invited Speaker: Emerging topics in Signal Processing, IEEE Section in Muscat, Oman, Dec. 2016
- Invited Speaker: Deep Learning and applications, IEEE Buenos Aires Section, Argentina and in IEEE Santiago, Chile, January 2016.
- Keynote Speaker: Emerging Applications in Signal Processing in the "Visual Signal Analysis and Processing" workshop, Abu Dhabi, November 9-10, 2015.
- Invited Speaker: at China Sip conference and IEEE Chengdu Section, July 2015
- Invited Speaker at IEEE Beijing Section, Tsinghua University July 2015.
- Keynote Speaker: Future of Broadcasting at the Emerging Technology Workshop, the Communication University of China, July 2015.
- Invited Speaker, Graduate School Information Night for Undergraduate Students in Engineering and Science, April 2010, Undergraduate Engineering Student Association.
- Keynote speaker, Inspirational Speaker Night, Women in Engineering Society in collaboration with Society of Women in Science and Technology, April 26, 2009.
- Presented and demonstrated a prototype on video noise reduction, enhancement, and resizing to Equator Inc. and Hewlett-Packard in August 2005; and to Enuclia Semiconductor in October, 2005.
- Keynote speaker of the California Lebanese Ladies Society's Gala, Los Angeles, May 2004.
- Presented and demonstrated our prototype on video picture enlargement to Rogers Cable TV and to Equator Inc., 2003.
- Guest speaker at the Research Mentoring Dinner, organized by the UBC VP Research office and St. John's College, entitled "Research Topics, Students, Publishing and Multi-disciplinarity", November 20, 2002.
- Gave a lecture entitled "In Praise of Engineering" at a Public Science Forum organized by the Canadian Academy for the Advancement of Science at Mulgrave High School, West Vancouver, November 18, 2002.
- Keynote Speaker, UBC Applied Sciences Seminar on Engineering for Women, May 2000.
- Presented and demonstrated our prototype on video compression improvement at the Western Cable TV show, December, 2000.
- Invited talk at the University of Waterloo on " Automatic Monitoring of cable TV Picture Performance ", 1999

- Gave a speech entitled, "Information Revolution and Societal Change" at a Public Science Forum of the Canadian Academy for the Advancement of Science, March 28, 1998, Robson Square Conference Centre, Vancouver.
- Invited Talk on "Video Noise Reduction", April 11, 1997, University of Waterloo.
- Gave a seminar entitled "Emerging Trends in Multimedia" at the UBC Applied Science Speaker Series, UBC, Feb. 1997
- Gave a one-hour interview to Lebanese television, September 1996, on women and engineering. Earlier in 1968, gave a similar interview to Egyptian television
- One of three panelists on challenges facing women grad students in engineering (March 1996).
- Speaker for UBC, CICSR Distinguished Lecturer Series, Home Base Seminar, Feb. 21, 1995.
- Presented our work to the President of Sanyo, California, US, who visited our lab for discussions about relevant work, July 16, 1994.
- Invited by Rogers Inc. to present my work on cable TV to selected engineers in the National Cable Television Association, San Francisco, June 6-9, 1993. As a result, I was invited to address the technical committee of the National Cable TV Association, June 30-July 1, 1993, Washington, D.C.
- Invited by Techtronics (Portland, Oregon), as a distinguished guest, met with the vice-president of engineering and senior engineers, gave a two-hour seminar attended by over 100 of their engineers, and conducted many discussions with their engineers about common work, January 1993.
- I address on a regular basis the Faculty of Applied Science Conference for Women's senior secondary school students. The aim of this one-day long conference is to encourage high school girls to consider engineering as a career. Many of our present female students in engineering have said that they joined the engineering school only after they heard my speeches and had discussions with me.
- Guest lecturer, Shad Valley Program, June 1991 & July 1994 hosted the whole group, August 1999
- Presented and demonstrated our prototype on video noise reduction at the Western Cable TV show, December 1997, 1998, and 1999.
- I gave various newspaper and radio interviews about engineering and women, e.g., in 1990-91, I appeared twice on CBC TV News, the first time was regarding the Montreal massacre and the second time was about the attitude of engineering students towards women and minorities.
- Presented and demonstrated our prototype on video noise reduction at the U.S. Cable Labs Winter meeting, San Diego, CA, February 1997.
- Presented and demonstrated our prototype on video noise reduction in Cablenet, LA, CA, December 1996.
- Presented our work to a group of Hewlett Packard (Santa Rosa, Calif.) engineers who visited us and had discussions about our work, June 1992, January 1995.
- Presented our work to the Vice President and members of TCI (then the largest US cable TV company), Denver, Colorado, August 1991
- I have given public talks on a continuous basis and for many years to various Women's groups and various high school female students about Women in Engineering, e.g., last year I addressed the Vancouver Female Careers Day in Killarney School and was one of the three panel speakers for the York House students' presentation organized by the UBC School and College Liaison Office.
- Main speaker for several years at UBC Applied Sciences seminar on engineering for high school teachers to promote engineering as a career to their students
- One of three panelists, "A Day in Science", organized by UBC School and College Liaison Office for high school women students, May 1990.
- Main speaker, UBC Applied Science Women in Engineering Conference, April 1990, April 1991, April 1992, April 1993.
- Gave a condensed course on "Digital Image Processing" to practicing professional engineers in Zimbabwe. Also gave two public lectures on the subject, July, 1989.
- Invited to give a course seminar and discussions with members of the Water Research Center, University of Western Australia. The title of the seminar was "Estimation of Signals Distorted by Systems of Random Impulse-Response," February 1989.
- Gave a condensed course on "Optimization and Non-linear Control", to practicing professional engineers in Zimbabwe. Also gave two public lectures on image processing, August 1987.

- Invited to update a working model and a computer program (which I developed in 1977-1979) to forecast electricity needs for Zimbabwe. Work was sponsored by the Canadian International Development Agency (CIDA) and by the University of Zimbabwe, April-June 1982.
- Speaker at the annual meeting of the cable TV lab, April 1990, May 1992, April 1993, April 1994, April 1995, May 1996, and May 1997.
- "Electricity Demand for Zimbabwe", February 1982. Organized by the UBC Simulation and Modelling Seminar.
- "Women in the Scientific Community: Techniques for Survival and Success" February 25, 1982, Organized by the AMS Women's Committee.
- "Women, Science and Technology", November 1981, the Society of Canadian Women in Science and Technology.
- "Women in Engineering", the University Women Graduates Assoc., May 1979.
- "Energy" in the "Development for Independence" programme by the Development Studies Committee of the University of Rhodesia, February 1979.
- "Operations Research Applications for Rhodesia", the Rhodesian Institution of Engineers, January 1978.
- Invited to give two condensed courses on "Data Structures" and "Numerical Methods" in Al-Hazen Research Centre, Baghdad, Iraq, October-November 1975.

Conference Participation (Organizer, Keynote Speaker, etc.)

chair/co-chair of the following important conferences:

IEEE Canadian Conference on Electrical and Computer Engineering (2016)

IEEE ICASSP (2013),

Brain Computer Interface Workshop (2012),

IEEE International Workshop on Multimedia (2012),

IEEE International Symposium on Signal Processing and Information Technology (ISSPIT) 2006,

IEEE International Symposium on Circuits and Systems (ISCAS) 2003,

IEEE International Conference on Image Processing (ICIP), (2000).

The ICASSP and ICIP are the flagship conferences of the IEEE Signal Processing Society: ICASSP attracting 2600 attendees and ICIP attracting 1300 attendees.

Also, IEEE ISCAS is a flagship of the IEEE Circuits and Systems Society attracting around 1400 attendees

I organized and co-chaired three by "Invitation Only" workshops:

1) on Multimedia and Mathematics in 2005,

2) on workshop on Mentoring for Engineering Academia in 2007 and

3) on Multimedia, Mathematics, and Machine Learning in 2009.

I have also served on a large number of conferences and workshops as an Advisory Committee chair, Technical Committee member, Advisor, Program committee member.

11. SERVICE TO UBC

(a) Memberships in committees, including offices held and dates

| Organizational Unit | Committee Name | Dates | |
|---------------------|---|------------|------------|
| | | Start | End |
| EECE Dept. | Curriculum Planning Committee | 1986 | |
| EECE Dept. | Optical Scanning Equipment Advisory Committee | Nov / 1986 | Jul / 1987 |

| | | | |
|------------|---|----------|----------|
| EECE | Curriculum Planning Committee | 1992 | 1996 |
| UBC | President's Advisory Committee to select Head for the Civil Engineering Department | 1992 | UBC |
| UBC | President's Advisory Committee to select Head for the Mechanical Engineering Department | 1993 | UBC |
| UBC | President's Advisory Committee to select Head for the CS Department. | 1995 | UBC |
| UBC | President's Advisory Committee to select the Dean of the Faculty of Applied Science | 1996 | 1997 |
| UBC | President's Advisory Committee to select Head for the Advanced Technical Management program | 1996 | 1997 |
| UBC | Killam Fellowship Awards Selection Committee | 1996 | 1997 |
| UBC | Advisory Board of UBC Continuing Education Certificate in Software Engineering | 1996 | Present |
| EECE | ECE department committee to decide on salary and merit increases for the ECE faculty members | 1994 | 2000 |
| UBC | Faculty Awards Committee | 1996 | 1997 |
| UBC | President's Committee to select Head for the EECE Dept. | 1997 | |
| UBC | Wide Strategic Initiative-Focus Group | 1997 | UBC |
| UBC | Campus Connectivity Project Steering Committee for BC Tel Partnership (of the Advisory Committee on Information Technology) | 1997 | |
| UBC | President's Advisory Committee to select dean for the Faculty of Applied Science | 1997 | 1998 |
| EECE Dept. | Resource Committee | 1998 | |
| UBC | Alternate Route to Computing Committee | 1998 | |
| UBC | New MIC Committee | 1998 | 1999 |
| UBC | CICSR-CFI Committee | 1998 | 2000 |
| UBC | Dean of Applied Science and Dean of Medicine Committee for Biomedical Engineering | 1999 | |
| UBC | Committee Chair to Appoint Professor in the Biomedical Engineering Field | 2000 | |
| UBC | Vice President Academic Committee to further collaboration between the CS and EECE | 2001 | 2002 |
| UBC | President Committee to design and establish the Kuwait Institute of Business & Technology | 2001 | 2004 |
| UBC | President's Advisory Committee to select Head for the EECE Dept. | 2002 | 2003 |
| UBC | President's Committee for the Reappointment of the Dean of Applied Science | 2003 | |
| UBC | Vice President Research Committee to review UBC Industry Liaison Office | 2005 | |
| EECE Dept | Chairman or member of committees for individual faculty members promotion or tenure (around 2 professors yearly) | 2003 | 2015 |
| UBC. | President's Advisory Committee to select the Dean for the Faculty of Applied Science | Feb 2008 | Jun 2008 |
| UBC | CFI-LEF Adjudication Committee | 2008 | 2015 |
| UBC | CFI-NOF Adjudication Committee | 2008 | 2015 |
| UBC | Martha Piper Fund Scholarship Adjudication Committee | Apr 2008 | 2015 |
| UBC | Coordinator of the NSERC CREATE Program | Apr 2008 | 2015 |

| | | | |
|-----------------|--|------------|----------|
| UBC | Responsible fo all NSERC programs .eg. Discovery, Accelerate, CREATE, RTI, Strategic, CRD etc. | April 2008 | 2015 |
| UBC | Responsible for the NSERC General Research Fund | April 2008 | 2014 |
| UBC | UBC committee to select NSERC DAS candidates, chair | Jul 2008 | 2014 |
| UBC | APSC CFI-LOF Advisory Committee on Applications Chair | Aug 2008 | 2015 |
| UBC | CFI-LOF Adjudication Committee | 2009 | |
| UBC | Peter Wall Institute Adjudication and Advisory Committee | Jul 2009 | 2015 |
| UBC | Steacie Selection Committee | May 2010 | May 2010 |
| EECE Dept. | FOGS Adjudicating Committee (to rank all UBC student scholarship applicants in the NSERC areas) | Oct 2010 | Nov 2010 |
| UBC | UBC Selection Committee of NSERC Steacie candidates, chair | Apr 2012 | Apr 2012 |
| UBC | Chair of the Banting PDF Selection Committee | Aug 2012 | Sep 2012 |
| ECE | Member of the Promotion Committee of Dr. Dunford | 2011 | 2013 |
| ECE | Member of the promotion Committee of Dr. Mirabasi | 2012 | 2013 |
| ECE | Member of the Committee to rank ECE faculty for April 2012 consideration for Merit and PSA salary awards | 2012 | |
| ECE | 3 minutes Thesis adjudication Committee | | Feb 2013 |
| ICICS/ECE/IEE E | Workshop on Future Communications and Multimedia System | | Mar 2013 |
| UBC | Responsible for the Banting Postdoctoral fellowships | July 2011 | 2015 |
| UBC | Responsible for the Imaging Lab Development | 1989 | Present |
| MITACS | Reviewer of Accelerator PDF Program | 2011 | Present |

I served as internal Examiner at UBC: I have served on at least 400 (Masters, PhD qualifying, PhD dept. and PhD final) exams of students supervised by other faculty members in my department. The names are too many to include here. In the past 12 months I served on 8 such exams. I have also chaired many University Ph.D. exams.

I have also served as Committee member or University examiner for over 30 UBC graduate students outside Electrical and Computer Engineering Department. The students were in Civil Eng., Mechanical Eng., Bioresource Eng., Computer Science, Mathematics, Commerce and Zoology.

12. SERVICE TO THE COMMUNITY

(a) *Memberships in scholarly societies, including offices held and dates*

| Scholarly Society | Role | Dates | |
|--|---|------------|------------|
| | | Start | End |
| Canadian Society for Electrical and Computer Engineering | VP for Western Canada | 1990 | 1995 |
| IEEE | Admission & Advancement Committee to decide on members' promotion to the rank of senior members | Feb / 1992 | Mar / 2000 |
| IEEE Signal Processing Society | VP /Conferences | Jan / 2003 | Dec / 2005 |
| IEEE Signal Processing Society | Board of Governors | Jan / 2003 | Dec / 2005 |

| | | | |
|--|--|-------------|--------------|
| IEEE Signal Processing Society | Executive Committee | Jan / 2003 | Dec / 2005 |
| IEEE Signal Processing Society | Conference Board | Jan / 2006 | Dec/2007 |
| British Columbia Institute of Technology | External review committee of the new Bachelor of Engineering in Electrical Engineering | 2006 | 2007 |
| Academy of Science in the Developing World (Rome, Italy) | to select the Trieste Science Prize winner | 2008 | 2009 |
| IEEE Signal Processing Society | IEEE Signal Processing Society Committee to select IEEE Fellows | Jan 1, 2008 | Dec 31, 2010 |
| IEEE Signal Processing Society | Board of Governors (re-elected) | Jan 1/ 2008 | Dec 31, 2010 |
| | | | |
| Royal Society of Canada | Committee to select fellows of the Royal Society of Canada, (engineering field) | 2012 | 2015 |
| IEEE Canada | Awards and Recognition Committee | Jan 1, 2013 | 2021 |
| IEEE Signal Processing Society | President-Elect | Jan 1, 2014 | Dec 31, 2015 |
| IEEE Signal Processing Society | President | Jan 1, 2016 | Dec 31, 2017 |
| IEEE Technical Activities Ad-Hoc Committee on Africa and Education | Chair | Jan 1, 2016 | Dec 31, 2017 |
| IEEE Technical Activities Strategic Planning Committee | Member | Jan 1, 2017 | Dec 31, 2017 |
| IEEE Technical Activities Management Committee | Member | Jan 1, 2018 | Dec31. 2018 |
| IEEE Director-Elect | Director-Elect | Jan 2019 | Dec 31, 2019 |
| IEEE Africa Distinguished Lecturer Program | Chair | Jan 2019 | Dec 31, 2020 |
| IEEE Director (Division 1X) | DIRECTOR | Jan 1, 2020 | Dec 31, 2021 |
| National Academy of Engineers, Canada | Member | Jan 1, 2000 | Present |
| USA National Academy of Engineers | Member | Jan 1, 2020 | Present |

(b) Memberships in non academic organization, including offices held and dates

| Other Society | Role | Dates | |
|--|--|-------|---------|
| | | Start | End |
| University Women Graduate Association | Member | 1980 | 1980 |
| Society for Canadian Women in Science and Technology | Participated in its founding Member | 1980 | Present |
| Academic Women's Association, UBC | Executive Board | 1982 | 1983 |
| International Scientific Advisory Board of the BC Advanced Systems Institute | Member | 1996 | 2004 |
| ISAB sub-committee of the above body (BC ASI) | Member | 1996 | 2004 |
| Canadian Academy for the Advancement of Science | Member of the Advisory Board | 1997 | 2007 |

(c) Memberships in scholarly committees, including offices held and dates

| Scholarly Committee | Role | Dates | |
|--|--------|-------|------|
| | | Start | End |
| Best student papers awards, VCIP conference of the International Society for Optical Engineering | Chair | 1997 | 1998 |
| The USA NSF IGERT program Adjudication Committee | Member | 2001 | |
| The USA NSF National Science Foundation committee to review the Integrated Media Systems Center, University of Southern California | Member | 2002 | |

(d) Memberships in other committees, including offices held and dates

| Other Committees | Role | Dates | |
|---|------------------|-------|------|
| | | Start | End |
| Advisory Board of the Pacific Institute of Mathematical Sciences | Member | 1988 | 2009 |
| National Science, & Engineering Research Council of Canada, Grant Selection Committee, Communications, Computers and Components Engineering | Member | 1997 | 2000 |
| Committee to review the ECE department of University of Victoria | One of 3 members | 1998 | 1998 |
| National Research Council of Canada, Advisory Committee on Information Technology | Member | 1999 | 2002 |
| Committee to review the Electrical and Computer Engineering Dept, University of Victoria, Canada | Member | 2000 | |
| Royal Society of Canada Awards committee on Women Students | Member | 2003 | 2008 |

(e) Editorships/List of journal and dates

- Assoc. Editor, Jour. of Electronic Imaging (SPIE), 2001-2006.
- Member of the Editorial Board of the IEEE Signal Processing Magazine, Jan 2006-2009

- Member of the IEEE Signal Processing Editorial Board, 2016-2017

(f) *Reviewer/journal, agency, etc.*

- NSERC Discovery Grants reviewer (Reviewing 2-3 applications yearly since 1990)
- Biomedical Signal Processing & Control
- Journal of Real-Time Processing
- Computer Vision and Image Understanding
- Journal of Neural Engineering
- IEEE Trans. on Multimedia
- IEEE Trans. on Automotive Control
- IEEE Trans. on Communication
- IEEE Trans. on Image Processing
- IEEE Trans. on Pattern Analysis & Machine Intelligence
- IEEE Trans. on Signal Processing (previously ASSP)
- IEEE Trans. on Systems, Man and Cybernetics
- Jour. of the Can. Soc. of Comp. & Electrical Engineers
- Jour. of Visual Communication & Image Representation
- Jour. of the Optical Society of America A Applied Optics
- Optimal Control: Applications and Methods
- IEE Proceedings on Vision, Image and Signal Processing
- IEE Electronics Letters
- The Computer Journal
- Computational Intelligence and Neuroscience
- Investigative Ophthalmology and Visual Science
- Elsevier Digital Signal Processing Journal.
- EURASIP Jour. On Advances in Signal Processing
- Banff International Research Station workshops 3 to 5 proposal yearly since 2003
- Book proposal reviewer: have reviewed few books, (e.g., Multilinear Subspace Learning: Dimensionality Reduction of Tensors, names of authors cannot be included for confidentiality)
- Several Conferences (too many to state here)

(g) *External Ph.D. thesis examiner*

- External Examiner of Ryan (Reza) Moradi Rad, Simon Fraser University, July 2019
- External examiner of Kemal Ugur, Tampere University of Technology, Finland, July 2009
- External Examiner for Mr. Diego Sorrentino, Univ of Victoria, July 2009
- External examiner of Dr. Jun Cheng. Ph.D. dissertation, Nanyang Technological University, Singapore, 2007.
- External examiner of Dr. Naga Mudigonda - Ph.D. dissertation, University of Calgary, Nov., 2001.
- External examiner of Dr. Mahmoud El-Sakka, University of Waterloo, April 1997.
- External examiner of Dr. Jianping Li - Ph.D. dissertation, University of Victoria, Sep. 1996.
- External examiner of Dr. Peter Jones - Ph.D. dissertation, Queen's University, Feb. 1993.
- External examiner of Dr. Aziz Qureshi - Ph.D. dissertation, Queen's University, Dec. 1991.
- External examiner of Dr. Salah G. Foda - Ph.D. dissertation, University of Victoria, July 1988.

(h) Consultant to industry

- MDA, Vancouver, 2013-2014
- BBTv, Vancouver, 2007 -2012
- AdvancedIO Systems Inc., 2007-2009
- WebTech Wireless, telematics, 1999-2005
- R.F.I.D., Passport photograph compression, November 1996-1999.
- Hewlett-Packard (Santa Rosa, Calif.), Non-intrusive measurements of cable TV parameters.
- Vision Systems Inc. Building a computer vision system for grading lumber, 1989.
- The Whitsun Foundation of Rhodesia, building a computer model for Agrarian Reform, 1978.
- Arab Projects and Development on their project with the Iraqi Ministry of Planning "Five Year Plan for transportation development," June-August 1974.
- Computer Modelling of Operations Decisions for the Okanagan Lakes System, January-June 1973.

(i) Service to the community at large

- Member of the Royal Canadian Mounted Police Advisory Committee on deterring violence, in BC, 2005 – 2009.
- Speaker at the Royal Canadian Mounted Police Conference on Community and Security, January 2002.
- Speaker at the Vancouver Peace rally, November 2001.
- Speaker at the BC Labour Federation, November 2001.
- Speaker at the rally for Canada's unity held at the steps of the Vancouver Art Gallery, Vancouver, October 1995.
- Organized a community dinner for the Committee for Racial Justice, attended by approximately 100 people representing over a dozen governmental, religious and ethnic groups. During the dinner I gave a 30-minutes speech (broadcasted on local TV) about "stereotyping some ethnic religious groups," March 1995.
- Member of the Vancouver Jewish-Arab group to promote mutual understanding, 2003-2004.
- Gave a one hour talk about "Islam and Women," which was televised and broadcasted on Vancouver Community TV Channel. The talk was attended by over 150 people at the Unitarian Church, March 1991.
- Gave a public 20-minute speech at International Women's Day rally, Vancouver, 1991.
- Gave a public speech outside the Student Union Building at UBC after the Montreal Massacre of women engineers, 1989.

13. OTHER RELEVANT INFORMATION

- I was the first woman to be appointed professor in Zimbabwe and in British Columbia, Canada, in all engineering disciplines.
- I was the first woman with a Ph.D. to be appointed as professor of electrical engineering in Canada.
I was the first woman to become a member of the Lebanese Professional Engineering Society.
- I was the first woman to receive many top awards. Three examples are "the IEEE Fourier Award for signal Processing ", the top award in the field, "The Norbert Wiener Society Award," which is the top IEEE Signal Processing Society Award and the RA

Machlachlan Award, the highest award of the Association of Professional Engineers in BC, emphasizing significant technical contributions and leadership, in engineering.

Popularizing Engineering to Women and STEM to the public at large:

I have given over a hundred talks to popularize engineering and science to women, elementary and secondary school children, and to the public at large. Some of these talks are included in Section (10 d) above.

Media exposure and other talks:

my work has been featured in popular media including newspapers, popular magazines, radio and TV. Examples are:

Press media: Many articles featuring my scientific achievements have been published in various popular newspapers, magazines, Journals and newsletters. For example, our work on facial image compression was featured in the *ASI Journal* (April 1995), and written about in the *Vancouver Province* newspaper (April 1995). Our work on video compression was written about in *Future Vision* (Spring 1996). Our work on improving TV picture quality was featured in *UBC PATSCAN News* (Fall 1993), *Future Vision* (Autumn 1993), *UBC FOCUS* (Spring 1994 and Fall 1991), *Cablecaster* (2001) and *Tele-com* (Aug. 1996). The latter is a US popular electronics magazine. Our work on biomedical and health in general and specifically on brain computer interfaces have been written about in the daily Vancouver Sun newspaper, February 2007, Innovation Magazine, February 2007, Focus Newsletter, 2006 and 2007, UBC Reports, April 1996. Articles about our research on baby crying signals were published in *UBC Reports*, *Chatelaine*, the daily Vancouver Sun newspaper; and the popular *Family Practice* magazine, which is commonly found in waiting rooms in many practicing medical doctors.

Radio: I also gave two radio interviews about our work on baby crying signals to the widely popular programs of the Canada Broadcast Corp.: *Quirks and Quarks* and *Early Edition* (1996).

Television: My work was also featured for 30-minute on TV by Al-Jazeera, 2003, another 30-minute program on the Canadian CTV Channel, 1999, and another 30-minute TV program on the Canadian Shaw Multicultural Channel, 2005.

- In addition to the above, I have given various interviews on the subject of women and engineering: e.g., a one-hour interview to the Lebanese television LBC, September 1996, Earlier in 1968, gave a similar interview to Egyptian television, in 1990-91, I appeared twice on CBC TV News, the first time was regarding the Montreal massacre of engineering women, and the second time was about the attitude of engineering students towards women and minorities (2018)
- I participated in the founding of the Society for Canadian Women in Science & Technology, which has become a powerful force in Canada. Some of the great achievements of this society were the introduction of programs to help high school girls in mathematics and provide them hands-on experience in technology and science.
- To broaden the visibility of engineering and signal Processing among high school students and the public-at-large, I produced and directed seven PR videos. The videos "What is Signal Processing?" <https://www.youtube.com/watch?v=EErkgr1MWw0&t=1s> and "Signal Processing and Machine Learning" <https://www.youtube.com/watch?v=mexN6d8QF9o&t=46s> have received few hundred thousand hits on YouTube (and were translated into Spanish, Mandarin and Arabic). Another

video “Under the Radar” won the Favorite Audience award in Vancouver Short Movie Festival Jan. 2018 and was included in the entertainment program of all Air Canada flights in 2017.

Other Industry related Activities in USA, Zimbabwe, and Canada

- My work on improving and reducing the noise in television and video signals attracted leading international companies to visit our lab to see our prototype. Although many universities and industry research groups were working on the same problem, the performance of our prototype exceeded all others, including Sony, Panasonic and Intelvideo. Not only was the quality superior but the cost range was significantly reduced.
- Vice Presidents and engineers from companies, e.g. Scientific Atlanta, Level I, Sanyo, Sony, Cannon, Daikin, RainMaker, Midnet, MDSI, Sierra Consulting Ltd., Rogers Cable TV, Shaw Cable TV, JB Thompson & Assoc. Ltd., Hewlett Packard, TCI, Equator, Mosaid, Pioneer and General Instruments visited my lab (1995-2005).
- One of our patents (licensed by Hewlett Packard (1996)) allowed cable TV operators (for the first time) to measure picture quality of TV pictures without interrupting program transmission.
- Our collaboration during 2008 – 2011 with a Vancouver multimedia company BBTv resulted in algorithms that protect the rights of multimedia owners (e.g. audio, songs, images and video assets) from illegal copying and content piracy. BBTv then developed this technology for commercializing.
- I was Chief Scientist of Ward Laboratories Inc., a spin-off company from my lab (1993-2006). This company signed an agreement with my university to license patents and know-how related to cable television picture quality monitoring, measurement and noise reduction developed by me and my associates at UBC.
- I was invited to update a working model and a computer program (which I developed in 1977-1979) to forecast electricity needs for Zimbabwe. This work was sponsored by the Canadian International Development Agency (CIDA) and by the University of Zimbabwe, April-June 1982.
- The model I developed for forecasting electricity demand for Zimbabwe was adopted by the Zimbabwe Electricity Supply Commission, 1982 and used for several years.
- My work with Prof. Petrell on a video imagery system for the aquacultural industry (such as salmon farming) was commercialized by a Canadian company, JB Thompson & Assoc (1998). The instrument measures in a non-interfering and non-destructive fashion the size, biomass and swimming speed of fish in cages and tanks.
- My work with Dr. Kossentini on video compression has resulted in an algorithm for motion vector estimation which has been officially adopted in the ITU-T H-263+ Standard TMN8 model for video encoding.
- My work with Steven Poon resulted in a Fluorescence microscope-based system which could, for the first time, measure the length of every telomere in every chromosome. This work has been now used in research centres worldwide, including the BC Cancer Research Agency, Spain, John Hopkins, Holland, Germany, Hong Kong.

International Activities

- Leader of the IEEE Technical Activities Board effort on Africa (2016-2017). The theme was to “educate the educators in the digital era.” Although the attendees of our courses were university lecturers in Africa, we also had several lectures and events for students, industry practitioners and government policy makers. We sponsored 30 educational and professional

development courses, workshops and tutorials in six sub-Saharan African countries (2016-2017). Every year, over 500 individuals attended, from 20 universities, and government and industry professionals. In 2019, I was responsible for the African Distinguished Visitor Program of the IEEE Ad-Hoc Committee on Africa, and put (14) lectures in 5 African countries, reaching many hundred attendees from universities and industry.

- I was a member of an international advisory group to her highness Sheika Mozah of Qatar, (2006-2008), to establish and enhance research in Qatar.
- I was member of the UBC consulting group (2001-2004) that designed a new university for Kuwait, whose graduates would be proficient in both engineering and business.
- I was a member of a UBC three-people delegation (VP Research & International, Dean of Applied Science and I) that visited Saudi Arabia in April/May, 2010 to strengthen research and collaboration between Saudi Universities and UBC.

THE UNIVERSITY OF BRITISH COLUMBIA

Publications Record

SURNAME: WARD

FIRST NAME: Rabab

MAIDEN NAME: Kreidieh

BELOW, ONLY REFEREED “SCIENTIFIC” JOURNAL AND CONFERENCE PAPERS ARE LISTED.

For a list of more publications please go to my Google Scholar page

<https://scholar.google.ca/citations?user=dqsw1u8AAAAJ&hl=en>

1. REFEREED PUBLICATIONS

(a) Journals:

1. Q Tang, Z Chen, R Ward, C Menon, M Elgendi, “Subject-Based Model for Reconstructing Arterial Blood Pressure from Photoplethysmogram”, *Bioengineering* 9 (8), 402, Aug 2022.
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13. Y Wang, X Ding, Y Yang, L Ding, R Ward, ZJ Wang, "Perception matters: exploring imperceptible and transferable anti-forensics for GAN-generated fake face imagery detection", Pattern Recognition Letters 146, 15-22, 2021
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15. R. Hussein and R. Ward," Quantitative and Qualitative Analyses of Invasive EEG for Epileptic Seizure Prediction", Austin Journal of Clinical Neurology, Vol. 8, Issue 1, id1144, 7 pages, 2021
16. Y Liu, X Chen, A Liu, RK Ward, ZJ Wang" Recent Advances in Sparse Representation Based Medical Image Fusion", IEEE Instrumentation & Measurement Magazine 24 (2), 45-53. 2021
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6. **OTHER WORKS**

Technical Reports

1. A total of 3 progress reports on our findings regarding our project on "Facial Image Compression" were submitted to Sierra Consulting Ltd., & BC ASI. The dates these reports were submitted are Jan. 1995, April 1995 and Aug. 1995.
2. A total of 25 reports on our findings regarding our projects, "Automatic Monitoring of the Quality of the Cable Television Picture," "Noise Reduction in TV Pictures" and "Video Compression," have been written for the Canadian Cable Labs Fund of the Rogers Cable Television Company. The dates these reports were submitted are Oct. 1990, Jan. 1991, April 1991, July 1991, Oct. 1991, Jan. 1992, April 1992, July 1992, Oct. 1992, Jan. 1993, April 1993, July 1993, Oct. 1993, Jan. 1994, April 1994, July 1994, Oct. 1994, Jan. 1995, April 1995, July 1995, Oct. 1995, April 1996, July 1996, Nov. 1996, Jan. 1997, March 1997, June 1997, Dec. 1997, March 1998 and July 1998.
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