

2018 - RESUME SUMMARY

Dr. Ferial El-Hawary, Life Fellow IEEE

POSITIN:

President, BH Engineering Systems Ltd., Halifax, Canada

Former Prof. Dalhousie Univ., Halifax, N.S., Canada

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ACADEMIC QUALIFICATIONS:

- ⊖ Ph.D Electrical Engineering (Oceans Engineering), Memorial University of Newfoundland, St. John's, NF. Canada 1981
- ⊖ M. Sc. Electrical Engineering, University of Alberta, Edmonton., Canada 1971
- ⊖ B. Eng. Electrical Engineering, University of Alexandria Egypt. 1967
- ⊖ Registered Engineer: Association of Professional Engineers of Nova Scotia (APENS), Canada.

SUMMARY OF ACADEMIC ACCOMPLISHMENTS:

- ◆ Over 25 years experience teaching subjects related to the electrical and oceanic engineering field. Dr. El-Hawary has supervised many Graduates Ph.D and M. Sc Students who are now occupied significant positions in Industry and Academia. Served the following Universities.
 - ⊖ **Technical University of Nova Scotia (Now is Dalhousie University), Halifax, N.S.: (1981- 2009) : Served with many different positions as:**
 - Professor Dalhousie University Faculty of Engineering
 - Director “Modeling and Signal Analysis Research Laboratory” at the Faculty of Engineering of Dalhousie University
 - Course Developer / Instructor (Continuing Education Division)
 - Adjunct Associate Professor and Research Engineer,
 - Adjunct Assistant Professor and Research Engineer, Dalhousie University Faculty of Engineering.
 - ⊖ **Memorial Univ. of Newfoundland (MUN), St. John's, NF, Canada: (1973-1981)**
 - Post Doctoral Fellow, MUN Faculty of Engineering.

- Teaching and Research Assistant, MUN Faculty of Engineering (Ocean Engineering Research Group).
- Member of the joint Scientific Cruise: MUN Oceans Engineering Group, Bedford Institute of Oceanography On CSS Hudson and Huntec Limited Operating Company For (Hibernia Oil Explorations Project)

**¬University of Alberta, Edmonton, Alberta, Canada
1969-1971**

- M. Sc. Graduate Student and Teaching Assistant, Electrical Engineering Dept., **University of Alberta, Edmonton, Canada.**

¬University of Alexandria, Egypt, 1967.

- B. Eng. Electrical Engineering Department, Univ. of Alexandria

Dr. El-Hawary has significant Contributions to Under-water Signal processing, with Particular Emphasis on Target Tracking and Dynamic Heave Compensation.

- ◆ Sustained research contribution devoted to OCEANS Application with significant impact on Defence, Navigation and Oil & Gas Exploration.
- ◆ The exploration for Oil and Gas in Placentia Bay off the Coast of Newfoundland was a major driver of Ferial's Ph.D. thesis involving collecting and analyzing real data for Sediment Classification in what to become the discovery of Hibernia Oil fields.
- ◆ In the early 80's she used online techniques during data acquisition stage to compensate for errors caused by ship dynamics and towing cable connected to the sensors. This has lead to hardware implementation by Huntec Ltd. which was very efficient in obtaining clean images on-line with significant processing time savings.
- ◆ Obtained major Operational and Infrastructure research funding from the Natural Sciences and Engineering Research Council of Canada (NSERC) to establish the Modeling and Signal Analyses Research Laboratory at Dalhousie University, Halifax, Canada
- ◆ Secured research funding from Oil Companies.
- ◆ ◆ Founder of the Modeling and Signal Analysis Research Laboratory at the Faculty of Engineering of Dalhousie University
- ◆ Dr. El-Hawary has contributed to the training of highly qualified researchers, as a graduate students advisor on a number of Ph. D. and M. A. Sc. Theses. These graduates are extremely productive in their new technical North American environments (Industry and Academia).
- ◆ Significant Research Publications record in (Oceans Engineering)

Published widely in IEEE/Journal, Invited Chapters in Books and Conference Proceeding (Attached is a List of Publications & Invited Keynote Speaker)

- ◆ **Editor-In-Chief of the Ocean Engineering Handbook published by CRC Press, (2001 and 2nd Edition in 2004) which has a significant collection of influential articles on Ocean Dynamics and AUV's**
- ◆ **Associate Editor of IEEE/Oceanic Engineering Journal.**
- ◆ **Dr. El-Hawary is a Fellow of IEEE for: “Contributions to applications of digital system concepts to underwater dynamic motion estimation and marine seismic methods.” She is also, Emeritus Life Fellow of the Marine Technology Society (MTS).**
- ◆ **Founder and President of BH Engineering Systems Ltd. -Developed and promoted both advanced and upgrading Professional Development Courses for both the Electrical Engineering and Ocean Industry communities. More than 20 courses have been designed and attended by over 300 professional engineers from close to 100 companies that made major contribution to technology transfer from the academic sphere to the industry.**
- ◆ **Ferial has demonstrated leadership in linking the Industry with the Academic sphere through innovations in providing professional development courses and tutorials to numerous IEEE International Conferences**
- ◆ **Strong Connections with The Marine Industry Internationally:**
 - 1-Tomson Marconi Sonar LTD. , France.
 - 2- Tomson Marconi Sonar Limited U.K.
 - 3- Draper Laboratory, Cambridge, MA, USA
 - 4- Naval Undersea Warfare Center, Newport, USA
 - 5- Raytheon, Electronic Systems, MA, USA.
 - 6- Harbor Branch Oceanographic Institution, FL, USA
 - 7- Woods Hole Oceanographic Institute, MA, USA
 - 8- Scripps Institute of Oceanography, San-Diego, CA, USA
 - 9- Lockheed Martin - Ocean, Radar & Sensor Systems, Sunnyvale, CA, USA.
 - 10- Unocal Science and Technology Division, Brea, California, USA.
 - 11- International Submarine Engineering, Vancouver, BC, Canada

This is in addition to the Canadian Defense Research Establishment Atlantic (DREA), the Canadian Defense Research Establishment Ontario, Bedford Institute of Oceanography (BIO) and Sable Off-Shore of Nova Scotia.

- ◆ **Ferial is a devoted IEEE volunteer, served the IEEE/OES and**

IEEE/ SMC societies with many different capacities. In addition, she is a recipient of many awards both from IEEE and MTS.

AWARDS & RECOGNITIONS:

Ferial is the recipient for many awards recognizing her contributions with devoting services to IEEE:

- ↪ 2017 -“Murugan Memorial Award” for her contributions to the Canadian Atlantic Section and IEEE.
- ↪ 2008 -The IEEE-Systems Man & Cybernetics Society Outstanding Contribution Award.
- ↪ 2007- IEEE- Educational Activities Board (EAB) Meritorious Achievement Award in Continuing Education.
- ↪ 2005 - Marine Technology Society (MTS) Ocean Engineering Compass International Award.
- ↪ 2002 - The J.J. Archambault IEEE/Eastern Canada Council Merit Award.
- ↪ 2001- The IEEE Canada Wally Read Service Award for Outstanding Service & contribution to IEEE-Canada.
- ↪ 2000 - IEEE Third Millennium Medal,
- ↪ 1999 - IEEE/RAB Achievement Award.
- ↪ 1997 - IEEE/OES Distinguished Service Award.
- ↪ 1991 Going Global Award, Association of Universities and Collage of Canada (AUCC)/ Department of External Affairs, Genoa, Italy,
- ↪ 1985 - Fellow of Marine Technology Society (MTS).
- ↪ 1997 - Fellow of the Engineering Institute of Canada (EIC).
- ↪ 1999 - Life Fellow of IEEE.

PROFESSIONAL MEMBERSHIPS:

- ↪ 1981 Member, Association of Professional Engineer of Nova Scotia (APENS)
- ↪ 1982 Member IEEE
- ↪ 1983 Member of Marine Technology Society (MTS).
- ↪ 1978 Sigma Xi, the Scientific Research Society of America.
- ↪ 1979 Canadian Society of Exploration Geophysics.

PUBLICATIONS:

Most Significant Publications and Invited Lectures:

Books

**Editor-In-Chief The Ocean Engineering Handbook CRC Press,
Year'2001 and 2nd Edition , Year' 2004.**

Chapters in Refereed Books

B-6	El-Hawary, Ferial, " Pattern Recognition For Marine Seismic Exploration", a Chapter in Expert systems, and Pattern Recognition in Marine Seismic Exploration, Springer-Verlag Publishers, Edited by Sengupta and Palaz, 1992.
B-5	Ferial El-Hawary, " An Overview of Underwater Target Tracking Filtering Techniques", in M. Rahman, Editor, Ocean Wave Mechanics, Computational Fluid Dynamics, and Mathematical Modelling, pp. 869-878, Computational Mechanics Publications, 1990
B-4	El-Hawary, Ferial," Application of Burg's Spectral Analysis to Heave Response Modeling in underwater Applications", Maximum Entropy and Bayesian Methods, edited by P. Fougere, pp. 409-417, Kluwer Academic Publishers, 1990.
B-3	El-Hawary, Ferial, " Role of Peak Detection and Parameter Estimation in Non-destructive Testing of Materials", NATO Advanced Special Institute, Series F, Computer and System Science, Vol. 44, pp. 327-343, Springer Verlag, Berlin, 1988.
B-2	El-Hawary, Ferial, " Marine Geophysical Signal Analysis ", A Chapter in the Handbook of Signal Processing, Edited by C. H. Chen, pp. 643-659, Marcel Dekker, New York and Basel, 1988.
B-1	El-Hawary, Ferial, "An Approach to Seismic Information Extraction" In Time Series Analysis : Theory and Practice 6 ,O.D. Anderson, J.K. Ord and E.A. Robinson (editors), pp. 223-238, Elsevier Science Publishers, Amsterdam, 1985.

Publications in Refereed IEEE-Journals

F-23	Ferial El-Hawary and G. A. N. Mbamalu, "Dynamic Heave Compensation using Robust Estimation Techniques", Computers and Electrical Engineering, Vol.22, No. 4, pp. 257-273, September 1996.
F-22	Ferial El-Hawary and Yuyang Jing, "Robust Regression-Based EKF for Tracking Underwater Targets", IEEE Journal of Oceanic Engineering, Vol.20, No.1, pp.31-41, January 1995.
F-16	Ferial El-Hawary and G. A. N. Mbamalu, " Refined Autoregressive Moving Average Modeling of The Underwater Heave Process", IEEE Oceanic Engineering Journal, Vol. 18, No. 4, October 1993.
F-15	Ferial El-Hawary and G. A. N. Mbamalu," Fair and Andrews' Weighting Based IRWLS Algorithms for Time Delay Estimation in Underwater Target Tracking", IEEE Oceanic Engineering Journal, Vol. 18, No. 2, pp. 142-150, April 1993.
F-10	El-Hawary, Ferial, " A Comparison of Recursive Weighted Least Squares Estimation and Kalman Filtering for Source Dynamic Motion Evaluation" Canadian Journal of Electrical and Computer Engineering, Vol. 17, No. 3, pp. 136-145, 1992.
F-9	El-Hawary, Ferial, Aminzadeh, F., and G. Mbamalu,"The Generalized Kalman Filter Approach to Adaptive Underwater Target Tracking", IEEE Oceanic Engineering Journal, Vol. 17, pp. 129-137, January 1992.

F-8	El-Hawary, Ferial, and G. Mbamalu, " Underwater Target Tracking Via the IRWLS Filtering Approach", IEE Proceedings, Part F, Vol. 138, No. 5, pp. 459-469, October 1991.
F-7	El-Hawary, Ferial, " Role of Parameter Estimation and Correlation in Remote Imaging with Emphasis on Signal Attenuation in Varied Media", Journal of Wave-Material Interaction, Vol. 3, No. 2, pp. 163-172, 1988.
F-6	El-Hawary, Ferial, " Image Analysis Methods From Sea-bed Reflections and Multiple Reflections", International Journal of Pattern Recognition and Artificial Intelligence, Vol. 1, No. 2, pp. 261-272, August 1987.
F-5	El-Hawary, Ferial, " An Approach to Extract the Parameters of Source Heave Dynamics", Canadian Electrical Engineering Journal, pp. 19-23, January 1987
F-4	El-Hawary, Ferial, "An Approach to Seismic Information Extraction" In Time Series Analysis : Theory and Practice 6 ,O.D. Anderson, J.K. Ord and E.A. Robinson (editors), Elsevier Science Publishers, Amsterdam, pp. 223-238, 1985
F-3	El-Hawary, Ferial, " Compensation for Source Heave by use of Kalman Filter", IEEE Journal of Oceanic Engineering, Vol. OE-7, No. 2, pp. 89-96, 1982.
F-2	El-Hawary, Ferial, and Vetter, W.J., "Event Enhancement on Reflections from Subsurface Layered Media", IEEE Journal of Oceanic Engineering, Vol. OE-7, No. 1, pp. 51-58, 1982.
F-1	El-Hawary, Ferial, and Vetter, W.J., "Spatial Parameter Estimation for Ocean Subsurface Layered Media", Canadian Electrical Engineering Journal, Vol. 5, N0.1, pp. 28-31, 1980.

Publications in Refereed Conference Proceedings

C-50	Saeed S.Tabaai, Ferial El-Hawary and Mo. El-Hawary "Adaptive Control of AUV: Fault Accommodation" Proceedings of the 3rd. IFAC Workshop on Control Applications in Marine Systems (CAMS'95) pp. 424-434, Trondheim, NORWAY, May 1995
C-47	Yuyang Jing and Ferial El-Hawary, "A Multilayered ANN Architecture For Underwater Target Tracking", Canadian Conference on Electrical and Computer Engineering, Vol. 2, pp. 785-788 Halifax, NS, September 1994.
C-46	Saeed Setayeshi and Ferial El-Hawary, "Neural Network Based Signal Prediction and Parameter Estimation for Underwater Layered Media System Identification", Canadian Conference on Electrical and Computer Engineering, Vol. 2, pp. 777-780 Halifax, NS, September 1994.
C-45	Ferial El-Hawary and Jian Li, " Artificial Neural Networks for Additive Noise Filtering Techniques", Proceedings of IEEE Oceans' 94 Conference, pp. I-323-329, Brest, France, September 1994.

C-44	Saeed S. Tabaii, Ferial, and M. El-Hawary, "Hybrid Adaptive Control of Autonomous Underwater Vehicle", Symposium on Autonomous Underwater Vehicle Technology, Proceedings, pp. 275-282, Cambridge, Massachusetts July 19-20, 1994.
C-41	Ferial El-Hawary and Saeed Setayeshi, "Fuzzy Min-Max Neural Network Based Classification of Layered Media due to Attenuation Effects", NATO Workshop on "Advances in Signal Processing for Non Destructive Evaluation of Materials", Laval University, Quebec City, August 1993.
C-40	Ferial El-Hawary, " Underwater Applications of Generalized Kalman Filtering", UnderSea Defence Conference, Cannes, France, June 1993.
C-38	Saeed Setayeshi, and Ferial El-Hawary, "A Content-Addressable Memory (CAM) Neural Network Detector for Attenuated Seismic Signals in Underwater Layered Media", International Conference on Neural Networks in Signal Processing, Singapore, August 1993.
C-36	Ferial El-Hawary, "Applications of Dynamic Heave Compensation in the Underwater Environment and Approaches to its Solution", pp. 254-259, Volume 1, Proceedings of IEEE Oceans' 92 Conference, New Port, RI, October 1992.
C-34	Ferial El-Hawary, and G. A. N. Mbamalu, "Noise Effects on the IRWLS Algorithm Performance for Time Delay Estimation", pp. 50-54, Volume 1, Proceedings of IEEE Oceans' 92 Conference, New Port, RI, October 1992.
C-33	Ferial El-Hawary, and G. A. N. Mbamalu, "The Fair Weighting Based IRWLS Algorithm For Time Delay Estimation In Underwater Target Tracking", pp.1304-1307, Volume 3, Proceedings of IEEE Oceans' 91 Conference, Honolulu, Hawaii, October 1991.
C-29	Ferial El-Hawary, " Adaptive Underwater Target Tracking Via a Generalized Kalman Filter", IEEE Autonomous Underwater Vehicles Workshop, pp. 275-279, Washington, D.C. June 4-5, 1990
C-28	Ferial El-Hawary, and G. A. N. Mbamalu, " The IRWLS Filtering Approach to Underwater Target Tracking", Subsea Search and Salvage'90, pp. 47-54, Miami, Florida, May 1990.
C-26	El-Hawary, Ferial, " Adaptive Underwater Target Tracking using Recursive Prediction Error Estimation", Proceedings of Underseas Defence'89 Conference, pp. 35-39, Marine Technology Society, San Diego, CA, November 1989.
C-24	El-Hawary, Ferial, and Richards, Troy, " A Systolic Computer Architecture for Spectrum Analysis", Proceedings of IEEE Oceans '89, Vol. 4, pp. 1061-1065, Seattle, WA, October 1989.
C-22	El-Hawary, Ferial, " Recursive Weighted Least Squares Estimation for Adaptive Underwater Tracking", Proceedings of the Third International Workshop on Time-Varying Image Processing and Moving Object Recognition, Florence, Italy, May 29-31, 1989, published by North-Holland

C-21	El-Hawary, Ferial, " Parallel Implementation of Recursive Weighted Least Squares Estimation for Source Dynamic Motion Evaluation", Proceedings of SPIE' 89, Technical Symposia on Aerospace sensing, Vol. 1096, pp. 8-22, Orlando, FLA, March 1989.
C-19	El-Hawary, Ferial, " Compensation of Vertical Displacement Components in Marine Seismic Applications using the Coupled Heave and Pitch Model", IEEE Proceedings of Oceans 88, Vol. 1, pp. 291-295, Baltimore, MD, October 1988.
C-18	El-Hawary, Ferial, " Role of Parameter Estimation and Correlation in Remote Imaging with Emphasis on Signal Attenuation", SPIE Wave Propagation and Scattering in Varied Media Proceedings, Vol. 927, pp. 112-121, Orlando, Florida, April 1988.
C-17	El-Hawary, Ferial, "Image Processing of Underwater Acoustic Arrays in Geophysical Exploration Including Attenuation Effects", International Conference on Digital Signal Processing, pp. 623-627, Florence, Italy, Published by North Holland Co., 1987
C-15	El-Hawary, Ferial, and Richards, Troy, " Heave Response Modeling Using Higher Order Models ", Proceedings of the International Conference on Applied System Simulation and Modeling, pp. 60-64, Santa Barbara, CA, May 1987.
C-14	El-Hawary, Ferial, "Knowledge -Based Seismic Signal Interpretation", Special IEEE Workshop on Expert Systems and Pattern Analysis, International Conference on Pattern Recognition, Paris, France, October 1986.
C-11	El-Hawary, Ferial, "The use of Shallow Marine Seismic Methods", Workshop on Geotechnical in Situ Testing for the Canadian Offshore, Panel on Energy Research and Development, NRC Subcommittee on Marine Geotechnical Engineering, Frontier Geo-Sciences Program, Bedford Institute of Oceanography, Dartmouth, N.S. January, 1986.
C-9	El-Hawary, Ferial, "Accounting for Attenuation in Subsurface Layered Media Parameter Estimation, A Frequency Domain Approach", Proceedings of IEEE Oceans'83 Conference, San Francisco, CA, pp. 45-49, September 1983.
C-6	El-Hawary, Ferial, and Vetter, W.J., "Heave Compensation of Shallow Marine Seismic Reflection Records by Kalman filtering," IEEE Oceans'81, Boston, MA, September 1981
C-1	El-Hawary, F., and Vetter, W.J., " Estimation of Subsurface Layer Parameters by use of Multiple Reflection Model for Layered Media", Proceedings of the Fourth International Conference on Ports and Oceans Engineering under Arctic Conditions, (POAC'77), St. John's, Newfoundland, pp. 1087-1099, September 1977.

Invited and Keynote Speaker:

I-18 *“Overview of Robotics Evolutions Emphasizing*

Underwater Applications", invited talk by HKUST Univ.
Hong Kong, January 2018

- I-17 Underwater Robotics: "Status, Trends and Forecast",
invited
talk by WOC/SOS'2017, Halifax, NS, Canada, December, 2017
- I-16 "Overview of Robotics Evolutions Emphasizing
Underwater Applications", invited Panel session by
SMC'2017, Banff, Canada, October 2017
- I-15 "Overview of Robotics Evolutions Emphasizing
Underwater Applications", invited talk by ICCAR'2017,
Nagoya, Japan, April, 2017
- I-14 "Overview of Robotics Evolutions Emphasizing
Underwater Applications", invited talk by Guangdong
Univ. Guangzhou, China, April, 2017
- I-13 "Overview of Robotics Evolutions Emphasizing
Underwater Applications", invited talk by IEEE -
Industrial Applications International Conference,
Curitiba, Brazil, December, 2016
- I-12 "Celebration of IEEE125th. Anniversary of Technological Inovations"
Invited talk by the IEEE/Image Signal Processing Society at their Annual
Conference (ICIP'2009) held in Region-8 Cairo, Egypt, November'2009.
- I-11 "Celebration of IEEE125th. Anniversary of Technological Inovations"
invited talks by the IEEE/NCS Edmonton, September 24, 2009, IEEE/Toronto
Section September 25, 2009, IEEE/Ottawa Section, December'2009, and
IEEE/Canadian Atlantic Section, Halifax, Dec.'2009
- I-10 "Pre-University Education" invited talk by the IEEE/Educational Activities
Board (EAB) at the two days Training Workshop, Montreal, May'08.
- I-9 "Winning In Life", Banquet Presentation For Electrical Engineering Students
Graduation, Dalhousie University, Halifax, N.S., March 2005.
- I-8 "Challenges for EE Students in the Oceans and Role of IEEE",
IEEE/France Section Lecture, TELECOM Institute, Brest, France, June 1993.
- I-7 "Counting Down to 2000": An Overview of Signal Analysis in Marine
Applications, Oceanography Institute of the Italian Navy, Genoa, Italy May'91
- I-6 "Ten Years to 2000": An Overview of Signal Analysis in Marine Applications
IEEE Miami Section Engineering Lecture Series, May 1990

- I-5 "Deep Underwater Target Tracking Using the Iteratively Reweighted Least Squares Approach", Sixth SEG/USN Joint Technical Symposium, Stennis Space Center, Mississippi, February 1990
- I-4 "Applications of Kalman Filtering in Marine Seismic Exploration", Unocal Science and Technology Division, Brea, California, October 1989.
- I-3 "Systolic Array Implementation of Parallel Kalman Filtering for Heave Compensation in Underwater Acoustic Data Processing", NATO Advanced Study Institute, Underwater Acoustic Data Processing, RMC, Kingston, Ontario, July 1988
- I-2 "Role of Peak Detection and Parameter Estimation in Nondestructive Testing of Materials", NATO Advanced Workshop on Signal and Pattern Recognition in Nondestructive Evaluation, St. Castin at Lac Beauport, Quebec, August 1987
- I-1 "Systolic Array Implementation of Kalman Filter", 1986 Bay States Skills Corporation Special Institute on Knowledge Based Signal Processing, Southeastern Massachusetts University, North Dartmouth, MASS, June 1986

Briefs

- BF-1 "Engineering as a Rewarding Experience for Both Sexes", presented to the Canadian Committee on Women in Engineering, Atlantic Region Public Forum, at the WTCC, Halifax, N.S., March 26, 1991

Theses

- T-2 El-Hawary, Ferial, " Modeling and Signal Processing for Identification of Ocean Subsurface Features From Acoustic Reflections", Ph. D. Thesis, Memorial University of Newfoundland, May 1981.
- T-1 El-Hawary, Ferial, " Transient Analysis of Transmission Lines ", M. Sc. Thesis, University of Alberta, 1971. Part of this work is reported in V. Dvorak: " Computer Simulation of Signal Propagation through a Non-uniform Transmission Line", IEEE Trans. on Circuit Theory, Vol. CT- 20, pp. 580-583, 1973.

