

PUBLICATIONS

Book Chapters

- [1] Huang W, Gill E W. (2015). Ocean Remote Sensing Using X-band Shipborne Nautical Radar - Applications in Eastern Canada" in *Coastal Ocean Observing Systems: Advances and Syntheses*. Editors: Liu Y, Kerkering H, Weisberg R H. Elsevier. pp. 248-264.
- [2] Huang W, Gill E W. (2019). HF Surface Wave Radar, *Wiley Encyclopedia of Electrical and Electronics Engineering: J. G. Webster*. John Wiley and Sons.

Articles in Refereed Journals: Published or Accepted

Student names (or postdoctoral fellows) are followed by *.

- [1] Chen Z, Chen X, Zhao C, Li J, Huang W, Gill E W. (2019). Observation and intercomparison of wave motion and wave measurement using shore-based coherent microwave radar and HF radar, *IEEE Trans. on Geoscience and Remote Sensing*. (accepted)
- [2] Silva* M, Shahidid R, Gill E W, Huang W. (2019). Nonlinear Extraction of Directional Ocean Wave, Spectrum from Bistatic HFSWR Using Tikhonov Regularization in Hilbert Scales, *IEEE J. Oceanic Eng.* (in press)
- [3] Mahdianpari* M, Mohammadimanesh F, Homayouni, S. and Gill, E., 2019. The First Wetland Inventory Map of Newfoundland at a Spatial Resolution of 10 m Using Sentinel-1 and Sentinel-2 Data on the Google Earth Engine Cloud Computing Platform. *Remote Sensing*, 11(1), p.43.
- [4] Bobby* P, Gill E W. (2019). Radar Scatter from Layered Media and Rough Surfaces, *Progress in Electromagnetics Research (PIER C)*.(accepted)
- [5] Mohammadimanesh* F, Salehi, B., Mahdianpari, M., Brisco, B. and Gill, E., 2019. Full and Simulated Compact Polarimetry SAR Responses to Canadian Wetlands: Separability Analysis and Classification. *Remote Sensing*, 11(5), p.516.
- [6] Mohammadimanesh* F, Salehi, B., Mahdianpari, M., Gill, E. and Molinier, M., 2019. A new fully convolutional neural network for semantic segmentation of polarimetric SAR imagery in complex land cover ecosystem. *ISPRS Journal of Photogrammetry and Remote Sensing*, 151, pp.223-236.
- [7] Silva* M, Gill E W, Huang W. (2018). An Improved Estimation and Gap-Filling Technique for Sea-Surface Wind Speeds Using NARX Neural Networks, *J. Atmos. Oceanic Tech.*. doi.org/10.1175/JTECH-D-18-0001.1
- [8] Al-Habashneh* A, Moloney C, Gill E W, Huang W. (2018). The Effect of Radar Ocean Surface Sampling on Wave Spectrum Estimation Using X-band Marine Radar, *IEEE Access*, vol. 6, pp. 17570-17585.
- [9] El-Darymli K, Hansen* N, Dawe B, Gill E W, Huang W. (2018). Design and Implementation of a High-Frequency Software-Defined Radar for Coastal Ocean Applications," *IEEE Aerosp. Electron. Syst. Mag.*, vol. 33, no. 3, pp. 14-21 (invited paper)

- [10] Ma* Y, Gill E W, Huang W. (2018). Bistatic High Frequency Radar Ocean Surface Cross Section Incorporating a Dual-Frequency Platform Motion Model, *IEEE J. Oceanic Eng.* vol. 43, no. 1, pp. 205-210. (invited paper)
- [11] Ma* Y, Huang W, Gill E W. (2018). High Frequency Radar Ocean Surface Cross Section Incorporating a Dual-Frequency Platform Motion Model, *IEEE J. Oceanic Eng.* vol. 43, no. 1, pp. 195-204. (invited paper)
- [12] Gill E W, Ma* Y, Huang W. (2018). Motion Compensation for High Frequency Surface Wave Radar on a Floating, *IET Radar Sonar Navig.*, vol. 12, no. 1, pp. 37-45.
- [13] Huang W, Liu* X, Gill E W. (2017). Ocean Wind and Wave Measurements Using X-Band Marine Radar: A Comprehensive Review, *Remote Sens.*, vol. 9, no. 12, 1261. (invited paper)
- [14] Huang W, Liu* X, Gill E W. (2017). An Empirical Mode Decomposition Method for Sea Surface Wind Measurements From X-Band Nautical Radar Data, *IEEE Trans. Geosci. Remote Sens.*, vol. 55, no. 11, pp. 6218-6227.
- [15] Liu* X, Huang W, Gill E W. (2017). Estimation of Significant Wave Height From X-Band Marine Radar Images Based on Ensemble Empirical Mode Decomposition, *IEEE Geosci. Remote Sens. Lett.*, vol. 14, no. 10, pp. 1740-1744.
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- [17] Wang* W, Gill E W, Huang W. (2017). Comparison of Spectral Estimation Methods for Rapidly-Varying Currents Obtained by High Frequency Radar. *IEEE J. Oceanic Eng.*, vol. 42, no. 3, pp. 556-565.
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Current Measurement Applications. *AMS Journal of Atmospheric and Oceanic Technology*. 32(8):1515-1525.

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- [65] Bobby* P, Gill E W. (2019). Radar backscatter from layered media with a rough surface, (in preparation)
- [66] Tian Z, Tian Y, Wen B, Wang S, Zhao J, Huang W, Gill, E. (2019). Wave Height Mapping from Second-order Harmonic Peaks of Wide-beam HF Radar Backscatter Spectra, *IEEE Trans. on Geoscience and Remote Sensing*. (under review)
- [67] Chen Z, Chen X, Zhao C, Li J, Huang W, Gill E W. (2019). Observation and intercomparison of wave motion and wave measurement using shore-based coherent microwave radar and HF radar, *IEEE Trans. on Geoscience and Remote Sensing*. (under revision)
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Reports

- [1] Gill E W, Huang W. (2018). Enhanced Radar Ocean Surface Applications 2 (E-ROSA2) Project, Final Report to the NL Department of Tourism, Culture, Industry and Innovation. [\$100k].
- [2] Eric Gill, Weimin Huang, Reza Shahidi, Neil Cater. (2017). Atlantic Innovation Fund (AIF) High Frequency Radar Ocean Surface Applications (HF-ROSA) Project, Final Report for Atlantic Canada Opportunity Agency. [\$1.7M]
- [3] Neil Cater, Eric Gill, Weimin Huang. (2014). Enhanced Radar Ocean Surface Applications (E-ROSA), Final Report to the NL Department of Industry Business, and Rural Development (IBRD). 11. [\$193k].
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- [1] Mahdianpari, M., Salehi, B., Mohammadimanesh, F., Homayouni, S. and Gill, E., 2019. A 10 m Sentinels-derived Wetland Extent Product of Newfoundland on the Google Earth Engine Cloud Computing Platform, *IGARSS 2019 IEEE International Geoscience and Remote Sensing Symposium*. (Accepted)
- [2] Shahidi R, Gill E W. (2019). Time-Domain Motion Compensation of HF-Radar Doppler Spectra for an Antenna on a Moving Platform, *Proc. IEEE/OES Twelfth Current, Waves, and Turbulence Measurement and Applications Workshop (CWTMA)*, San Diego, USA, March.
- [3] Shahidi R, Gill E W. (2019). An Efficient and Accurate Solution for Directional Ocean Wave Spectrum Extraction from HF-Radar Field Data, *MTS/IEEE Oceans*, Marseille, France. (accepted)
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- [11] Shahidi* R, Gill E W. (2017). Periodogram-Based Derivation of First-Order Power Spectral Density from Remote Sensing of the Ocean Surface by HF-Doppler Radar, *32nd International Union of Radio Science General Assembly and Scientific Symposium*, Montreal, Canada, Aug.
- [12] Shahidi* R, Gill E W. (2017). An Efficient and Accurate Solution for the Extraction of Non-directional Ocean Wave Spectra from Second-Order High-Frequency Doppler Spectra, *MTS/IEEE Oceans*, Aberdeen, Scotland, June.

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- [18] Liu* X, Huang X, Gill E W. (2016). Wind Direction Determination From Rain-Contaminated X-Band Radar Images, *MTS/IEEE Oceans*, Monterey, USA, 2016. (**Student Poster Competition Finalist**)
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Radiowave Oceanography and Other Workshop Contributions

This is an international 4-day workshop of 35 to 40 HF radar experts and users (mainly physicists and engineers) where the latest models and applications of the science and technology associated with the remote sensing of the oceans via HF radar, as well as required research directions, are discussed. While it is **not a 'refereed'** workshop, it is probably the single most important venue for the dissemination of research expertise in this field and input is invited from a small group of experts. Our group at Memorial University is among a minority of participants who are deeply involved with the basic and applied science underlying the technology.

- [104] W. Huang, R. Carrasco, C. Shen*, E. W. Gill, and J Horstmann, "Further validation of the polar-current-shell current algorithm for X-band marine radar," third Workshop on Sensing the Ocean with Marine Radars (SoMaR-3), Seattle, USA, 2015.
- [105] Wang* W, Gill E W, Ryan* B. (2014). A Combined Beamforming/Direction Finding Scheme for Phased Arrays and Other Recent Developments. *Radiowave Oceanography 12th International Workshop*, Savannah, Georgia, USA, May 11-15.
- [106] Norga* M, Shen* C, Gill E, Huang W. (2012). Scattering of High Frequency Electromagnetic Radiation in a Noisy Environment and Simulation of HF Radar Cross Sections for Swell Contaminated Seas. *Radiowave Oceanography 11th International Workshop*, Toulon, France, Apr. 17-19. (Invited Presentation).
- [107] Walsh J, Zhang J, Gill E. (2010). Ocean Cross Section Characteristics for FMCW Waveforms. *Radiowave Oceanography 10th International Workshop*, Mount Hood, Oregon, USA, Sept. 26-29. (Invited Paper).
- [108] Walsh, J., E. Gill, and W. Huang, Further Analysis of Antenna Platform Motion. *Radiowave Oceanography 9th International Workshop*, Split, Croatia, May 19-22, 2009. (Invited Paper).
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Other Conference/Workshop Contributions/Presentations

(All, but two of the following were presentations at the local yearly *IEEE Newfoundland Electrical and Computer Engineering Conference (NECEC)* and appear in the Proceedings.)

- [114] Gill E W. (2017). Fundamentals of Radio Oceanography 1, *International Summer School on Radio Oceanography*, Caen, France, August.
- [115] Silva* M, Shahidi R, Gill E W, Huang, W. (2018). Empirical Initial Value Estimation for Nonlinear Extraction of Ocean Wave Spectra from Bistatic HF Radar Data, *IEEE NECEC*, St. John's, November.
- [116] Bobby* P, Gill E W. (2018). Effective Surface Impedance for Layered Media, *IEEE NECEC*, St. John's, November.
- [117] Shahidi R, Gill E W. (2017). An Alternative Periodogram-based Derivation of the First-order Radar Cross-Section for a Bistatic HF-radar configuration, *IEEE NECEC*, St. John's, November.
- [118] Bobby* P, Gill E W. (2017). Radar backscatter from sea ice ridges modeled as rough and layered media, *IEEE NECEC*, St. John's, November.
- [119] Liu* X, Huang W, Gill E W. (2017). Radon Transform-Based Wave Parameters Estimation From X-Band Marine Radar Images, *IEEE NECEC*, St. John's, November.
- [120] Ma* Y, Gill E W, Huang W. (2017). HF radar ocean cross section models with consideration of platform pitch and roll motions, *IEEE NECEC*, St. John's, November.
- [121] Salami* A, Gill E W, Huang W, El-Darymli K. (2017). Evaluative Study on Nonstationary and Nonlinear Dynamics in High Frequency Radar Data, *IEEE NECEC*, St. John's, November.
- [122] Silva* M, Gill E. W, Huang W. (2017). The Use of Artificial Neural Networks in Hindcasting and Filling Gaps in Buoy Wind Speed Data Under Extreme Winds, *IEEE NECEC*, St. John's, November.
- [123] Shahidi* R, Gill E W. (2016). New Frontiers in the Extraction of Ocean Wave Spectra from Second-Order Doppler HF-Radar Data, *IEEE NECEC*, St. John's, November.
- [124] Silva* M T, Gill E W, Shahidi* R. (2016). A Change of Variables for Ocean Wave Spectrum from Bistatic Second-Order Doppler HF-Radar Data, *IEEE NECEC*, St. John's, November.
- [125] Liu* X, Huang W, Gill E W. (2016). A Method for Wind Speed Estimation From X-Band Nautical Radar Data, *IEEE NECEC*, St. John's, November. (**Wally Read Best Young Professional Paper Award**)

- [126] Ma* Y, Huang W, Gill E W. (2016). Motion Compensation for High Frequency Surface Wave Radar on a Floating Platform, *IEEE NECEC*, St. John's, November.
- [127] Chen* S, Huang W, Gill E W. (2015). Bistatic High Frequency Radar Clutter Power for Ionosphere-Ocean Propagation. *IEEE NECEC*, St. John's, Newfoundland, 2015.
- [128] Wang* W, Gill E W. (2015). Estimation Methods for Sea Surface Wind Speed Measured by High Frequency Radar. *IEEE NECEC*, St. John's, Newfoundland.
- [129] El-Darymli K, Hansen* N, Etezzad M, Gill E W, Dawe B. (2015). High-Frequency Software-Defined Radar (HF-SDR): Preliminary Results. *IEEE NECEC*, St. John's, Newfoundland.
- [130] Liu* X, Huang W, Gill E W. (2015). "Wave Height Estimation From Ship-Borne X-Band Nautical Radar Images - SNR Algorithm vs Modified Shadowing Algorithm. *IEEE NECEC*, St. John's, Newfoundland. (**Wally Read Best Young Professional Paper Award**)
- [131] Ma* Y, Huang W, Gill E W. (2015). The First-Order FMCW Bistatic High Frequency Radar Cross Section for an Antenna on a Floating Platform. *IEEE NECEC*, St. John's, Newfoundland.
- [132] Liu* X, Huang W, Gill E W. (2014). Significant wave height retrieval based on signal-to-noise ratio analysis from X-band nautical radar images. *IEEE NECEC*, St. John's, Newfoundland.
- [133] Ma* Y, Gill E W, Huang. (2014). A Review of High Frequency Radar Cross Section of the Ocean Surface. *IEEE NECEC*, St. John's, Newfoundland.
- [134] Chen* S, Gill E W, Huang W. (2014). An Ionospheric Reflection Coefficient Model for Mixed-path Ionosphere-Ocean Propagation of High Frequency Radio Waves. *IEEE NECEC*, St. John's, Newfoundland. (**Wally Read Best Student Paper Award**)
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- [138] Al-Habashneh* A, Moloney C, Gill E. (2013). Wave Number Napping in Ocean Wave Spectrum Estimation from Marine Radar Data by the Polar Fourier Transform. *IEEE NECEC*, St. John's, Newfoundland, November.
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- [141] An* J, Huang W, Gill E W. (2012). Extraction of Fundamental Wave Components Information from X-band Nautical Radar Images. *IEEE NECEC*, St. John's, November.
- [142] Shen* C, Gill E W, Huang W. (2012). The shallow water HF radar cross sections for swell contaminated seas. *IEEE NECEC*, St. John's, November.

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- [144] An* J, Huang W, Gill E. (2011). Numerical Simulation of X-Band Marine Radar Imaging, *IEEE NECEC*, St. John's, November. (**Oceanic Eng. Soc. Paper First Prize Award**)
- [145] Gill E W. (2010). High Frequency Radar Ocean Surface Operations in Placentia Bay and Beyond, *IEEE NECEC*, St. John's, November.
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- [147] Zhang* J, Gill E W, Walsh J, Gurgel K. (2008). Comparison of Simulated HF Radar Data with Field Data for a Frequency Modulated Continuous Wave (FMCW) Source, *IEEE NECEC*, St. John's, November. (**Best Student Paper Award**)
- [148] Zhang* J, Gill E W, Walsh J. (2007). HF Radar Remote Sensing with Frequency Modulated Sources, *IEEE NECEC*, St. John's, November.
- [149] Walsh J, Gill E W, Huang W. (2007). Analytical Considerations for High Frequency Surface Wave Radar Operating from a Moving Ocean Platform, *IEEE NECEC*, St. John's, November. (**Best Industry Paper Award**)
- [150] Hickey* K, Gill E W, Walsh J. (2007). Modeling the Ocean Clutter for Ship Detection Purposes Using a Narrow-beam High Frequency Ground Wave Radar System: A Heuristic Approach, *IEEE NECEC*, St. John's, November.
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- [156] Zhang* J, Gill E W. (2003). Extraction of Ocean Wave Information from Simulated Noisy Bistatic High Frequency Radar Spectra, *IEEE NECEC*, St. John's, November.
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- [158] Churchill* S, Randell C, Power D, Gill E W. (2003). Data Fusion: Associations of Detections for Multiple Hypothesis Tracking using Remote Sensing, *IEEE NECEC*, St. John's, November.

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- [161] Bobby* P, Gill E. (2002). On the Use of the Continuity Equation for Vector Current Extrapolation using HF Radar. *IEEE NECEC*, St. John's, November.
- [162] Hickey* K, Gill E, Walsh J. (2002). Vector Surface Currents Using a Long-Range, High-Frequency Radar Station: A Practical Approach, *IEEE NECEC*, St. John's, November.
- [163] Sircar* S, Power D, Youden J, Gill E, Han P. (2002). Lateral Movement Estimation from Space-borne Radar by Differential Interferometry, *IEEE NECEC Conference*, St. John's, November.
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- [165] Churchill* S, Randell C, Power D, Gill E. (2001). Toward Fusion of Satellite SAR and other Remotely Sensed Marine Data for Wide-Area Operational Monitoring, *IEEE NECEC*, St. John's, November.
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