

# Curriculum Vitae

Roger Dean De Roo

## Business Address:

2543D Space Research Bldg.  
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Ann Arbor, MI 48103-3250  
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## Education

Ph.D., Electrical Engineering

The University of Michigan: January 1996

Dissertation: Theory and Measurement of Bistatic Scattering of X-Band Microwaves from Rough Dielectric Surfaces

Committee: Prof. Fawwaz T. Ulaby (Chair), Prof. Kamal Sarabandi, Prof. Tony England, Prof. John Vesecky and Prof. Linda Katehi

MSE, Electrical Engineering

The University of Michigan: April 1989

BSE, Electrical Engineering

The University of Michigan: December 1986

BS in Letters and Engineering

Calvin College, MI: December 1986

## Professional Positions

Associate Research Scientist

September 2015 - present

CLaSP Dept., The University of Michigan, Ann Arbor

Lecturer IV

September 2015 - present

CLaSP Dept., The University of Michigan, Ann Arbor

September 2014 - Aug 2015

AOSS Dept., The University of Michigan, Ann Arbor

Lecturer III

July 2010 - Aug 2014

AOSS Dept., The University of Michigan, Ann Arbor

Assistant Research Scientist

January 2001 - Aug 2015

AOSS Dept., The University of Michigan, Ann Arbor

Lecturer I

September 2009 - April 2010  
AOSS Dept., The University of Michigan, Ann Arbor

Adjunct Professor

September 2004 - December 2004  
EECS Dept., The University of Michigan, Ann Arbor

Research Fellow

January 1996 - September 2000  
EECS Dept., The University of Michigan, Ann Arbor

Graduate Student Instructor

September 1994 - April 1995  
EECS Dept., The University of Michigan, Ann Arbor

Graduate Student Research Assistant

September 1987 - January 1996  
EECS Dept., The University of Michigan, Ann Arbor

**Teaching Experience**

Q1: “excellent course?”; Q2: “excellent teacher?”; Q4: “wanted to take this class”;  
(5=“agree strongly”) n: number of responses

ENGR 100, “Introduction to Engineering”

Winter 2018, 4 CH, 59 students; Q1: tbd, Q2: tbd, Q4: tbd, n=tbd  
Winter 2017, 4 CH, 60 students; Q1: 3.50, Q2: 4.25, Q4: 3.72, n=38  
Winter 2016, 4 CH, 48 students; Q1: 3.82, Q2: 4.43, Q4: 4.00, n=17  
Winter 2015, 4 CH, 48 students; Q1: 4.38, Q2: 4.76, Q4: 4.11, n=25  
Winter 2014, 4 CH, 59 students; Q1: 3.83, Q2: 4.25, Q4: 3.64, n=24  
Winter 2013, 4 CH, 48 students; Q1: 4.00, Q2: 4.05, Q4: 4.06, n=18  
Winter 2012, 4 CH, 55 students; Q1: 4.00, Q2: 4.53, Q4: 3.96, n=37  
Winter 2011, 4 CH, 61 students; Q1: 3.90, Q2: 4.21, Q4: 4.17, n=34  
Winter 2010, 4 CH, 39 students; Q1: 3.93, Q2: 3.94, Q4: 4.28, n=23

CLaSP 462, “Instrumentation for Atmospheric and Space Sciences”

Winter 2018, 4 CH, 6 students; Q1: tbd, Q2: tbd, Q4: tbd, n=tbd  
Winter 2017, 4 CH, 11 students; Q1: 5.00, Q2: 4.00, Q4: 5.00, n=1

AOSS 462, “Instrumentation for Atmospheric and Space Sciences”

Winter 2016, 4 CH, 13 students; Q1: 3.83, Q2: 4.00, Q4: 3.30, n=8  
Winter 2015, 4 CH, 12 students; Q1: 4.67, Q2: 4.88, Q4: 4.67, n=5  
Winter 2014, 4 CH, 7 students; Q1: 5.00, Q2: 5.00, Q4: 5.00, n=4  
Winter 2013, 4 CH, 20 students; Q1: 4.44, Q2: 4.82, Q4: 4.15, n=15  
Winter 2012, 4 CH, 10 students; Q1: 4.20, Q2: 4.60, Q4: 4.38, n=9  
Winter 2011, 4 CH, 11 students; Q1: 4.83, Q2: 4.83, Q4: 4.50, n=8

Winter 2010, 4 CH, 12 students; Q1: 4.10, Q2: 4.21, Q4: 4.25, n=10  
Winter 2009, 4 CH, 13 students; Q1: 4.60, Q2: 4.86, Q4: 4.00, n=9  
Winter 2008, 4 CH, 11 students; Q1: 4.29, Q2: 4.58

ENGR 455, "Multidisciplinary Engineering Design II"  
Summer 2013, 3 CH, 1 student.

ENGR 256, "Mentor-Leaders in Multidisciplinary Design"  
Winter 2012, 1-2 CH, 9 students.  
Winter 2011, 1-2 CH, 5 students.

CLaSP 105, "Our Changing Atmosphere"  
Fall 2017, 3 CH, 260 students; Q1: 4.44, Q2: 4.84, Q4: 3.75, n=75  
Fall 2016, 3 CH, 251 students; Q1: 4.39, Q2: 4.83, Q4: 3.48, n=57

AOSS 105, "Our Changing Atmosphere"  
Fall 2015, 3 CH, 274 students; Q1: 4.35, Q2: 4.80, Q4: 3.77, n=103  
Fall 2014, 3 CH, 255 students; Q1: 4.38, Q2: 4.72, Q4: 3.80, n=86  
Fall 2013, 3 CH, 242 students; Q1: 4.36, Q2: 4.69, Q4: 3.64, n=82  
Fall 2012, 3 CH, 232 students; Q1: 4.44, Q2: 4.80, Q4: 4.05, n=87  
Fall 2011, 3 CH, 220 students; Q1: 4.33, Q2: 4.69, Q4: 3.83, n=95  
Fall 2010, 3 CH, 210 students; Q1: 4.18, Q2: 4.64, Q4: 3.65, n=101  
Fall 2009, 3 CH, 174 students; Q1: 3.57, Q2: 4.21, Q4: 2.95, n=77

AOSS 499, "Directed Study"  
Fall 2014, 4 CH, 1 student;

AOSS 747, "Graduate Student Seminar"  
Winter 2005, 1 CH, 4 students; Q1: 3.17, Q2: 3.83

EECS 215, "Introduction to Linear Circuits"  
Fall 2004, 4 CH, 51 students; Q1: 4.03, Q2: 4.33

**Referred Journal Articles**

- S. Mousavi, R. De Roo, K. Sarabandi, A. England, S. Y. E. Wong, and H. Nejati, "Lake icepack and dry snowpack thickness measurement using wideband autocorrelation radiometry," IEEE Transactions on Geoscience and Remote Sensing, vol. 56, no. 3, pp. 1637–1651, March 2018.
- P.-W. Liu, J. Judge, R. De Roo, A. England, and T. Bongiovanni, "Uncertainty in soil moisture retrieval using the SMAP combined active-passive algorithm for growing sweet corn," Journal of Special Topics in Applied Earth Observations and Remote Sensing, vol. 9, no. 7, pp. 3326–3339, July 2016.
- P.-W. Liu, J. Judge, R. D. De Roo, A. W. England, T. Bongiovanni, and A. Luke, "Dominant backscattering mechanisms at L-band during dynamic soil moisture conditions for sandy soils," Remote Sensing of Environment, vol. 178, pp. 104–112, 01 June 2016.
- K. Nagarajan, P.-W. Liu, R. De Roo, J. Judge, R. Akbar, P. Rush, S. F. D. Preston, and R. Terwilleger, "Automated L-band radar system for sensing soil moisture at high temporal resolutions," IEEE Geoscience and Remote Sensing Letters, vol. 11, no. 2, pp. 504–508, February 2014.
- P.-W. Liu, R. De Roo, A. England, and J. Judge, "Impact of moisture distribution at the soil surface on L- and C-band emission in sandy soils," Journal of Special Topics in Applied Earth Observations and Remote Sensing, vol. 6, no. 2, pp. 887–899, April 2013.
- S. Misra, R. D. De Roo, and C. S. Ruf, "An improved radio frequency interference model: Reevaluation of the kurtosis detection algorithm performance under central limit conditions," IEEE Transactions on Geoscience and Remote Sensing, vol. 50, no. 11, pp. 4565–4574, November 2012.
- R. D. De Roo and S. Misra, "A moment ratio RFI detection algorithm that can detect pulsed sinusoids of any duty cycle," IEEE Geoscience and Remote Sensing Letters, vol. 7, no. 3, pp. 606–610, July 2010.
- V. L. Mironov, R. D. De Roo, and I. V. Savin, "Temperature dependable microwave dielectric model for an arctic soil," IEEE Transactions on Geoscience and Remote Sensing, vol. 48, no. 6, pp. 2544–2556, June 2010.
- R. D. De Roo, "A simplified calculation of the kurtosis for RFI detection," IEEE Transactions on Geoscience and Remote Sensing, vol. 47, no. 11, pp. 3755–3760, November 2009.
- J. Hardy, R. Davis, Y. Koh, D. Cline, K. Elder, R. Armstrong, H.-P. Marshall, T. Painter, G. Castres Saint-Martin, R. De Roo, K. Sarabandi, T. Graf, T. Koike, and K. McDonald, "NASA Cold Lands Processes Experiment (CLPX 2002/03): Local Scale Observation Site," Journal of Hydrometeorology, vol. 9, no. 6, pp. 1434–1442, December 2008.

- R. D. De Roo and S. Misra, "A demonstration of the effects of digitization on the calculation of the kurtosis for the detection of RFI in microwave radiometry," IEEE Transactions on Geoscience and Remote Sensing, vol. 46, no. 10, pp. 3129–3136, October 2008.
- R. D. De Roo, A. R. Chang, and A. W. England, "Radiobrightness at 6.7-, 19- and 37-GHz downwelling from mature evergreen trees observed during the Cold Lands Processes Experiment in Colorado," IEEE Transactions on Geoscience and Remote Sensing, vol. 45, no. 10, pp. 3224–3229, October 2007.
- R. D. De Roo, S. Misra, and C. S. Ruf, "Sensitivity of the kurtosis statistic as a detector of pulsed sinusoidal RFI," IEEE Transactions on Geoscience and Remote Sensing, vol. 45, no. 7, pp. 1938–1946, July 2007.
- K.-J. Tien, R. D. De Roo, J. Judge, and H. Pham, "Comparison of calibration techniques for ground-based C-band radiometers," IEEE Geoscience and Remote Sensing Letters, vol. 4, no. 1, pp. 83–87, January 2007.
- M. Tedesco, E. J. Kim, A. W. England, R. D. De Roo, and J. P. Hardy, "Brightness temperatures of snow melting/refreezing cycles: Observations and modeling using a multilayer dense medium theory-based model," IEEE Transactions on Geoscience and Remote Sensing, vol. 44, no. 12, pp. 3563–3573, December 2006.
- R. De Roo and C.-T. Tai, "Plane wave reflection and refraction involving a finitely conducting medium," IEEE Antennas and Propagation Magazine, vol. 45, pp. 54–61, October 2003.
- B. K. Hornbuckle, A. W. England, R. D. De Roo, M. A. Fischman, and D. L. Boprie, "Vegetation canopy anisotropy at 1.4 GHz," IEEE Transactions on Geoscience and Remote Sensing, vol. 41, no. 10, pp. 2211–2223, October 2003.
- A. Nashashibi, K. Sarabandi, P. Frantzis, R. D. De Roo, and F. T. Ulaby, "An ultra-fast wide-band millimeter-wave (MMW) polarimetric radar for remote sensing applications," IEEE Transactions on Geoscience and Remote Sensing, vol. 40, no. 8, pp. 1777–1786, August 2002.
- A. Nashashibi, F. T. Ulaby, P. Frantzis, and R. D. De Roo, "Measurements of the propagation parameters of tree canopies at MMW frequencies," IEEE Transactions on Geoscience and Remote Sensing, vol. 40, no. 2, pp. 298–304, February 2002.
- R. D. De Roo, J. Munn, L. E. Pierce, A. Y. Nashashibi, F. T. Ulaby, and G. S. Samples, "SPRI: Simulator of polarimetric radar images," IEEE Transactions on Aerospace and Electronic Systems, vol. 38, no. 1, pp. 251–261, January 2002.
- R. D. De Roo, Y. Du, F. T. Ulaby, and M. C. Dobson, "A semi-empirical backscattering model at L-band and C-band for a soybean canopy with soil moisture inversion," IEEE Transactions on Geoscience and Remote Sensing, vol. 39, no. 4, pp. 864–872, April 2001.

- R. D. De Roo, F. T. Ulaby, A. E. B. El-Rouby, and A. Y. Nashashibi, "MMW radar scattering statistics of terrain at near grazing incidence," IEEE Transactions on Aerospace and Electronic Systems, vol. 35, no. 3, pp. 1010–1018, July 1999.
- B. Hauck, F. Ulaby, and R. De Roo, "Polarimetric bistatic-measurement facility for point and distributed targets," IEEE Antennas and Propagation Magazine, vol. 40, no. 1, pp. 31–41, February 1998.
- F. T. Ulaby, A. Nashashibi, A. El-Rouby, E. S. Li, R. D. De Roo, K. Sarabandi, R. J. Wellman, and H. B. Wallace, "95-GHz scattering by terrain at near-grazing incidence," IEEE Transactions on Antennas and Propagation, vol. 46, no. 1, pp. 3–13, January 1998.
- K. Sarabandi, L. Pierce, M. C. Dobson, F. Ulaby, J. Stiles, T. C. Chiu, R. De Roo, R. Hartikka, and A. Zambetti, "Polarimetric calibration of SIR-C using point and distributed targets," IEEE Transactions on Geoscience and Remote Sensing, vol. 33, no. 4, pp. 858–866, July 1995.
- R. D. De Roo and F. T. Ulaby, "Authors' reply to comments on bistatic specular scattering from rough dielectric surfaces," IEEE Transactions on Antennas and Propagation, vol. 43, no. 2, pp. 225–226, February 1995.
- R. D. De Roo and F. T. Ulaby, "Bistatic specular scattering from rough dielectric surfaces," IEEE Transactions on Antennas and Propagation, vol. 42, no. 2, pp. 220–231, February 1994.
- Y. Kuga, F. T. Ulaby, T. F. Haddock, and R. D. De Roo, "Millimeter-wave radar scattering from snow: 1. radiative transfer model," Radio Science, vol. 26, no. 2, pp. 329–341, March–April 1991.

**Conferences and Symposia with Published Proceedings**

- L. Brucker, C. Hiemstra, H.-P. Marshall, K. Elder, R. De Roo, M. Mousavi, F. Bliven, W. Peterson, J. Deems, P. Gadowski, A. Gelvin, L. Spaete, T. Barnhart, T. Brandt, J. Burkhart, C. Crawford, T. Datta, H. Erikstrod, N. Glenn, K. Hale, B. Holben, P. Houser, K. Jennings, R. Kelly, J. Kraft, A. Langlois, D. McGrath, C. Merriman, N. Molotch, A. Nolin, C. Polashenski, M. Raleigh, K. Rittger, C. Rodriguez, A. Roy, M. Skiles, E. Small, M. Tedesco, C. Tennant, A. Thompson, L. Tian, Z. Uhlmann, R. Webb, and M. Wingo, "A first overview of SnowEx ground-based remote sensing activities during the winter 2016-2017," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '17), pp. 1391–1394, Ft. Worth, TX, 23–28 July 2017.
- R. De Roo, S. Rogacki, E. Haengel, and C. Ekins, "Snowpack time-series ground truth via a low-power datalogger," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '17), pp. 1384–1387, Ft. Worth, TX, 23–28 July 2017.
- S. Mousavi, R. De Roo, K. Sarabandi, and A. W. England, "Sampling requirements for wideband autocorrelation radiometric (wibar) remote sensing of dry snowpack and lake icepack," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '17), pp. 1004–1007, Ft. Worth, TX, 23–28 July 2017.
- S. Chakrabarti, P.-W. Liu, J. Judge, A. Rangarajan, R. De Roo, R. Bindlish, A. Colliander, S. Misra, S. Tripp, B. Lantham, R. Williamson, I. Ramos, T. Jackson, A. England, S. Ranka, and S. Yueh, "A spatio-temporal data fusion algorithm for estimating high-resolution soil moisture in agricultural regions," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '17), pp. 2495–2498, Ft. Worth, TX, 23–28 July 2017.
- S. Mousavi, R. De Roo, K. Sarabandi, A. W. England, and H. Nejati, "Dry snowpack and freshwater icepack remote sensing using wideband autocorrelation radiometry," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '16), pp. 5288–5291, Beijing, China, 10–15 July 2016.
- S. Mousavi, R. De Roo, K. Sarabandi, A. W. England, and H. Nejati, "Remote sensing using coherent multipath interference of wideband Planck radiation," in Proceedings, IEEE International Symposium on Antennas and Propagation (APSURSI '16), pp. 2051–2052, Fajardo, PR, 26 June– 01 July 2016.
- E. Haengel and R. De Roo, "A novel technique for autonomous snow quantity measurement," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '14), pp. 3987–3990, Quebec, QC, 13–18 July 2014.
- H. Nejati, R. De Roo, L. van Nieuwstadt, K. Sarabandi, and A. England, "Design and modeling of a wideband autocorrelation radiometer (WiBAR) as a snowpack thickness sensor," in A/V Recordings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '14), Quebec, QC, 13–18 July 2014.

- P.-W. Liu, J. Judge, R. De Roo, A. England, and A. Luke, "Utilizing complementarity of active/passive microwave observations at L-band for soil moisture studies in sandy soils," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '13), pp. 743–746, Melbourne, AU, 21–26 July 2013.
- B. Hornbuckle, T. Rowlandson, E. Russell, A. Kaleita, S. Logsdon, A. Kruger, S. Yueh, and R. De Roo, "How does dew affect L-band backscatter? Analysis of PALS data at the Iowa validation site and implications for SMAP," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '10), pp. 4835–4838, Honolulu, HI, 25–30 July 2010.
- S. Misra, R. De Roo, and C. Ruf, "Evaluation of the kurtosis algorithm in detecting radio frequency interference from multiple sources," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '10), pp. 2019–2022, Honolulu, HI, 25–30 July 2010.
- V. L. Mironov, R. De Roo, and I. V. Savin, "The process of unfrozen water freezing with decreasing temperature studied by dielectric measurement in the case of an arctic soil," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '10), pp. 4423–4425, Honolulu, HI, 25–30 July 2010.
- V. L. Mironov, I. V. Savin, and R. De Roo, "Temperature dependence of a tundra soil permittivity, with water freezing in soil capillaries," in Proceedings, XIII International Scientific Conference, pp. 185–186, Krasnoyarsk, Russian Federation, 10–12 November 2009. in Russian.
- R. D. De Roo, "A simplified calculation of the kurtosis for RFI detection," in Proceedings, volume 2 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '08), pp. II-327 – II-330, Boston, MA, 07–11 July 2008. Invited Session.
- R. D. De Roo and S. Misra, "Effectiveness of the sixth moment to eliminate a kurtosis blind spot in the detection of interference in a radiometer," in Proceedings, volume 2 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '08), pp. II-331 – II-334, Boston, MA, 07–11 July 2008. Invited Session.
- R. D. De Roo, A. W. England, Y.-C. Chung, E. Weininger, and K. M. Howell, "Absorption at microwave frequencies in a moist metamorphic snow pack due to pendular ring accumulations of liquid water," in Proceedings, volume 5 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '08), pp. V-41 – V-44, Boston, MA, 07–11 July 2008.
- R. D. De Roo, S. Misra, and C. S. Ruf, "Sensitivity of the kurtosis statistic as a detector of pulsed sinusoidal radio frequency interference in a microwave radiometer receiver," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '07), pp. 2706–2709, Barcelona, Spain, 23–27 July 2007. Invited Session.



- R. D. De Roo, C. S. Ruf, and K. Sabet, "An L-band radio frequency interference (RFI) detection and mitigation testbed for microwave radiometry," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '07), pp. 2718–2721, Barcelona, Spain, 23–27 July 2007. Invited Session.
- V. L. Mironov, S. V. Savin, and R. D. De Roo, "Dielectric spectroscopic model for tussock and shrub tundra soils," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '07), pp. 726–731, Barcelona, Spain, 23–27 July 2007.
- Y.-C. Chung, A. W. England, R. D. De Roo, and E. Weininger, "Effects of vegetation and of heat and moisture fluxes from soil on snowpack evolution and radiobrightness," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 3746–3749, Denver, CO, 31 July – 04 August 2006.
- R. D. De Roo, A. W. England, H. Gu, H. Pham, and H. Elsaadi, "Ground-based radiobrightness observations of the active layer growth on the North Slope near Toolik Lake, Alaska," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 2708–2711, Denver, CO, 31 July – 04 August 2006.
- R. D. De Roo, A. W. England, and A. R. Chang, "Radiobrightness at 6.7GHz, 19GHz and 37GHz from mature evergreen trees observed during the Cold Lands Processes Experiment in Colorado," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 3224–3227, Denver, CO, 31 July – 04 August 2006.
- H. Gu, R. D. De Roo, and A. W. England, "The comparison of AMSR-E brightness temperature with ground-based observation on the North Slope," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 1748–1751, Denver, CO, 31 July – 04 August 2006.
- V. L. Mironov, P. P. Bobrov, P. V. Zhironov, S. V. Krivalsevitsh, A. S. Jaschenko, and R. D. De Roo, "Radiobrightness dynamics of freezing/thawing processes for different soils," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 3015–3018, Denver, CO, 31 July – 04 August 2006.
- C. S. Ruf, S. Misra, S. Gross, and R. D. De Roo, "Detection of RFI by its amplitude probability distribution," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 2289–2291, Denver, CO, 31 July – 04 August 2006. Symposium Prize Paper Award.
- C. Erbas, R. D. De Roo, and B. K. Hornbuckle, "Iowa State University / The University of Michigan direct sampling digital radiometer," in Proceedings, IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), pp. 3074–3077, Denver, CO, 31 July – 04 August 2006.

- R. D. De Roo, C. Erbas, and B. K. Hornbuckle, "The Iowa State University direct sampling L-band digital radiometer," in Proceedings, Specialist Meeting on Microwave Remote Sensing, pp. 70–76, San Juan, PR, 28 February 2006.
- S. Misra, C. S. Ruf, and R. De Roo, "Agile digital detector for RFI mitigation," in Proceedings, Specialist Meeting on Microwave Remote Sensing, pp. 66–69, San Juan, PR, 28 February 2006. Invited Paper.
- M. Tedesco, E. J. Kim, D. Cline, A. England, R. de Roo, M. Brodzik, and J. Hardy, "Forward modeling of measured CLPX 2003 snow brightness temperatures during melting/refreezing cycles by means of a multi-layer model based on dense medium radiative transfer theory," in Digest, IEEE Antennas and Propagation Society International Symposium, Washington, DC, 03-08 July 2005.
- K.-J. Tien, R. D. De Roo, and J. Judge, "Comparison of different radiometric calibration techniques," in Proceedings, volume 6 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '04), pp. 3748–3751, Anchorage, AK, 20–24 September 2004.
- R. D. De Roo, A. W. England, and J. Munn, "Circular polarization for L-band radiometric soil moisture retrieval," in Proceedings, volume 2 of Aerospace Conference, pp. 1015–1023, Big Sky, MT, 6–13 March 2004. Invited Paper.
- A. W. England, H. Pham, R. De Roo, L. van Nieuwstadt, and L. Yam, "Performance of STAR-Light receivers during CLPX," in Proceedings, volume 2 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '03), pp. 1235–1237, Toulouse, FR, 21–25 July 2003.
- H. Pham, R. De Roo, A. W. England, L. van Nieuwstadt, and J. Glettler, "A C band radiometer based on STAR-Light receivers: Design approach, implementation and performance evaluation," in Proceedings, volume 3 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '03), pp. 2155–2157, Toulouse, FR, 21–25 July 2003.
- L. van Nieuwstadt, R. De Roo, D. Boprie, R. Rizor, P. Hansen, A. W. England, H. Pham, and B. Lim, "A compact direct detection receiver for L-band STAR radiometry," in Digest, volume 1 of IEEE International Microwave Symposium (IMS 2003), pp. 563–566, Philadelphia, PA, 8–13 June 2003.
- Y. Du, J. Munn, R. D. De Roo, A. Y. Nashashibi, and F. T. Ulaby, "MMW forward scattering at near grazing incidence," in Proceedings, Fifth Annual FedLab Symposium on Advanced Sensors, pp. 123–127, University of Maryland, 20–22 March 2001.
- J. Munn, R. D. De Roo, and F. T. Ulaby, "Statistical testing of the form of the Mueller matrix of terrain at millimeter wavelengths," in Proceedings, volume 6 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '00), pp. 2567–2569, Honolulu, HI, 24–28 July 2000.

- R. D. De Roo, F. T. Ulaby, G. S. Samples, J. Munn, J. Costanza, A. Y. Nashashibi, A. E. B. El-Rouby, and L. E. Pierce, "MMW polarimetric data base of terrain reflectivity and an associated image simulator," in Proceedings, volume 5 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '00), pp. 2290–2292, Honolulu, HI, 24–28 July 2000.
- R. D. De Roo, J. Munn, A. Y. Nashashibi, and F. T. Ulaby, "MMW clutter database and modeling," in Research and Technology Organization (RTO) Meeting Proceedings 60, Low Grazing Angle Clutter: Its Characterization, Measurement and Application, pp. 26–1 – 26–12, Laurel, MD, 25–27 April 2000, NATO Sensors and Electronic Technology Panel (SET).
- R. D. De Roo, F. T. Ulaby, A. El-Rouby, A. Y. Nashashibi, and G. S. Samples, "SPRI: Simulator of polarimetric radar images," in Research and Technology Organization (RTO) Meeting Proceedings 60, Low Grazing Angle Clutter: Its Characterization, Measurement and Application, pp. 35–1 – 35–12, Laurel, MD, 25–27 April 2000, NATO Sensors and Electronic Technology Panel (SET).
- A. Y. Nashashibi, F. T. Ulaby, P. Frantzis, and R. D. De Roo, "MMW measurements of the extinction and volume backscattering coefficients of tree canopies at near grazing incidence," in Research and Technology Organization (RTO) Meeting Proceedings 60, Low Grazing Angle Clutter: Its Characterization, Measurement and Application, pp. 27–1 – 27–10, Laurel, MD, 25–27 April 2000, NATO Sensors and Electronic Technology Panel (SET).
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- R. D. De Roo and F. T. Ulaby, "A modified physical optics model of the rough surface reflection coefficient," in Digest, volume 3 of IEEE Antennas and Propagation Society International Symposium, pp. 1771–1775, Baltimore, 21–26 July 1996.
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- R. D. De Roo, Y. Kuga, M. C. Dobson, and F. T. Ulaby, "Bistatic radar scattering from organic debris of a forest floor," in Digest, volume 1 of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '91), pp. 15–18, Helsinki, Finland, 3–6 June 1991.

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**Technical Reports and Handbooks**

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- T. Bongiovanni, H. Enos, A. Monsivais-Huertero, B. Colvin, K. Nagarajan, J. Judge, P.-W. Liu, J. Fernandez-Diaz, R. De Roo, Y. Goykhman, X. Duan, D. Preston, R. Shrestha, C. Slatton, M. Moghaddam, and A. England, "Field observations during the eighth microwave water and energy balance experiment (MicroWEX-8): from June 16 through August 24, 2009," Technical Report AE476, University of Florida, Gainesville, FL, August 2011.
- R. D. De Roo, "Evaluation of DIELCOM: Numerical solution of the Rayleigh approximation to a dielectric body of revolution," Technical Report RL-1017, The University of Michigan, Ann Arbor, MI, 15 November 2007.
- A. W. England and R. D. De Roo, "Active layer thickness and moisture content of arctic tundra from SVAT/radiobrightness models and assimilated 1.4 or 6.9 GHz brightness," Technical Report RL-1014, The University of Michigan, Ann Arbor, MI, June 2006.
- E. Weininger, A. W. England, and R. D. De Roo, "Electromagnetic characteristics of a pendular ring of water as found in a moist snow pack," Technical Report RL-1013, The University of Michigan, Ann Arbor, MI, January 2006.
- R. D. De Roo and A. W. England, "Preparation for radiometric measurements of snow covered terrain at the Fraser forest site of CLPX," Technical Report RL-1011, The University of Michigan, Ann Arbor, MI, 16 January 2005.
- A. W. England and R. D. De Roo, "Monitoring and forecasting attributes of land surface hydrology that are relevant for characterizing a potential battlefield," Technical Report RL-1010, The University of Michigan, Ann Arbor, MI, 10 December 2002.
- A. Y. Nashashibi, K. Sarabandi, P. Frantzis, R. D. De Roo, and F. T. Ulaby, "Design of an ultra-fast wide-band MMW polarimetric instrumentation radar," Technical Report RL-1006, The University of Michigan, Ann Arbor, MI, June 2002.
- F. T. Ulaby, L. P. B. Katehi, G. Rebeiz, A. Nashashibi, R. De Roo, L. Pierce, A. El-Rouby, E. Li, M.-S. Park, P. Frantzis, Y. Du, J. Munn, T. Ellis, and R. Robertson, "MMW radar architecture, phenomenology, and applications," Technical Report QK 8820, The University of Michigan, Ann Arbor, MI, May 2001.
- R. Appleby, S. Stratton, T. Blalock, D. Joynson, R. Smith, R. De Roo, B. Blume, L. van Ewijk, J. Gallagher, S. Taylor, and R. J. Chase, "Modelling and phenomenology," in *Millimeterwave Imaging Experiment (MIMEX) Final Report*, R. Appleby, editor, chapter 6, NATO RSG-20, 1998.

- F. T. Ulaby, A. Y. Nashashibi, R. D. De Roo, P. Frantzis, and A. E. B. El-Rouby, "Handbook of near-grazing millimeter-wave polarimetric radar response of terrain," Technical report, The University of Michigan, December 1998.
- R. D. De Roo, Theory and Measurement of Bistatic Scattering of X-band Microwaves from Rough Dielectric Surfaces, PhD dissertation, University of Michigan, Ann Arbor, January 1996.
- R. De Roo, R. Hartikka, N. Peplinski, and A. Zambetti, "Bistatic measurement facility user's manual," Technical Report 031163-F, The University of Michigan, Ann Arbor, MI, August 1994.

**Research Grants and Contracts**

\* denotes Principal Investigator.

Roger De Roo\*, Leung Tsang, “New Methods for Snow Remote Sensing Using Ultra-Wideband Microwave Radiometry,” NASA 2017 Terrestrial Hydrology Program via Ohio State University, Feb 2018 - Jan 2021, \$180k

Roger De Roo\*, Anthony W. England, and Line van Nieuwstadt, “Wideband Autocorrelation Radiometer Receiver Development and Demonstration for Direct Measurement of Terrestrial Snow and Ice Accumulation,” NASA ROSES 2016 IIP, Jun 2017 - Nov 2018, \$737k

Allison Steiner\*, Gretchen Keppel-Aleks, and Roger De Roo, “Leveraging SMAP to improve understanding of carbon-water-climate interactions,” NASA ROSES 2016 SUSMAP, Apr 2016 - Mar 2019, \$492k

R. D. De Roo\*, “Broadband Radiometry for Snowpack Travel Time Measurement,” NASA Terrestrial Hydrology Program, Jan 2015 - Dec 2017, \$474k

R. D. De Roo\*, “A Low-Cost In-Situ Sensor for Quantifying Spatial and Temporal Variability of Snow Packs for SCLP Validation,” NASA Terrestrial Hydrology Program, Aug 2012 - Aug 2015, \$575k

R. D. De Roo\*, “University of Florida L-band Scatterometer,” University of Florida, Sep 2009 - Oct 2010, \$85k

R. D. De Roo\* and M. Moghaddam, “Instrumentation Support for a Soil Moisture Disaggregation Study,” NASA Terrestrial Hydrology Program via University of Florida, May 2009 - Apr 2013, \$274k

R. D. De Roo\*, “HIRad Instrument Development,” NASA Marshall Space Flight Center via von Braun Space Institute, Dec 2008 - Mar 2009, \$46k

R. D. De Roo\*, “Support for Real-Time Digital Receiver Test Equipment,” NASA SBIR phase I via EMAG Technologies, Inc., Sep 2006 - May 2007, \$33k

R. D. De Roo\* and C. S. Ruf, “An L-band Radio Frequency Interference (RFI) Detection and Mitigation Testbed,” NASA SBIR phases I & II via EMAG Technologies, Inc., Feb 2005 - Dec 2007, \$302k

V. Mironov\* and R. D. De Roo\*, “Dielectric Database for Microwave Remote Sensing of the Circumpolar Arctic,” Civilian Research and Development Foundation (CRDF) of U.S. State Dept., Apr 2006 - Jun 2007, \$30k

C. S. Ruf\* and R. D. De Roo, “Electronic Correlated Noise Calibration Standard for Interferometric and Polarimetric Microwave Radiometers,” NASA SBIR phases I & II via EMAG Technologies, Inc., Feb 2004 - Dec 2006, \$263k

R. D. De Roo\*, “University of Florida L-band Radiometer Upgrade,” University of Florida, Dec 2004 - Aug 2005, \$33k



R. D. De Roo\*, “Iowa State University L-band Radiometer,” Iowa State University, Feb 2004 - Jul 2005, \$97k

A. W. England\* and R. D. De Roo, “Active Layer Thickness and Moisture Content of Arctic Tundra From SVAT Models and Assimilated 1.4 or 6.9 GHz Brightness,” NSF OPP, Mar 2003-Mar 2005 \$462k

R. D. De Roo\*, “University of Florida C-band Radiometer,” University of Florida, May 2002 - Feb 2003, \$51k

### **Student Advising**

Mohammad Mousavi, PhD Candidate, University of Michigan.  
Research Co-Advisor.

Adam Schneider, PhD Candidate, University of Michigan.  
Member of Dissertation Committee.

Harvey Elliot, PhD, University of Michigan, 2017.  
“Using Multipath Interference to Infer Subsurface Soil Properties on Mars and Beyond”  
Member of Dissertation Committee.

Shurun Tan, PhD, University of Michigan, 2016.  
“Multiple Volume Scattering in Random Media and Periodic Structures with Applications in Microwave Remote Sensing and Wave Functional Materials”  
Member of Dissertation Committee.

David Chen, PhD, University of Michigan, 2016.  
“GNSS-R Remote Sensing of the Ocean: Surface Waves and Related Phenomena”  
Member of Dissertation Committee.

Karl Gendler, MEng, University of Michigan, 2015.  
Research Advisor.

Eric Haengel, MS, University of Michigan, 2015.  
Research Advisor.

Hamid Nejati, PhD, University of Michigan, 2014.  
“Passive Remote Sensing of Lake Ice and Snow using Wideband Autocorrelation Radiometer (WiBAR)”  
Member of Dissertation Committee.

Pang-Wei Liu, PhD, University of Florida, 2013.  
“Integration of Active and Passive Microwave Signatures for Characterization of Soil Properties”  
Member of Dissertation Committee.

Sidharth Misra, PhD, University of Michigan, 2011.

“Development of Radio Frequency Interference Algorithms for Passive Microwave Remote Sensing”

Member of Dissertation Committee.

Boon Lim, PhD, University of Michigan, 2008.

“The Design and Development of a Geostationary Synthetic Thinned Aperture Radiometer”

Member of Dissertation Committee.

Yi-Ching Chung, PhD, University of Michigan, 2007.

“A Snow-Soil-Vegetation-Atmosphere Transfer/Radiobrightness Model for Wet Snow”

Member of Dissertation Committee.

Haoyu (Haley) Gu, PhD, University of Michigan, 2006.

“6.9, 19, and 36 GHz Brightness Observations of Cold Lands Hydrology in Alpine and Arctic Terrains”

Member of Dissertation Committee.

Hanh Pham, PhD, University of Michigan, 2006.

“Analysis of Microwave Radiometer Noise”

Member of Dissertation Committee.

K.-J. (Calvin) Tien, PhD, University of Florida, 2006.

“Linking Changes in Dynamic Cotton Canopy to Passive Microwave Remote Sensing”

Member of Dissertation Committee.

Brian Hornbuckle, PhD, University of Michigan, 2003.

“Radiometric Sensitivity to Soil Moisture Relative to Vegetation Canopy Anisotropy, Canopy Temperature, and Canopy Water Content at 1.4 GHz”

Member of Dissertation Committee.

### **Certifications**

Student Pilot with solo endorsement

Engineer-In-Training, April 1989

Michigan Class B Commercial Vehicle Driver License

Amateur Radio, Technician Class, Dec 2012. Call sign: KD8TSL

### **Honors**

Eastern Snow Conference Weisnet Medal, 2016 (jointly with M. Mousavi, K. Sarabandi, A. W. England)

Eastern Snow Conference Sno-Foo Award, 2016

IEEE Geoscience and Remote Sensing Society Symposium Prize Paper Award, 2007  
(jointly with C. Ruf, S. Misra and S. Gross)

NSF Undergraduate Research Opportunity Program (UROP) Recognition Award for  
Outstanding Research Mentorship, 2004 (jointly with A. W. England)

**Societies**

IEEE Geoscience and Remote Sensing Society

American Geophysical Union

**University Service**

CLaSP Safety Committee member, 2015-present

AOSS Safety Committee member, 2012-2015

AOSS Awards Committee member, 2013-2015

AOSS Executive Committee member, 2006-2008

CoE Major Review Casebook Committee member, 2015

**Professional Activities**

Proposal Review Panelist for NASA Advanced Information Systems Technology Pro-  
gram, 2008

Proposal Review Panelist for NASA Planetary Instrument Definition and Develop-  
ment Program, 2005

Proposal Reviewer for Natural Sciences and Engineering Research Council of Canada  
Discovery Grant RFP, 2016

Proposal Reviewer for National Science Foundation, 2005, 2014

Proposal Reviewer for US Army Engineering Research and Development Center Ba-  
sic Research RFP, 2013, 2014

Proposal Review Panelist for University of Michigan UROP Summer Fellowship,  
2008

Reviewer of the Algorithm Theoretical Basis Document for the NASA Soil Moisture  
Active-Passive (SMAP) mission Level 2-3 active-only soil moisture retrieval al-  
gorithm, 2011

Reviewer for IEEE Transactions on Geoscience and Remote Sensing, 1998, 2002,  
2003, 2005–2008, 2010–2012, 2014, 2017

Reviewer for IEEE Geoscience and Remote Sensing Letters, 2006–2008, 2011, 2012,  
2016

- Reviewer for IEEE Journal of Selected Topics in Earth Observations and Remote Sensing, 2009, 2011–2013, 2016, 2017
- Reviewer for MDPI Algorithms, 2009
- Reviewer for MDPI Remote Sensing, 2009
- Reviewer for IEEE Transactions on Instrumentation and Measurement, 2008, 2009
- Reviewer for AGU Radio Science, 2007
- Reviewer for Hydrological Processes, 2013, 2014
- Reviewer for IEEE Transactions on Microwave Theory and Techniques, 2002, 2010
- Reviewer for IEEE Transactions on Aerospace and Electronic Systems, 1999
- Reviewer for Remote Sensing of Environment, 2016
- Session Chair at IEEE Geoscience and Remote Sensing Society Symposium, Quebec, 2014 and Denver, 2006
- Session Chair at Eastern Snow Conference, Huntsville, ON, 2013
- Session Chair at IEEE Antennas and Propagation Society Symposium, Orlando, 1999
- Judge Team Leader for Science Fair, Forsythe Middle School, Ann Arbor, 2005–2009
- Judge for Science Fair, Forsythe Middle School, Ann Arbor, 1999–2003