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Department of Geography and Geoinformation Science

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Education:

Johns Hopkins University, Baltimore, MD

Doctor of Philosophy in Geology, 1993.

Boston College, Chestnut Hill, MA

Master of Science in Geology, 1989.

Northeastern University, Boston, MA

Bachelor of Science in Geology, 1984.

Positions:

2003-present Adjunct Associate Professor, College of Science, George Mason University, Fairfax, VA

Lead- and co-instructor for graduate-level courses in general remote sensing and hyperspectral remote sensing. Advise graduate student research and serve on graduate student committees. A member of the staff of the Center for Earth Observing & Space Research (CEOSR).

Honors and Awards:

2014 Teaching Excellence Award, George Mason University

2008 Secretary of Defense Medal for the Global War on Terrorism, Civilian Recognition

2005 Special Recognition, William Allen Award Nominee for Volunteer Service, The Boeing Company

2005 Invited Lecturer, Institute for Pure and Applied Mathematics (IPAM), UCLA, Graduate Summer School

2004 Letter of Appreciation from the School of Computational Sciences, George Mason University

2002 Elected an Associate Technical Fellow in the Boeing Company

2001 National Reconnaissance Office Technology Fellowship Award

Certifications:

1985 Certificate in Computer Programming, Computer Learning Center (CLC), Somerville, MA

Skills/Applications:

C/C++, Python, FORTRAN, BASIC, Pascal, Windows XP/7/10, UNIX, Arduino

ENVI/IDL, Matlab, Photoshop, FlexPDE, Maxima, Minitab, Maple, R, MS Office (Word, Excel, PowerPoint)

Professional Memberships:

The Society of Photo-Optical Instrumentation Engineers (SPIE)

American Geophysical Union (AGU)

Continuing Education:

2020 Ordinary Differential Equations, MATH677, audit, George Mason University, Fairfax, VA

2011 Introduction to Radar, MITRE Institute, TSP020, McLean, VA

2001 Molecular Dynamics Modeling, CSI786, George Mason University, Fairfax, VA

1997 Applied Statistics, STAT554, George Mason University, Fairfax, VA

1997 Probability for Engineers and Scientists, STAT344, George Mason University, Fairfax, VA

1996 Digital Signal Processing, ECE535, George Mason University, Fairfax, VA

**Publications – Papers**

Resmini, R.G., 2020; in press. On a synthesis of crystal population dynamics and trace element partitioning models: a mechanism for zoning in minerals. To appear in: Journal of Volcanology and Geothermal Research.

Resmini, R.G., Christiansen, K.P., and Allen D.W., 2019. Unraveling low abundance intimate mixtures with deep learning. Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXV, M. Velez-Reyes and D.W. Messinger, eds., 14-18 Apr., Baltimore, MD., v. 10986, 13 p., doi:10.1117/12.2518487.

Paine, E.C., Slonecker, E.T., Simon, N.S., Rosen, B.H., Resmini, R.G., and Allen, D.W., 2018. Optical characterization of two cyanobacteria genera, Aphanizomenon and Microcystis, with hyperspectral microscopy. Journal of Applied Remote Sensing, v. 12, no. 3, https://doi.org/10.1117/1.JRS.12.036013, 12 p.

Slonecker, E.T., Allen, D.W., Resmini, R.G., Rand, R.S., and Paine, E., 2018. Full-range, solar-reflected hyperspectral microscopy to support earth remote sensing research. Journal of Applied Remote Sensing, v. 12, no. 2, doi: 10.1117/1.JRS.12.026024, 23 p.

Stevens, J.R., Resmini, R.G., and Messinger, D.W., 2017. Spectral-density based graph construction techniques for hyperspectral image analysis. IEEE Transactions on Geoscience and Remote Sensing, v. 55, no. 10, pp. 5966-5983, doi:10.1109/TGRS.2017.2718547.

Rand, R.S., Resmini, R.G., and Allen, D.W., 2017. Modeling linear and intimate mixtures of materials in hyperspectral imagery with single scattering albedo and kernel approaches. Journal of Applied Remote Sensing, v. 11, no. 1, pp. 016005-1 to 016005-28, doi: 10.1117/1.JRS.11.016005.

Rand R.S., Resmini R.G., and Allen D.W., 2017. Approaches for Characterizing Nonlinear Mixtures in Hyperspectral Imagery. In: Balan R., Benedetto J., Czaja W., Dellatorre M., and Okoudjou K. (eds), Excursions in Harmonic Analysis, Volume 5. Applied and Numerical Harmonic Analysis. Birkhäuser, Cham (Springer International Publishing), publ., doi: https://doi.org/10.1007/978-3-319-54711-4\_5, pp. 113-128.

Rand, R.S., Resmini, R.G., and Allen, D.W., 2016. Abundance estimation of solid and liquid mixtures in hyperspectral imagery with albedo-based and kernel-based methods. Proceedings of the SPIE, v. 9976, Imaging Spectrometry XXI, J.F. Silny and E.J. Ientilucci, eds., no. 99760M, Sept. 19, 2016, doi:10.1117/12.2239253, 19 p.

Powell, J.H., and Resmini, R.G., 2016. A spectral climatology for atmospheric compensation of hyperspectral imagery. Proceedings of the SPIE, v. 9840, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXII, M. Velez-Reyes and D.W. Messinger, eds., no. 98401Q, May 17, 2016, doi:10.1117/12.2224746, 20 p.

Slonecker, E.T., Allen, D.W., and Resmini, R.G., 2016. Towards establishing compact imaging spectrometer standards. International Journal of Experimenta; Spectroscopic Techniques, v. 1, no. 1, http://vibgyorpublishers.org/content/international-journal-of-experimental-spectroscopic-techniques/ijest-1-005.pdf, 6 p.

Rand, R.S., Resmini, R.G., and Allen, D.W., 2015. Characterizing intimate mixtures of materials in hyperspectral imagery with albedo-based and kernel-based approaches. Proceedings of the SPIE, Imaging Spectrometry XX, T.S. Pagano and J.F. Silny, eds., v. 9611 (961112), doi: 10.1117/12.2190067, 20 p.

Rand, R.S. and Resmini, R.G., 2014. Using kernel-based and single-scattering albedo approaches for generalized spectral mixture analysis of hyperspectral imagery. Proceedings of the SPIE, Imaging Spectrometry XIX, P. Mouroulis and T.S. Pagano, eds., v. 92220J, (15 Sept., 2014), doi:10.1117/12.2063278, 18 p.

Resmini, R.G., Rand, R.S., Allen, D.W., and Deloye, C.J., 2014. An analysis of the nonlinear spectral mixing of didymium and soda-lime glass beads using hyperspectral imagery (HSI) microscopy. Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XX, M. Velez-Reyes and F.A. Kruse, eds., v. 90880Z (5-9 May, 2014), doi:10.1117/12.2051434, 15 p.

Powell, J.H., and Resmini, R.G., 2014. A spectral climatology for atmospheric compensation. Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XX, M. Velez-Reyes and F.A. Kruse, eds., v. 90880I (5-9 May, 2014), doi:10.1117/12.2050596, 12 p.

Salvador, M.Z., and Resmini, R.G., 2014. Computation in hyperspectral imagery (HSI) data analysis: role and opportunities. In: *Data Mining for Geoinformatics: Methods and Applications*, Cervone, G., Lin, J., and Waters, N, eds., Springer, (book chapter) pp. 1-28.

Resmini, R.G., and Allen, D.W., 2014. The microscene: a novel method for hyperspectral image generation  
for algorithm development and testing. In press for the 2014 Meeting of the Military Sensing Symposium  
(MSS) Specialty Groups on Passive Sensors, Battlefield Survivability & Discrimination, Detectors &  
Materials, Gaithersburg, MD, 8-12 Sept., 2014, 10 p.

Resmini, R.G., Deloye, C.J., and Allen, D.W., 2013. An analysis of the probability distribution of spectral angle and Euclidean distance in hyperspectral remote sensing using microspectroscopy. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XIX, S.S. Shen and P.E. Lewis, eds., v. 8743, doi: http://dx.doi.org/10.1117/12.2015701, Baltimore, MD, 29 April-3 May, 2013, 13 p.

Allen, D.W., Resmini, R.G., Deloye, C.J., and Stevens, J.R., 2013. A microscene approach to the evaluation of hyperspectral system level performance. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XIX, S.S. Shen and P.E. Lewis, eds., v. 8743, doi: http://dx.doi.org/10.1117/12.2015834, Baltimore, MD, 29 April-3 May, 2013, 13 p.

Resmini, R.G., 2012. Simultaneous spectral/spatial detection of edges for hyperspectral imagery: the HySPADE algorithm revisited. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVIII, S.S. Shen and P.E. Lewis, eds., v. 8390, doi: http://dx.doi.org/10.1117/12.918751, Baltimore, MD, 23-27 April, 2012, 12 p.

West, M.S., Manville, K., and Resmini, R.G., 2011. Quantification of constituents in areal and intimate binary mixtures of particulate materials. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVII, S.S. Shen and P.E. Lewis, eds., v. 8040, doi: 10.1117/12.887698, Orlando, Fla., 25-29 April, 2011, 12 p.

Resmini, R.G., 2010. On a model for generating theoretical crystal size distributions (CSDs) in igneous systems: a moment transformation approach. Mathematical Geosciences, v. 42, no. 3, pp. 347-354, doi: 10.1007/s11004-010-9266-9.

Resmini, R.G., 2010. Section 2.3, Land Remote Sensing: Hyperspectral Techniques. Book chapter/section contribution to Yang, C.P., Wong, D., Miao, Q., and Yang, R., eds. *Advanced GeoInformation Science.* CRC Press/Taylor and Francis Group, publ.

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Schlamm, A., Resmini, R.G., Messinger, D.W., and Basener, W., 2010. A comparison study of dimension estimation algorithms. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVI, S.S. Shen and P.E. Lewis, eds., v. 7695, doi: 10.1117/12.849125, Orlando, Fla., 5-9 April, 2010, 8 p.

Resmini, R.G., 2009. A tool for the nonparametric characterization of the geometry of spectra in hyperspace. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XV, S.S. Shen and P.E. Lewis, eds., v. 7334, doi: 10.1117/12.819312, Orlando, Fla., 13-17 April, 9 p.

West, M.S., and Resmini, R.G., 2009. Hyperspectral imagery and LiDAR for geological analysis of Cuprite, Nevada. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XV, S.S. Shen and P.E. Lewis, eds., v. 7334, doi: 10.1117/12.819315, Orlando, Fla., 13-17 April, 10 p.

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Salvador, M.Z., Resmini, R.G., and Gomez, R.B., 2009. Detection of sulfur dioxide in AIRS data with the wavelet packet subspace. IEEE Geoscience and Remote Sensing Letters, v. 6, no. 1, pp. 137-141, doi: 10.1109/LGRS.2008.2009645.

Resmini, R.G., and Mitchell, H.J., 2008. On the use of thin plastic films as gas-phase analog targets. IEEE International Geoscience and Remote Sensing Symposium, 2008, 7-11 July, v. 4, pp. IV-577 to IV-580, doi: 10.1109/IGARSS.2008.4779787.

Resmini, R.G., 2008. Using remotely sensed thermal infrared multispectral data and thermal modeling to estimate lava tube roof thickness at Kilauea Volcano, Hawaii. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XIV, S.S. Shen and P.E. Lewis, eds., v. 6966, doi: 10.1117/12.771633, Orlando, Fla., 16-20 March, 10 p.

Salvador, M.Z., Resmini, R.G., and Gomez, R.B., 2008. Hyperspectral trace gas detection using the wavelet packet transform. In Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XIV, S.S. Shen and P.E. Lewis, eds., v. 6966, doi: 10.1117/12.777586, Orlando, Fla., 16-20 March, 12 p.

Resmini, R.G., 2007. Modeling of crystal size distributions in sills. Journal of Volcanology and Geothermal Research, v. 161, pp. 118-130, doi: 10.1016/j.jvolgeores.2006.06.023.

Castrodad, A., Bosch, E., and Resmini, R.G., 2007. Spectral transformations in hyperspectral imagery using real and imaginary components. In: Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XIII, S.S. Shen and P.E. Lewis, eds., v. 6565, doi: 10.1117/12.718932, Orlando, Fla., 9-13 April, 10 p.

Lausten, K.M., and Resmini, R.G., 2006. Temperature emissivity separation (TES) utilizing a temperature-modulated spectrally-homogeneous region: an alternative perspective. In: Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XII, S.S. Shen and P.E. Lewis, eds., v. 6233, doi: 10.1117/12.665233, Orlando, Fla., 17-21 April, 10 p.

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Resmini, R.G., 2004. Hyperspectral/Spatial Detection of Edges (HySPADE): An algorithm for spatial and spectral analysis of hyperspectral information. Proceedings of the SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery X, S.S. Shen and P.E. Lewis, eds., Orlando, Fla., April 12-16, v. 5429, doi: 10.1117/12.541877, pp. 433-442.

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Hort, M., Marsh, B.D., Resmini, R.G., and Smith, M.K., 1999. Convection and crystallization in a liquid cooled from above: an experimental and theoretical study. Journal of Petrology, v. 40, no. 8, pp. 1271-1300.

Resmini, R.G., 1997. Enhanced detection of objects in shade using a single-scattering albedo transformation applied to airborne imaging spectrometer data. The International Symposium on Spectral Sensing Research, San Diego, California, CD-ROM, 7 p.

Tompkins, S., Sunshine, J.M., and Resmini, R.G., 1997. Terrain categorization based on classification results from spectral mixture analysis of hyperspectral imagery. The International Symposium on Spectral Sensing Research, San Diego, California, CD-ROM, 5 p.

Resmini, R.G., Sunshine, J.M., Tompkins, S., and Farrand, W.H., 1997. Mapping of alteration mineralogy and fumarole indicators at Mt. St. Helens. Proceedings of the Twelfth International Conference on Applied Geologic Remote Sensing, 17-19 November, Denver, Colo., ERIM International, Inc., publ., pp. II-457­-II-464.

Olsen, R.C., Bergman, S., and Resmini, R.G., 1997. Target detection in a forest environment using spectral imagery. Proceedings of the SPIE: Imaging Spectrometry III, San Diego, California, 28-30 July, v. 3118, pp. 46-56.

Resmini, R.G., Kappus, M.E., Aldrich, W.S., Harsanyi, J.C., and Anderson, M.E., 1997. Mineral mapping with Hyperspectral Digital Imagery Collection Experiment (HYDICE) sensor data at Cuprite, Nevada, U.S.A. International Journal of Remote Sensing, v, 18, no. 7, doi: 10.1080/014311697218278, pp. 1553-1570.

Stoner, W.W., and Resmini, R.G., 1996. Hyperspectral remote sensing. SAIC Science and Technology Trends: From Science to Solutions. pp. 35-41.

Resmini, R.G., Graver, W.R., Kappus, M.E., and Anderson, M.E., 1996. Constrained energy minimization applied to apparent reflectance and single-scattering albedo spectra: a comparison. Proceedings of the SPIE: Hyperspectral Remote Sensing and Applications, Sylvia S. Shen, ed., Denver, Colo., August 5-6, v. 2821, pp. 3-13, doi:10.1117/12.257168.

Aldrich, W.S., Kappus, M.E., Resmini, R.G., and Mitchell, P., 1996. HYDICE post flight data processing. Proceedings of the SPIE: Algorithms for Multispectral and Hyperspectral Imagery II, A. Evan Iverson, ed., Orlando, Fla., April 9-11, v. 2758, pp. 354-363.

Kappus, M.E., Aldrich, W.S., Resmini, R.G., and Mitchell, P., 1996. The flexible HYDICE sensor's first year of operation. Proceedings of the 11th Thematic Conference on Geologic Remote Sensing, 27-29 February, v. 1, pp. 433-441.

Resmini, R.G. and Marsh, B.D., 1995. Steady-state volcanism, paleoeffusion rates and magmatic system volume inferred from plagioclase crystal size distributions in mafic lavas: Dome Mountain, Nevada. Journal of Volcanology and Geothermal Research, v. 68, pp. 273-296.

Voelker, M.A., Resmini, R.G., Mooradian, G.C., McCord, T.B., Warren, C.P., Fené, M.M., Anderson, R.D., and Coyle, C.C., 1995. Advanced Airborne Hyperspectral Imaging System (AAHIS): An imaging spectrometer for maritime applications. Imaging Spectrometry, Descour, M.R., Mooney, J.M., Perry, D.L., and Illing, L., editors, Proceedings of the SPIE, v. 2480, pp. 357-367.

Resmini, R.G., Sunshine, J.M., Schaum, A., McCord, T.B., Forsythe, J.L., and Gillespie, A.R., 1994. Assessment of the linear mixing model for subpixel materials detection in Thermal Infrared Multispectral Scanner (TIMS) images. Proceedings of the International Symposium on Spectral Sensing Research '94, v. 1, pp. 312-332.

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Resmini, R.G., 1989. The thermal structure of the continental crust: computer modeling experiments in heat conduction. M.S. Thesis, Boston College, 451 pp.

**Publications – Abstracts**

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