

Roman Kuc

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Education:

Ph.D.	1977	Columbia University.
M.S.E.E.	1970	Columbia University.
B.S.E.E.	1968	Illinois Institute of Technology.

Professional experience:

Yale University	7/94 - present	Professor of Electrical Engineering.
	7/87 - 6/94	Tenured Associate Professor of Electrical Engineering.
	7/83 - 6/87	Associate Professor of Electrical Engineering.
	7/86 - present	Director of Intelligent Sensors Laboratory.
	7/79 - 6/83	Assistant Professor of Electrical Engineering.
Columbia University	6/77 - 7/79	Post-Doctoral Fellow in Electrical Engineering.
Bell Laboratories	6/68 - 1/75	Member of Technical Staff.

Yale Service:

Associate Dean of Educational Affairs (Director of Educational Affairs), SEAS	1/2000 - 6/2012
Director of Undergraduate Studies, Eng. & Applied Science	1/2000 - 6/2012
Member, Summer Session Advisory Committee	1/2005 - present
Member, Professional School Deans Committee	7/2008 - 6/2012
Member, SEAS Advancement Committee for Engineering (ACE)	7/2010 - 6/2013
Member, SEAS Dean's Executive Committee (DEC)	7/2010 - 6/2012
Member, Yale College ROTC Advisory Committee	7/2011 - present
Member, Quantitative Reasoning Council (Chair in 2006)	7/2005 - 12/2009
Chair, Advisory Committee for Resources for Students & Employees with Disabilities	1/2001 - 6/2008
Member, Chopivsky Yale-Ukraine Initiative	1/1994 - 12/1999

Visiting Professorships:

Tokyo University	1984	Institute of Medical Electronics.
Carnegie Mellon University	1986	Robotics Institute.
Tokyo Institute of Technology	1986	Graduate Center at Nagatsuta.
University of Alcalá, Spain	2009, 2011	Department of Electronics, Masters Class.

Awards and Honors:

1. Honorary Doctorate, Glushkov Institute of Cybernetics, Kyiv, Ukraine, 2013.
2. Award for Excellence in Physical Sciences and Mathematics, for Springer Handbook of Robotics, by Professional & Scholarly Division, Association of American Publishers, Inc., 2008.
3. Member, Connecticut Academy of Science and Engineering, 2004.
4. Fellow, Shevchenko Scientific Society, 2001.
5. Grand Order of the Golden Bulldog, Yale University, 1999.
6. Academician (Honorary), Academy of Sciences of Ukraine, Kyiv, Ukraine, 1998.
7. Sheffield Distinguished Teaching Award, Yale University, 1998.
8. Master of Arts, *privatim*, Yale University, 1995.
9. IEEE Acoustics, Speech and Signal Processing Society Paper Award, 1983.
10. Honorary societies: $\Phi\text{H}\Sigma$, HKN , T B II and $\Sigma\Xi$.

Professional activities:

Institute of Electrical and Electronics Engineers (IEEE):

6/12-present	Emeritus Senior Member.
6/89-6/12	Senior Member.
3/84-4/90	Member, Multidimensional Signal Processing Technical Committee.
3/84-4/90	Liaison, Steering Committee, Transactions on Medical Imaging.
ICASSP'88	Program Committee, Exhibits Chairman.
1/84-1/87	Associate Editor, Trans. on Acoustics Speech and Signal Processing.
1/84-1/87	Member, Speech Processing Technical Committee.
6/84-6/85	Chairman, CT Chapter, Acoustics, Speech and Signal Processing Society.
1/80-6/84	Chairman, CT Chapter, Engineering in Medicine and Biology Society.
9/80-7/90	Faculty Adviser, Yale Student Chapter.

New York Academy of Sciences:

1/81-1/83	Chair, Instrumentation Section.
1/79-1/81	Vice-chair, Instrumentation Section.

American Scientist Magazine:

6/83-5/90	Consulting Editor (Electrical Engineering).
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Tau Beta Pi:

9/80-7/2007	Faculty Adviser, CT- α Chapter.
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Acoustical Society of America:

9/90-	Member.
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American Society of Engineering Education:

12/99-7/12	Member.
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Books:

1. *Electrical Engineering in Context: Smart Devices, Robots and Communications*. Cengage Learning Press. 2014.
2. *The Digital Information Age - 2nd Edition*. Cengage Learning Press. 2014.
3. Sonar sensing. (with L. Kleeman) Chapter in *Springer Handbook of Robotics - 2nd Edition*, B. Siciliano and O. Khatib (Eds). Springer Press. 2013.
4. Sonar sensing. (with L. Kleeman) Chapter in *Springer Handbook of Robotics*, B. Siciliano and O. Khatib (Eds). Springer Press. 2008. (*This book received two PROSE 2009 Awards by the American Association of Publishers, Inc.*)
5. Biomimetic sonar recognizes objects from echoes. Chapter in *Echolocation in Bats and Dolphins*, edited by J. Thomas, C. F. Moss, and M. Vater. University of Chicago Press. 2004.
6. *The Digital Information Age*. PWS Publishing Co. 1999.
7. *Introduction to Digital Signal Processing*. McGraw-Hill, 1988. Reprinted by BSP Publications, India, 2006.
8. Application of ultrasonic tissue characterization to diffuse liver disease. Chapter in *CRC Tissue Characterization with Ultrasound*, J. Greenleaf (Ed.) 1986.
9. *Multidimensional Digital Signal Processing*. Member of Editorial Staff. IEEE Press, 1986.

Consulting:

1. Rehabilitation Engineering in Veterans Administration, NYC.
2. Expert Witness in electro-mechanical devices, digital systems and telecommunications.
3. Review panel member for NSF, NIH, EU, & NSER Canada.
4. Workshop participant for DARPA, National Academy of Sciences, and ABET.

Patents:

1. Adaptive Acoustic Signal Sensing Device and Recognition System, U.S. Serial No. 5,577,006.
2. Biomedical Magnetism Imaging Apparatus and Method, U.S. Serial No. 5,594,849.

Areas of Research:

Digital signal processing, intelligent sensors, embedded systems, telecommunications, biomimetic sensor systems, sonar, radar, digital systems, robotics.

Cover articles:

1. R. Kuc Bounds on estimating the acoustic attenuation of small tissue regions from reflected ultrasound signals. *Proceedings IEEE* 73, 1159-1168, 1985.
2. R. Kuc and B. Barshan. Bat-like sonar for guiding mobile robots. *IEEE Control Systems Society Magazine*, 12(4), 4-12, 1992.
3. R. Kuc. Biomimetic sonar system recognizes objects using binaural information. *Journal of the Acoustical Society of America*, 102(2), 689-696, 1997.

Invited articles:

1. R. Kuc. Applying digital signal processing to diagnostic ultrasound signals. *IEEE Acoust. Speech Signal Processing Magazine* 1, 19-26, 1984.
2. R. Kuc. Biomimetic sonar locates and recognizes objects. *IEEE J. Oceanic Engineering*, 22(4), 616-624, 1997.

Other articles published:

1. R.Kuc and M. Schwartz. Estimating the acoustic attenuation coefficient slope for liver from reflected ultrasound signals. *IEEE Trans. Sonics Ultrasonics SU-26*, 353-362, 1979.
2. R.Kuc, M. Schwartz, N. Finby and F. Dain. Statistical estimation of the acoustic attenuation coefficient slope for liver tissue from reflected ultrasonic signals. *NBS Ultrasound Tissue Characterization II*, 125-132, 1979.
3. R.Kuc. Application of Kalman filtering techniques to diagnostic ultrasound. *Ultrasonic Imaging* 1, 105-120, 1979.
4. R.Kuc. Clinical application of an ultrasound attenuation coefficient estimation technique for liver pathology characterization. *IEEE Trans. Biomedical Eng. BME-27*, 312-319, 1980.
5. R.Kuc. Digital filter models for media having linear with frequency loss characteristics. *J. Acoust. Soc. Amer.* 69, 35-40, 1981.
6. R.Kuc and K. Taylor. Variation of the acoustic attenuation coefficient slope for in vivo liver. *Ultrasound Med. Biol* 8, 403-412, 1982.
7. R. McGowan and R.Kuc. A direct relation between a signal time series and its unwrapped phase. *IEEE Trans. Acoust. Speech Signal Process. ASSP-30*, 719-726, 1982.
This paper received the 1983 ASSP Society Paper Award.
8. R.Kuc. Estimating the acoustic attenuation from reflected ultrasound signals: Comparison of spectral-shift and spectral-difference approaches. *IEEE Trans. Acoust. Speech Signal Process. ASSP-32*, 1-6, 1984.
9. R.Kuc and D. Regula. Diffraction effects in reflected ultrasound spectra. *IEEE Trans. Biomedical Eng. BME-31*, 537-545, 1984.
10. R.Kuc. Modeling acoustic attenuation of soft tissue with a minimum-phase filter. *Ultrasonic Imaging* 6, 24-36, 1984.
11. R.Kuc. Estimating reflected ultrasound spectra from quantized signals. *IEEE Trans. Biomedical Eng. BME-32*, 105-112, 1985.
12. R.Kuc. Ultrasound tissue characterization using kurtosis. *IEEE Trans. Ultrasonics Ferroelectrics Freq. Control UFFC-33*, 273-279, 1986.
13. R.Kuc and H. Li. Reduced order autoregressive modeling for center-frequency estimation. *Ultrasonic Imaging* 7, 244-251, 1986.
14. K.J.W. Taylor, C.A. Riely, L. Hammers, S. Flax, G. Weltin, G. Garcia-Tsao, H. Conn, R. Kuc, and K.W. Barwick. Quantitative US attenuation in normal liver and in patients with diffuse liver disease: The importance of fat. *Radiology* 160, 65-71, 1986.

15. R. Kuc and H. Miwa. A computer model for simulating reflected diagnostic ultrasound signals. *J. Acoust. Soc. Amer.* 80(3), 951-954, 1986.
16. R. Kuc, K. Haghkerdar and M. O'Donnell. Presence of cepstral peak in random reflected ultrasound signals. *Ultrasonic Imaging* 8, 196-212, 1987.
17. R. Kuc and M. Siegel. A physically-based simulation model for acoustic sensor robot navigation. *IEEE Trans. Pat. Analysis Mach. Intelligence PAMI-9*, 766-778, 1987.
18. B. Barshan and R. Kuc. Differentiating sonar reflections from corners and planes employing intelligent sensors. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 12, 560-569, 1990.
19. R. Kuc. A spatial sampling criterion for sonar obstacle detection. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 12, 686-690, 1990.
20. R. Kuc and V. B. Viard. A physically-based navigation strategy for sonar guided vehicles. *Int. J. Robotics Research* 10(2), 75-87, 1991.
21. O. Bozma and R. Kuc. Characterizing pulses reflected from rough surfaces using ultrasound. *J. Acoust. Soc. Amer.* 89(6), 2519-2531, 1991.
22. O. Bozma and R. Kuc. Building a sonar map in a specular environment using a single mobile transducer. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 13(12), 1260-1269, 1991.
23. R. Kuc and B. Barshan. A bat-like sonar system for obstacle localization. *IEEE Trans. Systems, Man and Cybernetics*, 22(4), 636-646, 1992.
24. R. Kuc. Three-dimensional tracking using qualitative bionic sonar. *Robotics and Autonomous Systems*, 11, 213-219, 1993.
25. O. Bozma and R. Kuc. A physical model-based analysis of heterogeneous environments using sonar – ENDURA method. *IEEE Trans. Pattern Analysis and Machine Intelligence* 16(5), 497-506, 1994.
26. R. Kuc. Sensorimotor model of bat echolocation and prey capture. *J. Acoust. Soc. Amer.* 96(4), 1965-1978, 1994.
27. L. Kleeman and R. Kuc. Mobile robot sonar for target localization and classification. *International Journal Robotics Research* 14(4), 295-318, 1995.
28. T. Ogawa, K. Kameyama, R. Kuc, and Y. Kosugi. Source localization with network inversion using an answer-in-weights scheme. *IEICE Transactions on Information and Systems* E79-D(5), 608-619, 1996.
29. R. Kuc. Biologically-motivated adaptive sonar system. *Journal of the Acoustical Society of America*, 100(3), 1849-1854, 1996.
30. R. Kuc. Magnetometer spacing criterion for biomagnetic source current imaging. *IEEE Trans. Biomed. Engineering*, 43, No. 11, 1125-1127, 1996.
31. L. Venkataramanan, L.J. Walsh, R. Kuc, and F. J. Sigworth. Identification of Hidden Markov Models for ion channel currents – Part I: Colored background noise. *IEEE Trans. Signal Processing* 46(7), 1901-1915, 1998.
32. L. Venkataramanan, R. Kuc, and F. J. Sigworth. Identification of Hidden Markov Models for ion channel currents – Part II: State-dependent excess noise. *IEEE Trans. Signal Processing* 46(7), 1916-1929, 1998.

33. R. Kuc, G.M. Bakan, V.V. Volosov, N.N. Kussul, and A.Yu Shelestov. Reflected ultrasonic signals recognition using neural networks. *Problems in Processing and Informatics*, April, 1998, 126-142 (in Russian).
34. N. Kirichenko, R. Kuc, and N. Lepekha. 3-D object detection with ultrasonic echo-signals. *Problems of Control and Informatics*, 5, 110-122. 1999.
35. L. Venkataramanan, R. Kuc, and F. J. Sigworth. Identification of Hidden Markov Models for ion channel currents – Part III: Band-limited, sampled data. *IEEE Trans. Signal Processing* 48(2) 376-385, 2000.
36. R. Mueller and R. Kuc. Foliage echoes: A probe into the ecological acoustics of bat echolocation. *Journal of the Acoustical Society of America*, 108(2), 836-845, 2000.
37. R. Kuc. Teaching the Non-science major: EE101 - The Digital Information Age. *IEEE Transactions on Education*, 44(2), 158-164, 2001.
38. R. Kuc. Improving object classification with biomimetic sonar. *Journal of the Acoustical Society of America*, 110(3), 1263-1236, 2001.
39. R. Kuc. Transforming echoes into pseudo-action potentials for classifying plants. *Journal of the Acoustical Society of America*, 110(4), 2198-2206, 2001.
40. R. Kuc. Pseudo-amplitude scan sonar maps. *IEEE Trans. Robotics and Automation*, 17(5), 767-770, 2001.
41. R. Kuc. Binaural sonar electronic travel aid provides vibrotactile cues for landmark, reflector motion, and surface texture classification. *IEEE Trans. Biomedical Engineering*, 49(10), 1173-1180, 2002.
42. R. Kuc. Object localization from acoustic emissions produced by other sonars. *Journal of the Acoustical Society of America*, 112(5), 1753-1755, 2002.
43. R. Kuc. Forward model for sonar maps produced with the Polaroid ranging module. *IEEE Trans. Robotics and Automation*, 19(2), 358-362, 2003.
44. R. Kuc. Recognizing retro-reflectors with an obliquely-oriented multi-point sonar and acoustic flow. *International J. Robotics Research*, 22(2), 129-145, 2003.
45. R. Kuc, E. Jackson and A. Kuc. Teaching introductory robotics with JavaScript simulations and actual robots. *IEEE Transactions on Education*, 47(1), 74-82, 2004.
46. R. Kuc. Neuro-computational processing of moving sonar echoes classifies and localizes foliage. *Journal of the Acoustical Society of America*, 116(3), 1811-1818, 2004.
47. R. Kuc. Biomimetic sonar and neuromorphic processing eliminate reverberation artifacts. *IEEE Sensors J.* 7(3), pp. 361-369, 2007.
48. R. Kuc. Neuromorphic processing of moving sonar data estimates passing range. *IEEE Sensors J.* 7(5), 851-859, 2007.
49. R. Mueller and R. Kuc. Biosonar-Inspired Technology: Goals, Challenges, and Insights. *Bioinspiration & Biomimetics*, 2 pp. 1-16, 2007.
50. R. Kuc. Generating B-scan images with a conventional sonar. *IEEE Sensors Journal.* 8(2), 151-160, 2008.

51. F.J. Alvarez and R. Kuc. Dispersion relation for air via Kramers-Kronig analysis. *Journal of the Acoustical Society of America*, 124(2), EL57-EL61, 2008.
52. F.J. Alvarez and R. Kuc. High resolution adaptive spiking sonar. *IEEE Trans UFFC*. 56(5), 1024-1033, 2009.
53. R. Kuc. Model predicts bat pinna ridges focus high frequencies to form narrow sensitivity beams. *Journal of the Acoustical Society of America*, 125(5), May 2009, pp. 3454-3459.
54. R. Kuc. Morphology suggests noseleaf and pinnae cooperate to enhance bat echolocation. *Journal of the Acoustical Society of America*, 128(5), Nov 2010, pp. 3190-3199.
55. F.J. Alvarez, R. Kuc and T. Aguilera. Identifying fabrics with a variable emission airborne spiking sonar. *IEEE Sensors Journal*. *IEEE Sensors Journal*, 11(9), 2011, pp. 1905-1912.
56. R. Kuc. Bat noseleaf model: Echolocation function, design considerations, and experimental verification. *Journal of the Acoustical Society of America*, 129(5), 2011, pp. 3361-3366.
57. R. Kuc. Echolocation with bat buzz emissions: Model and biomimetic sonar for elevation estimation. *Journal of the Acoustical Society of America*, 131(1), 2012, pp. 561-568.
58. R. Kuc and V. Kuc. Bat wing air pressures may deflect prey structures to provide echo cues for detecting prey in clutter. *Journal of the Acoustical Society of America*, 132(3), 2012, 1776-1779.

Invited Lectures:

1. Tissue characterization based on reflected ultrasound. Fifth Int. Symp. Ultrasonic Tissue Characterization, 1980.
2. Estimating acoustic attenuation from reflected ultrasound. 34th Annual Conf. Eng. Med. Biology, 1981.
3. Ultrasound tissue characterization using differential spectral estimates. 9th Annual Northeast Bioengineering Conf. 1981.
4. Estimating the acoustic attenuation of small tissue regions using reflected ultrasound spectra. AIUM Annual Convention, 1983.
5. An overview of techniques for estimating attenuation. Ninth Int. Conf. Ultrasound Tissue Characterization, 1984.
6. Estimating the attenuation from reflected ultrasound signals: Bounds and clinical application. Plenary Session Speaker during Fourth European Workshop on Ultrasonic Tissue Characterization, Harrogate UK, 1984.
7. Diagnosing diffuse liver disease from reflected ultrasound attenuation estimates. Japanese Ultrasound Society Meeting, Tokyo, 1984.
8. Sonar guided vehicles. New York Academy of Sciences, Instrumentation Section, 1988.
9. Remote measurement of structural motion by sonar. ATLSS Seminar Series, Lehigh University, 1990.
10. Current sources in biomagnetism, Bogomolets Institute of Physiology, Ukrainian Academy of Sciences, Kyiv, Ukraine, 1991.
11. The biomagnetic inverse problem. University of Kyiv, Ukraine, 1991.

12. Biomagnetic source imaging. Polytechnic Institute of Lviv, Ukraine, 1991.
13. ROBAT: A bat-like mobile robot for tracking a moving obstacle. New York Academy of Sciences, Instrumentation Section, 1992.
14. Image grid spacing for biomagnetic current reconstruction. First All-Ukrainian Int. Conf. Signal/Image Proc. and Pat. Recog. Kyiv, Ukraine, 1992.
15. Mobile robot sonar for target localization and classification. MIT Autonomous Underwater Vehicles Seminar Series, 1993.
16. Frontiers of sonar sensing in robotics. Tokyo Inst. Technology, Japan, 1994.
17. Biomimetic sonar system recognizes objects. MIT Ocean Engineering Dept, 1997.
18. Teaching engineering to liberal arts students. Directions in Engineering Education: National Perspectives Symposium, Sesquicentennial of Engineering at Brown, 1997.
19. Biomimetic sonar. Monterey Bay Aquarium Research Institute Seminar Series, 1997, Monterey Bay, CA.
20. Temporal and spectral information in echoes for biomimetic object recognition. 134rd Meeting of Acoustical Society of America, 1997, San Diego, CA.
21. Biomimetic sonar processing. Workshop on Biosonar, University of Tuebingen, 1998, Germany.
22. Pseudo-action potentials for recognizing natural objects. MIT Ocean Eng Dept, 2001.
23. Recognizing corners from conventional sonar data. CMU Robotics Inst., 2002.
24. Sonar localization for extraneous sources. MIT Ocean Eng. Dept, 2003.
25. Cybernetic model for monitoring early dementia from vehicle operation data. 7th Annual Conf. Japan Society for Early Stage of Dementia, Tokai Univ., 2005.
26. R. Kuc. Biomimetic Robots: Applying Nature's Approaches, Silicon Valley Yale Club, San Jose CA, 2007.
27. R. Kuc. Biomimetic Sonar Sensing for Robots, Physics Seminar Series, Mount Holyoke College, 2008.
28. R. Kuc. Generating Rich Emission Beams for Echolocation, 15th International Bat Research Conference (IBRC), Prague, 2010.
29. R. Kuc. Neuromorphic sonar using sparse echo coding, International Conference on Informatics, Glushkov Cybernetics Institute, Kyiv, Ukraine, 2013.

Other presentations:

1. Engineering and medical aspects of clinical sonography. 28th Ann. Conf. Eng. Med. Biol. 1973 (with L. von Micsky).
2. Parametric estimation of the acoustic attenuation coefficient slope for soft tissue. IEEE Ultrasonics Symp. 1976, pp 44-47. (with M. Schwartz and L. von Micsky).
3. Variance reduction in the characterization of liver tissue using reflected ultrasound signals. IEEE Ultrasonics Symp. 1977 (with M. Schwartz, N. Finby and F. Dain).

4. Spatial correlation properties of the acoustic attenuation for in vitro liver samples. IEEE Ultrasonics Symp. 1978 (with M. Schwartz, F. Darr and R. Aisenberg).
5. Kalman filter approach in the analysis of reflected ultrasound signals. Third Int. Symp. Ultrasonic Tissue Characterization, 1978 (with M. Schwartz and J. Kaufman).
6. Non-invasive determination of liver pathology using ultrasound spectral estimates. 14th Annual Meeting AAMI, 1979.
7. Quantitative characterization of in vivo liver pathology using acoustic attenuation slope estimates. Fourth Int. Symp. Ultrasonic Tissue Characterization, 1979 (with F. Dain and R. Enerson).
8. Kalman filter models for ultrasound signals. Fourth Int. Symp. Ultrasonic Tissue Characterization, 1979 (with V. Houston).
9. Application of Kalman filter models to tissue characterization. Fourth Int. Symp. Ultrasonic Tissue Characterization, 1979 (with J. Kaufman).
10. Progress in characterizing diffuse diseases of the liver using attenuation slope estimates. Fifth Int. Symp. Ultrasonic Tissue Characterization, 1980 (with K. Taylor).
11. Repeatability of attenuation slope estimates for liver tissue disease characterization. 25th Annual Convention AIUM, 1980 (with K. Taylor).
12. Comparison of attenuation slope estimates and A-scan analysis for detection of diffuse liver disease. 25th Annual Convention AIUM, 1980 (with K. Taylor and A. Rosenfield).
13. Attenuation slope estimates in diffuse liver disease: clinical results. Sixth Int. Symp. Tissue Conf. 1981 (with K. Taylor, A. Rosenfield, D. Regula and R. Randall-Chaffee).
14. Estimating the dynamics of in vivo liver from reflected ultrasound signals. Sixth Int. Symp. Tissue Characterization, 1981.
15. Estimating the nonlinear attenuation with frequency characteristic of in vivo liver. Sixth Int. Symp. Tissue Characterization, 1981 (with D. Regula).
16. Modeling and estimating reflected signal spectra. Seventh Int. Conf. Ultrasonic Tissue Characterization, 1982.
17. Differentiating diffuse liver diseases with spectral difference estimates. Fifth World Congress of Ultrasound in Medicine and Biology, Brighton, UK, 1982 (with K. Taylor and D. Regula).
18. Optimal estimation of center location of a Gaussian spectrum. Eighth Int. Conf. Ultrasonic Tissue Characterization, 1983.
19. Comparison of spectral-shift and spectral-difference methods for estimating acoustic attenuation coefficient slopes. Eighth Int. Conf. Ultrasonic Tissue Characterization, 1983.
20. Error bounds for spectral estimates using zero-crossing count analysis. Eighth Int. Conf. Ultrasonic Tissue Characterization, 1983 (with S. Flax).
21. Adaptive processing for ultrasound signals. Fifth Annual IEEE-EMBS Conference, 1983 (with J. Kaufman and H. Meadows).
22. Applying spectral-shift procedure for estimating acoustic attenuation to non-Gaussian spectra. IEEE Ultrasonics Symp, 1983.

23. Generating a minimum-phase digital filter model for the acoustic attenuation of soft tissue. IEEE Ultrasonics Symp, 1983.
24. Feasibility of attenuation images from reflected ultrasound signals. Ninth Int. Conf. Ultrasound Tissue Characterization, 1984.
25. Determining vocal tract shape by applying dynamic constraints. Int. Conf. Acoustics Speech Signal Processing, 1985 (with F. Tuteur and J. Vaisnys).
26. Laser emission and coherent Raman scattering from individual flowing droplets. AFOSR Rocket Propulsion Research Meeting, 1985 (with R.K. Chang and M.B. Long).
27. Estimating the center-frequency of reflected ultrasound using maximum entropy method spectral estimation. Tenth Int. Conf. Ultrasound Tissue Characterization, 1985 (with H. Li).
28. Estimating kurtosis of reflected ultrasound signals for tissue characterization. Tenth Int. Conf. Ultrasound Tissue Characterization, 1985.
29. A learning vocoder employing a vocal tract model. Fourth Yale Workshop on Applications on Adaptive Systems Theory, 1985 (with S. Reich).
30. Presence of cepstral peak in reflected ultrasound signals. Eleventh Int. Conf. Ultrasound Tissue Characterization, 1986 (with K. Haghkerdar and M. O'Donnell).
31. Investigation of Superradiant LDV Markers and Three-Component Velocity Mapping. AFOSR Rocket Propulsion Research Meeting. Stanford, 1986 (with R.K. Chang and M.B. Long).
32. Intelligent sensor approach to differentiating sonar reflections from corners and planes. Int. Conf. on Intelligent Autonomous Systems. Amsterdam, 1986 (with Y.D. Di).
33. Efficient representation of reflecting structures for a sonar navigation model. IEEE Robotics and Automation Conf, 1987 (with M.W. Siegel).
34. Errors in determining the vocal tract shape from the acoustic signal. Int. Conf. Acoustics, Speech, and Signal Processing, 1987 (with H. Han).
35. INCH: An intelligent Wheelchair Prototype for the Blind. (with S. Rao) NE Bioengineering Conf, Boston, 1989.
36. Navigating vehicles through an unstructured environment with sonar. IEEE Int. Conf. Robotics and Automation. 1422-1427, 1989 (with B. Barshan).
37. Measuring structural motion and location remotely with sonar. Conf. Nondestructive Evaluation of Civil Structures and Materials, University of Colorado, 1990.
38. Sonar system for obstacle localization with insights from the echolocating bat. Acoustical Society of America Meeting, San Diego, 1990 (with B. Barshan).
39. Characterizing pulse signals reflected from rough surfaces. Acoustical Society of America Meeting, San Diego, 1990 (with O. Bozma).
40. Active sonar for obstacle localization using envelope shape information. Int. Conf. on Acoustics, Speech and Signal Processing, Toronto, 1991 (with B. Barshan).
41. Wide-band analysis of reflections from rough surfaces. Int. Conf. on Acoustics, Speech and Signal Processing, Toronto, 1991 (with O. Bozma).

42. Zoom-SVD Biomagnetic imaging. 8th Int. Conf. Biomagnetism. Munster, Germany, 1991 (with Szinger, Shimura, Goto and Hayashi).
43. Application of SVD to Biomagnetic Imaging. 8th Int. Conf. Biomagnetism. Munster, Germany, 1991 (with J. Szinger).
44. Application of simulated annealing to discrete-dipole localization. 8th Int. Conf. Biomagnetism. Munster, Germany, 1991 (with S. Rao).
45. Bat-like sonar system strategies for mobile robots. IEEE Int. Conf. on Systems, Man and Cybernetics. Charlotte VA, 1991 (with B. Barshan).
46. Novel sonar map-building based on physical principles of reflection. IEEE Int. Conf. on Systems, Man and Cybernetics. Charlotte VA , 1991 (with O. Bozma).
47. Bat-like mobile robot for tracking a moving obstacle. SPIE Conf. on Intelligent Robotic Systems. Boston, 1991 (with B. Barshan).
48. ROBAT: A sonar-based mobile robot for bat-like prey capture. Robotics and Automation Conf, Nice, France, 1992 (with B. Barshan).
49. Docking mobile robots using a bat-like sonar. IEEE Int. Conf. Intelligent Robots and Systems. Raleigh NC, 1992 (with B. Barshan).
50. Characterizing the environment using echo energy, duration and range: The ENDURA method. IEEE Int. Conf. Intelligent Robots Systems. Raleigh NC, 1992 (with O. Bozma).
51. Three-dimensional docking using qualitative sonar. Int. Conf. on Intelligent Autonomous Systems, IAS-3, Pittsburgh, 1993.
52. Estimating the extent of distributed sources. Biomag'93, Vienna, 1993 (with J. Szinger).
53. Grid spacing criterion for source current imaging. Biomag'93, Vienna, 1993.
54. Biosonar projects in the Intelligent Sensors Laboratory. Critical Issues in Replicating Biosonar, NRaD, San Diego, 1994.
55. Hidden Markov analysis of noisy single channel current recordings. 40th Annual Meeting Biophysical Society, Baltimore, 1996 (with L. Venkataramanan and F.J. Sigworth).
56. Sonar vision. Problems in Robot Technology Seminar Series. Department of Cybernetics, University of Kyiv, Ukraine, August 1996.
57. Fusing binaural sonar information for object recognition. Proc. 1996 IEEE/SICE/RSJ International Conf on Multisensor Fusion and Integration for Intel. Systems, 727-735. Washington DC.
58. Biomimetic sonar for object recognition. Proc. 23rd International Symp on Acoustical Imaging, 1997, Boston.
59. Teaching the Non-science major: EE101 - The most popular course at Yale. 1997 ASEE Conf. Milwaukee.
60. Biomimetic sonar differentiates coin head from tail. 133rd Meeting of Acoustical Society of America, 1997, State College, PA.
61. Biomimetic sonar systems. Biological Sonar Conference, June, 1998, Corvoeiro, Portugal.

62. Biomimetic sonar recognizes objects from echoes. Biological Sonar Conference, June, 1998, Corvoeiro, Portugal.
63. Biomimetic sonar recognizes objects from echoes. Biological Sonar Conference, June, 1998, Corvoeiro, Portugal.
64. R. Mueller and R. Kuc. Biosonar in a textured world. 137th Meeting of Acoustical Society of America, 1999, Berlin.
65. Nonlinear Sonar. June 1999. Cybernetics Faculty, Kyiv University, Ukraine.
66. Biomimetic Sonar. June 1999. Academy of Sciences of Ukraine, Informatics Laboratory, Lviv, Ukraine.
67. Nature-inspired sonar projects. August 1999. DARPA Air Coupled Acoustic Microsensor Workshop.
68. R. Kuc, M. Kirichenko, and M. Lepekha. Adaptive and mobile biomimetic sonar recognizes objects from echoes. September 1999. Oceans'99, Seattle.
69. R. Mueller and R. Kuc. Non-Gaussian randomness outside and inside the bat's brain. 138th Meeting of Acoustical Society of America, 1999, Columbus.
70. R. Kuc, M. Kirichenko, and M. Lepekha. New techniques for classifying echoes. Second All-Ukrainian Int. Conf. Signal/Image Proc. and Pat. Recog. Kyiv, Ukraine, Dec. 2000.
71. C.E. Yawson and R. Kuc. Software modifications for autonomous robot navigation. Annual Biomedical Research Conference for Minority Students, Nov. 2002. (A) p. 441-2.
72. P.J. Were, R. Kuc, and H. Waterford. Biomimetic sonar sensing for autonomous vehicle navigation. Annual Biomedical Research Conference for Minority Students, Oct. 2003.
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75. R. Kuc. Teaching Science to Non-Science Majors. CT Yale Club, Mystic CT, 2005.
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79. R. Kuc. What robots can learn from bats. Engineering Seminar, University of Alcalá', Spain, 2011.

Exhibits, Articles and Interviews describing my Research

1. Museum exhibit - Rodolph (robot dolphin) image in The Tech Museum of Innovation's exhibit, "Robot Explorers", San Jose, CA.
2. Television Reports:
 - (a) PBS, November 18, 1989 (Yale-Princeton Football Halftime Report): Robot Wheelchair.

- (b) Science Technology Network, August 11, 1998: High-Tech Shower International # 1378. Sonar Robot.
 - (c) Discovery Science Channel, June 9, 1999: Beyond 2000 - Episode 18, Sonar Robot.
 - (d) Discovery Science Channel, February 8, 2004: WildTech - Episode 5, SEEING.
3. Web sites:
- (a) http://cosmiclog.msnbc.msn.com/_news/2010/10/06/5246429-ratcar-takes-to-the-robo-road describes my biomimetic research.
4. Radio interviews:
- (a) AAAS Science Update # 1524 (Radio), December 19, 1997: Rodolph.
 - (b) Liberty Radio - London (Live interview) on October 19, 1997.
 - (c) Yale iTunes U. (Podcast interview) I, ROBAT: Robots that navigate the way bats and dolphins do. 2009.
5. Magazine articles:
- (a) New Scientist, June 21, 1997: Animals teach robots how to see.
 - (b) Science, October 3, 1997: Dolphin-inspired robot.
 - (c) Discover, November, 1997: The Batbot.
 - (d) Science World (a science magazine for 7th-8th graders that's distributed in schools across the country), February 9, 1998: Dolphin-Bot.
 - (e) Farm Futures (magazine for affluent farmers), 1997: Article describes sonar for use in robot tractors.
 - (f) Wired, February, 1998: Seeing with Sonar.
 - (g) Mechanical Engineering (ASME magazine), February, 1998, Input/Output section: Robotic dolphin follows Nature's design.
 - (h) Ill. Inst. of Tech. Catalyst, Fall 1999. IIT Alum Roman Kuc Wows Classes at Yale.
 - (i) Yale Scientific Magazine, Summer 2004, Getting Back to Nature: Biomimetic Sensors.
6. Newspaper articles:
- (a) Yale Bulletin & Calender, September 22-29, 1997. Turning sound into sight.
 - (b) The Atlanta Journal and Constitution, October 5, 1997, Sunday, all editions. Science section.
 - (c) Los Angeles Times, October 9, 1997, Thursday. Robot prompts new look at using sonar in exploration.
 - (d) The London Sunday Times: Innovation, October 12, 1997. Rodolph the robot uses sound to see.
 - (e) London Daily Telegraph, October 14, 1997, Tuesday. Robot dolphin proves to be sound investigator.
 - (f) New Haven Register: Health/Science, October 23, 1997, Thursday. Lessons from dolphins & bats.
 - (g) Newsday (Long Island), October 28, 1997, Tuesday. A fish out of water/ like a dolphin, mobile robot uses sonar.
 - (h) Science Blog, 1997 Yale Sonar Robot Modeled After Bat And Dolphin Echolocation Behavior.
 - (i) Yale Bulletin, Jan 18, 2002. The 'real world' is next testing ground for new breed of robots.

- (j) Yale Daily News, Sept 29, 2010. Lend me an ear: Electrical Engineering Professor uses animals' ears to design sensors.

7. Reports:

- (a) Yale University Science News Tips, September, 1997. Sonar robot that mimics bats and dolphins rivals camera vision.
- (b) Insider R&D, vol. 26(41), October 15, 1997. Sonar takes better pictures than camera.