
CURRICULUM VITAE

NORMAN DAVID BLACK

1. Personal Details, Qualifications and Career

Name:	Professor Norman D Black BSc, PhD, FRCM, MIEEE
Occupation:	University Professor School of Information and Software Engineering University of Ulster Jordanstown
Educational Qualifications:	B.Sc. (Hon.) Electrical and Electronic Engineering (1980) Ph.D. (QUB) by thesis entitled "Filterbank Analysis of Speech" (1984)
Professional Qualifications:	President of the European Society for Engineering and Medicine (ESEM) (1999-present) Fellow of the Royal College of Medicine MIEEE Member of the Institute of Electrical and Electronic Engineers (1980 - present) AMIEE Associate Member of the Institute of Electrical Engineers (1986 - present) Past President of The Ulster Biomedical Engineering Society (1995 - 1998) Founder Member of the Institute of Telemedicine (1998)

2. Statement of Experience

1999 – present	Dean, Faculty of Informatics, University of Ulster
1999 - present	Professor of Medical Informatics, University of Ulster
1999 - present	Director, Institute of Health Informatics
1996 - 1999	Professor in Digital Communication, University of Ulster
1994 - 1999	Director, Northern Ireland BioEngineering Centre.
1994 - 1999	University Co-ordinator of UoA 26, General Engineering
1993 - 1996	Reader (Dept. Electrical and Electronic Engineering)
1990 - 1993	Senior Lecturer (Dept. Electrical and Electronic Engineering)
1989 - 1994	Assistant Director Northern Ireland BioEngineering Centre.
1985 - 1990	Lecturer University of Ulster (Electrical and Electronic Engineering)
1971 - 1985	British Telecom

Publications & Funding

I currently have a substantial output record having published and presented over 130 scientific papers (see appendix A.1) along with considerable research income of grants worth over £8.5 million (see appendix A.2).

6. Awards and Prizes

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| 1996 | Premium paper award, IEE Computer and Control section for the publication "Hearing Aids - A development with DSP devices" |
| 1988 | Research Corporation Trust scholarship for continuing work on "digital hearing aids" |
| 1986 | Nuffield Foundation scholarship award for the development of hearing aid technology through "real-time auditory processing". |
| 1981-1982 | QUB best PhD studentship award in Electrical and Electronic Engineering |
| 1976-1980 | British Telecom Minor award holder. This is a scholarship awarded by British Telecom to enable staff to undertake degree studies. |

Appendix 1: PUBLICATIONS

2002

1. Lopez J A, Nugent C D, BLACK ND, Parallel consensual neural networks to support lead-positioning in body surface cardiac mapping to improve myocardial infarction diagnosis, *ISCE 2002*, in press, 2002.
2. Nugent C D, Lopez J A, Smith, A E, BLACK, N D, Prediction models in the design of neural network based classifiers: A neural network and genetic programming approach, *BMC Journal of Medical Informatics and Decision Making*, 2:1, pp. 1-15, 2002. (<http://www.biomedcentral.com/1472-6947/2/1>)

2001

3. Min Li, McAllister H G, Black N D, De Perez Trina Adrian, Perceptual Time-Frequency Subtraction Algorithm for Noise Reduction in Hearing Aids, *IEEE Transactions on Biomedical Engineering*, Vol 48, No 9, September 2001.
4. Lopez JA, Nugent CD, BLACK ND, Smith AE, Automated synthesis of prediction models for neural network based myocardial infarction classifiers, submitted to IEEE EMBS 2001, May 2001.
5. Nugent CD, Finlay D, BLACK ND, The design of a care model and associated peripherals to assist with non-compliance of medication, submitted to IEEE EMBS, May 2001.
6. Nugent CD, Finlay D, BLACK ND, An internet approach to delivery and management of medication in the home, submitted to Belfast2001, March 2001.
7. Nugent CD, Lopez JA, Smith AE, BLACK ND, Reverse engineering of neural network classifiers in medical applications, submitted to Belfast2001, March 2001.
8. Wang H, BLACK N D, Nugent C D, Design of an interactive GSM-based mobile telecardiology system, *Proceedings of the VII EFOMP Congress, Physica Medica*, vol. XVII, no. 3, pp. 184, 2001.
9. Nugent CD, BLACK ND, Fiorni P, An IT approach to the design and management of medication in the home; requirements analysis, *Technology and Healthcare*, Vol 9, pp33-34, 2001.
10. Nugent CD, Lopez JA, Smith AE, BLACK ND, A neural network prediction model to assist in the design of myocardial infarction classifiers, *Technology and Health Care*, Vol 9, pp197-199, 2001.
11. Lopez JA, Nugent CD, BLACK ND, Smith AE, Prediction models for the design of neural networks for myocardial infarction classification: a genetic programming approach, *Technology and Health Care*, Vol 9, pp38-40, 2001.
12. Lopez JA, Nugent CD, Ziri-Castro KI, BLACK ND, An electro-oculogram based human-computer interface for the disabled, *Technology and Health Care*, Vol 9, pp189-191, 2001.
13. Lopez JA, Nugent CD, BLACK ND, Coronary tree modelling with iterative function systems using a genetic algorithm, *Technology and Health Care*, Vol 9, pp187-189, 2001.

14. Nugent CD, McCormack M, Davies RJ, BLACK ND, A human-computer interface to assist in the development of musical devices for physically impaired students, *Technology and Health Care*, Vol 9, pp191-192, 2001.
15. McCormack M, Nugent CD, Davies RJ, BLACK ND, Creative interfacing – the development of appropriate assistive technologies for real-time music performance, *Technology and Health Care*, Vol 9, pp60-61, 2001.

2000

16. Nugent CD, Webb JAC & BLACK ND, 'Feature and Classification Fusion for 12-Lead ECG Classification', *Medical Informatics and the Internet in Medicine*, 2000
17. Azuaje F, Dubitzky W, BLACK ND & Adamson K, 'Discovering Relevance Knowledge in Data: A Growing Cell Structure Approach', submitted to the *IEEE Transactions on Systems, Man and Cybernetics*. (in press), 2000
18. Azuaje F, Dubitzky W, Lopes P, BLACK ND, Adamson K & White J, 'Prediction of Coronary Heart Disease Risk Changes Based on Fuzzy ARTMAP Neural Networks', submitted to *Medical Informatics*, 2000
19. Dubitzky W, Azuaje F, Lopes P & BLACK ND, 'Using Genetic Algorithms for Learning Global and Local Case Feature Weights', submitted to the *Int. Journal of Computers and their Applications*, 2000
20. Li M, McAllister G, BLACK ND & Adrian de Perez T, 'Perceptual Time-Frequency substraction algorithm for noise reduction in hearing aids', submitted to *IEEE Proceedings in Biomedical Engineering*, 2000
21. Li M, McAllister G, BLACK ND & Adrian de Perez T, 'A wavelet based nonlinear homomorphic AGC method for hearing aid loudness compensation', submitted to *IEEE Proceedings Visual Image and Signal Processing*, 2000
22. BLACK ND, Millar RJ, Kunt M, Ziliani F & Reid M, 'Second Generation Image Coding', *Advances in Imaging and Electron Physics*, Academic Press, Vol. 112, pp 1-54, 2000
23. De Perez T A, Li M, McAllister G H, BLACK N D, 'Noise Reduction and Loudness Compression in a Wavelet Modelling of the Auditory System', *Proceedings of the Third IEEE International Caracas Conference on Devices, Circuits and Systems*.
24. Nugent C D, Webb J A C, BLACK N D, 'Feature and classifier fusion for 12-lead ECG classification', *Medical Informatics and the Internet in Medicine*, Vol 25, No 3, pp225-235, 2000.
25. Nugent C D, Lopez J, Smith A, BLACK ND, 'Neural Network and Genetic Programming Prediction Models for the Design of Neural Network Based ECG Classifiers', submitted to *Medinfo2001*.
22. C D Nugent, Lopez J A, Black N D, Webb J A C, 'The Application of Neural Networks in the Classification of the Electrocardiogram', submitted to *Computational Intelligence Techniques in Medical Diagnosis and Prognosis*, Springer, 2001.

1999

23. Nugent CD, Webb JAC, BLACK ND & Wright G, 'Electrocardiogram II: Classification', *Automedica*, Vol 17, pp281-306, 1999

24. Nugent CD, Webb JAC, Dempsey G, BLACK ND, Beat Detection: A Review of the past 3 decades, Proc of the Annual Scientific Meeting of the Ulster Biomedical Society, pp6, 1996.. (Ir J Med Sc, Vol 168, No 1, pp56, 1999).
25. Nugent CD, Webb JAC, Wright GTH, BLACK ND, Dempser-Shafer Orthogonal Summation of Bi-Group Neural Networks Applied to Electrocardiography, Proc of the Annual Scientific Meeting of the Ulster Biomedical Society, pp1, 1997. (Ir J Med Sc, Vol 168, No 1, pp59, 1999).
26. Azuaje F, Dubitzky W, Lopes P, Wu X, BLACK ND, Adamson K & White J, 'Prediction of Coronary Disease Risk Based on Short-Term Electrocardiogram Patterns: A Neural Network Approach', Artificial Intelligence in Medicine, (in Press), 1999
27. Nugent CD, Webb JAC, BLACK ND, Wright G & McIntyre M, 'An Intelligent Framework for the Classification of the 12-Lead ECG', Artificial Intelligence in Medicine, Vol 16, pp205-222, 1999
28. Azuaje F, Dubitzky W, BLACK ND & Adamson K, 'Improving Clinical Decision Support Through Case-Based Fusion', IEEE Transactions on Biomedical Engineering, Vol. 46, No. 10, pp 1181-1185, October 1999
29. Azuaje F, Dubitzky W, Lopes P, BLACK ND, Adamson K, Wu X & White J, 'Predicting Coronary Disease Based on Short-Term RR Intervals Measurements: A Network Approach', Artificial Intelligence in Medicine, pp 275-297, 1999
30. Azuaje F, Dubitzky W, BLACK ND & Adamson K, 'Discovering and Fusing Relevant Knowledge in Databases', to appear in the Proceedings of the 2nd International Conference on Information Fusion, to appear in the Proceedings of the 2nd International Conference on Information Fusion, 1999
31. Dubitzky W, Azuaje F, Lopes P, BLACK ND, McCullagh P & Song P, 'On Local and Global Feature Weight Discovery for Case-Based Reasoning', in Proc. ISCA 14th Int. Conf. On Computers and their Applications, Mexico, 1999
32. Wu X, Dubitzky W, Azuaje F & BLACK ND, 'Discovering Relevant Knowledge for Clustering through Incremental Growing Cell Structures, submitted to the 16th Int. Joint Conf. On Artificial Intelligence, 1999
33. Dubitzky W, Azuaje F, Lopes P, BLACK ND, McCullagh P & Song Y, 'On Local and Global Feature Weight Discovery for Case-Based Reasoning', In Proceedings of ISCA 14th Int. Conf. On Computers and their Applications, pp 107-110, Mexico, 1999
34. Nugent CD & BLACK ND, 'Telecardiology: Remote monitoring of the 12-Lead ECG', invited lecture for the British Council Major Trauma Seminar, November 1999

1998

35. Azuaje F, Dubitzky W, Lopes P, Wu X, BLACK ND, Adamson K & White J, 'Discovery of Incomplete Knowledge in Electrocardiographic Data', IPMU '98 (in preparation) 1998
36. Nugent CD, Webb JAC, Wright G & BLACK ND, 'Electrocardiogram I: Pre-processing Prior to Classification', Automedica, Vol. 16, pp 263-282, 1998
37. Nugent CD, Webb JAC, Wright G & BLACK ND, 'Dempster-Schafer Orthogonal Summation of Bi-group Neural Networks Applied to Electrocardiography', Automedica, (Paper in Press) 1998
38. Nugent CD, Webb JAC, BLACK ND, Wright G & McIntyre M, 'Computerised Electrocardiography Employing Bi-Group Neural Networks', Artificial Intelligence in Medicine, Vol. 13, pp 167-180, 1998

39. Nugent CD, Webb JAC, Wright GTH, BLACK ND, A Potential 'Third Generation' Computerised Electrocardiogram System, Proceedings of Bioengineering in Ireland, 1997. (Ir J Med Sc, Vol 167, pp1113,, 1998).
40. Nugent CD, Webb JAC, BLACK ND & McIntyre M, '12 Lead ECG Classification Employing Bi-group Neural Networks', Proceedings of the International Society of Computerised Electrocardiology, 1998
41. Nugent CD, Webb JAC, BLACK ND & McIntyre M, 'Feature Selection Techniques for 12 Lead ECG Classification', Proceedings of Bioengineering in Ireland/The Annual Scientific Meeting of the Ulster Biomedical Society, pp 44, 1998
42. Nugent CD, Webb JAC, BLACK ND & McIntyre M, 'Bi-group Neural Network Classification of the 12 Lead ECG', Proceedings of the VIII Mediterranean Conference on Medical and Biological Engineering and Computing, MEDICON, 1998
43. Nugent CD, Webb JAC, BLACK ND & McIntyre M, 'Bi-dimensional Feature Selection of Electrocardiographic Data', Proceedings of the VIII Mediterranean Conference on Medical and Biological Engineering and Computing, MEDICON, 1998
44. Nugent CD, Webb JAC, BLACK ND, Wright GTH & McIntyre M, 'Classification of the 12-Lead Electrocardiogram Employing a Framework of Bi-group Neural Networks', IEE Digest, Vol. 98514, pp 6/1-6/3, 1998
45. Nugent CD, Webb JAC & BLACK ND, '12-Lead Electrocardiography: An Engineering Perspective', To be presented at the IEE Young Members Premiums Final, pp 1-2, 18 November 1998
46. Azuaje F, Dubitzky W, Lopes P, BLACK ND, Adamson K, Wu X & White J, 'Discovery of Incomplete Knowledge in Electrocardiographic Data', Proceedings of the Third Int. Conf. On Neural Networks and Expert Systems in Medicine and Healthcare, Ifeachor E, Sperduti A & Starita A (eds), World Scientific, 286-294 Singapore, 1998
47. Azuaje F, Dubitzky W, Lopes P, BLACK ND, Adamson K, Wu X & White J, 'Knowledge Discovery in Electrocardiographic Data Based on Neural Clustering Algorithms', Proceedings of the VIII Mediterranean Conf. On Medical and Biological Engineering and Computing, MEDICON '98, ISBN 9963-607-13-6, 1998
48. Azuaje F, Dubitzky W, Lopes P, BLACK ND, Adamson K, Wu X & White J, 'Making Clinical Data Meaningful: Knowledge Discovery in Coronary Disease Risk Assessment', abstract published in Proceedings of Bio-Engineering...in Ireland, pp 62, 1998
49. Azuaje F, Dubitzky W, Lopes P, BLACK ND, Adamson K, Wu X & White J, 'Making Clinical Data Meaningful: Knowledge Discovery in Coronary Disease Risk Assessment', abstract published in The Irish Journal of Medical Science, Vol. 167, No. 4, pp 274, 1998

1997

50. Li M, McAllister HG & BLACK ND, 'Noise Reduction Using Wavelets for Sensorineural Hearing Impairments', The Int. Conf. On Signal Processing Application and Technology, ISSPAT, San Diego, 14-17 September 1997
51. Li M, McAllister HG & BLACK ND, 'Compensation for recruitment of loudness in sensorineural hearing impairment using a wavelet model of speech', ISP, Magee, 1997

52. Reid M, Millar R & BLACK ND, 'Second Generation Image Coding: An Overview', IEEE Transactions on Image Processing, ACM Computing Surveys, Vol. 29, No. 1, pp 3-30, March 1997
53. Nugent CD, Webb JAC, Wright GTH & BLACK ND, 'ECG Classification: A Hybrid Approach', Irish DSPCC97, pp 85-91, Magee College, Londonderry, June 1997
54. Nugent CD, Webb JAC, Wright GTH & BLACK ND, 'ECG Classification: A Hybrid Approach', Proceedings of the Irish Signals and System Conference 97, pp 259-266, 1997
55. Nugent CD, Webb JAC, Wright GTH & BLACK ND, 'A Potential Third Generation Computerised Electrocardiogram System', Proceedings of Bioengineering in Ireland, 1997
56. Nugent CD, Webb JAC, Wright GTH & BLACK ND, 'Dempster-Shafer Orthogonal Summation of Bi-Group Neural Networks Applied to Electrocardiography', Proceedings of the Annual Scientific Meeting of The Ulster Biomedical Society, pp 1, 1997
57. Nugent CD, Webb JAC & BLACK ND, '12 Lead Electrocardiography: An Engineering Perspective', IEE Young Members Paper Evening, 1997
58. Azuaje F, Dubitzky W, Wu X, Lopes P, BLACK ND, Adamson K & White J, 'A Neural Network Approach to Coronary Heart Disease Risk Assessment Based on Short-term Measurement of RR Intervals', IEEE Computers in Cardiology, Vol. 24, pp 53-56, 1997
59. Azuaje F, Dubitzky W, Wu X, Lopes P, BLACK ND, Adamson K & White JA, 'A Neural Network Approach to Coronary Heart Disease Risk Assessment Based on Short-Term Measurement of RR Intervals', In: Computers in Cardiology, IEEE Computer Society, Vol. 24, pp 53-56, Los Alamitos, 1997
60. Nugent CD, Webb JAC, BLACK ND & Wright GTH, 'Electrocardiogram 2: Classification, Submitted to Automedica, October 1997

1996

61. Irvine D, BLACK ND & Cinnamond M, 'On the use of hidden markov modelling for the acoustical analysis of Stridor', Irish DSPCC96, pp 61-67, Trinity College, Dublin, 1996
62. Li M, McAllister HG & BLACK ND, 'Multirate Multi-resolution filter banks works as a platform for signal processing in hearing aids', Irish DSPCC96, pp 85-89, Trinity College, Dublin, 1996
63. Adamson K, McClelland I & BLACK ND, 'Telecardiology', Lecture notes in Artificial Intelligence - Artificial Intelligence in Medicine, Springer Verlag, pp 409-410, Ed Barahona et al, 1996
64. Nugent CD, Webb JAC, Dempsey G & BLACK ND, 'Beat Detection: A review of the past 3 decades', Proc. Of the Annual Scientific Meeting of the Ulster Biomedical Society, pp 6, 1996
65. Nugent CD, Webb JAC, Wright GTH & BLACK ND, '12-lead ECG Diagnosis: Reasoning Under Uncertainty', Poster Presentation at the 6th Annual Cambridge Neural Networks Summer School, 1996
66. Nugent CD, Webb JAC, Wright GTH & BLACK ND, 'Computerised ECG Classification', IEE Young Members Paper Evening, 1996

1995

67. McClelland I, Adamson K & BLACK ND, 'Information Issues in Telemedicine Systems', Review Article in Journal of Telemedicine and Telecare, Vol. 1, No 1, pp 7-12, 1995

68. Weiss S, Dempsey G & BLACK ND, 'ECG Compression: New Relative Zero Order Interpolation', 3rd European Conference on Engineering and Medicine, pp 451, Florence, Italy, April/May 1995
69. McAllister HG, BLACK ND, Waterman N, Mitchell M & Houston G, 'A wearable digital signal processing based hearing aid', 3rd European Conference on Engineering and Medicine, pp 343-344, Florence, Italy, April/May 1995
70. McClelland I, Adamson K and BLACK ND, 'Applications of Telemedicine to Monitoring of ECG Patients', IASTED Int. Conf. Austria, 1995
71. McClelland I, Adamson K & BLACK ND, 'Telecardiology' Proc. of AIME, Int. Conf. On Artificial Intelligence in Medicine, pp 409-410, Pavia, Italy, 1995
72. BLACK ND, 'BioEngineering in Northern Ireland', ITBM Special Issue, 1995
73. Li M, McAllister HG & BLACK ND, 'Statistical Analysis of Quantisation and Roundoff Errors in Fixed-Point Realisation of a Frequency Sampling Filter for Audiogram Matching', IEE Proc. Vision, Image and Signal Processing, 1995
74. McClelland I, Adamson K & BLACK ND, 'Telemedicine: ISDN & ATM - The Future', IEEE Engineering in Medicine and Biology, Int. Conf. Montreal, Canada, November 1995
75. McClelland I, Adamson K & BLACK ND, 'Heterogeneous Integrated Multimedia Medical System (HIMMS)', IEEE Engineering in Medicine and Biology, Int. Conf. Montreal, Canada, November 1995
76. BLACK ND, 'Digital Processing in Hearing Aids', Invited Lecture, British Society of Audiology Annual Conference, pp 3 Abstracts, Coleraine, Northern Ireland, 1995
77. McAllister HG, BLACK ND & Waterman N, 'A body worn Digital Hearing Aid', IEEE Engineering in Medicine and Biology, Int. Conf. Montreal, Canada, November 1995
78. Li M, McAllister HG & BLACK ND, 'An Optimal curve for choosing the number of zeros in an audiogram', IEEE Engineering in Medicine and Biology, Int. Conf. Montreal, Canada, November 1995
79. McAllister HG, BLACK ND & Waterman N, 'Hearing Aids - a development with digital signal processing devices', Computing & Control Engineering Journal, Vol. 6, No. 6, 1995
80. Reid M, Millar R & BLACK ND, 'Lossless volume compression for PACS', Proc. Of Telemedicine Int. Conf. On Telecare, pp 55-56, London, UK, November 1995

1994

81. Mitchell M, Evans NE & BLACK ND, 'Use of Software Controlled Timers for Data Synchronisation in a Digital Portable Radio Communications System', 3rd Bangor Symposium on Communications, pp. 122-125, 1994
82. Adamson K & BLACK ND, 'A Concurrent Implementation of a 128 Channel Filterbank model of the Cochlea using Transputers'. Automedica, Vol. 16, pp 83-95, 1994
83. Adamson K, Donnan G & BLACK ND, 'Application of concurrency to a digital vocal tract simulation'. Automedica Vol. 16, pp 83-95, 1994

84. BLACK ND, McAllister HG, Rao MPRV, Waterman N, O'Kane PC & Powderly M, 'A Digital Filterbank Master Hearing Aid', *Automedica*, Vol. 16, pp 183-190, 1994
85. Mitchell CM, Evans NE, BLACK ND & Matthews JGW, 'Providing primary health care with a digital radio patient monitoring network', *Automedica*, Vol. 16, pp 83-95, 1994
86. Powderly M, BLACK ND & Walbridge A, 'Real-time vocal tract shape display for vowel production', *Automedica*, Vol. 16, pp 175-181, 1994
87. BLACK ND & Moore I, 'Communication Skills', *The New Academic*, Vol. 3, pt 2, pp 13, March 1994
88. BLACK ND & Moore I, 'Developing transferrable skills through data communications' in *Alternative Approaches to Teaching Engineering*, Vol. 1 Ed Moore and Exley, pp 41-44, 1994
89. Reid M, Millar R & BLACK ND, 'A comparison of first generation image coding techniques applied to the same magnetic resonance image', *The Ulster Biomedical Engineering Society Spring Conf. Drogheda, Ireland*, 1994

1993

90. Malone M, BLACK ND, Lydon M & Cinammond M, 'The Acoustical Analysis of Infantile Stridor - A Review', *Medical & Biological Engineering & Computing*, Vol. 31, pp 85-96, 1993
91. BLACK ND, McAllister HG, Waterman N & Powderly M, 'Frequency response shaping with a master hearing aid', *2nd European Conference on Engineering in Medicine*, pp 70-71, Stuttgart, 1993

1992

92. BLACK ND & Irvine DA, 'Physiologically Based Digital Filterbank', *Automedica*, Vol. 14, No. 2-3, pp 145-154, 1992
93. Adamson K, Perry D & BLACK ND, 'Performance results on the implementation of physiological models using transputer networks'. *IEEE, EMBS International Conference*, Vol. 6, pp 2574-2575, Paris, 1992
94. Adamson K & BLACK ND, 'Physiological modelling of the Human Cochlea', *IEEE, EMBS Int. Conf.* Vol. 6, pp 2565-2567, Paris, 1992
95. BLACK ND & Adamson K, 'Transputer array processor for physiological modelling', *IEEE, EMBS Int. Conf.* Vol. 6, pp 2576-2577, Paris, 1992
96. Mitchell M, Matthews JGW, Evans NE & BLACK ND, 'Networked portable digital radio for the hospital environment' *MEDICOM Int. Conf.* pp 83-95, Capri, 1992
97. Waterman N & BLACK ND, 'The investigation of pitch processing algorithm as a possible noise reduction system in a digital hearing aid'. *The Ulster Biomedical Engineering Society*, 1992
98. Mitchell CM, Matthews JGW, Evans NE & BLACK ND, 'An investigation into the use of low speed digital radio networks for patient monitoring within hostile environments'. *Royal Irish Academy, 5th One-Day Symp.*, pp 4, 1992
99. BLACK ND, Lydon M, Waterman N & Powderly M, 'Programmable Audiogram Matching Using a Frequency Sampling Filter Implemented on the Texas TMS 320C30', *IEEE Int. Conf. On Acoustics Speech & Signal Processing*, pp II225-II228, 1992

1991

100. Adamson K, Donnan G & BLACK ND, 'Biomedical Data Computation & Graphical Communications Using Parallel Processing', IEEE, EMBS, Vol. 13 pt. 3, pp 1214-1215, Orlando, 1991
101. Adamson K, Donnan G & BLACK ND, 'Parallel Computing in Diagnosis', IEEE, EMBS, Vol. 13 pt. 3, pp 1230-1231 Orlando, 1991
102. Mitchell M, Evans NE & BLACK ND, 'Networked Portable Digital Radio in Hostile Environments', ARMMS, pp 131-132, Belfast, 1991

1990

103. Malone M, BLACK ND, Lydon M & Cinnamond M, 'The Acoustical Analysis of Stridor using a Physiologically Based Filterbank', Proc. Inst. Mech. Eng. Vol. 203, pp 175, 1990
104. Lydon M & BLACK ND, 'Integrating Network Design into Data Communications Teaching', International Journal of Applied Engineering Education. Vol. 6, No 3, pp 343-348 1990
105. Powderly M, BLACK ND & Lydon M, 'Towards Automated Message Relay Services for the Hearing-Impaired', IASTED International Conference. Artificial Intelligence Applications and Neural Networks, pp 216a-219 Zurich, 25-27 June 1990
106. Adamson K, Donnan G & BLACK ND, 'Processing Biomedical Acoustic Data using Distributed Parallel Processing', Latvian Signal Processing International Conference, USSR, April 1990
107. Adamson K, Donnan G & BLACK ND, 'Parallel Computing Applied to Audiological and Parametric Diagnosis using Transputers', International Conference of Computers in Medicine and Health Care, Czechoslovakia, April 1990
108. Adamson K, Donnan G & BLACK ND, 'Transputers as a Versatile DSP Component. 9th IASTED International Conference on Modelling, Identification and Control. Innsbruck, Austria February 1990
109. Powderly M, BLACK ND & Lydon M, 'Towards Automated Message Relay Services for the Hearing-Impaired. Spring Conference. The Ulster Biomedical Engineering Society, Enniskillen, 1990

1989

110. Adamson K, Donnan G & BLACK ND, 'A Multiprocessor Approach to Auditory Modelling'. Proceedings of the 7th IASTED International Symposium Applied Informatics, Acta Press, Grindelwald, Vol. MA-M3.5, pp 227-230, February 1989
111. Adamson K, Donnan G & BLACK ND, 'Investigation of the Application of Concurrency to a Digital Filter Simulation of the Vocal Tract'. Proceedings of the 7th IASTED International Symposium Applied Informatics, Acta Press, Grindelwald, Vol. MA-M3.5, pp 231-234, February 1989
112. Adamson K, Donnan G & BLACK ND, 'A Transputer-based Graphics Tool for the Development of Medical Prothesis'. Proceedings of the 7th IASTED International Symposium Applied Informatics, Acta Press, Grindelwald, Vol. MA-M3.5, pp 223-226, February 1989
113. BLACK ND & Lydon M, 'A Design-based Approach to Data Communications Education'. IEEE Melecon 89, Lisbon, April 1989

114. Adamson K, Donnan G & BLACK ND, 'Biomedical imaging using transputers and the IMSG170 colour palette', Proceedings on the International Conference on Acoustics Speech and Signal Processing, Vol. MA-M3.5, May 1989
115. Adamson K, Donnan G & BLACK ND, 'Physiological Implementation of the Basilar Membrane/vocal tract on transputers'. Proceedings of the 11th Annual International Conference of the IEEE Engineering in Medicine and Biology, November 1989
116. BLACK ND, 'Telecommunications for the Deaf' in 'Turn on the Light Mummy, I Can't Hear'. Hales, Pub. UID, pp 73-75, Belfast, 1989
117. Malone M, Lydon M, BLACK ND & Cinnamond M, 'Acoustical analysis of stridor using a physiologically-based filterbank' Spring Conference of the Ulster Biomedical Engineering Society, May 1989
118. Malone M, Lydon M, BLACK ND & Cinnamond M, 'Acoustical analysis of stridor using a physiologically-based filterbank'. Proceedings of the 11th Annual International Conference of the IEEE Engineering in Medicine and Biology, November 1989
119. Ambikairajah E, BLACK ND & Linggard R, 'Digital Filter Simulation of the Basilar Membrane', Computer Speech and Language, Vol. 3, pp 105-118, 1989
120. Smyth N, Lydon M & BLACK ND, 'Audiogram matching using self-tuning digital filters'. Proceedings of the Institute of Mechanical Engineers, Vol. 3, pp 120, 1989

1988

121. BLACK ND, 'Telecommunications for the Deaf' DHSS Seminar 'Coping with Acquired Deafness', pp 61-69, March 1988
122. Smyth ND, Lydon M and BLACK ND, The Ulster Biomedical Engineering Society, Annual Spring Conference. Portrush, June 1988
123. Adamson K, Donnan G and BLACK ND, 'Simple Transformation rules in the application of the Transputer to the Physiological processing of speech', Euromicro Proceedings of 14th Symp. On Microprocessing and Microprogramming North-Holland, Vol. 24, pp 397-402, Zurich, August 1988
124. BLACK ND, 'Application of Vocal Tract Shapes to Vowel Production', Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Vol. 10, pp 1535, New Orleans, November 1988
125. Smyth ND, Lydon M & BLACK ND, 'Audiogram Matching Using Self-Tuning Digital Filters'. Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Vol. 10, New Orleans, November 1988

1987

126. Adamson K, Donnan G & BLACK ND, 'A Concurrent Implementation of a Channel Filterbank model of the Cochlea using Transputers' Proceedings of the International Association of Science and Technology for Development (IASTED) Int. Conf. on Applied Control, Filtering and Signal Processing, pp 174-178 Geneva, Switzerland, June 1987
127. Irvine D, Owens FJ & BLACK ND, 'System for the Analysis of Sounds' The Ulster Biomedical Society, Jordanstown, November 1987

128. BLACK ND, 'Vibrotactile Aids', The Ulster Biomedical Engineering Society. Conference Proceedings. pp1, Spring Conf., Newcastle, 1987
129. Adamson K, Donnan G & BLACK ND, 'Investigation into the Application of Concurrency to a Digital Simulation of the Human Basilar Membrane', European Speech Technology International Conference, pp 140-143, Edinburgh, 1987

1986

130. BLACK ND & Adamson K, 'Physiological Modelling of the Human Cochlea' Proceedings of the International Association of Science and Technology for Development (IASTED) Symposium Measurement, Signal Processing and Control, pp 53-56, Taormina, 1986
131. BLACK ND & Gailey L, 'Vowel Production Using Visual Feedback' Proceedings of the Institute of Acoustics IOA Autumn Conf., pp 217-222, Windermere, 1986

1982

132. BLACK ND & Linggard R, 'High-resolution Filterbank for Speech Analysis' Acoustical Society of America Supp. Acoustical Society of America, 103rd Conf., 1 Vol.. 71 pp S103 Chicago, 1982
133. BLACK ND & Linggard R, 'A Filterbank Model of the Cochlea' Proceedings of the Institute of Acoustics, IOA Autumn Conf., pp A4.1-A4.4, Bournemouth, 1982

BOOKS

Digital Communications: Level 3 Communications Technology, National Distance Education Centre, 1990 (Course notes for distance education)

Appendix A.2 Funding

2002

1. N D Black et al, Application for a Network of Excellence: Information Technologies and Communications in Mental Health Care.
2. N D Black et al, Application under the European Year of Disabled People (EYDP) 2003.
3. S I McClean, C D Nugent, N D Black, Application to EPSRC, MEDISTEP – MED ical Intelligent System Tool for Evalaution of Performance.

2001

4. N D Black et al, MEDICATE, EU IST Programme, Framework V, 2001, 3,334,913 Euros (total project), 648,897 Euros (UU contribution).

2000

5. V Patterson & N D Black, NI Research and Development Office, Investigate the role of Teleneurology in Improving Management of Neurological Patients in General Practice, 2000, £63,000

1999

6. N D Black et al, Telematics Architecture for Medical Informatics (TAMI) (1), DENI - JREI MRC, January 1999, £204,000
7. N D Black et al, Telematics Architecture for Medical Informatics (TAMI) (2), Various, January 1999, £115,000
8. D Walsh, G D Baxter & N D Black, Rehabilitation of Multiple Sclerosis, MS Society, May 1999, £343,513
9. J Hughes, N D Black et al, Technology Development Programme, Knowledge Based Systems for Industrial and Medical Applications, Bridging Funding, November 1999, £321,261

1998

10. N D Black, R Wootton, J Adgey et al, Provision of Equipment and Running Costs in Support of Telemedicine Research, Joint Equipment Research Initiative, January 1998, £350,000
11. T J Shields, N D Black & H A Donegan, A Feasibility Study Identifying Cost Eeffective Strategy for Realisation of Life Time Homes in Existing Stock, EPSRC, April 1998, £30,000
12. N D Black et al, NI Centre for Health Informatics (NICHI), Foresight, September 1998
13. R Wootton, N D Black et al, Telemedicine: Innovation in Healthcare Delivery, DTI Sector Challenge, October 1998, £850,000
14. N D Black et al, Biomedical Engineering Training Action, B3 Mobility of Postgraduates, EC ALFA Programme, 1998, EURO 416,720

1997

15. N D Black, J Anderson, Meridian Medical Technologies Ltd, PRIME Static Vector Algorithm, June 1997, £59,400
16. N D Black et al, Biomedical Engineering Training Action, B1 & B2 Network Formation and Academic Standards, EC ALFA Programme, 1997, EURO 42,000

1996

17. J Anderson, N D Black et al, International Fund for Ireland, Biomedical and Environmental Sensor Technology (BEST) Centre, 1996, £1.9 million
18. J Hughes, N D Black et al, Technology Development Programme, Knowledge Based Systems for Industrial and Medical Applications, 1996, £2.84 million
19. N D Black, Training & Employment Agency, Production of Video for Bioengineering, 1996, £5,000

1994

20. N D Black, CEC STRIDE RTD, Networking BIOTECH, 1994, £4,560
21. N D Black, Northern Ireland Tourist Board, Opening of the BioEngineering Centre, 1994, £500

1992

22. N D Black & J Anderson, STRIDE EC Initiative, Establishment of an Infrastructure to Support the Regional Development of Technology Transfer and Commercial Enterprise of Medical Technology in NI, 1992, £500,000
23. N D Black & J Anderson, European Regional Development Fund, Construction of Bioengineering Centre, January 1992, £62,534

1991

24. N D Black & N Evans, Technology Board for Northern Ireland, Networked Portable Digital Radio Communications in Hostile Environments, February 1991, £32,852
25. N D Black & J Anderson, European Regional Development Fund, Construction of Bioengineering Centre, December 1991, £466,000

1989

26. N D Black, Garfield Weston Trust, Investigation into the Rapid Training of a Speech Recogniser, May 1989, £2,500
27. N D Black, D Carter & E Regan, Research Award, The Needs of Deaf Students in Higher Education, December 1989, £850
28. N D Black, Garfield Weston Trust, Educational Aspirations of Young Deaf People, 1989, £3,144

1988

29. N D Black, Research Corporation Trust, Development of a Digital Hearing Aid, February 1988, £5,000

30. N D Black & M Lydon, The International Fund for Ireland, The Development of a Digital Hearing Aid, August 1988, £86,000

1987

31. D Wilkinson, D Ruddick & N D Black, Educational Technology Research Projects, Visual Supplement of Group Telephone Teaching, 1987, £950
32. N D Black, British Telecom, Data Communication Equipment, 1987, £8,000

1986

33. N D Black & F J Owens, Research Award, Alarm for the Deaf, 1986, £2,500
34. N D Black, Nuffield Foundation, Real-Time Auditory Modelling, September 1986, £3,000