

Curriculum Vitae Professor Dr Usha Goswami



Name: Usha Claire Goswami

Born: 21 February 1960

Research Priorities: Dyslexia, Developmental Language Disorder, Reading

Usha Goswami is a world-leading researcher in the fields of literacy, neuroscience and education. Her research aims to understand how individual differences in children's "phonological awareness" (of word sound structure) underpin reading development and dyslexia across languages. Usha Goswami has identified a novel sensory cause of impaired phonological processing in dyslexia based on amplitude modulation (AM) discrimination and pioneered neuroimaging studies of speech encoding of AMs by infants and children. This research is enabling the development of listening technologies that could eventually prevent dyslexia and developmental language disorder.

Academic and Professional Career

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| since 2010 | Professor of Cognitive Developmental Neuroscience and Fellow, St John's College, University of Cambridge, Cambridge, UK |
| 2003 - 2010 | Professor of Education and Fellow, St John's College, University of Cambridge, Cambridge, UK |
| 1997 - 2002 | Professor of Cognitive Developmental Psychology, Institute of Child Health and Fellow, Institute of Cognitive Neuroscience, University College London, London, UK |
| 1990 - 1997 | University Lecturer in Experimental Psychology and Fellow, St. John's College, University of Cambridge, Cambridge, UK |
| 1988 - 1990 | Junior Research Fellow, Merton College, University of Oxford, Oxford, UK |
| 1987 - 1988 | Harkness Fellow (held at University of Illinois Champaign-Urbana), The Commonwealth Fund, New York City, USA |
| 1986 - 1987 | Junior Research Fellow, Merton College, University of Oxford, Oxford, UK |

- 1985 Acting Fellow for Psychology, St. John's College, University of Oxford, Oxford, UK
- 1985 Part-time Lectureship in Psychology, University of Warwick, Coventry, UK

Functions in Scientific Societies and Committees

- 2018 - 2020 Adviser, Prime Minister's Council for Science & Technology (Education report), UK
- 2009 - 2011 Scientific Expert, Brainwaves Project "Neurosci/Ed/Lifelong Learning", Royal Society, UK
- 2010 Scientific Advisory Board, Centre for Learning in Informal and Formal Environments, National Science Foundation (NSF), Seattle, USA
- 2006 - 2010 Education Advisory Committee, Nuffield Foundation, London, UK
- 2006 - 2008 Lead scientist (one of 5), Project "Mental Capital & Wellbeing project", Government Office for Science Foresight, UK
- 2005 - 2018 Scientific Advisory Board, International Dyslexia Association
- 2004 - 2007 Core Member, Brain and Learning Literacy Network, Organisation for Economic Co-operation and Development (OECD)
- 1999 - 2003 Neurosciences and Mental Health Board, Medical Research Council, UK

Project Coordination, Membership in Collaborative Projects

- 2020 - 2023 Principal Investigator, "Neural Mechanisms Underpinning Developmental Language Disorders: A Temporal Sampling Approach", Yidan Foundation, Hong Kong, China
- 2017 - 2023 Principal Investigator, "Developing Prototype Assistive Listening Technology for Remediating Developmental Dyslexia", Fondation Botnar, Basel, Switzerland
- 2016 - 2022 Principal Investigator, Advanced Grant "Oscillatory Rhythmic Entrainment and the Foundations of Language Acquisition", European Research Council (ERC)
- 2011 - 2016 Principal Investigator, "Educational Neuroscience and Developmental Dyslexia", Medical Research Council, UK
- 2011 - 2015 Co-Principal Investigator (together with Professor Denis Burnham), "The seeds of literacy in infancy", Australian Research Council, Australia
- 2009 - 2012 Co-Principal Investigator, "Multimodal Imaging of Parietal Brain Networks in Adults and Children with Developmental Dyscalculia", Medical Research Council, UK
- 2006 - 2010 Co-Principal Investigator, "Humans, The Analogy-Making Species", Framework VI, European Union (EU)

2005 - 2011 Principal Investigator, “Auditory Processing in Dyslexic Children: Behavioural and Neural Investigations”, Medical Research Council, UK

Honours and Awarded Memberships

since 2021 Fellow, Royal Society, UK

2021 Commander of the Order of the British Empire (CBE) in the Queen’s New Year Honours, UK

since 2020 Member, German National Academy of Sciences Leopoldina, Germany

2020 Nisbet Fellowship for lifetime research achievement, British Education Research Association (BERA), UK

2019 Yidan Prize for Education Research Laureate, Yidan Prize Foundation, Hong Kong, China

2013 Fellow, British Academy, UK

2011 President’s Award for outstanding mid-career research, British Psychology Society, UK

2009 Fellow by its Board of Directors, Association for Psychological Science (APS), Washington D.C., USA

2005 Elected to Reading Hall of Fame, International Reading Association

1995 Alexander von Humboldt Research Fellowship, Alexander von Humboldt Foundation, Bonn, Germany

Research Priorities

Usha Goswami is a world-leading researcher in the fields of literacy, neuroscience and education. Her research aims to understand how individual differences in children's “phonological awareness” (of word sound structure) underpin reading development and dyslexia across languages. Usha Goswami has identified a novel sensory cause of impaired phonological processing in dyslexia based on amplitude modulation (AM) discrimination and pioneered neuroimaging studies of speech encoding of AMs by infants and children. This research is enabling the development of listening technologies that could eventually prevent dyslexia and developmental language disorder.

Developmental disorders of language (such as Developmental Dyslexia, DD, and Developmental Language Disorder, DLD) are highly heritable and are found across languages, suggesting a shared neural basis independent of the particular language that a child is learning to speak. Her research investigates a neural/sensory basis for these disorders, based on auditory rhythmic processing. Speech unfolds in time, and rhythm patterning is central to the organisation of phonology (sound

structure), words and syntactic phrases. Acoustically, speech involves patterns of strong and weak beats (“stress beats”) that recur periodically in hierarchical structures and are carried primarily by amplitude/intensity changes (changes in amplitude modulation, hereafter AM). Across languages, speakers produce a stressed syllable approximately twice a second, 2 Hz. Accordingly, an acoustic rhythmic skeleton of AMs at ~2 Hz may underpin language acquisition in all languages.

Goswami's research priorities are to investigate this hypothesis behaviourally, cognitively, computationally and neurally, by studying development from infancy across languages. Having already shown AM “rise time” discrimination impairments in DD and DLD, Goswami is now investigating neural oscillatory entrainment to the AM patterns in the speech signal, entrainment triggered automatically by AM rise times in the signal. Goswami is examining neural entrainment to the AM-structure in speech by the DD and DLD brain, developing assistive listening technology to improve neural entrainment to speech, studying acoustic and linguistic development in infants at genetic risk for dyslexia from birth, and carrying out computational modelling of child-directed speech in diverse languages to uncover underlying AM-structure, which Goswami expects to be universal.

Her long-term research vision is that the specification of neural developmental mechanisms of language acquisition will enable the development of technological supports that enable all children to learn oral language efficiently, thereby eliminating DD and DLD.