

# Glossary

**Adaptive architecture** Buildings that can change their properties to adapt to different environments or users

**ADHD** Attention Deficit Hyperactive Disorder—A behavioural condition that makes focusing on everyday requests and routine challenging

**ADL** Activities of Daily Living

**Animated architecture** Buildings that can change their properties in real time according to input from users or the surrounding environment

**Artificial intelligence** Artificial Intelligence—the study and design of intelligent systems (agents) able to achieve goals through intelligent behaviour

**AS** Algorithmic Strategy—a combination of elementary functions needed to express behaviour

**Assistive music-technology** Where *assistive technology* refers to technology that is designed to enable a user to engage with activities that might ordinarily be challenging due to individual needs, *assistive music-technology* refers to those assistive technologies that are focused on music making

**Bubble-tube** A common sensory device—essentially a tall cylinder of water with a stream of air bubbles rising from the bottom. Bubble-tubes are often equipped with coloured lighting

**CP** Cerebral Palsy

**DIY/hacker musician** Someone who adapts and reconfigures audio-technologies to create new and unusual sound-generators/instruments

**DJ** An abbreviation for Disc Jockey. Originally referring to the person who would select and play the music at a disco, the term has more recently broadened to include elements of music performance where the DJ will mix, adapt and create music within a live environment

**DMI** Digital musical instrument

- Ecological validity** To establish the ecological validity of a neuropsychological measure, the neuropsychologist focuses upon demonstrations of either (or both) verisimilitude and veridicality. By verisimilitude, ecological validity researchers are emphasizing the need for the data collection method to be similar to real life tasks in an open environment. For the neuropsychological measure to demonstrate veridicality, the test results should reflect and predict real world phenomena
- EEG** Electroencephalography—recording of electrical activity in neurons in cortex through electrodes placed on the scalp
- Experience-based plasticity** The ability of the nervous system to respond to intrinsic or extrinsic stimuli through a reorganization of its internal structure
- Fibromyalgia** A long term condition characterized by chronic widespread pain throughout the body. The pain is allodynic (a heightened and painful response to pressure). The condition also often includes a range of other symptoms and as a result is often referred to as Fibromyalgia Syndrome
- fMRI** Functional Magnetic Resonance Imaging is a technique that detects increased blood flow in regions of the brain, the increase in which is associated with increased neural activity
- fMRI** Functional Magnetic Resonance Imaging. A brain imaging technique used to depict brain activity by measuring metabolism in the brain
- Frontostriatal system** The frontalstriatal system is responsible for executive functions and supervisory attentional processing. In neurodevelopmental disorders that disrupt executive functioning, a heterogeneous pattern of deficits emerges, including: impulsivity, inhibition, distractibility, perseveration, decreased initiative, and social deficits. These cognitive symptoms are characteristic of pervasive developmental disorders such as attention-deficit hyperactivity disorder and autism
- GSR** Galvanic Skin Response involves the analysis of the skin conductivity which provides an indication of psychological or physiological arousal. Changes in the skins moisture level resulting from sweat glands are controlled by the sympathetic nervous system, as a result of this GSR can provide a rapid indication of a subjects stress levels
- Haptic** Relating to active tactile-interaction of the kind that might exist within a human computer interface
- HMD** A Head Mounted Display is a display system worn on the head that presents views to one or both eyes. In Immersive Virtual Reality this is both eyes, often using stereoscopic displays to create the illusion of depth through the use of parallax. Other HMD systems exist that present ‘augmented reality where views of the real and virtual worlds are combined

**Infinity tunnel** A sensory device that uses a combination of LEDs and mirrors to create an illusion of a never ending tunnel of lights

**Intelligent architecture** Like animated architecture. But it also has a set or short and/or long term goals that it bases its actions on

**Intensive interaction** As defined by the Intensive Interaction Institute, “Intensive interaction is an approach to teaching the pre-speech fundamentals of communication to children and adults who have severe learning difficulties and/or autism and who are still at an early stage of communication development”

**Inverse kinematics** A mathematical system used to calculate the position of various joints and limbs relative to the position of a particular part of a ‘body’; such techniques allow animators to move the hand of a 3D human model to a desired position and orientation and following this an algorithm selects the appropriate angles and positions for the wrist, elbow, and shoulder joints

**IVE** Immersive virtual environments. Environments that immerse their users in virtual simulations

**IVR** Immersive Virtual Reality—this can take a number of forms including single user and multi user systems; however in each instance rather than an image being presented on a screen as a window upon another world users occupy the virtual world either through the projection of that world onto surfaces surrounding the viewer (such as CAVES) or by a user wearing technology such as a Head Mounted Display

**Life like architecture** Buildings that can change their properties in real time according to input from users or the surrounding environment. similar to a living organism

**Light wheel** Originally made for early discotheques, a light wheel uses a rotating disc of coloured lighting gels to project constantly changing patterns onto a suitable surface e.g. a white wall

**MSE** Multisensory environment

**Neglect** An attention deficit characterized by an inability to respond to or orient towards objects in the contralesional space which cannot be attributed to visual impairments

**Neuropsychological assessment** A neuropsychological assessment typically evaluates multiple areas of cognitive and affective functioning. In addition to measures of intelligence and achievement, it examines a number of areas of functioning that also have an impact on performance in activities of daily living

**PAT** Prism Adaptation Therapy—a therapy for patients suffering from the impairment neglect. The patient is exposed to prism-induced distortion of visual input during pointing activity

**Perimetry** Tests designed to measure the function of the visual field of the eye excluding the central field of vision (Fovea)

**PMLD** Profound and multiple learning difficulties

**PTSD** Post Traumatic Stress Syndrome—a psychological reaction that occurs after experiencing a highly stressing event out-side the range of normal human experience and that is usually characterized by depression, anxiety, flashbacks, recurrent nightmares, and avoidance of reminders of the event

**PVC** Polyvinyl chloride—a commonly produced type of plastic that is available in both exible and rigid forms

**Rebound room** An area designed to accommodate rebound therapy which typically includes a sunken trampoline surrounded by soft-furnishings

**REF** Reorganization of Elementary Functions—a model of the possible mechanisms behind recovery of function in reha-bilitation

**Repurposed technology** A term used to describe technology that is being used in a way that it was not originally designed e.g. a gaming controller being used within an electronic musical instrument

**Resonance board** A at wooden board that amplifies sounds as someone explores the surface with their hands e.g. scratching, tapping

**Responsive space** Space that has similar qualities to animated architecture

**Sensory space** A generic term of reference for an area that is designated for sensory activities, also described as a multisensory envirnoment

**SNE** Special needs education

**Snoezelen** Commercial realisation of the sensory room as originally conceived by Hulsegge and Verheul

**Soundbeam** A non-contact approach to triggering and manipulating sound using one or more ultrasound beams. Originally created to enable dancers to produce sound based on their own movements, Soundbeam is an item of assistive music technology that is commonly found in special needs schools in the UK

**VBI** Vision-Based Interfaces

**Velcro** Registered trade name of main manufacturer of hook-and-loop fastener as used for rapid fastening

**Visuomotor** Eye-to-hand activity and coordination

**Virtual human** Virtual humans consist of artificially intelligent graphically rendered characters that have realistic appearances, can think and act like humans, and can express themselves both verbally and non-verbally. Additionally, these virtual humans can listen and understand natural language and see or track limited user interactions with speech or vision systems

**Virtual reality** An advanced form of human–computer interaction, in which users are immersed in an interactive and ecologically valid virtual environment

**VJ** An abbreviation for Video Jockey, someone who creatively mixes, adapts and controls video projections in a live performance environment

**VR** Virtual Reality

**VR** Virtual reality

**Wand** An interface device used in virtual environments that allows the tracking of the wand device in space. The wand has a series of buttons that are used to trigger interactions, akin to a mouse that can be tracked in the third dimension

# About the Editors



**Anthony Lewis Brooks** acknowledged as a third culture thinker<sup>1</sup> and “a world pioneer in digital media and its use with the disabled community”,<sup>2</sup> *Brooksy* (as he is affectionately referred) resides on the south-western coast of Denmark in the city of Esbjerg where, under Aalborg University, he is director of the SensoramaLab, a VR, HCI, and Creative Design Innovation (Ludic Engagement Designs for All—LEDA) complex. He is also a leader-lecturer of the hugely successful Medialogy education—being a member of the original founding team from over a decade ago. He is a

EU expert examiner under Future Emerging Technologies and has a long list of global keynote credits. His research has been responsible for national, international (EU) projects, patents, creative industry initiatives, and commercial products. National and International awards have been awarded for his work. He runs his own not-for-profit SME (Small Medium Enterprise)—a consultancy and residential spa “training trainers” beachside resort with a focus on societal impact for life long learning of ICT under welfare technology/education. As a digital media artist, his work has been presented at major events including two Olympic/Paralympic Games (1996/2000), European Culture City (1996/2000), Danish NeWave New York (1999) -... and numerous Museum of Modern Art exhibitions. Over 150 publications contribute to his concepts on *Plasticity—Digital Media and Human Performance* that align with his view on how performance art intersects with healthcare as a *Transdisciplinary convergence resulting in Disruptive Innovation in Research and Education*.

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<sup>1</sup> John Brockman (1991) “... third-culture thinkers tend to avoid the middlemen and endeavor to express their deepest thoughts in a manner accessible to the intelligent reading public.” An artist “rendering visible the deeper meaning of lives” [http://www.edge.org/3rd\\_culture](http://www.edge.org/3rd_culture).

<sup>2</sup> [http://community.tes.co.uk/tes\\_special\\_educational\\_needs/b/weblog/archive/2013/08/07/the-latest-on-human-computer-interaction-and-special-needs.aspx](http://community.tes.co.uk/tes_special_educational_needs/b/weblog/archive/2013/08/07/the-latest-on-human-computer-interaction-and-special-needs.aspx).



**Sheryl Brahnam** is the Director/Founder of Missouri State University's infant COPE (Classification Of Pain Expressions) project. Her interests focus on face recognition, face synthesis, medical decision support systems, embodied conversational agents, computer abuse, human computer interaction, mediated psychotherapy, and artificial intelligence. Dr. Brahnam has published articles related to medicine and culture in such journals as *Artificial Intelligence in Medicine*, *Expert Systems with Applications*, *Journal of Theoretical Biology*, *Amino Acids*, *AI and Society*, *Bioinformatics*, *Pattern Recognition*, *Human Computer*

*Interaction*, *Neural Computing and Applications*, and *Decision Support Systems*.



**Lakhmi C. Jain** is with the Faculty of Education, Science, Technology and Mathematics at the University of Canberra, Australia and University of South Australia, Australia. He is a Fellow of the Institution of Engineers Australia.

Dr. Jain founded the KES International for providing a professional community the opportunities for publications, knowledge exchange, cooperation, and teaming. Involving around 5,000 researchers drawn from universities and companies world-wide, KES facilitates international cooperation and generate synergy in teaching and research. KES regularly provides networking opportunities for

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