Date	Topic	Facilitator
Wednesday 27 September 2017 **10.00 am to 12.00 pm** **JWBoardroom Level 2** **JadeWorld Building 5 Sir Gil Simpson Drive Christchurch**	**Neural Networks, Deep Learning and Neuromorphic AI** Artificial neural networks, or only *Neural Networks* (NN) are computational methods and systems that mimic to certain degree the structure and the functioning of the brain in its main characteristics of adaptive learning from data and from experience, generalisation to new data and situations, decision making. NN have been successfully used so far across many applications and subject areas, including: speech and image recognition, language processing, adaptive control, robotics, medical and health decision support etc. An important development in the learning algorithms for NN is the so called *Deep Learning (DL),* where many layers of NN are connected together for a much more precise data modelling that is based on learning deep insight the data. The first part of the talk presents the main principles of *NN* and DL. The latest generation of NN is called spiking neural networks (SNN) where information is represented and processed much closer to how the brain does that. The second part of the talk presents how NN, DL and more specifically – SNN, can be used to build Artificial Intelligence (AI) systems that are structured and process information in a brain-like way, in contrast to other AI systems that are based on rules or statistical calculations. Such brain-like AI systems are called in the talk *Neuromorphic AI*. An example of a Neuromorphic AI development system is NeuCube, developed in the AUT Knowledge Engineering and Discovery Research Institute (KEDRI) (www.kedri.aut.ac.nz/neucube/). NeuCube allows for the development of complex AI systems of hundreds to millions of spiking neurons connected between each other to capture in a deep learning spatio-temporal patterns from data and to predict future events. Several examples are demonstrated: brain data modelling; brain-computer interfaces; multisensory data analysis and pattern recognition in a real time, such as seismic sensors; audio-visual data; fast moving object recognition. Such AI systems can be implemented on various computational platforms, including: PCs; GPUs; tensor flow machines; highly parallel neuromorphic hardware platforms.	**Prof. Nikola Kasabov, FIEEE, FRSNZ, DVF RAE and SICSA UK**  Nikola K Kasabov is the Personal Chair of Knowledge Engineering in the School of Computer and Information Sciences, AUT. He has published over 600 works, among them journal papers, text books, edited research books and monographs, conference papers, book chapters, edited conference proceedings, patents and authorship certificates in the area of intelligent systems, connectionist and hybrid connectionist systems, fuzzy systems, expert systems, speech recognition, bioinformatics, neurocomputing and neural networks. These works have been cited more than 10,000 times. Prof. Kasabov is a: • Fellow of IEEE • Fellow of the Royal Society of NZ • NZ Institute for IT Professionals • Past President and Board member of the International Neural Network Society (INNS) • Asia Pacific Neural Network Assembly (APNNA) • Advisory - Professor at Shanghai Jiao Tong University, China. • General Chairman of a series of biannual international conferences on Neurocomputing in New Zealand. He has been awarded several

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	RSVP to hr@jadeworld.com by Friday 15 September	prestigious awards, such as: • The INNS Gabor Award (2012) • The APNNA Outstanding Achievement Award (2012) • The Bayer Science Innovator Award (2007) • The Royal Society of New Zealand Silver Medal (2001) • Co-editor in chief of the Springer Evolving Systems journal and • Associate Editor of numerous international journals.