BRAINS FOR DUMMIES

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Our brain is an information processing machine, one that often has to take on arduous tasks. Just think about something like searching for Waldo in a crowded scene. The sheer amount of visual information is staggering. When you are searching for Waldo, light waves from the image are turned into neural signals in the retina at the back of your eye. Various information, such as color and brightness, is extracted from this neural signal while it travels to the primary visual cortex at the back of the brain. The primary visual cortex processes this information further, breaking down the complex visual scene into its elementary features, such as stripes of various orientations. However, we do not really see color or brightness or stripes of particular orientations; we see Waldo – provided that we find him. How does the brain make any sense of what it is that we see? How can it know where something is, or what something is? How does the brain pick and choose the relevant elements („Waldo“) from the elements that are irrelevant for the current task („not Waldo“)? How does it store all this information in a neural code? Can we even decode it to understand how the brain represents information? And provided that we can, how can we use this knowledge to our benefit? In this talk you will come out knowing a bit more about how the brain allows us to experience the outside world through our senses, with an emphasis on how the intricate visual system allows us to recognize and act on the things around us. You will also learn something about how the brain manages to store information, allowing us to remember the past and use this knowledge to guide our later actions. Finally, you will learn how people are now going beyond the capabilities of the brain by augmenting it with external devices, connecting machines to the brain and controlling them by „thoughts“ alone.