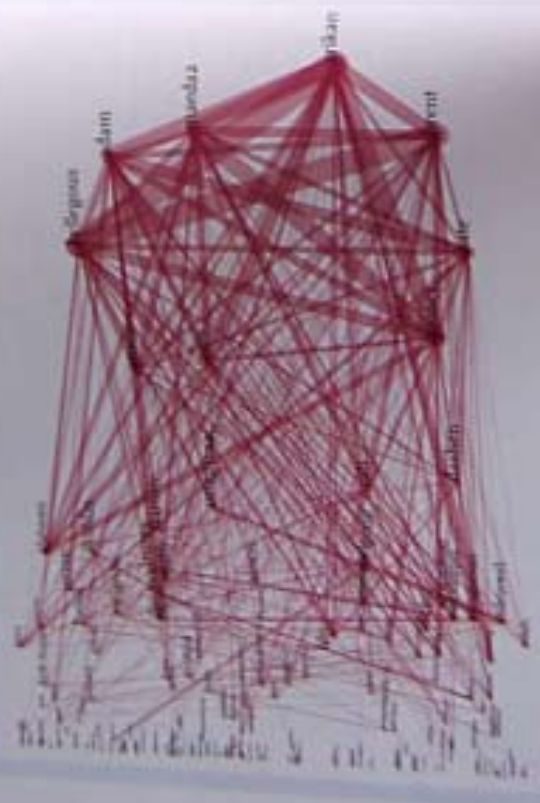




Physical Language Workshop, OPENSTUDIO, MIT Media Lab, 2008

Network graph. This experimental layout project explores the traditionally opaque processes of network building and exchange of creative production, integrating core links in doing so. It provides a dynamic participatory space for networking and exchanging ideas, with the network graph being a by-product of all in it of the public physical form. The intensity of the relationship is shown by the weight of connection. The nodes are distributed based on their connectivity with higher connectivity nodes located towards the right. (Illustration by Robert R. Fisher)



Network graph. A network representing a creative exchange of person from an early to a later phase. The diagram shows the intensity of relationship between people.




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Image from the Openstudio Relationship Visualizations published in AD Magazine.



# Collective Cognition: Neural Fabrics and Social Software

For decades, the MIT Media Lab has been a centre of innovative and highly influential research on emerging technologies, including responsive and interactive sensing systems, software programming and forms of artificial intelligence, and robotic design, and communication systems for new forms of knowledge production and distribution. Therese Tierney writes about several aspects of the Media Lab's research, including the current work of John Maeda, as well as the work of collaborators such as CEB Reas and Ben Fry, who she argues are developing work in new and sophisticated directions. She positions this work within the larger thematic of collective intelligence by addressing the particularly social forms of practice and the necessary connection to intelligent software and sensing technologies.

The human neocortex contains some 100 billion cells, each with 1000 to 10,000 connective synapses, and approximately 2% of the cortex (some 400 million) is devoted to writing, yet the surface area is less than 0.20 square metres (2.7 square feet). How can one begin to conceptualise an information processing system of this complexity? Moreover, if we consider the larger context, how does an organism produce meaningful information about the environment from its unstructured stream of data? These uncertainties bedeviled mid-20th-century scientists as they strove to develop accurate models of the mind. By the late 1970s, neuroscientists had begun to shift their thinking from neural circuit models to dynamic, proto-based models, one of the more robust of which were network topologies.

An analysis of the neurobiological system provides a precedent model or abstract machine, from which certain organizational principles may be captured. While it is evident that neurons process information, the function of such a system depends not only on its elements, but also on the way these elements are connected. In fact, it is the connectivity between neurobiological networks, we see the difficulty in separating neuronal material from neuronal architecture primarily because nerve cells exhibit hybridity. More verb than noun, neurons act as highly interconnected transmitting and receiving elements whose activities are based on electrical and chemical flows. They receive multiple thousands of weighted input signals and synthesise them into one output. The neurons are plastic, that is to say, their cellular components alter form in response to activity.

Paul De Kooninck, Dissociated culture of rat hippocampal neurons, Universitè Laval, Québec, 2008  
The neuronal population can be summarised as a distributed mechanism, about to be in relative feedback and interactivity.