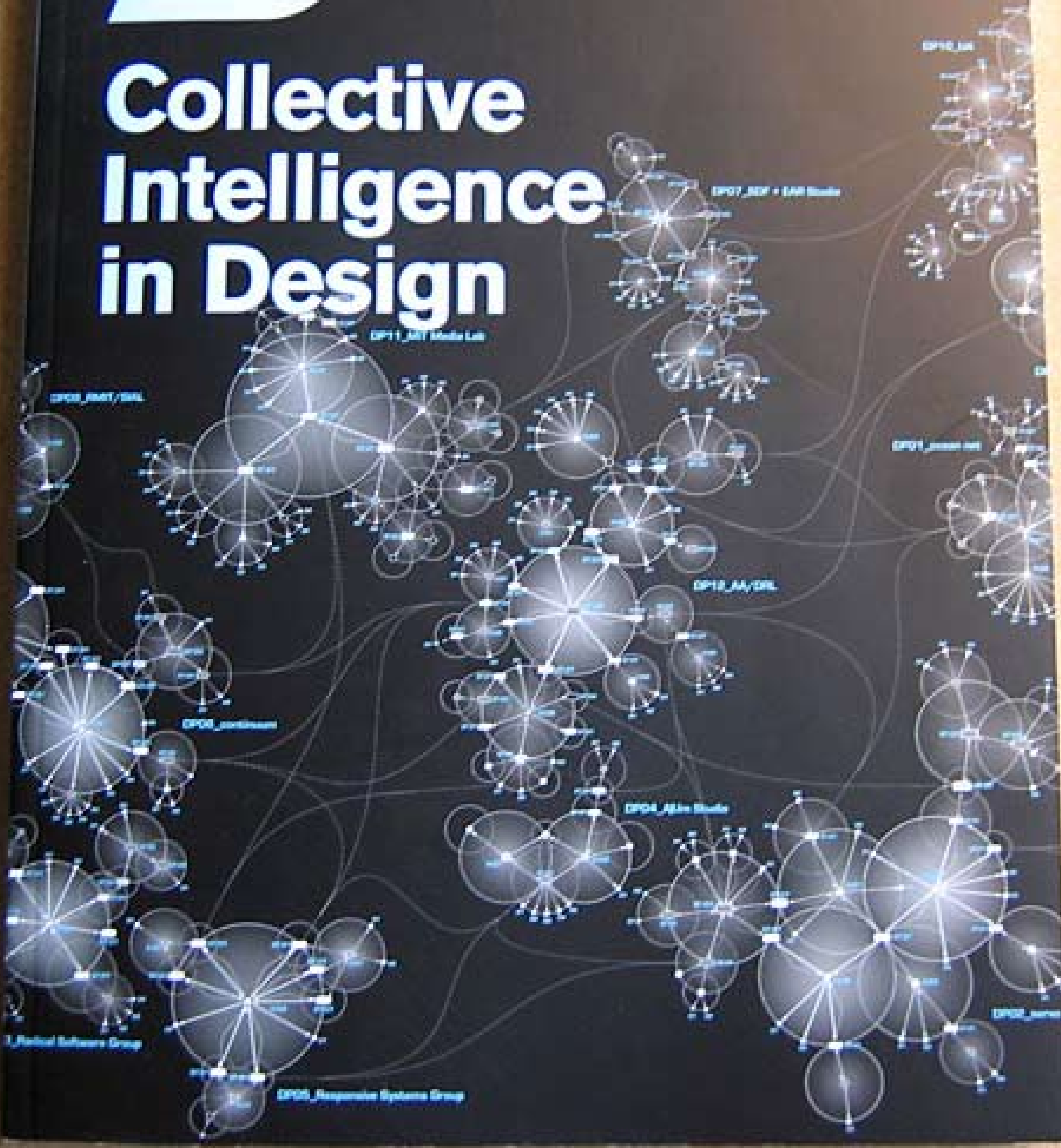
Collective Intelligence in Design



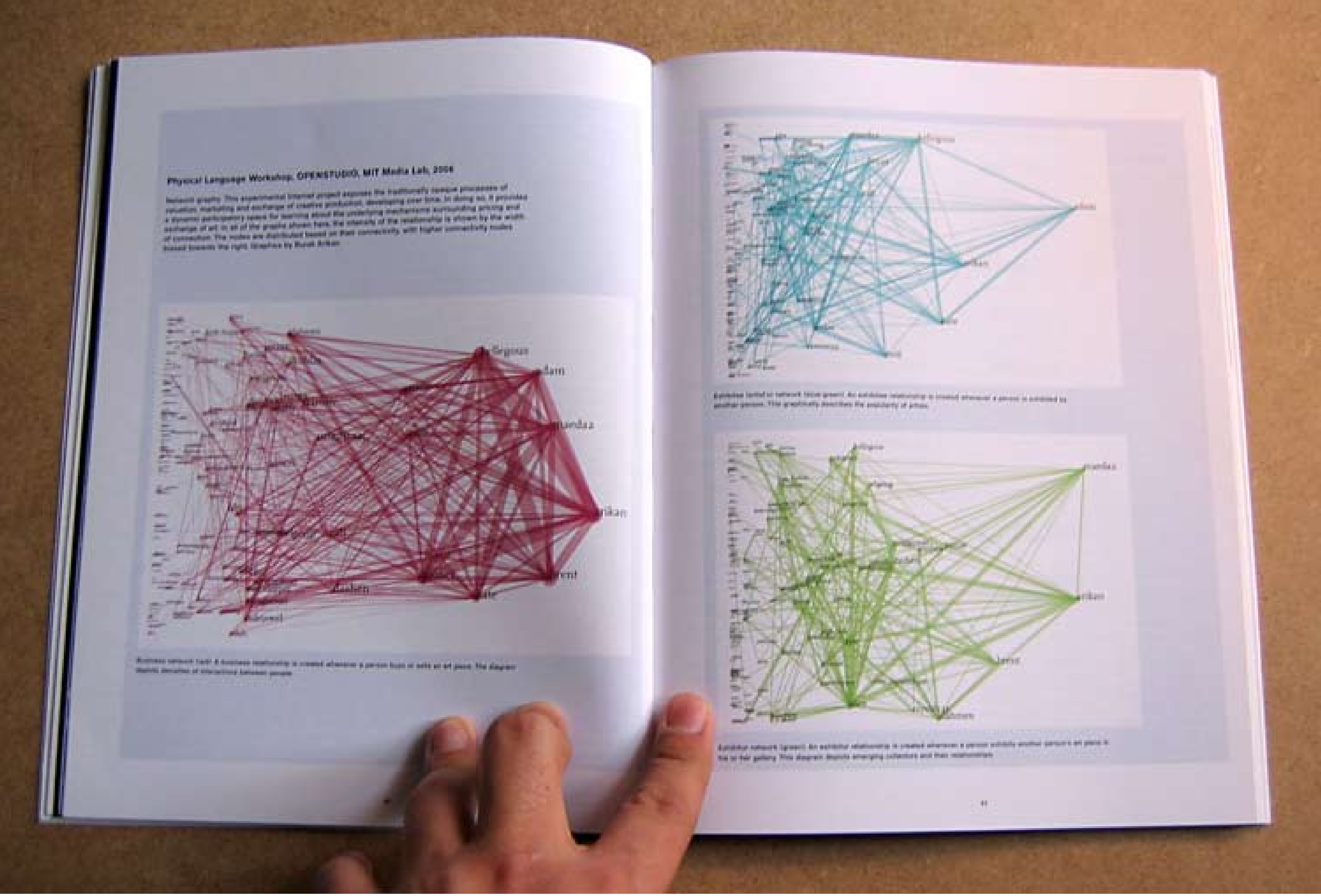
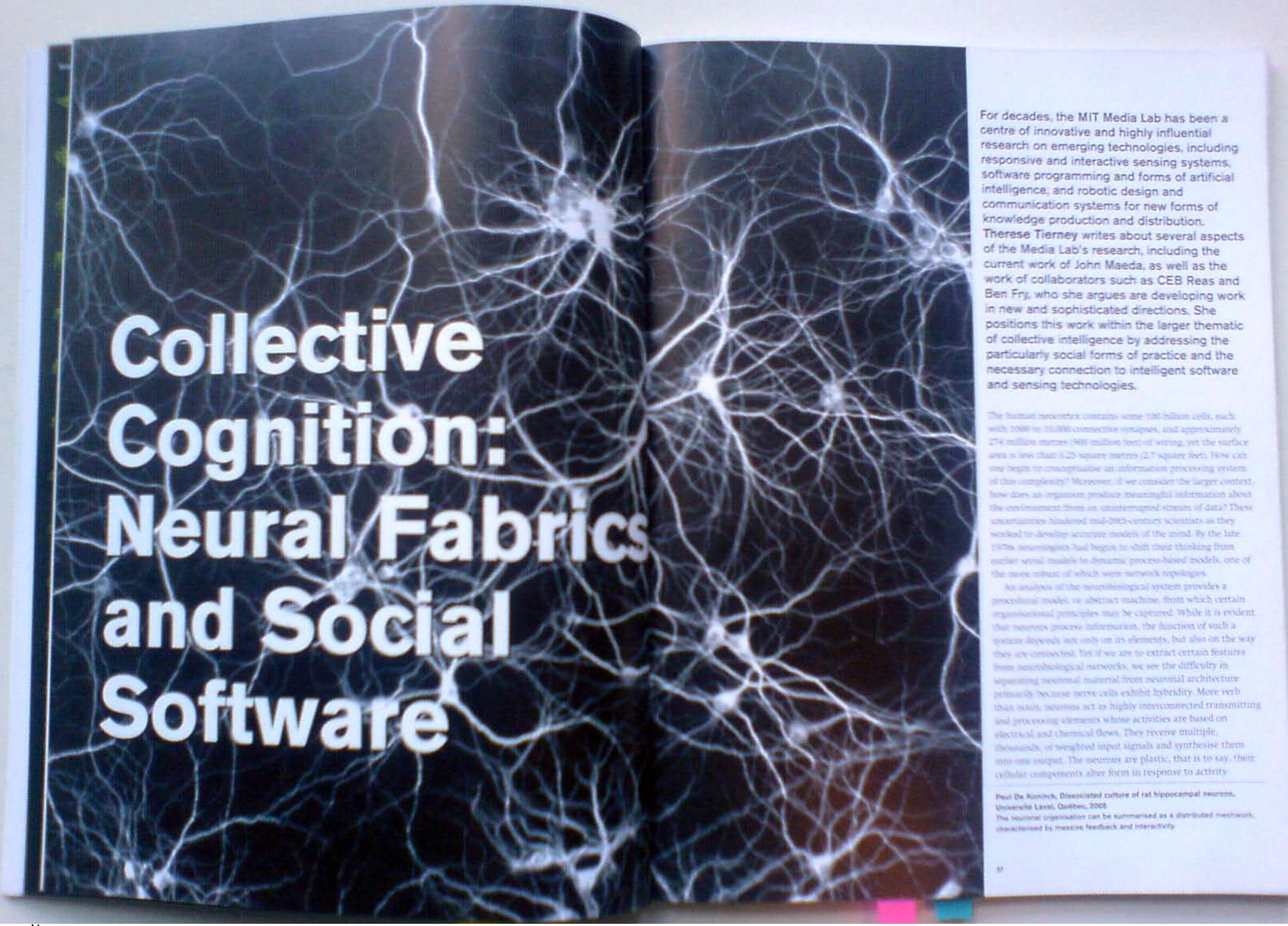


Image from the Openstudio Relationship Visualizations published in AD Magazine.



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 274 million metres (900 million feet) of wiring, yet the surface area is less than 0.25 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 an uninterrupted stream of data? These uncertainties hindered mid-20th-century scientists as they worked to develop accurate models of the mind. By the late 1970s neurologists had begun to shift their thinking from earlier serial models to dynamic process-based models, one of the more robust of which were network topologies.

An analysis of the neurobiological system provides a procedural model, or abstract machine, from which certain organisational 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 they are connected. Yet if we are to extract certain features from 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 processing 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 Koninck, Dissociated culture of rat hippocampal neurons, Université Laval, Québec, 2005
The neuronal organisation can be summarised as a distributed meshwork, characterised by massive feedback and interactivity.

Image from the AD Magazine article.