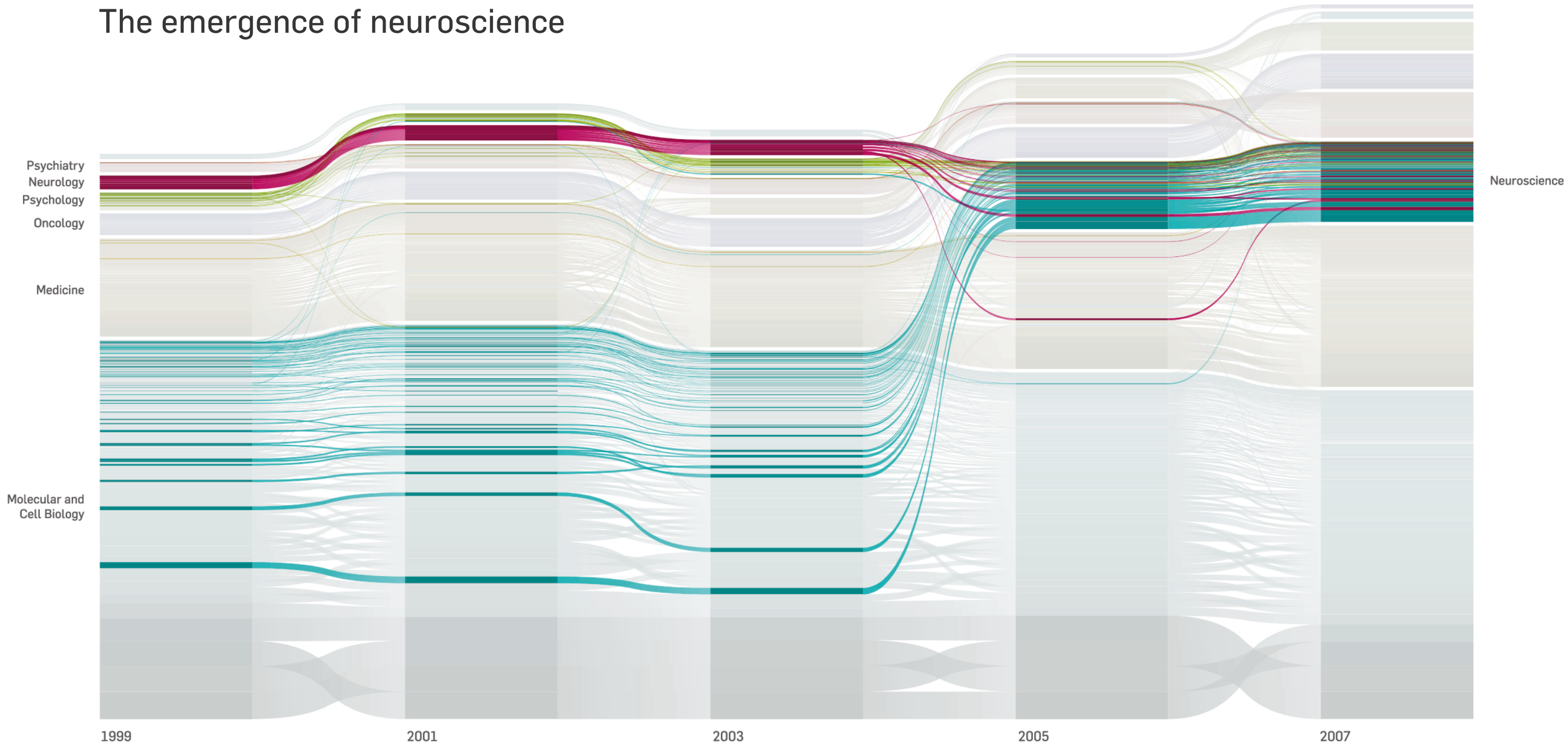
The emergence of neuroscience



This visualization documents the formation of neuroscience as a field of its own right over the last decade. Originally scattered across related disciplines (such as medicine, molecular and cell biology or neurology), the neuroscientific journals start to define a niche of their own, reflected in the dense cluster emerging in 2005.

First, almost 8000 scientific journals are clustered into groups, based on their citation patterns, and using the map equation. In short, for a network partitioned into groups, the map equation specifies the theoretical limit of how concisely we can describe a trajectory of a random walker on the network. Therefore, minimizing the map equation over all possible network partitions reveals regularities of information flow across directed and weighted networks or, in our case, the structure of how citations flow through science.

Second, using the Eigenfactor™ Score, the journals are assigned a measure of importance – much as Google's PageRank algorithm ranks the importance of web pages. The Eigenfactor™ Score measures the percentage of time that researchers would spend with the respective journal, if they were to move through the network by randomly following citations in the journals.

This process is repeated in two-year chunks from 1999–2007, in order to capture changes in clustering and shifts in importance over the years. For this diagram, we picked only the clusters relevant to the formation of neuroscience.

In the visualization, each cluster occupies a vertical column block in the respective year's column, further subdivided into a block for each journal. Each journal is connected with a horizontal band over the years. The height of each journal reflects the Eigenfactor Score. All journals in the cluster that corresponds to the field of neuroscience in year 2007 are highlighted to tell the story of the formation of this field of science. The coloring is based on the cluster assignments in the first year, 1999.

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