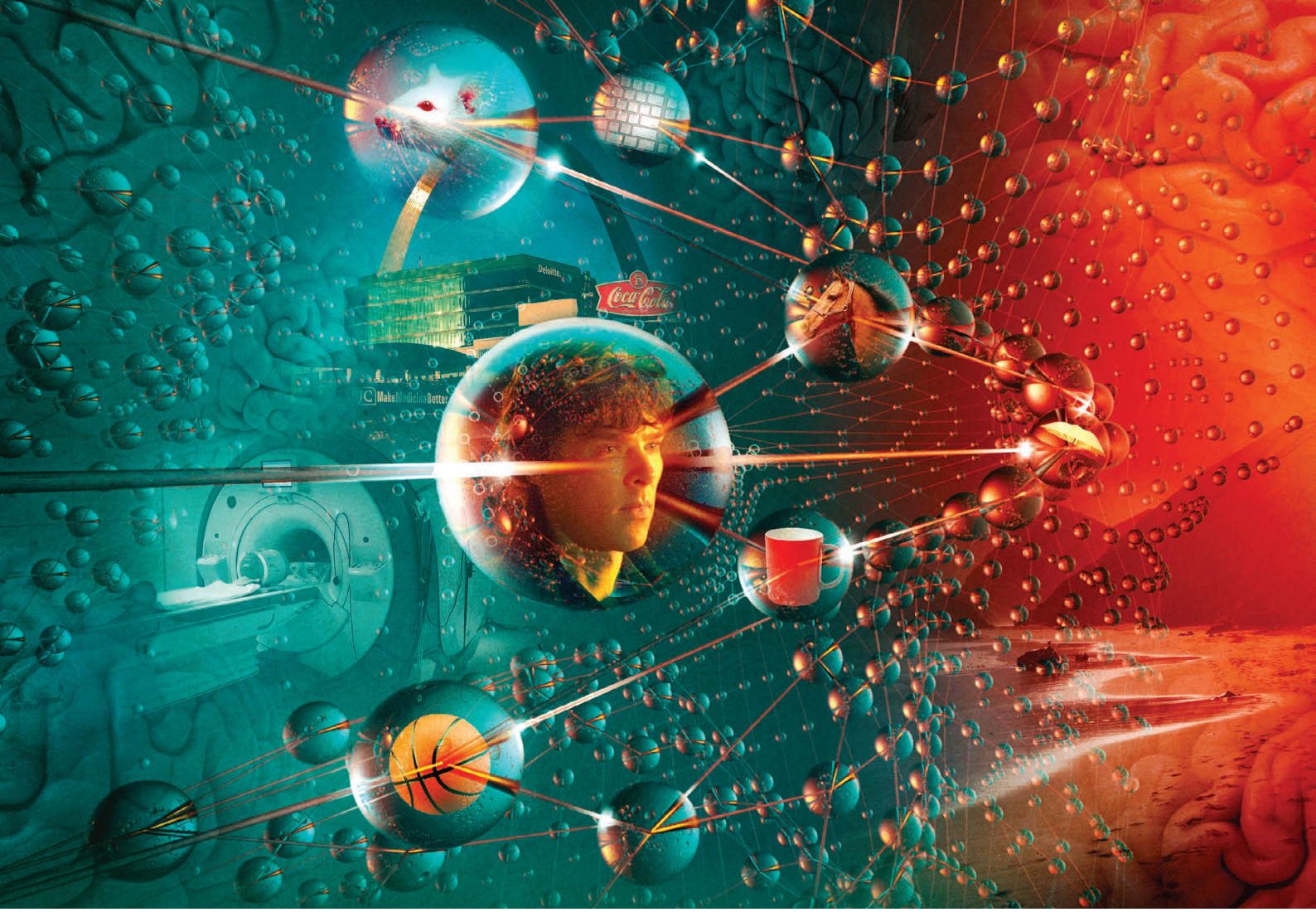

PORTRAIT OF A MEMORY

Researchers are painting intricate pictures of individual memories and learning how the brain works in the process.

BY HELEN SHEN

For someone who's not a *Sherlock* superfan, cognitive neuroscientist Janice Chen knows the BBC's hit detective drama better than most. With the help of a brain scanner, she spies on what happens inside viewers' heads when they watch the first episode of the series and then describe the plot.

Chen, a researcher at Johns Hopkins University in Baltimore, Maryland, has heard all sorts of variations on an early scene, when a woman flirts with the famously aloof detective in a morgue. Some people find Sherlock Holmes rude while others think he is oblivious to the woman's nervous advances. But Chen and her colleagues found something odd when they scanned viewers' brains: as different people retold their own versions of the same scene, their brains produced remarkably similar patterns of activity[1].

Chen is among a growing number of researchers using brain imaging to identify the activity patterns involved in creating and recalling a specific memory. Powerful technological innovations in human and animal neuroscience in the past decade are enabling researchers to uncover fundamental rules about how individual memories form, organize and interact with each other. Using techniques for labelling active neurons, for example, teams have located circuits associated with the memory of a painful stimulus in rodents and successfully reactivated those pathways to trigger the memory. And in humans, studies have identified the signatures of particular recollections, which reveal some of the ways that the brain organizes and links memories to aid recollection. Such findings could one day help to reveal why memories fail in old age or disease, or how false memories creep into eyewitness testimony. These insights might also lead to strategies for improved learning and memory.

The work represents a dramatic departure from previous memory research, which identified more general locations and mechanisms. "The results from the rodents and humans are now really coming together," says neuroscientist Sheena Josselyn at the Hospital for Sick Children in Toronto, Canada. "I can't imagine wanting to look at anything else."

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