America at 250: A Beacon for the AI Age

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SPECIAL PROFILE

Robert Desimone

The Neuroscientist Who Mapped Attention — the Faculty at the Heart of the AI Age

- Director, McGovern Institute for Brain Research, MIT
- Doris and Don Berkey Professor of Neuroscience, Department of Brain and Cognitive Sciences, MIT
- Member, U.S. National Academy of Sciences · American Academy of Arts and Sciences
- Troland Research Award, National Academy of Sciences · Golden Brain Award · Goldman-Rakic Prize
- Honored as one of the America 250 · AI Pioneers

I The Science of Attention

FOUR DECADES MAPPING HOW THE BRAIN CHOOSES WHAT MATTERS

Robert Desimone is among the most influential American neuroscientists of the modern era — a researcher who has spent more than four decades answering a deceptively simple question: *how does the brain decide what to pay attention to?* As Director of the McGovern Institute for Brain Research at MIT and the Doris and Don Berkey Professor of Neuroscience, he has built a body of work that reaches far beyond its origins in the biology of perception.

Our brains are continuously flooded with sensory information, yet we are able to single out what is relevant and let the rest fall away. Through decades of study of the visual system in humans and animals, Desimone showed that when we attend to something specific, **neurons in particular brain regions begin to fire in synchrony** — like a chorus rising above the noise — so that the signal can be heard more clearly by the rest of the brain. His work established attention not as a vague faculty, but as a precise, measurable neural mechanism.

In 1995, with John Duncan, Desimone published *"Neural Mechanisms of Selective Visual Attention"* in the *Annual Review of Neuroscience* — a synthesis that became one of the most cited papers in the field and helped define how a generation of scientists, in biology and beyond, would think about attention as a computational problem.

> *The ability to distinguish relevant information from irrelevant distraction is one of the brain's most critical skills — and one of the hardest to engineer.*

II From the Brain to the Machine

WHY A NEUROSCIENTIST BELONGS AMONG THE AI PIONEERS

The defining architectures of modern artificial intelligence are built on a single idea: **attention** — the capacity of a system to weigh some inputs more heavily than others, to focus its limited resources on what matters most. It is the principle at the core of the neural networks that now power language models, machine vision, and the AI systems reshaping the global economy.

That idea did not arrive from nowhere. It emerged from decades of patient scientific work on how biological brains solve the problem of information overload — and Robert Desimone's research sits squarely at the foundation of that lineage. His findings on selective attention, on the synchronization of neural activity, and on the feedback connections that let higher brain regions guide lower ones, gave both scientists and engineers a rigorous picture of what attention actually is and how it works.

The exchange has flowed in both directions. Studies in neuroscience inspired progress in the design of artificial neural networks; and increasingly, artificial networks provide new insights into the functioning of brain circuits. Desimone has helped lead institutions built precisely on that two-way conversation — positioning the McGovern Institute at the meeting point of systems neuroscience, new neuroscience technologies, and the translation of basic brain research into real-world application.

> *The architectures at the heart of the AI Age rest on a principle that biology discovered first — and that neuroscience taught us how to understand.*

III America at 250: AI Pioneers

HONORING THE FOUNDATIONAL SCIENCE THAT WILL DEFINE THE AI AGE

At the *America at 250: A Beacon for the AI Age* Conference at Loeb House, Harvard University, on **May 1, 2026**, Governor Michael Dukakis and Nguyen Anh Tuan honor Robert Desimone as one of the **America 250 · AI Pioneers** — the fifty leaders whose work is shaping America in the Age of Artificial Intelligence.

Desimone's recognition reflects a conviction at the heart of the Conference: that the AI Age was not built by computer science alone. It was built on a foundation laid across many disciplines — and the science of the brain is among the most essential of them. His career embodies the finest tradition of American basic research: sustained public investment in fundamental questions, pursued for decades, whose returns arrive in forms no one could have fully predicted at the outset.

Educated at Macalester College and Princeton University, Desimone served as Director of the Intramural Research Program at the National Institute of Mental Health — the largest mental health research center in the world — before joining MIT in 2004 to lead the McGovern Institute. His honors include the Troland Research Award of the National Academy of Sciences, the Golden Brain Award of the Minerva Foundation, and the Goldman-Rakic Prize for Outstanding Achievement in Cognitive Neuroscience Research. He is a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

On April 2, 2013, Desimone was among a select group of the nation's leading neuroscientists invited by President Barack Obama to the White House for the launch of the **BRAIN Initiative** — Brain Research through Advancing Innovative Neurotechnologies — which the President named one of his administration's "grand challenges." As Director of the McGovern Institute, whose research spans many of the areas central to the initiative, Desimone stood among those Obama called upon to help unlock what the President described as the "enormous mystery" of the human brain. It was a national recognition of a body of work that had already reshaped how science understands the mind — and that would prove foundational to the AI Age then taking shape.

His current work extends from the basic mechanisms of attention toward their application — including new neurofeedback approaches and technologies aimed at understanding, and potentially improving, the human capacity for attentional control. Nearly every brain disorder, he has observed, involves some impairment of attention; the science that illuminates the healthy brain is also the science that may help repair the troubled one.

> *Basic research is a compact across generations: a society invests in understanding, and the returns arrive in forms no one could have predicted.*

From the synchronized firing of neurons in the visual cortex to the attention mechanisms at the core of modern artificial intelligence, Robert Desimone has spent his career mapping how intelligence — biological and, by inheritance, artificial — chooses what matters. America at 250 honors that lifetime of work, and the foundation it has laid for the age now unfolding.

CONCLUSION

From four decades of foundational research on the neural mechanisms of attention to the institutions he has built at the meeting point of brain science and technology, ***Robert Desimone has helped illuminate the principle on which the AI Age is built*** *— reminding us that the most transformative technologies often begin as basic questions about ourselves, and that a nation's investment in understanding the human mind is also an investment in the intelligence of the machines that will serve it.*