



Curriculum Vitae Professor Dr Mandyam Srinivasan



Image: Markus Scholz | Leopoldina

Name: Mandyam V. Srinivasan

Born: 15 September 1948

Research Priorities: Biology, neurophysiology, behavioural biology, orientation, visual neuroscience

Mandyam V. Srinivasan is an Indian neurobiologist and behavioural scientist. He investigates the behaviours of flying insects, such as honey bees, and how they process visual stimuli. The biologist has been able to show how insects, despite their tiny brains that comprise a fraction of the nerve cells of a human brain, can carry out complex orientation and memory tasks.

Academic and Professional Career

Emeritus Professor of Visual Neuroscience, Queensland Brain Institute and School of Information Technology and Electrical Engineering, University of Queensland (UQ), Brisbane, Australia

2017 - 2019 Senior Professorial Research Fellow, UQ, Brisbane, Australia

2014 - 2017 Vice Chancellor's Senior Professorial Research Fellowship, UQ, Brisbane, Australia

2014 - 2016 Distinguished Outstanding Researcher, Australian Research Council (ARC), Australia

2013 - 2014 Senior Professorial Research Fellow, UQ, Brisbane, Australia

2008 - 2012 Queensland Smart State Premier's Fellow, Queensland, Australia

2002 - 2006 Inaugural Federation Fellow, ARC, Australia

2000 - 2006 Director, Centre for Visual Science, Australian National University (ANU), Canberra, Australia

2002 - 2006 Distinguished Professor of Visual Science, Research School of Biological Sciences, ANU, Canberra, Australia

- 1994 - 2002 Professor of Visual Science, Research School of Biological Sciences, ANU, Canberra, Australia
- 1994 PhD in Neuroethology, ANU, Canberra, Australia
- 1994 - 1996 Director, Centre for Visual Science, ANU, Canberra, Australia
- 1992 - 1993 Senior Fellow, Visual Sciences, Research School of Biological Sciences, ANU, Canberra, Australia
- 1985 - 1991 Fellow, Research School of Biological Sciences, ANU, Canberra, Australia
- 1982 - 1985 Assistant Professor of Biophysics, Department of Neurobiology, University of Zürich, Zürich, Switzerland
- 1978 - 1982 Research Fellow, Departments of Neurobiology and Applied Mathematics, ANU, Canberra, Australia
- 1977 - 1978 Research Scientist, Department of Ophthalmology and Visual Science, Yale University School of Medicine, New Haven, Connecticut, USA
- 1977 PhD in Engineering and Applied Science, Yale University, New Haven, USA
- 1973 M. Phil in Engineering and Applied Science, Yale University, New Haven, USA
- 1970 Master's Degree in Applied Electronics and Servomechanisms, Indian Institute of Science, Bangalore, India
- 1968 Bachelor's Degree in Electrical Engineering, Bangalore University, Bangalore, India

Project Coordination, Membership in Collaborative Research Projects

- 2022 - 2024 Discovery Project "Efficient strategies for visually guided flight: from insects to drones", ARC, Australia
- 2014 - 2017 Discovery Project "Perception of pain in simple nervous systems", ARC, Australia
- 2014 - 2017 Linkage Project "Strategies for mid-air collision avoidance in aircraft: lessons from bird flight", ARC, Australia
- 2014 - 2016 Discovery Project "Biologically-inspired detection, pursuit and interception of moving objects by unmanned aircraft systems", ARC, Australia
- 2013 - 2016 Research Project "Visual control of flight modes and transitions in birds", Human Frontier Science Program (HFSP), Strasbourg, France
- 2012 - 2019 Vice-Chancellor's Senior Research Fellowship "From flying animals to airborne machines and back", Australia

- 2012 - 2015 Project "Assessment and Development of bio inspired guidance, navigation and control (GNC) sensors, algorithms and solutions for unmanned aircraft systems", Boeing Defence Australia, Australia
- 2011 - 2013 Major Equipment and Infrastructure Project "A virtual environment for the study of multisensory learning, adaptation and control", UQ, Brisbane, Australia
- 2011 - 2013 Discovery Project "Visual Guidance of Flight in Birds", ARC, Australia
- 2010 - 2011 Major Equipment and Infrastructure Project "Zebrafish behavioural suite", UQ, Brisbane, Australia
- 2008 - 2009 Project "Visual guidance of autonomous helicopters", U.S. Army Research Office, USA
- 2008 Project "Intelligent surveillance systems for the transport industry", Curtin University of Technology, Perth, Australia
- 2006 - 2013 Project "ARC Centre of Excellence in Vision Science", ANU, Canberra, Australia
- 2007 - 2009 Project "CSIRO Flagship Collaboration Research Fund: Biosensor Cluster", ANU, Canberra, Australia
- 2007-2009 Scientific Research Project "Target Tracking and Interception by Aggressive Honeybees", U.S. Air Force, USA
- 2007 Discovery Project "How do bees orchestrate smooth landings?", ARC, Australia
- 2006 - 2011 Special Initiative "Thinking Systems: Navigating Through Real and Conceptual Spaces", ARC, Australia

Honours and Awarded Memberships

- 2021 Medal Lecture, World Academy of Sciences
- since 2017 Member, German National Academy of Sciences Leopoldina, Germany
- 2015 Member, Council, Australian Academy of Science, Australia
- 2015 Portrait, National Portrait Gallery of Australia
- since 2014 Member, Royal Institute of Navigation, UK
- 2014 Queensland Science Contest, Science Teachers Association of Queensland, Australia
- 2014 Fellowship, Royal Institute of Navigation, London, UK
- 2014 Harold Spencer-Jones Gold Medal, Royal Institute of Navigation, London, UK
- since 2012 Member, Order of Australia, Australia
- 2009 Distinguished Alumni Award, Indian Institute of Science, India

2008	Rank Prize in Optoelectronics, Rank Prize London, UK
2007 - 2012	Queensland Government Smart State Premier's Fellowship "From Small Brains to Novel Aerospace Technology", Queensland, Australia
since 2006	Member, World Academy of Sciences (TWAS)
since 2006	Distinguished Visitor, Royal Society of New Zealand, New Zealand
2006	Prime Minister's Prize for Science, Australia
2003	Centenary Medal, Australian Government
2002	Honorary Doctorate, University of Zurich, Zurich, Switzerland
since 2001	Member, Royal Society, UK
2001	Inaugural Australian Federation Fellowship Award, ARC, Australia
2001	Australian Science Prize, Australia
1996 - 1997	Daimler-Benz Fellow, Wissenschaftskolleg (Institute of Advanced Studies), Berlin, Germany
since 1995	Member, Australian Academy of Science, Australia

Research Priorities

Mandyam V. Srinivasan is an Indian neurobiologist and behavioural scientist. He investigates the behaviours of flying insects, such as honey bees, and how they process visual stimuli. The biologist has been able to show how insects, despite their tiny brains that comprise a fraction of the nerve cells of a human brain, can carry out complex orientation and memory tasks.

Mandyam V. Srinivasan recognised early on how bee brains have excellent recognition abilities.. It consists of only a million nerve cells, a fraction of the nerve cells in a human brain. Despite their very small brain, the social, nectar-gathering honey bees are capable of extraordinary feats of orientation and communication. Srinivasan was able to show that bees can find their way in labyrinths, remember smells and associate these with food sources, and warn fellow bees about dangers. Another distinctive feature of the honey bee helped to advance research: they can be fed and trained. In this way the biologist was able to show how the bees' relatively small neural networks work to coordinate complex orientation and communication tasks.

Another research area of the behavioural biologist is the question of whether bees are conscious beings. Up until now it has been assumed that insect behaviour is controlled by reflexes, meaning that a stimulus triggers a specific reaction. The work of Srinivasan clearly indicates that bees could have higher levels of perception and recognition than previously assumed.

In addition, Mandyam V. Srinivasan's research on the navigation of honey bees has also led to the development of new, biology-inspired algorithms for steering pilotless flight devices.

