

Curriculum Vitae

Batmanathan Dayanand (Daya) Reddy BSc(Eng) (Cape Town), PhD (Cantab)

Born 10 March 1953, Port Elizabeth, South Africa

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Education and academic positions

Daya Reddy graduated with a BSc degree in Civil Engineering from the University of Cape Town in 1973, with first-class honours, and a PhD degree in Engineering from Cambridge University in 1977. He held a post-doctoral position during 1978 at University College London, in the Department of Civil and Municipal Engineering.

He joined the University of Cape Town in 1979 as a Lecturer, jointly in the Departments of Civil Engineering and Applied Mathematics. He was appointed Professor of Applied Mathematics in 1989, and to the South African Research Chair in Computational Mechanics in 2006.

He has held various leadership positions in the Centre for Research in Computational and Applied Mechanics (Cerecam) and its predecessors: Deputy Director 1984–1995; Co-Director 1996–1999; and Director 1999 to date.

At the University of Cape Town he has served as head of the Department of Applied Mathematics (1989–1994); and as dean, Faculty of Science (1999–2005). He was elected by the Senate to serve three terms on the UCT Council (1996–1999, 2002–2005, 2005–2008).

Summary of profile as a researcher and educator

Daya Reddy has made major contributions to the analysis of problems in solid mechanics, most notably plasticity. He has developed new variational formulations, studied their well-posedness, developed novel convergent solution algorithms, and implemented these computationally, for both classical and gradient theories. The second area in which he has a substantial international reputation is in the development and analysis of stable mixed finite element methods in solid mechanics. Beyond these major areas of activity, his research has extended to include collaborations with medical scientists on problems in cardiovascular mechanics; with palaeontologists on the physiology of structures in extant mammals and prehistoric mammal-like reptiles; and studies of viscoelastic fluids and suspensions.

Professor Reddy is the author, co-author or editor of more than 170 publications, including two research monographs, two texts, and three edited volumes of invited papers. He has supervised 24 PhD and 31 Masters graduates, and 16 post-doctoral researchers. He currently supervises 5 Masters and 7 PhD students. He holds an A rating from the National Research Foundation. A full list of publications may be found at www.cerecam.uct.ac.za/people/bdr/publist.

Membership of professional bodies: Daya Reddy is a member of the Gesellschaft für Angewandte Mathematik und Mechanik (GAMM) (Germany), the Society for Industrial and Applied Mathematics (USA), the Society of Rheology, and the American Mathematical Society. He is also a member of the South African Association for Theoretical and Applied Mechanics, and the South African Mathematical Society.

Editorial activities include membership of the editorial boards of 10 journals, service as a reviewer of book manuscripts for Springer (New York and Berlin), and as a regular reviewer for more than 20 journals.

Plenary, keynote and invited presentations at conferences and specialist workshops (since 2011)

- 2011 2nd Joint International Meeting of the American Mathematical Society and the South African Mathematical Society, Port Elizabeth, South Africa
- 2011 82nd Meeting, International Association of Applied Mathematics and Mechanics (GAMM), Graz, Austria
- 2012 International Conference on Applications of Fluid Dynamics, Gaborone, Botswana
- 2013 Annual Conference of the Southern African Mathematical Sciences Association, Cape Town, South Africa

2014 International Congress of Mathematicians (ICM), Seoul, Korea: Invited Sectional 45-minute lecture
 2014 International Conference on Computational Methods in Applied Mathematics, St. Wolfgang, Austria
 2016 International Conference on Emerging Trends in Applied Mathematics and Mechanics, Perpignan, France
 2016 6th IASTED Africa Conference on Modelling and Simulation, Gaborone, Botswana
 Various (1999, 2001, 2005, 2007, 2012) specialist workshops, Mathematisches Forschungsinstitut Oberwolfach (MFO), Germany

Wider contributions to science (leadership, organization, scholarship and communication)

Within Africa, including South Africa

Daya Reddy has been at various times an office-bearer of the South African Mathematical Society and the South African Association for Theoretical and Applied Mechanics.

He was part of a group responsible for the establishment of the Centre for High Performance Computing (CHPC), a South African national facility, in 2005, and served subsequently on its Scientific Advisory Committee.

The African Institute for Mathematical Sciences (AIMS) is a pan-African network of centres of excellence for postgraduate education, research and outreach, in six African countries. Reddy was a founder member in 2003 of AIMS South Africa, the first such institute. He has since then served as a Council member of AIMS and as a Trustee of the AIMS Trust. He currently chairs the AIMS Council.

Professor Reddy served (1999–2008) as a member of the Board of the National Research Foundation. From 2002 to 2008 he served as Board chair.

He has been an elected Member of the Academy of Science of South Africa since 1996, and served as its President for four years from October 2012.

Postgraduate education Daya Reddy has over the last two decades actively recruited and graduated postgraduate students, advised postdoctoral researchers, and hosted visiting researchers from 13 African countries excluding South Africa. He has periodically offered courses at AIMS South Africa: on fluid dynamics (2004 and 2015), and on finite element methods (2007).

Together with colleagues from France, Germany and the UK he organized summer schools in Cape Town in 2004 and 2013, on finite element analysis, with a view to building capacity in the subject area at an advanced level.

Activities at the global level

Reddy serves on the steering committee of the InterAcademy Partnership (IAP), a body of some 130 academies of science or medicine, which provides science advice, promotes excellence in science education, and produces statements and reports on issues of global concern to national governments and international organizations.

The International Council for Science (ICSU) is a non-governmental body comprising 122 national members, representing 142 countries, and 31 scientific unions. Its mission is to strengthen international science for the benefit of society. Daya Reddy was elected in 2014 to become its next President in 2017, and serves on the Executive Board as President-elect.

Lectures, invited presentations and panel discussions on promotion of science and on science policy

International Conference on Science and Technology for Sustainability and Colossal Multiple Disasters, Science Council of Japan, Tokyo, 2012: presentation on nuclear energy policy in South Africa

World Science Forum, Rio de Janeiro, 2013: invited presentation and panelist, “Science and engineering education”; keynote presentation “Leveraging the nexus between health science, policy and business”

Humboldt Colloquium “The power of excellence in science – enhancing academia capacities in Africa”, Nairobi,

Kenya, March 2014: keynote lecture on “Lessons learned by an established science academy in Africa”

Conference on “Science meets politics: international scientific collaboration and regional competition among countries in the 21st century” organized by the Konrad Adenauer Foundation, Lake Como, Italy, October 2014: lecture on “The role of academies of sciences and their international networks”

Alexander von Humboldt Foundation, 9th Forum on the Internationalization of Sciences and Humanities, Berlin, October 2015: “Identifying the best: theory, methods, practice”

2nd International Conference on Science Advice to Government, organized by the International Network for Government Science Advice (INGSA) and the European Commission, Brussels, September 2016: Participation as panelist in session on science in the implementation of the sustainable development goals, and in a workshop to draft a set of principles and guidelines for science advice.

Honours and awards

Daya Reddy is the only South African to be an elected fellow or member of all four South African academies: the Academy of Science of South Africa (ASSAf), by legislation the official academy of South Africa; the South African Academy of Engineering; the Royal Society of South Africa; and the Suid-Afrikaanse Akademie vir Wetenskap en Kuns. He is also a Fellow of TWAS, The Academy of Sciences of the Developing World, and of the African Academy of Sciences.

He has held visiting positions at the University of Texas at Austin (Visiting Faculty Fellowship, Institute for Computational Sciences and Engineering, 2006) and Stanford University (Timoshenko Lecturer, 2008).

He was elected a Fellow of the International Association for Computational Mechanics in 2008. In 2009 he received the Award for Distinguished Service from the South African Association for Computational and Applied Mechanics, and the African Conference on Computational Mechanics Award for Outstanding Research.

He received the National Order of Mapungubwe (Bronze), bestowed by the President of the Republic of South Africa, in 2004, for distinguished international achievements. In 2012 he received the Georg Forster Research Award from the Alexander von Humboldt Foundation, Germany.