Educated at Boston University School of Medicine, DeMaria trained in surgery at Brown University then joined the faculty of Virginia Commonwealth University (VCU) in 1990. There, he was Director of the VCU Minimally Invasive Surgery (MIS) Center and established a fellowship training program in MIS / Bariatric Surgery. In 2003, he led the VCU Obesity Surgery Center and became Chair of General Surgery. In 2005, DeMaria went to Duke as Professor / Vice Chair and Chief of MIS/Bariatric Surgery. In 2010, DeMaria became Research Director at Surgical Review Corporation. He practiced MIS/Bariatric Surgery at WakeMed, a teaching affiliate of University of North Carolina, until returning to Virginia in 2013 as Director of Bariatric Surgery at Maryview Medical Center. He has recently returned to academics as Professor and Chair of the General and Bariatric Surgery Division at East Carolina University. DeMaria served on the Executive Council of the ASMBS previously for 7 years in several leadership positions including Program Chair, Clinical Issues Chair, Bariatric Training Co-Chair, and Executive Council Member-at-large. He was re-elected as a Member-at-large of the Executive Council in 2015 and subsequently elected Secretary-Treasurer of the organization in 2016. He is the current President of the ASMBS.

DeMaria trained 30 bariatric surgeons as a Bariatric Fellowship Director. He has spoken at countless conferences and published 129 articles, 30 book chapters, and 6 books. In 2007, he was invited to write a review of Bariatric Surgery for the prestigious New England Journal of Medicine. He developed and validated one of the first mortality risk scores for bariatric surgery (Obesity Surgery Mortality Risk Score). He served as Scientific Program Chair for IFSO, and has been guest speaker at the Brazilian Bariatric Society and the Mexican General Surgery Congress. In 2010 he was honored by election to the American Surgical Association.