Professor Prabhas Moghe
Vice Chancellor for Research and Innovation, Rutgers-New Brunswick
Distinguished Professor of Biomedical Engineering, Chemical & Biochemical Engineering

Professor Prabhas Moghe has actively contributed to the fields of bioengineering and nanomedicine and has established a research program at Rutgers with impacts on regenerative medicine, biomedical imaging, and translational neuroscience.

Moghe's most cited and impactful research areas in **nanomedicine** include the advancement of a new class of **polymer nanotherapeutics** for treatment of heart and cardiovascular disease (published in *Proceedings of the National Academy of Sciences*, 2015). This advance in nanomedicine was cited in *Nature Reviews*, while this research initiative was supported by continuous NIH, Coulter Foundation, NSF, and AHA funding over $ 4M and generated a robust intellectual property portfolio for Rutgers. The structural features of such polymers exhibit a unique mechanism of action, which blocks specific scavenger receptor pathways in immune blood cells, leading to the repression of atherosclerotic plaques that cause heart attacks or stroke. A second pivotal research advance from the Moghe lab relates to the design of innovative shortwave infrared **imaging nanotechnology** for deeper tissue imaging of micrometastatic cancer lesions (published in *Nature Biomedical Engineering* 2017, *Nature Communications* 2013), which is opening up a new paradigm of surveillance and molecular profiling of cancers that are difficult to detect and to elude treatment. Moghe's recent breakthroughs using this technology is the first such detection via the short wave infrared emissions from rare earth probes of early metastases of human breast cancer cells within a biomimetic animal model.

Moghe's work in the field of **regenerative tissue and stem cell technologies** includes a new concept of high content imaging informatics of stem cell phenotypes (published in *Proceedings of National Academy of Sciences*, 2010), which has received over 180 citations in just five years since publication, and was highlighted as a seminal technology of the year for the Biomedical Imaging and Engineering institute of the *National Institutes of Health*. This imaging approach has enabled the screening of stem cells with heterogeneous features and the early identification of stem cells that switch their phenotypes to strategic lineages of interest to regenerative medicine. A subsequent discovery appeared in *Scientific Reports-Nature*, 2017, where higher content analysis of super-resolution microscopy revealed differences in organizational territories for epigenetic marks of phenotypically similar stem cells destined for different fates. In the area of **brain health**, Moghe has led the pioneering advance in the reprogramming and brain-transplantation of human induced neurons within 3D devices from induced pluripotent stem cells (published in *Nature Communications* 2016; selected by the NIBIB as one of its scientific highlights for 2016). This is one of the first reports of networks of human neurons being used to treat nerve cell deficits accompanying brain neurodegeneration, such as that in Parkinsons' Disease.

To date, Professor Moghe has led over 15 research projects at Rutgers over $15M in federal grants. As a PI, he has led two large NIH R01 projects, co-directed one NIH T32 Postdoctoral Training Program on Regenerative Medicine, spearheaded a core P41 project of Resource Center for Polymeric Biomaterials (2003–), and led NSF NIRT Team Projects, and Coulter Biomedical Engineering Translational Awards, in addition to several additional federal, State, and industrial grants.   His leadership of two $7M NSF IGERT programs on Biointerfaces and Stem Cell Science and Engineering nucleated interdisciplinary research and training and global alliances for 60 PhDs and established a diversity research infrastructure for expansion of minority education in STEM fields, which was held as a model by the NSF, leading to a *Leadership in Diversity Award* at Rutgers.