THE UNIVERSITY OF MELBOURNE

Occasional Address
Royal Exhibition Building, 10 December 2018, 5.00 pm

Professor Colin Norman
Professor of Physics and Astronomy
Johns Hopkins University

Chancellor, Vice-Chancellor, Dean, Distinguished Faculty, Graduating Students, Parents and Friends,

Since I received my undergraduate degree here 49 years ago, many of the discoveries in astronomy and astrophysics have entered the culture.

We know there was a definite beginning to our universe about fourteen billion years ago. We know everything is evolving... from the universe itself, its stars, its galaxies all the way to the intricate evolution of the domain of life.

Additionally, we know the matter and energy constituting the universe is predominantly made up of dark matter and dark energy and its nature is consequently unknown. Only about 5% of all matter is observable to us with existing telescopes.

Astonishingly, all massive galaxies have central black holes -singularities in the fabric of space and time- and the influence of these tiny, but massive, objects on the structure of the galaxies themselves is profound. Black holes on even smaller scales have been now observed to merge leading to brilliant measurements of the associated gravitational wave signals.

The younger generation are intensely focused on habitable earth-like planets orbiting around other stars. Based on discoveries made since this graduating class was born, we project that every star in the universe has at least a 1-10% chance of harboring a potentially habitable earth-like planet.

The advances during this so-called golden age of astronomy and astrophysics are increasingly rapid and the spread of knowledge into the broad cultural awareness is also speedy.

There are three obvious cultural perspectives here: (1) we may well be able to find other habitable planets to occupy over the long reaches of time that our human civilization may survive (2) we may well not be alone and unique and (3) the more we study Earth and other exoplanets the more we are aware of huge changes of planet climate, planet surface, planet oceans…. In fact, what we call "global warming" is a relatively small change for our planet Earth but we do need to get though it to continue the adventure of our human species….and I am optimistic that our human genius for survival will prevail.

Returning now to education for a moment…The true measure of any great society -such as we have here in Melbourne -is how it educates its youth. The great teaching ethos here at Melbourne continues to be superb. My only regret is that it is not still free to all who merit

admission as it was in those postwar years where the hope of our society lay in educating the next generation- across all strata-to do better.

You graduate from this great university as well educated as any similar group on the planet. Be confident that you can achieve wonderful things. It used to be traditional at Melbourne to enter the professions of law, engineering, medicine, business etc. Fifty years ago there were less adventurous options. In this great multicultural affluent highly-educated society in Melbourne (and other global centers) you can afford to take risks and explore fascinating and adventurous career paths over a lifetime.

When things go well in life –for example, in space missions such as the Hubble Space Telescope and in science and technical research in general- it is all sunshine.

This is not always so. Character is needed to survive the inevitable setbacks and even catastrophes.

Always keep the balanced perspective and try to remember there are times for victories and at other times there are defeats and these are important and expected markers in one's life.

What's most important is to understand and remember and be grateful for the very real and fundamentally important inspiration and loyal support of family, friends and colleagues in this great life adventure.
Do not imagine you can, or should, "go it alone".

Congratulations to you on your graduation and best wishes and good luck to you in your future great endeavors.

Thank you.

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Doctor of Science *honoris causa* citation

Chancellor,

Professor Colin Arthur Norman is a graduate of the University of Melbourne, and has maintained strong links with the university in particular with the Astrophysics group in the School of Physics.

After his undergraduate degree, Professor Norman was awarded a number of extremely prestigious scholarships and fellowships to study overseas, including a Rhodes Scholarship to Oxford University, a Magdalen College Prize Fellowship and a Miller Fellowship at UC Berkeley. Since 1984, Colin Norman has been a professor in Physics and Astronomy at the Johns Hopkins University in Baltimore, cross-appointed as an astronomer at the Space Science Telescope Institute.

Professor Norman has a prodigious publication record with around 200 refereed publications, over 14,000 citations and an h-index of 59. His list of co-authors reads like a veritable who's who in modern astrophysics.

Key achievements of Professor Norman include papers in galactic dynamics, showing that galactic bars could be transitory features, a seminal paper developing our understanding of the recycling of gas in the galaxy, which is responsible for ongoing star formation, and many papers on the physics of X-ray clusters.

Professor Norman has also maintained an active interest in observational experiments, most recently in developing new technologies for high contrast imaging.

Professor Norman was Head of Academic Affairs at the Space Telescope Science Institute in Baltimore for 6 years, followed by a similar period as Director of the prestigious Hubble Fellowship program. Recently he has founded the Center for Planets and Life at the Johns Hopkins University.

Professor Norman has always been generous with his time and his ideas, in particular in supporting young Australian astronomers.

He is one of the world's leading theoretical astrophysicists.
Chancellor, I present to you Professor Colin Arthur Norman

for admission to the degree of Doctor of Science, honoris causa.