HUBBLE
European Space Agency Information Centre

c/o ST-ECF
ESO, Karl-Schwarzschild-Str.2
D-85748 Garching bei München,
Germany
Telephone: +49 (0)89 3200 6306
Cellular : +49 (0)173 38 72 621
Telefax: +49 (0)89 3200 6480
hubble@eso.org
www.spacetelescope.org

Video Podcast **Episode 15: Black hole found in enigmatic Omega Centauri** **EMBARGOED UNTIL 15:00 (CET)/09:00 AM EST 02 April, 2008**		
00:00 **[Visual starts]** **[Narrator]** **00:02** For astronomers, Omega Centauri has been an outcast amongst globular clusters for a long time. A new result obtained by the NASA/ESA Hubble Space Telescope and the Gemini Observatory provides a surprising explanation for Omega Centauri's peculiarities. **00:35** **[Woman]** This is the Hubblecast! News and Images from the NASA/ESA Hubble Space Telescope. Travelling through time and space with our host Doctor J a.k.a. Dr. Joe Liske. **00:47** **[Dr. J]** Welcome to the Hubblecast. Today's cosmic guest star is a very special object. Omega Centauri has long been known as the largest and brightest globular cluster visible in the night sky for a long time. A globular cluster is a nearly spherical group of old stars tightly bound together by gravity, found on the outskirts of many galaxies including our own Milky Way. Beautiful, but enigmatic, Omega Centauri has always been a bit of a puzzle to astronomers!		Pan on omega Centauri Image explosion Hubblecast Logo + web site Presented by ESA and NASA TITLE Slide: Episode 14: Black hole solves Omega Centauri enigma Nametag Virtual studio: Dr J on camera Graphics of Omega Cen behind Dr J

01:22 **[Narrator]** Omega Centauri lies in the constellation of Centaurus and is visible from Earth with the naked eye. It is one of the favourite celestial objects for southern hemisphere stargazers, appearing almost as large as the full Moon when seen from a dark site. Exactly what type of object Omega Centauri is, has long been a contentious topic. It was first listed in Ptolemy's catalogue as a single star nearly two thousand years ago. In 1677, Edmond Halley reported it as a nebula. In the 1830s the English astronomer John Herschel was the first to recognize it as a globular cluster, a classification that it has kept ever since.		Zoom on omega Cen, showing it as a fuzzy star with the constellation bg, then as a globular in the Hubble image
02:12 **[Dr. J]** Omega Centauri has several characteristics that separate it from other globular clusters: compared to a run-of-the-mill globular, Omega Centauri has a highly flattened shape, it rotates faster, and it includes several generations of stars – an unusual feature for globulars which normally contain only a single generation of old stars. Moreover, Omega Centauri is almost 10 times as massive as other globular clusters – almost as massive as a small galaxy. Now, new images obtained with the Advanced Camera for Surveys onboard the NASA/ESA Hubble Space Telescope and data obtained by the GMOS spectrograph at Gemini Observatory in show that Omega Centauri appears to harbour an elusive intermediate-mass black hole in its centre.		Virtual studio: Dr J on camera Behind Dr. J, show two globulars side-by-side, one round, rotating slowing, and one flattened rotating fast. Zoom into the flattened globular and show a black hole (animation) in is centre. With stars rotating faster near the centre. No accretion disk and no matter falling inside. Dr. J disappears into omega Cen
03:06 **[Narrator]** The black hole was discovered after astronomers measured the motions and brightnesses of stars at the centre of Omega Centauri. They found that these stars were moving much faster than expected given their total number and brightness. Such behaviour clearly indicates the existence of something extraordinarily massive at the centre of the cluster. The intense gravitational field of a black hole with a mass of 40,000 solar masses provides just the kick necessary to explain the measurements.		Animation showing stars moving around a blackhole
03:38 **[Eva Noyola & Dr. J]** Dr.J: This is Dr. Eva Noyola from the Max Planck Institute for Extraterrestrial Physics in Germany. So, you were the		Virtual Studio: Dr. J and Dr. Eva Noyola

lead author on this study. How you found this black hole? Eva: We found this black hole by looking at the whole image and measuring how many stars there were at the very centre of this cluster. Then we used the GMOS spectrograph and measured the velocity of the stars. We found that the velocities were much higher than what we would expect just from the stars, and that implies that there is an extra amount of matter that means that we found a black hole. Dr.J: And what's so special about this black hole? Eva: The very special thing about this black hole is that it has 40 thousand solar masses. It means it is a lot bigger than the stellar mass black holes that we find in our Galaxy, but is much smaller than the supermassive black holes that we find at the centre of galaxies. It means that nature makes black holes in a continuous mass range, not just in small and big sizes. Dr.J: So, what's the big deal? Why is it so important? Eva: This is the second black hole that we find in a globular cluster, so this is a very nice reassuring fact. But also, we know that there are seeds required to grow supermassive black holes from scratch. And if we find many of these, then it will be a nice source for the seeds to grow supermassive black holes. **04:56** **[Dr. J]** One implication of this discovery is that it is very likely that Omega Centauri is not a globular cluster at all, but a dwarf galaxy stripped of its outer stars and dark matter, as some scientists have suspected for a few years. More than two thousand years after Omega Centauri was wrongly classified as a star, it's true nature is finally coming to light. But I wonder, does Omega Centauri have more surprises in store for us? This is Dr. J signing off for the Hubblecast. Once again nature has surprised us beyond our wildest imagination … **05:33** **[Outro]** Hubblecast is produced by ESA/Hubble at ESO in Germany. The Hubble mission is a project of international cooperation between NASA and the European Space Agency. **05:53** **END**		Show the stars near the black hole. Virtual studio: Dr J on camera
