May 10, 2005

To: Dean of Physical & Biological Sciences Stephen Thorsett

From: Joseph S. Miller, Director

Subject: Merit Increase for Dr. Michael Bolte

The senior faculty of UCO and Astronomy and Astrophysics met on March 3, 2005, to consider the case for a merit increase for Dr. Michael Bolte, to be effective July 1, 2005. Dr. Bolte's last action was a merit increase to Astronomer/Professor Step III off scale on July 1, 2002, so this consideration comes at the normal time. The faculty had previously met in late Fall to consider this case and decided that the file was so strong that outside letters should be sought in order to explore the possibility of recommending an accelerated merit to Step VI. After a detailed and lengthy consideration of all the material in the file, including the outside letters, the faculty enthusiastically and unanimously voted for an accelerated advancement to Astronomer/Professor Step VI, effective July 1, 2005. The vote was 15 yes, 0 no, 0 abstentions; 3 faculty were on leave, and one faculty member did not wish to vote at all because he was unable to participate in the meeting. The case is summarized below.

Research:

Dr. Bolte's research covers a broad range of topics. He is well known for his extensive work in the areas of globular star clusters, stellar evolution, and the age of the Galaxy. His work on star clusters established him as one of the leading research astronomers in this field in the world. As Referee E writes, "... he has grown into one of only a handful of people who have made a genuine difference in the area of star cluster research over the past 15 years." In the last four years he has branched out into other fields. One area is the early chemical evolution of the Galaxy and the Universe. Immediately after the Big Bang, the only elements in the Universe were hydrogen, helium, and trace amounts of lithium and deuterium . All the rest of the elements were created inside stars and in stellar explosions. The overall picture of the gradual buildup of the chemical elements in galaxies is fairly well understood and is one of the outstanding contributions of astrophysics to science in the last half-century. However, the details of early chemical enrichment of our galaxy and, in particular, the nature of the first post-Big Bang enrichment events are not well understood from observations or theory. There are two ways of going about studying this problem. One is to study the most distant objects possible, for the light we see from them has been traveling so long that it originated at a time when the Universe was young. The second approach, the one being followed by Bolte and his colleagues, is to study the nearby "fossil record," the abundances in the oldest stars around us. These oldest stars were formed very early in the Universe.

With former graduate student Jennifer Johnson and current graduate student David Lai, Dr. Bolte has a program to identify stars that were among the very first to form in the Galaxy. These stars are very highly deficient in all the chemical elements heavier Than helium. This program has identified more than a dozen stars with the abundance of iron (a fiducial element in these studies) down by a factor of 1000 or more compared to the Sun. The next step is to carry out a detailed analysis of the element ratios in these