

Understanding stellar birth using old star clusters

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It is now known that most, if not all, of the stars in our Galaxy were born in star clusters. These spherical groupings contain anywhere from a few tens to several million members all milling about under the influence of gravity. But their fate is sealed. All star clusters slowly dissolve over time. "The net effect of this is that their stars eventually become redistributed throughout the Galaxy," said Nathan Leigh, a PhD student at McMaster University and lead author for a study being presented this week at the CASCA 2011 meeting in Ontario, Canada. "This is how we think most of the stars in the Milky Way came to be found in their currently observed locations."

Although we now know that [star clusters](#) have played an important role in shaping the history of our Galaxy, we still do not understand how their stars are formed. Part of the problem lies in the fact that populations of [young stars](#) are typically hidden by a dense veil of gas and dust. This makes it very difficult to directly observe and study regions where stars are currently being born. In order to get around this, [astronomers](#) have combined observations of star clusters so old that they date back to the beginning of the Universe itself with state-of-the-art simulations for their evolution.

"Unfortunately, most star clusters take so long to dissolve that we cannot actually see it happening. But we now understand how this process occurs, and we can look for its signatures by examining the current appearances of clusters," said Nathan Leigh. "We have gone about this by matching up the clusters we make with our simulations to the ones we

actually observe. This tells us about the conditions at the time of their formation."

This has allowed Leigh and collaborators to re-trace the histories of real star clusters, providing for the very first time a glimpse at their formation. To get the job done, they used highly sophisticated observations recently taken with the [Hubble Space Telescope](#).

"Remarkably, we are finding that all star clusters more or less share a common history, extending all the way back to their births," said Leigh. "This came as a big surprise to us since it suggests that the problem could be much simpler than we originally thought. Our understanding of not only how stars form, but also the history of our Galaxy, just took a much bigger step forward than we were expecting."

Provided by Canadian Astronomical Society

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