

# Catching Dissolving Clusters: the Resolved Stellar Populations Approach

Principal Investigator: Dr. Anne Pellerin

Institution: Space Telescope Science Institute

Electronic Mail: pellerin@stsci.edu

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## Abstract

We propose a novel approach to directly detect and study stellar clusters in their later stages of dissolution by using a clustering algorithm on resolved stars in nearby galaxies. Traditional studies of stellar clusters focus on young clusters which are still bright and compact enough to be separated from the background field population. The new approach presented here is to use a clustering algorithm on spatial maps of individual stars to study dissolving clusters. In this study, we will use the exceptional spatial resolution and field of view of ACS to resolve individual stars in three nearby galaxies. Using color-magnitude diagrams, we will isolate and spatially map stars more likely to be part of dissolving clusters (A-type stars and earlier). A clustering algorithm, adapted here for these stellar maps, will reveal and quantify the properties of all star clusters (compactness, shape). Then, even the less compact clusters will be revealed while they are being destroyed. For the first time, this study will bring a gold mine of information on the faintest and dissolving clusters in various environments (morphology and potential well of the host galaxy) and over a timescale of about 100 Myr, revealing fundamental clues on the dynamical evolution of stellar clusters. In particular, we will explore and quantify, for the first time, stellar clusters in their advanced stages of evolution.

## Catching Dissolving Clusters: the Resolved Stellar Populations Approach

**Investigators:**

|     | Investigator         | Institution                       | Country |
|-----|----------------------|-----------------------------------|---------|
| PI  | Dr. Anne Pellerin    | Space Telescope Science Institute | USA/MD  |
| CoI | Dr. Martin J. Meyer  | Space Telescope Science Institute | USA/MD  |
| CoI | Dr. Jason Harris     | University of Arizona             | USA/AZ  |
| CoI | Dr. Daniela Calzetti | Space Telescope Science Institute | USA/MD  |

Number of investigators: 4