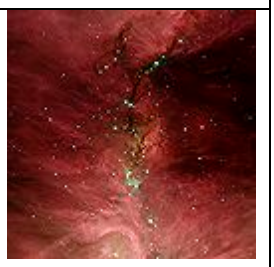
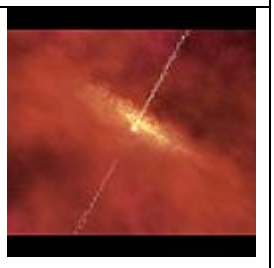
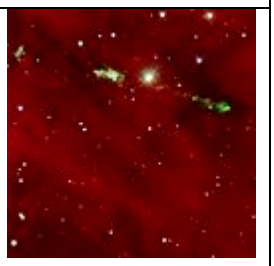
Hidden Universe #3: A Stellar Census of the Sword of Orion	
This new Spitzer image has unsheathed the Sword of Orion and led astronomers to a treasure trove of baby stars within.	
[Opening titles]	
Orion, the hunter, is one of the best-known constellations in the sky. Hanging beneath its distinctive three "belt" stars is a glowing patch known as the Sword of Orion, or M42	
At a distance of about 1,300 light years, this nearby stellar nursery is easily visible to the naked eye. But for astronomers studying the Sword of Orion, visible light alone just doesn't cut it. We see only the small patches where young stars heat the surrounding gas and make it glow.	
The bulk of the Orion cloud complex is a mostly dark swath of dust and gas containing the mass of about 100,000 Suns and spanning 250 light years. The infrared eye of the Spitzer Space Telescope can see this dust directly and identify the vast population of infant stars buried within.	
Spitzer can find young stars by detecting the infrared glow from their surrounding dusty disks. The very youngest stars are gobbling up material from their disks and growing larger. Later, the left-over disks around adolescent stars can provide the resources for building planets.	

Our tour of the Orion Nebula starts with the brilliant cluster of a thousand stars, residing in a bowl-shaped cavity in the larger cloud. Four of these stars, known as the Trapezium, are massive giants. Their dust-destroying ultraviolet light alone was enough to hollow out most of this cavity.	
The most prominent infrared feature here is the next generation of massive stars, which are completely hidden in visible light behind a fold of dust. Their expanding shockwaves heat the gas around them producing a brilliant green glow.	
Most of the stars in this ultraviolet-drenched region have dust disks, and astronomers are studying how this affects the potential for planet formation. Dr. Tom Megeath, the lead investigator of this project, explains.	
“These environments around hot massive stars where there’s a lot of UV radiation may have a dramatic effect on the disks. It may actually serve to erode or maybe evaporate the disks, while in contrast the disks that are far away from it in more isolate regions wouldn’t have to deal with those kinds of processes. So this gives us sort of an idea of where is the typical planetary system forming.”	
Looking to the North of the Orion nebula, we find a colorful region laced with dark veins of dust. The stars here appear to be forming in an orderly progression with older stars on the left and younger ones on the right. Many of the green blobs here literally point to nearby star formation.	
As infant stars feed on their surrounding disks, they eject fast-moving jets of material. When these jets slam through the surrounding cloud they produce shockwaves that glow green in Spitzer’s vision.	

Even to the south where there are no massive stars lighting up the dust, modest-sized stars are clearly forming in abundance.	
"These are features you can see throughout the region and one thing you can actually do with this data is trace back these jets to find where the stars are… and you can look at the morphology of the jets and their shapes and you can try to figure out which star is generating which jet."	
Dr. Megeath and his team have used this data to make the most complete census to date of star formation in Orion. They have identified about 200 growing baby stars and over 2000 young stars with planet-bearing disks. That's a lot more than we knew before, but the demographics of this census are even more important.	
If we think of the main Orion Nebula as a large metropolis of star formation, then about 60% of the stars were born in the big city, with 15% coming from smaller "towns," or clusters. This leaves a surprising 25% that grew up in isolation, far more than expected. Astronomers are working to understand more about the differences between these stellar city slickers and country bumpkins. This may someday help us figure out where and how our own solar system was born.