NASA

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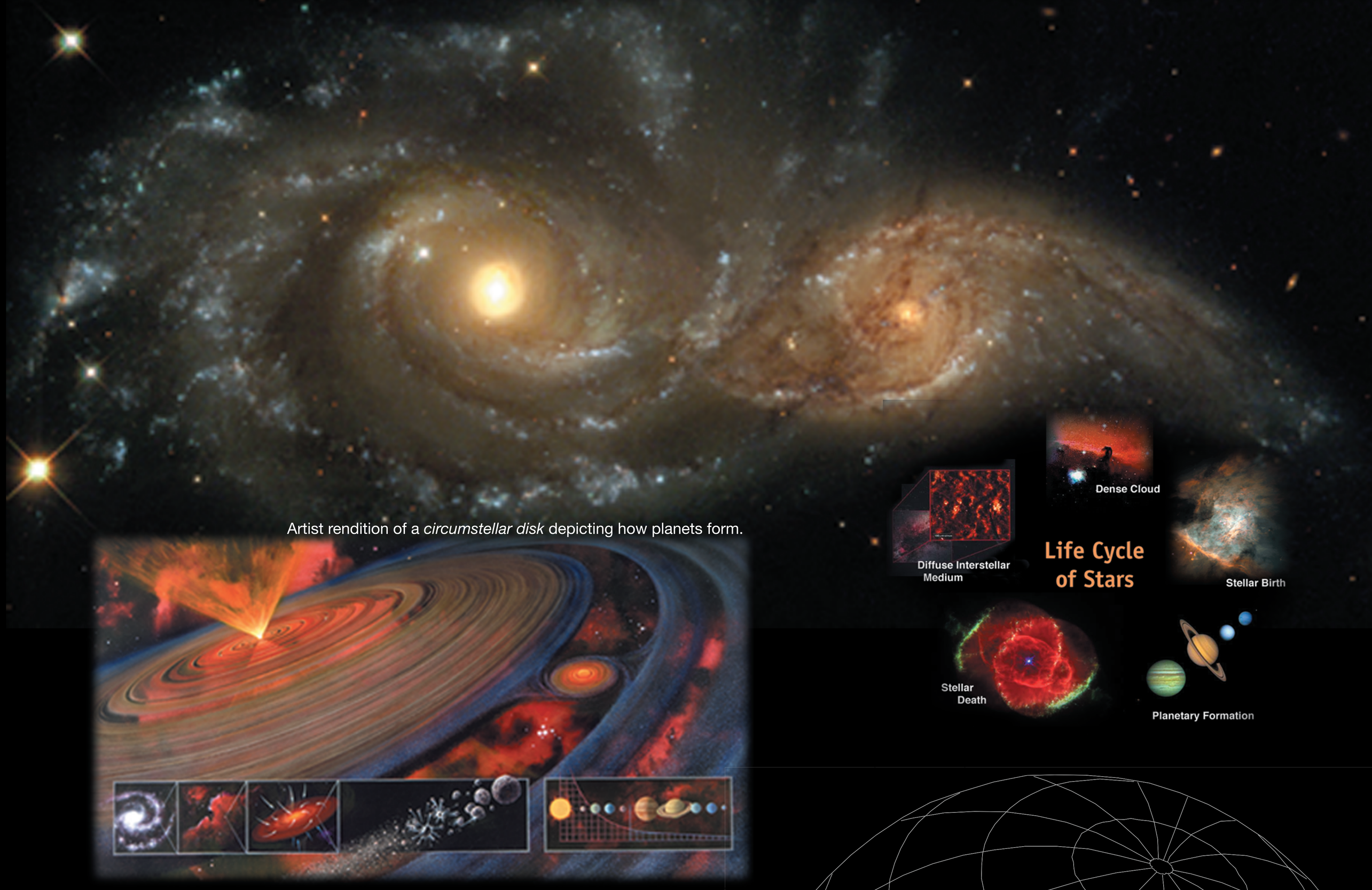
ASTROBIOLOGY
INSTITUTE

Does life exist elsewhere in the universe?

Surface of Europa



Artist rendition of a *circumstellar disk* depicting how planets form.

INTRODUCTION: THE STORY OF ASTROBIOLOGY

WHERE DID WE COME FROM? How did life begin and evolve? ARE WE ALONE? WHAT IS THE FUTURE OF LIFE - on Earth and elsewhere?

These are the questions of ASTROBIOLOGY… the study of life in the Universe.

By combining the expertise of many fields of science - astronomy, geology, biology, chemistry, and physics - to name a few, astrobiology is able to formally address these age old questions.

HABITABLE WORLDS

WHERE DO THE RAW MATERIALS OF LIFE COME FROM?

Astrobiologists think the raw materials of life – such as carbon based molecules and water – exist in the depths of space, and are used in the creation of planetary systems like our Solar System. When the star of a planetary system dies, as our Sun will in X years, those raw materials are recycled back into the universe.

HOW DOES A PLANET THAT CAN SUPPORT LIFE - a *habitable planet* - FORM?

When a star is born, planets often form around it at the same time. The planetary system that forms can consist of different types of planets – rocky planets like Earth and Mars, and/or gas giant planets like Jupiter and Saturn.

WHAT IS A HABITABLE ZONE?

Wherever there is liquid water on Earth, life has been found, so “following the water” as we search for life on other planets is important. In order to maintain liquid water, a habitable planet must be within a certain distance from a star – within that star’s *habitable zone.* If a planet is too close or too far from its star, the water will either evaporate or freeze, making the conditions for life inhospitable. As they search for life on other planets, astrobiologists are most interested in finding rocky, Earth-like planets within the habitable zones of their stars.

Surface of Mars