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The Lifetimes of Planetary Systems around Small Stars

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The Solar System furnishes our most familiar planetary architecture: many planets, orbiting nearly coplanar to one another. However, a typical system of planets in the Milky Way orbits a much smaller M dwarf. These stars present a very different blueprint in key ways when compared to the conditions that nourished evolution of life on Earth. Using ensemble studies of hundreds-to-thousands of exoplanets orbiting small stars, my research program investigates the links between planet formation from disks, orbital dynamics and stability of planetary systems, and the presence and observability of their atmospheres. These processes bear upon the potential for M dwarf systems to evolve and sustain living things. Studies of exoplanets with the James Webb Space Telescope comprise the clear next step toward understanding the hospitability of the Milky Way to life. Our success hinges upon leveraging the many thousands of planet discoveries in hand to determine how to use this precious and limited resource.