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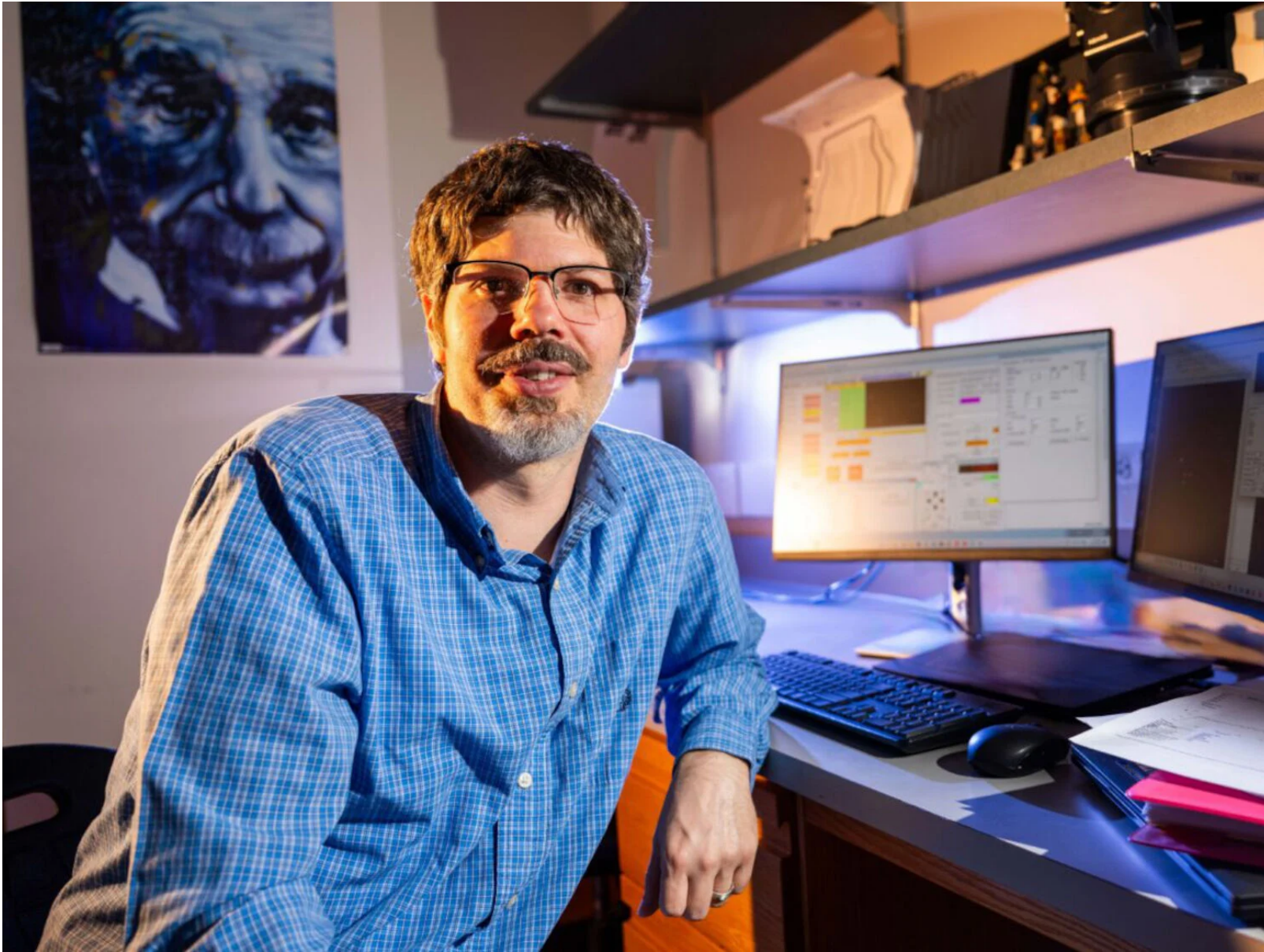
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East Texas A&M astrophysicist researches role of moons in making planets habitable

Herald-Banner Staff Report
Dec 17, 2025



Dr. Billy Quarles is a professor and astrophysicist at East Texas A&M University.

East Texas A&M Photo



Since around the time he completed his Ph.D. in 2008, East Texas A&M University professor and astrophysicist Billy Quarles has been interested in moons.

In a recent paper co-authored by Quarles, he presents data about planets that orbit M-dwarfs (small stars) and the affect that has on those planets' abilities to hold moons within their planetary orbit, and therefore their ability to support life.

“When a planet orbits very close to a small star, the star’s tidal pull becomes extremely strong – much stronger than anything in our own Earth–Moon system,” Quarles said in a press release from East Texas A&M. “Here on Earth, the Moon produces about twice the tidal force of the Sun, which slowly pushes the Moon outward. If you moved that same setup closer to the star, the star’s tides would become hundreds or even thousands of times stronger.

“Those powerful tides act like an engine that pushes the moon outward so quickly it eventually becomes unstable and escapes (from the planet’s orbit),” Quarles continues. “We expected this might shorten a moon’s lifetime from billions of years to perhaps 1 billion. Instead, our simulations show that around most M-dwarfs, large moons survive only 10 to 100 million years.

“That’s important because life on Earth took far longer to develop. So even if habitable-zone planets exist around M-dwarfs, they probably lost their big moons long before life ever had a chance to begin.”

These findings could be helpful to scientists searching for signs of life on other planets. Quarles bases this idea off of what the moon makes possible here on Earth.

“This result matters because large moons may play an important role in making a planet truly habitable,” Quarles said. “Some scientists think Earth’s early tides – driven mostly by the Moon – helped create the cycles of drying and re-wetting that allowed complex chemistry, and possibly life itself, to begin.

“The Moon also stabilizes Earth’s axial tilt,” Quarles added. “Without that steadying influence, a planet’s tilt can swing wildly over time, as it does on Mars, shifting from nearly 0 degrees to as much as 60 degrees. Those kinds of swings can radically alter seasons, temperature patterns and the long-term stability of a planet’s climate.”

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