



Red Planet White Smoke

We have plenty of news for you this week, with an impressive mathematical model created by two graduate students and Pope Leo continuing the excellent start to his new pontificate. At CatholicTech, students travel to Rome and beyond for both fun and education. Finally, our scientist this week has spoken out on issues close to our school's heart.

A Blue Red Planet

Two students at the University of Texas, Austin, recently co-authored a paper that provides crucial analytical tools for understanding the planet Mars, tools which not only help us better understand the cosmos, but also have repercussions for future missions to the red planet.



Mars is an arid wasteland, a great red desert. Geographical evidence, however, indicates that it was once covered with lakes, rivers, and perhaps even oceans similar to those on Earth. These bodies of water have long since disappeared, but we can learn a great deal about them both by studying the lay of the planet's land, and by trying to understand how the water cycle (the motion of water between the air, surface, and underground) worked. By learning about that cycle, we can in turn understand what Mars may once have looked like, what it looks like now, and even where there may still be life.

As mentioned above, two students, Mohammad Afzal Shadab and Eric Hiatt, working in the laboratory of Professor Marc Hesse, co-authored a paper that was published in the journal *Geophysical Research Letters*. The paper demonstrates a new set of equations describing Mars' ancient water systems. Those systems are composed of three main parts: surface water, like lakes and rivers; water present in the atmosphere; and groundwater, which is, as the name suggests, water in the ground. These three

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Shadab and Hiatt realized that one component of this process, infiltration, was being modeled incorrectly. Older descriptions of Mars' water cycle represented infiltration as if it were constant across all areas of the planet and at all depths. In reality, however, numerous factors go into determining the rate of infiltration. On top of that, infiltration affects certain aspects of the cycle which can themselves affect it, creating a cascading effect. This means that older models of the ancient Mars water cycle are flawed, and thus fail to fully predict important geographical and biological realities of the current state of the red planet.

Better understanding Martian geography will be extremely useful if manned missions are ever sent to Mars. This improved understanding could determine suitable landing locations, help with navigation, and even prevent areas that still have some water from being contaminated by bacteria from Earth. Furthermore, an improved geographical map has use in missions with rovers, helping prevent accidents and damage which could cost millions or even billions of dollars from issues like getting stuck in sand. Finally, perhaps the most important advantage Shadab and Hiatt's equation gives us is a better chance of finding extraterrestrial life. If Mars still has life, it'll be in the small pockets of water still present beneath the planet's surface. The location and composition of those pockets will be determined by the ancient planet's water cycle. Understanding that cycle, then, could eventually give us our first proof of life on another planet.

Understanding the history of Mars is also important for more universal reasons. While most planets are inaccessible to us except through a telescope, Mars is close enough for us not only to send rovers to it, but also to consider sending manned missions there. It's a whole other world ready for study, and the knowledge that can be gleaned from studying Mars is far more than just geographical. The existence of life on other planets is a question that has occurred over and over throughout history, and for good reason. Philosophy and theology would be presented with some stark new questions if there are living beings outside of Earth, even non-intelligent ones.

Those two Texas grad students, then, did us all a service with their paper, as does every scientist when he gives his research to the world. Scientific contributions both large and small improve the body of human knowledge as a whole, pressing us on towards our ultimate end of knowing, loving, and serving our Creator.

Beginning Again in Rome



Two members of CatholicTech also took a weekend trip to Edinburgh, Scotland to hear the tunes of bagpipes and see the sharp Scottish skylines. While there, they toured a dazzling Scottish castle and hiked Arthur's Seat, an extinct volcano. Back in Italy, our resident foodies enjoyed some delicious sushi. Our school's proximity to Rome gives students access to a myriad of cultural cuisines and international grocery stores, and our newly remodeled kitchen provides students a place to test their culinary skills with cuisine of every sort.

Thank you as always for joining us, and stay tuned next week!

Scientist of the Week: Dr. Daniel Kuebler

Dr. Dan Kuebler is Dean of the School of Natural and Applied Sciences at Franciscan University. His thoughtful opinions on the relationship of Faith and science are backed up by his strong scientific credentials, and we're happy to present him as our scientist of the week.



Beginning his career at the Catholic University of America (CUA) with an English degree, Dr. Kuebler switched to the sciences after college. He earned his M.S. in molecular biology from the same school, then finished his education at the University of California, Berkeley, earning a PhD in molecular and cell biology. From there he went straight to teaching at Franciscan university. He now researches human bone marrow, along with teaching courses and fulfilling his duties as dean.

Dr. Kuebler's work on faith and science stands a cut above. "The reality is that science as we see it today, modern science, is a Christian and Catholic thing," he said in one interview, recognizing the reality on which

CatholicTech was founded. The Catholic Faith and science go hand in hand; they always have and always will.

Along with his science courses, Dr. Kuebler also teaches track and field, sharing a favorite hobby with students. Please keep him and all other Catholic scientists in your prayers, that their work may continue to ever more greatly glorify God.

Around Campus



CatholicTech Summer Program

Calling all rising high school Juniors and Seniors!

This summer CatholicTech will be hosting a summer program from July 5 to August 4, 2025. Contact our Admissions Office at admissions@catholic.tech to apply!

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