



IN MEMORIAM

A TRIBUTE TO WOLFGANG DREYBRODT (1939–2025)



Prof. Wolfgang Dreybrodt passed away in June 2025.

Life, at its heart, is a web of interactions—moments that shape who we are, how we're seen, and how we shape others in return. My own interactions with Wolfgang began in 1996, when I approached him as a potential doctoral student. They continued for nearly three decades, until a final phone call just a few months before his passing. Over those years, we exchanged thoughts—scientific, philosophical, and deeply personal—that shaped me more profoundly than any other.

A LIFE ROOTED IN CURIOSITY AND INTEGRITY

Born in Saxony on the eve of World War II, Wolfgang witnessed the hardships of post-war Germany and the tenacity of its recovery. From early on, his talent for science and curiosity about the world stood out. He pursued physics, completing a PhD in solid-state physics, followed by a postdoctoral position at MIT. In the early 1970s, he returned to the Max Planck Institute before

taking a professorship at the University of Bremen, where he specialized in the spectroscopy of organic molecules.

But his story cannot be told through scientific credentials alone. Wolfgang was a man of deep integrity, insatiable curiosity, and intellectual independence. He was dismayed by the structural and conceptual changes in University of Bremen in the 1970s and sought relief from the associated stress through hiking—until, at his wife Marion's suggestion, he discovered caving. It quickly became more than a pastime. He recognized that caves offered not just adventure, but an open field of scientific inquiry.

Inspired in part by the work of Herbert W. Franke—an influential scientist and latter collaborator—Wolfgang published his first paper on calcite deposition and stalagmite growth in 1980. Through the 1980s, he established a karst research lab (later known as the Karst Processes Research Group) at the University of Bremen. With his doctoral students, he carried out pioneering studies on calcite dissolution and precipitation in both laboratory and natural settings. These efforts culminated in the 1988

Springer book *Processes in Karst Systems: Physics, Chemistry, Geology*, a milestone in karst science that has inspired generations of quantitatively minded researchers to pursue karst.

KARST, SPELEOGENESIS, AND SCIENTIFIC LEGACY

By the late 1980s, Wolfgang began focusing more deeply on speleogenesis. His groundbreaking 1990 paper in *Journal of Geology* on the evolution of single karst conduits marked the beginning of a rich and productive line of work. With students and collaborators, he investigated early speleogenesis under both confined and unconfined conditions, exploring phenomena such as mixing corrosion, karstification near hydraulic structures, and worm-hole formation in fracture networks.

His studies of dissolution kinetics of calcite and gypsum led to still-unsurpassed rate laws that remain foundational to understanding the formation of dissolutional features in karst. In his later years, Wolfgang devoted increasing attention to isotopic signals in speleothems. His passion never waned. Even when financial or institutional support ended, he continued to run experiments—sometimes improvising setups in the bathroom of his senior residence.

A MENTOR, A FRIEND, AND A HUMANIST

Our relationship began as supervisor and student, but it evolved into a deep, collaborative friendship that lasted a quarter of a century. As a newcomer to his group, I was struck by the intensity of engagement he had with his students. Soon, I experienced it myself: questions, challenges, and intriguing problems that kept me awake with excitement.

We often lost track of time, spending entire days in discussion, deeply immersed in results. During this period, Wolfgang also began his visits to Slovenia—a country he returned to regularly until 2019. These visits were rich in science and camaraderie, filled with fruitful discussions, joint publications, and unforgettable field trips. We have found in these excursions both joy and new puzzles to solve. He became an associated coworker of the Karst Research Institute and, in 2021, was elected

a corresponding member of the Slovenian Academy of Sciences and Arts.

He was frequently accompanied by his witty and gracious wife, Marion. Together, they shared a deep mutual love and respect—a partnership from which I learned a great deal. Marion passed away in 2011. Wolfgang's passion for caves and karst lives on through their son, Joerg, who has devoted much of his life to caving expeditions around the world.

THE SOUL OF A SCIENTIST

Wolfgang had a deeply rooted sense of ethics. To him, publishing was not a career step but a moral act—an honest report to the community. I remember vividly how he once questioned a group of young researchers at an EGU poster session, asking pointedly which of the many listed authors had truly contributed to the work.

Though fundamentally conservative, Wolfgang was socially conscious and open-minded. He was never easily convinced—but neither was he bound by dogma. He helped international students settle in Bremen, supported them with scholarships and personal generosity, and remained deeply curious about their work and lives.

Wolfgang was also delightfully eccentric. When I first arrived in Bremen in 1996, I was worried about how I would find him among all the people at the train station. But I immediately recognized the man who looked lost in space and time. There was no mistaking it—my search was over.

Despite several serious health challenges, his spirit never faded. I vividly remember how, upon waking from surgery for a spinal disc intrusion, he called me to share a new idea for our paper. Naturally, I spent much of the following days at his hospital bedside. Even in his final years, amid physical difficulty and fading strength, his bursts of scientific inspiration never stopped.

Wolfgang Dreybrodt leaves behind not only an extraordinary scientific legacy but also a life that touched many—marked by honesty, warmth, brilliance, and a relentless desire to understand the world.

He will be deeply missed, but his ideas and spirit live on in those he taught, inspired, and befriended.

Franci Gabrovšek