Daniel Boese, Institute of Chemistry, Speaker for the "Functional Nanostructers in Physics, Chemistry and Life Sciences" Doctoral Academy (NanoGraz)
A network of researchers in chemistry, physics, molecular biosciences, and pharmacology, NanoGraz uses an interdisciplinary approach to provide answers to fundamental questions related to miniaturisation in medicine and industry.

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Another question with an eye to the future:

#48

How small can computer chips get?

WHY IS THE UNIVERSITY OF GRAZ A FITTING LOCATION FOR THIS DOCTORAL SCHOOL?
We are privileged to have an ideal combination of excellent scientists in the associated fields who possess highly specialised instrumental expertise. The University of Technology is an important partner, and the strong industry presence in the surrounding region ensures that the research complements their needs.

WHAT ADVANTAGES DO STUDENTS BENEFIT FROM?
Doctoral students should spend half of their time working in a field different from their own so as to become familiar with a variety of scientific approaches. This interdisciplinary approach allows scientists with different expertise to tackle a problem from different perspectives to find a solution. Input from other subjects also helps to broaden one's own perspective.

WHAT IS THE GREATEST CHALLENGE THAT THIS FIELD OF RESEARCH CURRENTLY FACES?
One of this century's key challenges will be to describe the transitions between solid, fluid, and gas phases. We still lack sufficient understanding of the behavior of single molecules in the fluid phase or on a solid surface. But this is precisely where key reactions often take place.

WHAT DO YOU CONSIDER TO BE YOUR FIELD'S MOST IMPORTANT INSIGHT YET?
We are trying to comprehend nature by breaking it down to a more simplified model with the same properties. This model of reduced complexity allows us to characterise and calculate a system while still providing useful conclusions about the real systems.

STARTING POINT
Early career researchers who participate in NanoGraz work with structures measuring 0.1 nanometres to 1 micrometre in size. Their task is to describe these natural or synthetic molecules in precise physical and theoretical terms. Classical physics and chemistry cannot sufficiently explain what happens at these size scales. An entirely new understanding of these miniaturizations' characteristic traits must be developed. Pharmaceutics, medicine, and material science are just some of the fields that will profit from these discoveries.