

## Diffusion is anywhere: A thank you to Angelika Berlejung on her 65<sup>th</sup> birthday

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It is good academic practice to use milestone birthdays – especially those on approaching retirement – as an opportunity to express heartfelt gratitude for selfless dedication to the community of teachers and learners, with its many overlaps where teachers can often become learners themselves.

I am very grateful to the organizers of this festive event for giving me the opportunity to join the chorus of those expressing their gratitude and congratulations. The gratitude of a physicist expressed in an auditorium largely dominated by theologians is probably not something that can be taken for granted and might deserve some explanation.

In my own work, I have been fortunate to be able to build on Leipzig's great traditions in the field of Nuclear Magnetic Resonance, today probably best known by its application in Magnetic Resonance Tomography, one of the most powerful imaging technique in medicine. Leipzig's roots to nuclear magnetic resonance may be traced back to Felix Bloch, one of the Nobel Prize laureates for the detection of this phenomenon, who had been Werner Heisenberg's first doctoral student here in Leipzig [1].

The starting point for my work was the application of this technique to measure molecular diffusion, i.e., the speed of random movement of molecules and of their spreading, specifically in nanoporous solids. As catalysts, such systems are of great technological interest for environmentally friendly, resource-saving product refinement. With this, I also followed a second Leipzig tradition, namely the catalysis research founded here in Leipzig by Wilhelm Ostwald – and benefited, in this way, from the advantages of interdisciplinary research at the overlap of physics and chemistry. Thus, diffusion measurement in nanoporous solids by Nuclear Magnetic Resonance finally resulted in a paradigm shift of our understanding of the ongoing phenomena in these materials [2].

With its three classes - the Mathematical-Natural Sciences Class, the Philological-Historical Class and the Class of Engineering Sciences - the Saxon Academy of Sciences and Humanities in Leipzig offers particularly favorable conditions for promoting interdisciplinary research. In view of such possibilities, the phenomena of spreading and diffusion warrant a by far more comprehensive consideration than offered in connection with molecular diffusion in material refinement through mass separation and conversion by nuclear magnetic resonance in the overlap of physics and chemistry, I had originally been concerned with. Indeed, as with the reactant and product molecules in catalysis, phenomena of spreading may as well be observed on, e.g., sweetening our morning coffee, in the appearance of fake news in the media and with the dissemination of diseases [3]. There had even been efforts to determine the age of ancient ceramic materials by an in-depth study of their re-hydroxylation, i.e. by studying the rate of their occupation by hydroxyl groups after activation [4]. Today, at the end of the Christmas season, I am particular pleased to refer, in this context, to the Gospel of Luke, which tells us about the shepherds who „spread the word“.

Thus, when a „Structural Commission“ was formed at the Saxon Academy of Sciences and Humanities in Leipzig with the aim of inviting experts from a wide range of disciplines to engage in interdisciplinary dialogue on “Spreading in Nature, Technology, and Society” [5], it was therefore a particular pleasure for me to receive active support from your institution, that is, from the theologians at our Leipzig University. Joint activities within the Senate of our university and the German Protestant Research Academy had, in particular, brought me in contact with you, dear Rüdiger Lux, and it was from you that

I received the excellent advice to win Angelika Berlejung for this project. Her studies on, e.g., the Babylonian deportation and resettlement policy of the sixth century BCE and, associated with this, on the risks and chances for the displaced and resettled people in the countryside are devoted to spreading (i.e. diffusion) phenomena, which are of a completely different nature than those mentioned at the beginning – but nevertheless of as well great significance and importance [6].

On behalf of our „Spreading Commission“ – and, most certainly, of the Saxon Academy of Sciences in Leipzig as a whole – I would like to express my sincere gratitude to you, dear Angelika, for your commitment. As a member of this commission, you have provided impressive examples in your field of expertise of the diversity of perspectives from which spreading phenomena can be viewed. One of these was presented under the heading “Small gifts for great gods: votive offerings in ancient Israel” at the public academy meeting in 2019 in our Old City Hall [7].

Our special thanks, however, go to you for your commitment to preparing the 10th meeting of Diffusion Fundamentals, a series of conferences under the patronage of the Saxon Academy of Sciences and Humanities, specifically its Spreading Commission, which is dedicated to the phenomena of spreading and diffusion in their entirety. This meeting took place in Tashkent, bringing the conference series to Asia for the first time, after Europe and America.

Your joint leadership of the Minerva Center “Research on Israel and Aram in Biblical Times,” dear Angelika, has certainly contributed significantly to our success in securing Aren Maeir as one of the keynote speakers at this conference. It is therefore a particular pleasure for me to see you again, dear Aren, at today's ceremony in Angelika's honor and to hear you speak. Your lecture on “Movements of artifacts, people, and ideas in antiquity” in Tashkent was undoubtedly one of the highlights of our conference. I am happy to mention that, like all other conference contributions, it is available to everyone at any time in the Diffusion Fundamentals Online Journal accompanying the conference series [8].

The look back at Diffusion-Fundamental X in Tashkent would be incomplete without a mention of the plenary lecture by Felix Hagemeyer, one of your – if I may say so – master students, dear Angelika, and one of the good souls behind the preparation of today's festive gathering. In his lecture on “Interactions and exchange processes as driving forces of social development in ancient Palestine” [9] he addresses an important issue from his dissertation, for which he received special recognition and honor with the award of the Young Talent Prize from the Saxon Academy of Sciences and Humanities in Leipzig.

The next meeting in the series will take place in July 2027 at the Catholic University in Leuven. I am particularly pleased to mention this because your appointment, dear Angelika, to the professorship for “Languages and Cultures in Syria and Palestine” there was an important milestone in your career. How wonderful that this was followed in 2004 by the call to Leipzig, which ultimately brought us together. I thank you very much for all your loyalty and for our equally fruitful and enjoyable collaboration. I would be very happy to continue this collaboration in whatever form. Thank you all very much for your attention, and I wish you God's blessing on your journey, dear Angelika.

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