

Kai-Uwe Schmidt 1978–2023

by Jonathan Jedwab, Simon Fraser University



Kai-Uwe Schmidt passed away suddenly and unexpectedly on 20 August 2023 at the age of just 45. It is still difficult to believe that such a wonderful colleague, friend, husband, and father is no longer with us.

Kai worked with me in Vancouver, Canada as a postdoctoral fellow from 2008 to 2011. During those four years my wife Jenny and I became close friends with Kai and his wife Anke, meeting up most weekends to eat, drink, laugh, and play games together.

Kai and Anke taught us to play the German card game Skat and we taught them to play the Chinese tile game Mah Jong. Vancouver is a port city with hundreds of excellent sushi restaurants, and we would often order takeaway sushi for dinner in order to increase our game-playing time together. The only time we heard Anke call Kai by his full name “Kai-Uwe” was when she thought he was taking too long to consider his next game move!



Kai considering his next Mah Jong move

Kai was one of the most caring and devoted fathers I know. He adored his three children Leo, a newborn when he and Anke arrived in Vancouver; Luis, born in Vancouver; and Miriam, born after the family returned to Germany. The children could not wait to spend time with their father as soon as he returned from work each day. Every year Jenny and I would look forward to receiving a calendar from Kai and Anke, with a different family photo for each month.



Anke and Kai with Luis, Miriam, and Leo

Kai was a reliable and adventurous travel companion with a particular liking for mountains and large outdoor spaces. Jenny and I spent several days touring with him after a conference in Fort Collins, Colorado in November 2011. The flight from Vancouver to Fort Collins was very early and I spent it snoozing, but Kai was glued to the window throughout and told me afterwards it was the most spectacular scenery he had ever seen from an airplane. The car rental company persuaded us to upgrade to a four-wheel drive vehicle in case we needed to cross a snowy pass. This turned out to be fortuitous because we decided on a whim to go off-road in Utah on a steep and narrow four-wheel track that seemed quite perilous to Jenny and me. We would not have dared to attempt this by ourselves, but Kai showed us how to handle the vehicle and introduced us to a new world of rugged off-the-beaten-track scenery. The highlights of our trip were the sandstone arches of the iconic Arches National Park, and the vastness of Canyonlands National Park where we seemed to have the entire park to ourselves.



Kai in Canyonlands National Park, Utah, 2011

Kai was happy to act as translator when colleagues visited Germany, even if he was not the formal host. In 2015 the ALCOMA conference on Algebraic Combinatorics and Applications was held in Kloster Banz, Germany and the conference excursion took us to the nearby Bavarian town of Bamberg. Dinner was at a historic brewery where our guide urged us to try the famous smoked beer: “Don’t worry if you don’t like the first glass, you’ll enjoy the second!” It was the most pungent beer I have ever tasted and the mugs were huge. Kai did his best to negotiate between the conference participants’ requests, such as switching temporarily to water, and the waitresses who simply wanted to know how many more large mugs of beer they should serve. All held together until someone asked Kai to request from the waitresses a half-size measure of beer. Kai looked flustered as he explained that they were already serving half-size measures for the benefit of the non-locals, and that asking for quarter-size measures wasn’t a request he was comfortable translating!

Kai loved the physical beauty of Canada and was very happy to return to British Columbia in 2019 for the 14th Conference on Finite Fields and their Applications at which he was a plenary speaker. The conference excursion involved a 10-minute ride on the Sea-to-Sky gondola to eat dinner on a mountain summit, with sweeping views over Howe Sound. After the conference, Kai joined Jenny and me on a hike to the three Joffre Lakes outside Vancouver, famous for their beautiful bright blue waters. I remember Kai eyeing the snow-covered mountain peaks at the end of the trail and devising a possible climbing route for a future trip.



Kai with Ken Smith, Jonathan, and Jim Davis on the excursion of the 14th Conference on Finite Fields and their Applications, British Columbia, 2019



Jonathan and Kai at Joffre Lakes, British Columbia, 2019

Kai was very proud to have won the Best Paper Award at the 2010 Sequences and their Applications conference in Paris for his paper “Appended m-sequences with merit factor greater than 3.34”. Even more memorable than the monetary award was the champagne reception given in his honour at the conference!

Kai exuded kindness and gentleness, making friends wherever he went. So many colleagues wrote to me after hearing the news of his untimely passing, stressing above all the deeply personal loss they felt. Two of my non-mathematician friends in Vancouver, who very much enjoyed Kai’s company, wrote: “We were devastated by the news of Kai’s death... a successful mathematician obviously, thoughtful, kind, and a true gentleman in the proper sense of the word... It is tragic that Kai’s family will not continue to benefit from his loving companionship and that future generations of students and mathematicians will not benefit from his intellectual abilities.”

Kai obtained his doctorate in Electrical Engineering from Dresden University of Technology in 2007 and his Habilitation in Mathematics from Otto-von-Guericke University in 2014. He was a postdoctoral fellow at Simon Fraser University from 2008 to 2011 with me, and at Otto-von-Guericke University from 2012 to 2015 with Alexander Pott. From 2015 onwards he was a Professor of Mathematics at Paderborn University. Kai was awarded the Kirkman Medal of the ICA in 2010 and the Hall Medal of the ICA in 2018.

Kai’s professional interests were often inspired by problems from digital communications and coding theory. His early research considered complementary sequence sets and their connections with Reed-Muller codes, motivated by their application to power control in OFDM (orthogonal frequency division multiplexing) transmission. He was fascinated by binary sequences having low correlation, as measured by the merit factor and the peak sidelobe level. Over time his interests broadened to include quadratic and symmetric bilinear forms over finite fields, the interplay between sequence design and Boolean functions, the existence pattern for planar functions and planar polynomials, and questions from finite geometry. More recently he applied probabilistic methods to study random binary sequences, asymptotically optimal Boolean functions, and asymptotically optimal aperiodic correlation. He maintained his interest in coding theory, particularly via the study of rank distance codes.

The depth and breadth of Kai’s skills, combined with his easygoing personality, made him a popular collaborator. He was a principal investigator for Integral Structures in Geometry and Representation Theory, a multi-project collaboration between Bielefeld University and Paderborn University that uses integral structures as a unifying theme to creatively combine methods from combinatorics, algebraic geometry, number theory and representation theory. This is one of 13 Collaborative Research Centres

funded by the German Research Foundation in 2023 over a four-year period, and the only one to be awarded in pure mathematics.

Kai's career was still on a clear upward trajectory when it was inexplicably cut short. Despite his many accomplishments and his quiet desire to excel, Kai remained humble and approachable and with a constant smile. Jenny and I will always remember him with deep affection as an endlessly kind and supportive friend.