

Preface

At the occasion of the 60th birthday of Professor Pekka Neittaanmäki it is time to take a look at his versatile activities from the decades passed so far.

Young Athlete

Pekka was born in 1951 in Saarijärvi, Central Finland—a rural community associated with perseverance and a spirit of hope even under the hardest of conditions in Finnish poetry. Saarijärvi is also known for its active society in athletics which made sports a natural target for Pekka's energy in the teen years. His ongoing running and skiing activities stem from those times. His more extreme hobbies from those times are perhaps less known. Pole vaulting and ski jumping are certainly not that frequent in academic CVs. However, they are good indicators of Pekka's daring attitude.

Emergence of a Researcher

In early 70's Pekka entered the University of Jyväskylä in the early 70's (with intention to graduate fast as math's teacher). Despite of the desire to graduate fast, Pekka did not ignore the social aspects of life as a student, which in the seventies implied also political activity, and gathered a strong personal network of future decision makers that has been an essential asset ever since. Fast graduation caught the attention of Professor I.S. Louhivaara who recruited Pekka for doctoral studies. Louhivaara, who had been trained as the right hand of Rolf Nevanlinna, had an extensive and active international network and a broad understanding of the active fields in mathematics. Thus, in his thesis work on boundary value problems to plate equation, mentored by K. Witsch from Bonn, Pekka got an extensive background in mathematical analysis of PDEs.

After his PhD Pekka went to Bonn as a post doc and got acquainted with both a generation of young German researchers and, more importantly, the finite element

method. When Pekka returned from Bonn, he brought a pile of punch cards containing a FEM code and several manuscripts and ideas to be written jointly with R. Picard and J. Saranen on FEM for different wave and eigenvalue problems.

Building His Own Group

In the beginning of the 80's Pekka started to be on his own. The FEM papers after the PhD qualified him to the level of a docent and it was time to start teaching and recruiting students. The first seminar around FEM was organized in Jyväskylä in fall 1982 and it attracted the attention of several promising students. Pekka exploited well the position of Finland as a gateway between East and West and quickly built a collaboration network with Czech and Romanian researchers. This helped him to both deepen and broaden the research activities. By a fortunate mishap Pekka learned about the superconvergence phenomenon related to averaging and managed to analyze it with M. Krizek with whom he continued the FEM track to review articles and eventually to monographs.

Simultaneously Pekka found other long-lasting interests: shape optimisation with J. Haslinger and optimal control with D. Tiba, both of these, in particular, in the context of variational inequalities. These openings led not only to numerous papers and several monographs in the years to come but also to a fair number of PhD students and theses, and to the first major industrial collaboration in the field of steel casting. The collaboration with industry was facilitated by Pekka's short excursion to Lappeenranta University of Technology as an associate professor and by a membership in the Research Council of Technology.

To facilitate his return back to Jyväskylä, Pekka played a major role in the University's initiative of "Applied Science" and managed to raise significant donations from the region to open new positions in computational and applied sciences, including the professorship he has been holding from 1988.

Shaping the University

In the beginning of the 90's the activities were booming. Being established as full professor, knowing the research councils from inside, having a successful industrial case in his portfolio and several young post docs, Pekka could expand the group with new students and attract new industrial partners and international collaborators. Simultaneously the situation in Eastern Europe had changed. Pekka was fast to make good contacts in the leading schools in St. Petersburg and Moscow while summarizing the fruits of collaboration with colleagues from Eastern Europe and establishing links to the French school of applied mathematics and the European free boundary community. This all has made Jyväskylä a collaboration hub for scientists from many countries. Simultaneously Pekka was busy internationalizing the group, by co-initiating the Jyväskylä International Summer Semester, starting the

organizing of international conferences and by recruiting first foreign PhD students to the group. This alone would have been more than enough to fill the days of a professor. But other things emerged in parallel.

Pekka was called to serve in a government-level committee of research issues and, after a few months as Dean of the Faculty of Natural Sciences, as the first vice-rector of the University. The period as vice-rector manifested Pekka's ability to recognize qualitatively new opportunities as they emerge. Finland, by joining the European Union in the beginning of 1995, became eligible to European regional funding—Jyväskylä region, in particular, because of a major crisis in the regional economy. Thanks to Pekka's initiatives (and personal network of strategic people), Jyväskylä was able to harness the EU funding to a real structural change in the local economy, largely through expansion and modernization of university education by targeted master programs.

The master programs and other actions expanded the IT-related activities so that they fitted neither in the facilities nor the organization of the University. This led to the creation of the Faculty of Information Technology, splitting up the Department of Mathematics, and forming the Department of Mathematical Information Technology. Simultaneously a new building was needed and Pekka was a key person in the conceptualization of a site that linked several academic disciplines and related enterprises under a common roof. To implement the idea timely, new types of financial instruments had to be piloted at the same time. All this helped the University to move qualitatively forward to the new millennium.

Collaboration Across the Disciplines

In 2000 Pekka turned towards new challenges. Giving up the vice-rector duties, he started to promote collaboration between computational sciences and human oriented sciences actively. He saw the need of a platform for multidisciplinary research and collaboration and helped to establish Agora Center as such a unit. Serving several years as the head of Agora Center, Pekka has helped several multidisciplinary groups to find collaborators and new funding opportunities. Once again Pekka has been alert and able to react to the changes in the society and our region by launching an impressive series of actions to counterbalance the effects of the global financial crisis of 2008 by targeted educational and research programs.

To parallel his activities in multidisciplinary research, Pekka has expanded his personal research interests to game theory, data mining, and the like. When doing this he has not forgotten his roots. His first love, plate equation and wave phenomena, has led him to active collaboration and contributions in the field of nanotechnology. Error estimates for finite elements are still a relevant topic, now in the context of reliable a posteriori estimates.

Pekka has continued to be active in fatherly supervision of his PhD students, now passing over 60 in cumulative count.

60 and Beyond

What can be said about the future? Predicting the behavior of multidimensional dynamic systems is never easy. In Pekka's case it is virtually impossible. Having grown up with exterior problems, Pekka sees his domain unbounded by nature. He knows that irregularities from incompatibilities tend to smooth out asymptotically and that obstacles and barriers can be overcome, perhaps with paying a small penalty. He knows that even non-smooth systems can be controlled and optimized, that optimal solutions may be structurally different from the current design and that approximate solutions will do for practical cases. So, honestly, we cannot predict what exactly Pekka will be doing in the future.

However, 60 years of observation is enough to infer what Pekka will be working for—for the benefit of his friends and collaborators, for the University of Jyväskylä, for the region of Central Finland, for Finland, and beyond.

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