Preface

It is my greatest pleasure and honor to present this special collection of papers in the *Electronic Journal of Qualitative Theory of Differential Equations* and to congratulate Tibor Krisztin on the occasion of his 60th birthday.

In recent decades, Tibor has been a leading figure in the qualitative theory of functional differential equations due to his numerous and widespread activities. He has published 62 influential papers, several of these presenting significant breakthroughs in contemporary theory. His monograph *Shape, smoothness and invariant stratification of an attracting set for delayed monotone positive feedback*, co-authored with Hans-Otto Walther and Jianhong Wu provides one of the most comprehensive description of the geometric structure of the global dynamics ever given for any particular class of infinite dimensional nonlinear dynamical systems. Another highlight of his career is his contribution to the emerging theory of state dependent delays, and his seminal work *Functional differential equations with state-dependent delay: theory and applications*, co-authored with Ferenc Hartung, Hans-Otto Walther and Jianhong Wu, which has synthesized the state-of-the-art of the field, and has become one of the key fundamental references.

Tibor has spent significant time abroad at various universities, such as Memphis State University and University of South Florida in the USA; University of Alberta and York University in Canada; University of Pau in France; and Universität Giessen in Germany; however his base always remained in the Bolyai Institute in Szeged where he has trained a number of graduate students, many of whom are successful researchers today.

He has achieved many beautiful results with his PhD students. I still recall that when I attended a summer school on delay differential equations in Marrakesh as a graduate student, Mária Bartha's results on state dependent delays, which were part of her thesis supervised by Tibor, had been praised by one of the lecturers. With Gabriella Vas, they identified a new type of attractors for delayed monotone positive feedback, and showed that the closure of the unstable set of large amplitude periodic orbits can be represented by a tulip shaped structure, which is one of the most spectacular results I have seen for nonlinear delay differential equations. With Ábel Garab and Ferenc Bartha they proved the nearly forty years old global stability conjecture of Levin and May for two-dimensional Ricker maps, and this publication was chosen as the best paper of the *Journal of Difference Equations and Applications* in 2013.

The combination of analytical and rigorous numerical techniques that led to the proof of the Levin–May conjecture turned out to be a powerful tool in an infinite dimensional setting as well, and resulted in a long awaited major step towards the celebrated Wright conjecture for the delayed logistic equation. Tibor published this result in a joint paper with Arnold Neumaier, Balázs Bánhelyi and Tibor Csendes in 2014, and for this work the authors were awarded the prestigious R. E. Moore Prize in 2016.

Besides mathematical research, Tibor has shown leadership also in other areas of academic life. He has organized a number of conferences, most notably the recent Colloquia on the Qualitative Theory of Differential Equations in Szeged, special sessions at Equadiff and AIMS conferences, and a minisymposium at the 6th European Congress of Mathematics in 2012. He had a leading role representing mathematics in the Hungarian National Science Foundation, and was the director of the Bolyai Institute in very difficult periods. He is on the editorial board of nine journals, and co-editor-in-chief of *EJQTDE*. His achievements have been acknowledged by numerous awards, and he was elected to be a corresponding member

(fellow) of the Hungarian Academy of Sciences in 2013.

The respect of the differential equations community towards Tibor is well illustrated by the enthusiastic response that followed the announcement of the plan of the present special issue. Here we publish 26 contributions of very high quality from reputed authors, who are former students, collaborators, or mathematical friends of Tibor. All submissions went through the standard referee procedure of the journal and consist of novel and relevant mathematical results. The papers cover classical topics, such as boundary value problems or Lotka–Volterra systems, as well as new emerging areas such as state dependent delays, stochastic differential equations or reliable numerical methods. Some of the papers respond to current real life challenges, such as disease spread on transportation networks or donation-stockpile dynamics for blood transfusion treatments. The variety of articles and the appearance of new methods and approaches show the vitality of the field of the qualitative theory of functional differential equations, and its current relevance in both pure mathematics and applications.

In addition to thanking each author of this issue who submitted a paper dedicated to Tibor, I thank the co-editors Ferenc Hartung, Eduardo Liz, Hans-Otto Walther and Jeff R. L. Webb for their devoted work that made this volume possible, and the referees who have spent a significant part of their summer with checking and improving the manuscripts. Last, but not least, kudos to our two technical editors Attila Dénes and Ábel Garab, who did a heroic job in communicating with the authors, and preparing the final version of the papers in high typographic quality within an extremely short timeframe.

I hope our readers will enjoy the papers of this collection and find inspiration for their future research.

Gergely Röst, Szeged, 12 September 2016