Dick Askey: A Special (and VERY IMPORTANT!) Guru Indeed

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Special Functions are functions that occur so often that they deserve a name, but even more important than functions are *people*, and Dick Askey is one of the most special people I have ever met.

In this brief note, let me mention a small sample of the very significant mathematics that he inspired.

• It was Dick who challenged Dominique Foata to find a combinatorial proof of the Mehler formula, and that lead to Foata's beautiful combinatorial approach to Special Functions, pursued by him, his collaborators, and many others.

• It was Dick who had brilliant PhD students, including Dennis Stanton, that became the absolute unit of quality for all PhD students. Being x-Dennis with $x > \frac{1}{2}$ means that the student is very good. Of course $x \leq 1$, and the inequality is *sharp*, with only one case (guess who?) achieving $x = 1$.

• Dick is very passionate about mathematics education, something very rate amongst research mathematicians, and is a 'gadfly' (with co-gadfly George Andrews) about what they deemed mis-guided reforms in K-12 education, stating that *Good intentions are not enough.* Dick did not just criticize, but set an example by writing insightful articles for the *Mathematics Teacher*, the leading periodical for high-school teachers, about Fibonacci and Lucas numbers.

• The 'Askey scheme' (aka *tableau d'Askey*), hanging in my office (nicely designed by Jacques Labelle), was the **conceptual skeleton** of lots of great research in special functions, highlighting the Askey hypergeometric hierarchy, with the Racah and Askey-Wilson polynomials on the top.

• Dick caught the q-disease, and along with George Andrews and others (Mizan Rahman, George Gasper, Dennis Stanton, Frank Garvan to name a few) inspired lots of insightful *q-analogs* of classical theorems, that lead to insightful combinatorial interpretations (Xavier Viennot and his school, Bill Chen and his school, and many others).

• The *Askey-Gasper inequality* was the **crucial fact** needed in the proof of one of the most *important* open problems of the 20-th century, Louis de Branges' proof of the Bieberbach conjecture.

Finally, let me mention Dick's influence on myself.

• Dick was a great professional father-figure. He is the one who challenged me to prove George Andrews' q-Dyson conjecture, that I did, in 1983 (published in 1985) in collaboration with Dave Bressoud. He is the one who challenged me to prove the G_2 case of Ian Macdonald's Constant Term Conjecture (that I did, also done independently by Laurent Habsieger), where I used the Dixon identity, that I learned from him and from Foata. Dick also challenged me to prove the G_2-dual case of the same conjecture, that I did using what I called the *Stembridge-Stanton* trick. That method was later used by another whiz, Frank Garvan, to prove the F_4 case.

• Dick was an implicit, but very strong, influence in the development of so-called **Wilf-Zeilberger algorithmic proof theory**.

Thank you Dick!

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