

# Step Into the Unknown

Tim Chartier

In the summer of 2010, I received a call from a producer of the ESPN *Sport Science* program. They were stymied in their mathematical analysis and needed help. *Sport Science* is a television program that airs short segments analyzing the science of sports. The program often examines current sporting events with analysis often involving mathematics, which is why they were turning to me.

As we completed the call, I jotted down ideas and then performed calculations. In the end, I had a result that was described in a report intended to give the *Sport Science* staff an understanding of my work so they could make any changes as the TV segment evolved during production.

Since that time, I've periodically received calls requesting help, with varying amounts of time available to complete the analysis. Each time, I've been able to offer insight that moved the production to a final piece that aired on ESPN.

Yet there is an important moment in every call. When the team poses the mathematical problem, I generally do not know what will be effective analysis. Said another way, I'm

immediately stuck. As such, my first question is always the same, "When do you need to know if I think I can produce a solution?" Meeting this deadline enables *Sport Science* to have confidence in my offering a solution or time to find someone else.

After I accept a request to explore a question, I step into the unknown. I don't expect numbers to glow and the solution to almost magically emerge from a momentary mental mist, as mathematical research is often depicted by Hollywood. *Sport Science* poses difficult problems. Only careful analysis and consideration can lead to insights that will fuel a process toward insight.

Stepping into the unknown is common in data analysis. The same moment often occurs in my work with my sports analytics group at Davidson College. I often tell the undergraduates who join the analytics group that they must learn to step into the unknown and stand there, not knowing the path to take, and trust that their training and ingenuity will help guide them to a place of insight and action. Often, if we knew immediately what to do, then someone would have

already done it. Keep in mind, *Sport Science* only calls with problems that stumped their stellar staff.

Einstein said, "If we knew what it was we were doing, it would not be called research, would it?" Research can offer new insight and lead a business in innovative and even bold directions. Who do you contact to pose open-ended challenges? When our analytics group is posed a difficult problem, I turn to my student collaborators who can comfortably not know an answer.

Artists sketch outlines of their final drawings before settling into their bold final strokes. The errant marks led to the final drawing. Innovation comes from taking various steps that are rarely entirely linear or lead directly to the desired goal. To lean on another Einstein quote, "Anyone who has never made a mistake has never tried anything new."

Failed attempts offer moments of learning and gained insight. To move in new directions, you must have patience. Further, when you get new results, you must look carefully. New insight can look odd, given it can offer insight

counter to general assumptions. New insight can also be exciting, which won't necessarily mean it is robust or correct.

Do you want to conduct research in a new and innovative direction? Consider carefully when you need to know if you think you can produce a solution or recommendation. If you have the time to explore, you may find valuable insight. Either way, you can gain new perspectives from the work. However, if you only have time to produce actionable results, then you may want to pose a problem that has a high likelihood of completion. Simply keep in mind that this may not correlate to posing a novel direction. Such times can come, but only when you are willing to step into the unknown and to figure out a path that can take you in new directions.

#### EDITOR'S NOTE

Tim has been a great "quick-thought" contributor to *JCAF*. His commentaries are very inspiring to our readers who have to make quick decisions that are rational. I am pleased to introduce Tim.

#### Timothy Chartier

##### Education

PhD, University of Colorado, Boulder  
MS, BS, Western Michigan University

##### Background

He is a recipient of a national teaching award from the Mathematical Association of America. Published by Princeton University Press, he co-authored *Numerical Methods: Design, Analysis, and Computer Implementation of Algorithms* with Anne Greenbaum. As a researcher, he has worked with both Lawrence Livermore and Los Alamos National Laboratories on the development and analysis of computational methods targeted to increase efficiency and robustness of numerical simulation on the lab's supercomputers, which are among the fastest in the world. The research with and beyond the labs was recognized with an Alfred P. Sloan Research Fellowship.

He is Chief Research for Tresata, a predictive analytics software company. He serves on the Editorial Board for *Math*

*Horizons*, a mathematics magazine of the Mathematical Association of America. He chaired the Advisory Council for the Museum of Mathematics, which is the first museum of mathematics in the United States and opened in December 2012. He has been a resource for a variety of media inquiries, which includes appearances on NPR, on the CBS Evening News, in *USA Today*, and in *The New York Times*. He also writes for the Science blog of the *Huffington Post*.

He received a BS degree in applied mathematics and an MS degree in computational mathematics from Western Michigan University, a PhD in applied mathematics from the University of Colorado at Boulder, and held a VIGRE postdoctoral position at the University of Washington, before arriving at Davidson in 2003.

The *Journal of Corporate Accounting and Finance* is pleased to share Tim's comments with our readers. If you missed his previous commentaries, you can read them beginning with the July/August 2015 issue.

**Tim Chartier** is an Associate Professor of Mathematics and Computer Science at Davidson College in North Carolina.