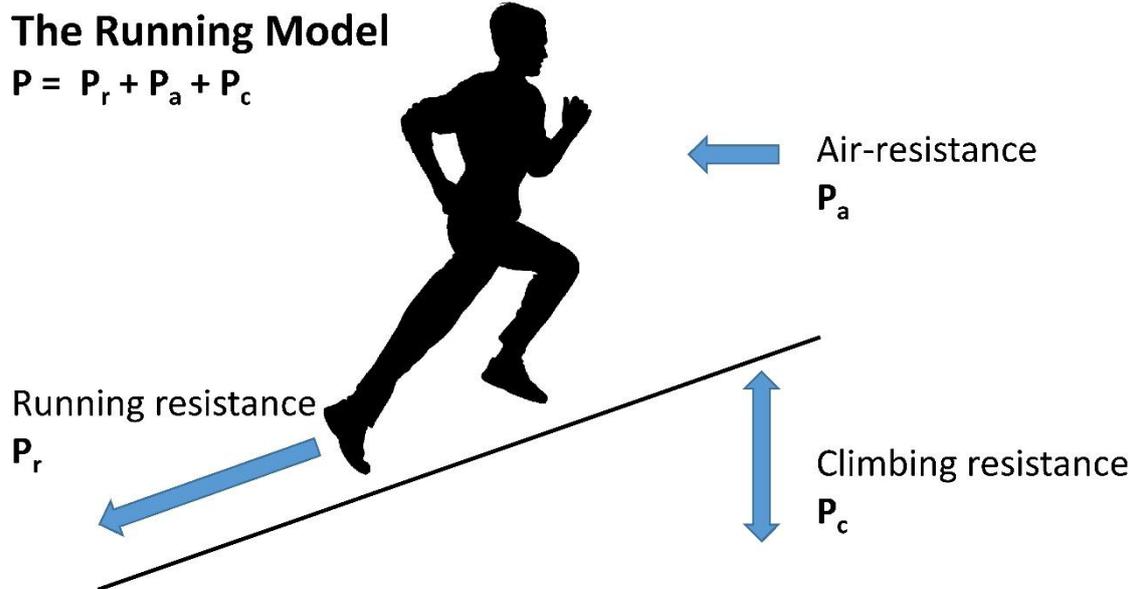


33. The Secret of Training

In our books **The Secret Of Running** (www.thesecretofrunning.com) and **The Secret Of Cycling** (www.thesecretofcycling.com) we have described our unified theory for the performance in running and cycling. Our running model is based on the premise that the power produced by the “human engine” (i.e. the leg muscles and the heart-lung system) must be equal to the sum of the power required to surmount the running resistance P_r , the air-resistance P_a and the climbing resistance P_c , as indicated in the figure below.



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Meanwhile, we have tested the model in many situations (running, cycling and both in the lab and in races) and found the results very convincing and consistent. Finally, we have tested the Stryd footpod on many occasions, both in the lab and in the field and we found that the Stryd power data match our model calculations perfectly.

In 2017 we performed research into using Stryd to determine the running economy in a project in cooperation with Radboud University of Nijmegen, the Netherlands. The results confirmed our earlier findings that the Stryd power data and in particular the ECOR can be used very well to optimize training and running technique on a daily basis. Improvements in training should lead to both lower energy cost (ECOR) as well as oxygen cost (RE) of running at a certain speed. The project also revealed an interesting finding, i.e. that trained runners ran much more economic than untrained runners (<https://thesecretofrunning.com/wp-content/uploads/2017/10/27.-The-physiological-differences-between-trained-and-untrained-runners.pdf>).

In 2018 we will investigate this ‘Secret of Training’ more closely. How should you train to run more economic? How long do you have to maintain this training? The answers to these questions are not trivial, as systematic scientific research into improving the running economy is scarce. Of course, many coaches have opinions (sometimes contradictory) on the best running technique, but so far it has been difficult if not impossible to test this scientifically. This is the goal of our next project: how can runners improve their running economy through training and how can it be optimized? In this

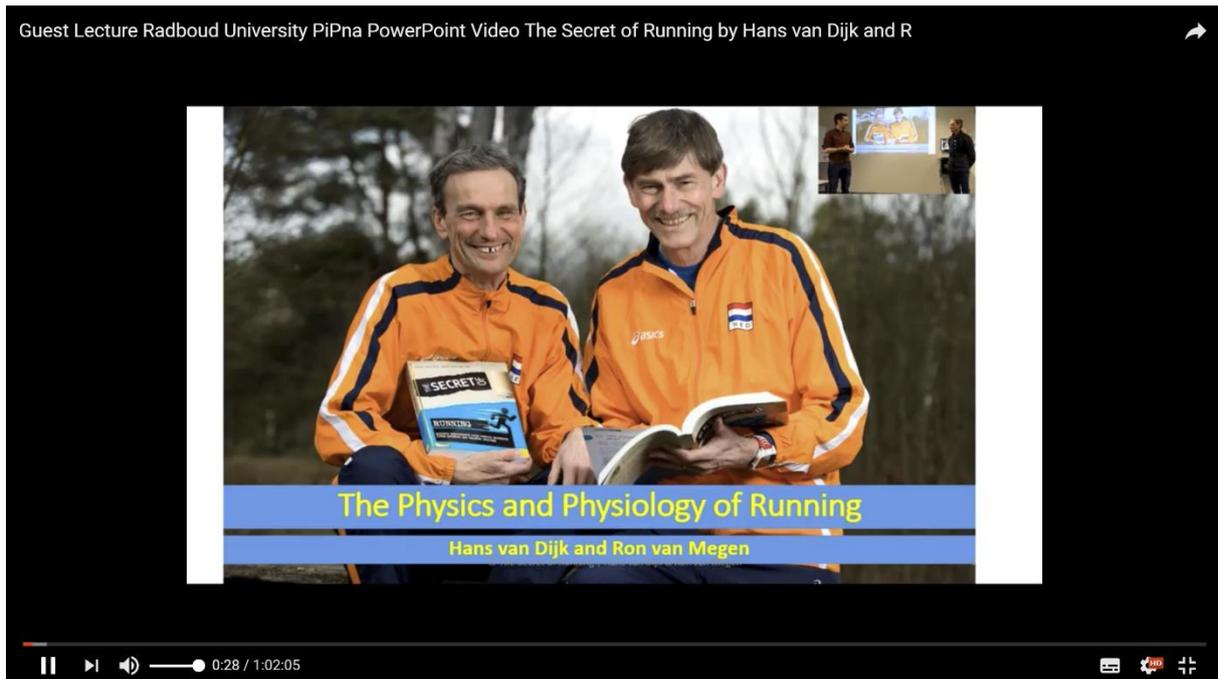
project we will work together with the famous Dutch middle distance runner and coach Bram Som and his athletes of the Team Zevenheuvelen (7Hills team). The principle researcher will be Michelle van Delden, supervised by prof. Maria Hopman.



Figure 1 Hans, Bram en Ron in front of the Radboud Castle

Guest lecture on the physics and physiology of running

Prior to the 2018 research project, we were asked to present a guest lecture on the physics and physiology of running at Radboud University. The lecture was part of the module Clinical Exercise Physiology for medical students and students of biomedical sciences. Hans gave the lecture (in English) and Ron recorded it on video. We have used the results to start our very own youtube channel on the Secret of Running, <https://youtu.be/lpMojEeZ08w> The video can be considered a 1-hour introduction into The Secret of Running, so anybody who is interested can have a look and listen.



After the lecture, the students were shown a National Geographic video on the Breaking2 project of Nike. <https://youtu.be/3dJW47y5Hlo> As most readers will know, Eliud Kipchoge narrowly missed the barrier of 2 hours. Earlier, we have analyzed his performance in this paper (<https://hetgeheimvanhardlopen.nl/wp-content/uploads/2017/05/23-The-power-of-Eliud-Kipchoge.pdf>).

The session ended with an exercise in which the students could use our spreadsheet model to calculate the impact of all factors on the Breaking 2 attempt. This proved very successful as many student came to correct conclusions and suggestions!

To be continued!

All in all we are very enthusiastic about the cooperation with Radboud University and we hope to be able to support the teaching and research on running in the coming years. Our main interest for next year is on the research into the secret of training; we will publish the results as soon as they become available.

We are curious to the reactions and experiences of the readers, we welcome you to share these at www.thesecretorunning.com.

Follow us on YouTube channel The Secret of Running
<https://www.youtube.com/channel/UCZD6RjE9d17TsXpB-TDCCrg>

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