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Yves Brun
Systems Biology/Microbiology Faculty Search
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Dear Dr. Brun:

   Dr. Van M. Savage has applied for a position in your department. I have known Van since 2000, and we have co-authored five papers (four published, one submitted), mostly about the interaction between body size and temperature in the determination of biological rates (times): metabolic rates, growth rate, individual production rate, and population growth rate. The recently submitted-to- *Science* paper is on the statistical invariance of dimensionless life-history numbers. Van has taken the intellectual lead on this paper and a population growth paper. Van is clearly among the best of the math talent now found in biology; what sets him ahead of others is that he uses his math skills to attack fundamental biological problems, and he does it with strong biological intuition . . . a remarkably elegant choice of what to put in and what to omit. This often involves approximations and the choice of phenomenology mixed with more basic assumptions. For example, in the population dynamics paper, population biomass is tracked through time, which involves averages for species with size structure; some of the allometric rules are approximations since they use average to a 0.75 power, rather than sum the sizes to the 0.75 power. The beauty is the simplicity of the analysis and the ability to see general rules from it. To see how good the approximations are, however, Van carried out a detailed analysis (*JTB* 227:525), and extended the averaging ideas to much larger aggregates (e.g., ecosystems). All of this is very important for those of us who wish to use averages to reduce complicated problems to a few "useful" numbers.

   In the submitted *Science* paper on life-history invariants, Van again took the lead by seeing that proposed null models with uniform distributions have very limited usefulness; he bounded that usefulness and showed me what kind of analysis would be useful. Indeed,

many life-history ratios have the kind of invariance I suggested in 1993, but Van pushed us to understand what we must do to really conclude that.

There is an old adage that churning complicated equations does not lead to important discoveries (even if great math skills help) . . . it takes a tasteful choice of what to put into those equations and what questions to ask in the first place. Van has certainly shown great skill in his choice of both problems and inputs. He should be a strong candidate for your position.

Sincerely,

Eric L. Charnov
Distinguished Professor
MacArthur Fellow

ELC/aer