

**Application for a Faculty Position: Theory and the Biological Sciences
Graduate Center, CUNY**

If you want a person such as you describe whose work is “grounded in the traditions of theoretical physics and applied mathematics” you can rule me out on the spot. I started as a pure math major at Harvard but left a year later after differential equations. There was math in all my early work and in my book with Austin Burt but now I only glance at the mathematics of a paper if I feel certain the conclusion is mistaken and wish to locate the source of the error (usually hidden within an assumption). I like to joke that I am a theoretical biologist and of course a mathematical one, but for convenience leave out most (or all) of the mathematical details.

On the other hand, my life’s work has always been based on logic, hopefully mathematically permissible logic, and I have certainly always transcended historical biological boundaries (and still do). If you propose the first and still only theory for the evolution of sex differences you automatically transcend boundaries between animal behavior and plant morphology etc and so forth. I have done extensive theoretical work in three separable disciplines of biology, social theory based on natural selection, the evolution of selfish genetic elements and the evolutionary logic of self-deception.

Regarding social theory I developed the theory for the evolution of sex differences, parent-offspring conflict, variation in sex ratios throughout life, and reciprocal altruism, in all species. Regarding selfish genetic elements Austin Burt and I were the first to organize and analyze this vast topic—all cases of within-individual genetic conflict in all species except bacteria and viruses. We estimate we read 6000 articles of which 1400 made the cut. Regarding self-deception I have developed a general theory for its evolution and function and laid the foundation for a future science of the subject by adding the best relevant findings from immunology, social

psychology, neurophysiology and everyday life (e.g. airplane crashes and space disasters).

I will not raise grants, I will not make fundamental new findings, but I do believe I can serve as a useful resource for others. Applied mathematicians need problems worthy of their mathematical talents. I can be helpful. If you are working in any of the above areas, it might save some time and orient you to better possibilities if you paid a visit to my office. I would welcome the interaction. I also enjoy teaching, have an active interest in the larger community and would love to help the initiative at CUNY grow where theoretical biology is concerned.

Research Statement

I will continue to work on social theory, selfish genetic elements and self-deception. In addition I will do work on my Jamaican Symmetry Project within the next few years.

Species selection. I am finishing a paper (with Koos Boomsma) on species selection, the differential reproduction of species over time—speciation and extinction—as a function of the traits within a species. Within species the traits evolve via natural selection on individuals and their genes but then a weeding out process must operate by which some species are preferentially removed from life while others prosper. The fundamental variables are reproductive—the degree of investment in the two sexes and the genetic variables of within-individual and between-individual variability as well as selection at the level of selfish genetic elements. It is astonishing that a topic of this importance should have lain dormant for so long under the absurd assumption that species selection would always override individual selection (vide Gould) when the reverse is usually the case. In any case, we describe an intriguing landscape of theory and facts—again laying the foundation for a future sub-science.

Honor killings. As a theoretician one is naturally attracted to phenomena that appear to contradict theory, the deeper the better. I have begun a project to figure out the underlying socio-genetic factors associated with honor killings. How on earth could selection favor murdering one's own (reproductively mature) daughter or full sister? It can, but the argument is complex and involves mastering degrees of relatedness in cousin marriage systems, especially parallel cousins (see attached proposal). Obviously the topic cuts through conventional boundaries and is an important one on which to make progress in hopes of ameliorating it.

Other topics. I will work on other subjects such as homosexuality, which again appears to challenge the adequacy of natural selection as an explanatory theory. There is now a large literature on the subject in both human sexes that I have followed closely and lecture on. It is ripe for a synthesis based on best guesses as to the key selection pressures involved. Other subjects loom.

Selfish genetic elements. I am working on a paper (with David Haig) on pediatric growth disorders. They turn out to be the result of imbalances in imprinted genes. We hope to organize the data to see if the severity of the disorder is associated with the severity of the imbalance. I may then turn to the topic of polyandry as a defense against the spread of selfish elements, especially so-called "driving" elements. I am supposed to produce a book someday called SGEs II—updating our 2006 book, but work is pouring forth at a rate that suggests I may content myself with addressing individual sub-topics one by one.

Self-deception. My interest in this topic is life-long and I am up-to-date since my 2011 book. Which sub-area I wish to contribute to is still up in the air.

Jamaican symmetry project. In the early 1990's it became clear that degree of bodily symmetry was an important predictive variable—female choice in insects, birds and mammals, including humans, is positively affected by the male's degree of

symmetry, so I began in 1996 the only long-term study of fluctuating asymmetry and its correlates in humans by measuring 288 rural Jamaican children (average age 8.2 years old) from head to toe, including teeth, bones of the hand, handedness, dermatoglyphics and external morphology.

Recently we made the remarkable discovery that those with symmetrical knees in 1996 at age eight (but in no other trait) ran faster 90m and 180m races fourteen years later in 2010, boys and girls alike. This in turn led to the discovery that elite Jamaican sprinters had more symmetrical knees than average Jamaicans and among them, the very best (e.g. Shelley Ann Fraser-Price) had the most symmetrical knees (see <https://vimeo.com/121156632>).

In a few years, all participants in our original 1996 sample will be thirty years of age or older so we can get life outcomes, number of children in women (and estimated in men), medical health in both sexes, as evaluated by doctors hired for the purpose, photos and so on and so forth—the payoff only a long-term project can provide. I have appended a list of papers growing out of this project. It will be noted that many deal with a secondary variable—the 2nd:4th digit ratio—which turns out to be valuable index of relative testosterone/estrogen *in utero*.

