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Dear Dr. Glazier,

It gives me great pleasure to write a reference letter for Dr. Gabriel Mindlin. I am uniquely qualified to judge Gabriel, as I know him as a fellow student, a colleague and a co-advisor. I met him while we were students at the University of La Plata, Argentina. From the very first moment I was impressed by the same qualities that would make him a scientist and scholar of international excellence: his unmatched ability to focus and his work ethos (I mean this, I do not know anybody that comes close), his command of formal and conceptual tools of physics and mathematics, his open-mindedness in regard other branches of science and culture (a point very dear to me, I admit, but also to his students), and his human qualities as a co-worker and mentor (likewise).

An example will demonstrate my assertions. I had been trying to convince him for some time to join forces to attack the problem of song generation in songbirds, a subject perfectly fit for the tools he had developed in the context of human voice production. I, without the constraints of running a lab and mentoring a large number of students in a Third World country, experiencing the social and economical turmoil now featured on CNN, was pushing him to move into a totally new field. Once he was convinced, after thorough meditation, that it was an enterprise worth the risk, he thrust all his scientific might into it, producing work of superb originality. Not only was he the driving force behind the, to my knowledge, first non-descriptive, analytic model of birdsong production – whose simulation fooled a founding father of the field, Fernando Nottebohm, into believing it was a real bird -, but he was the *de facto* advisor of the student who got a thesis out of it, several thousand miles away in The Rockefeller University. Faithful to himself, Gabriel has kept working on this line of research to produce an outstanding piece of work recently published in

Physical Review Letters, highlighted in *Physical Review Focus* and *The New Scientist*, and even featured in the Argentine TV news. He has demonstrated that driving his song production model with realistic spiking activity it is possible to reproduce the actual song generated by the animal. The adjective of outstanding that I used is not superfluous: as you well know, the only precedents of models driven by real or realistic spiking data involve very simple motor output, and moreover the models utilized are not analytic but heuristic, based on ANN or linear fitting. This is a demonstration of what you can expect from Gabriel if you let him loose among biologists.

I had also the opportunity to work with and mentor one of his many undergraduate students from University of Buenos Aires, Mariano Sigman, while he was a graduate student at The Rockefeller University. The professionalism that Gabriel impressed on each one of his students is hard to measure if you do not know how difficult the working conditions are in Argentina, and if you are not familiar with the continental bohemian, rather than anglosaxon pragmatism, that is its ruling scholastic tradition. Gabriel was a constant role model for Mariano during his graduate studies, and Gabriel would always check up on him through me, as a true mentor. I am certain that your students will find in Gabriel an exciting, involved and trustworthy mentor.

Regarding his many contributions to the field of dynamical systems, laser physics and stellar dynamics, there is no better judge than the number, quality and impact of his publication record, which speak for themselves. He has amassed an impressive number of highly cited publications, and his book remains one of the deepest and more comprehensive tools for students and researchers of non-linear dynamics.

In particular, his contributions to the field of topological reconstruction of dynamic flows rank among the top developments of non-linear dynamics of the last decade. But more importantly, these ideas will have an enormous impact on biology, in particular to neuroscience, as the very nature of neural systems is to be excitable media. For instance, although he has not published yet in the field of functional magnetic resonance, he is very aware of the many possibilities for physicists to contribute to analytic approaches to brain imaging. I have discussed with him, during my postdoctoral tenure in a functional MRI laboratory, what amounts to a full research program to apply his vast knowledge of nonlinear signal analysis and modeling to the spatio-temporal patterns of brain activity recorded in a scanner, with the goal of discriminating robust interactions between brain areas across brain states. Even though at that time his exposure to brain imaging issues was minimal, he immediately got to the heart of the problem, and proposed a number of avenues of exploration as if he were an

expert in the field. Give Gabriel access to data and experimentalists and you will see these ideas flourish (and will make me envious, for sure).

There is no doubt in my mind that Gabriel is the perfect match for your institute, and will be a powerful force in bridging the gap between physics and biology, which I know is one of the main goals of your institute. In him you have a world expert in dynamical systems with a vast experience in modeling real physics experiments, and set on a path of deeper involvement with biology. If this combination is the key to unlock the secrets of complex biological systems, you will be recruiting a master locksmith.

A handwritten signature in black ink, appearing to be 'G. Cecchi', with a large, stylized loop at the bottom.

Guillermo Cecchi, PhD
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