



Department of Physics
College of Arts and Sciences

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Ms. Yana Teterina
Senior Condensed Matter Faculty Search
Department of Physics
Indiana University
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Dear Ms. Teterina,

It is a real pleasure for me to write on behalf of Dr. Gabriel Mindlin who is being considered for a Senior Faculty position in your Department.

Gabriel is clearly one of the most talented physicists I have ever known. I have realized about Gabriel special gift for Physics and Mathematics since he was a graduate student at Drexel starting in 1988. Gabriel was one of the brightest students Drexel ever had. He demonstrated at that time a fierce imagination, great physical sense and superb ability for Physics and Mathematics. This has remained the characteristic of his research accomplishments since then. He is currently a Tenured Professor at the University of Buenos Aires, a significant achievement given the fact this University is arguably the best university in South America.

When he was a student, Gabriel played a major role in the research leading to a topological classification of strong attractors in low dimensional systems (Phys. Rev. Letters, 1990). This work showed very clearly his brilliance, his physical instinct, his uncanny mathematical ability and his great instinct for fundamental problems. This approach has since become the focus of the research by Prof. Gilmore, who has since extended and applied further their work and co-published a book "The Topology of Chaos", Wiley, 2002, with Marc Lefrand.

Gabriel has an unsurpassed knowledge of non-linear dynamics. He has published numerous Physical Review Letters on the topics with significant results. He has applied this knowledge to countless physical situations. His book, "Nonlinear Dynamics: a two way trip from Physics to Math", is an excellent text that explains the subject in a profound and rigorous way. He co-authored the book with Hernan Solari (Post-Doc at Drexel when Gabriel was a student) and M. Natielo, yet Gabriel's contributions to the book were foremost and fundamental.

Recently, Gabriel has become interested in the problem of "Voice Production". Together with his students, Gabriel has developed a very original model of the production of the vowels via the

nonlinear oscillation representing the vocal cords, and a wave model for the modification of the sound in the trachea and the mouth. This has led him to a patent on voice recognition in Argentina. A similar model was applied to bird songs. He was recently at Rockefeller working on this topic. He has produced a model that is revolutionizing the field of bird songs production. In his characteristic way, he has already published a Phys. Rev. Letter on this topic.

His research on bird songs and human voice has led Gabriel to ask fundamental questions on the brain control over the sound production. This led him to neural models in which he is seeking to model and eventually produce electronic replacement circuits for the neural networks. This work is fundamental. It led to a Phys. Rev. Lett. (89, 288102, 2002) entitled "Diversity within a Birdsong". In this work, Gabriel and his student, Laje, designed a model of the part of a birds' brain responsible to control their signing. They then coupled this model to the mathematical model of the birds' vocal cords to produce realistic "artificial" birdsongs. This work is a revolution in the area of mathematical biology and biocomplexity. The Physical Review Focus (<http://focus.aps.org/story/v11/st1>) an issue dedicated to this work.

I consider Gabriel as one of the most brilliant physicist I have known. His scientific production is terrific - a Phys. Rev. Letter each 2 years or so. He has applied his deep knowledge and instinct of Physics and Mathematics to numerous fields with equal success. He is a profound mathematician, one of the best dynamicists in existence, and yet can think physically to the point of collaborating in recent experiments concerning bird songs in the U.S. and neural networks with biologists from the University of Buenos Aires.

His CV shows that Gabriel has produced a larger number of Master and Ph.D. students. Note that many of the students at the University of Buenos Aires are brilliant, including many that are working with Gabriel. He is an advisor who is sought by the students, given his ability to find interesting and fundamental research topics and his ability to lead the students.

Gabriel is very good in the classroom as well. I was aware of his reputation as a TA at Drexel. I heard him many times giving scientific lectures. I have visited Buenos Aires and spoke to students in his classes. The picture that emerges is that of a clear lecturer, with great knowledge and of an instructor who clearly cares about the students.

I recommend Gabriel fully as a colleague as well. He has a pleasant personality, gives very clear talks and lectures, and takes genuine interest about his department.

I recommend Gabriel fully for your Department. He will bring deep and fundamental research to your department and be an excellent colleague.

Please do not hesitate to call should you like to discuss further about Gabriel.

Sincerely your,



Michel Vallières, Head