



Biocomplexity Faculty Search
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Dear Members of the Biocomplexity Faculty Search Committee:

I write in support of Dr. Narayanan Krishnamurthi, who has applied for a tenure-track faculty position in your Department.

I have had the pleasure of knowing Dr. Krishnamurthi for more than two years now. I hired him at the position of Research Scientist following his Post-Doctoral tenure with Jim Collins group at Boston University / Harvard Medical School. His position here is currently supported by a DARPA grant on "Advanced Neural Implants and Control", as well as by an NIH grant on "Bioengineering Research Partnership for Brain Dynamics". Narayanan has demonstrated an excellent ability to perform under pressure of grant, conference and paper deadlines, and has exhibited a unique ability to supervise my undergraduate and graduate students in their pursuit of M.S. and Ph.D. degrees (5 M.S. degrees have already awarded and 2 Ph.D. degrees are in the process of completion under his guidance and supervision). During this period, his research efforts have resulted into publication of 9 conference papers / abstracts and 2 journal papers, submission of 1 more journal paper, and preparation of 4 journal papers for submission in early 2004. Dr. Krishnamurthi has also played a critical role in the preparation of a multi-million dollar proposal to NIH on "Bioengineering epilepsy: Dynamical analysis of scalp EEG" (2003). He is a co-PI in this RO1 proposal. He is now preparing a second NIH proposal on "Dynamics in Parkinson's disease" in collaboration with Mayo clinic at Scottsdale and Good Samaritan Hospital in Phoenix. In addition to these highly remarkable research activities he has gained high marks in various teaching functions. Dr. Krishnamurthi has assisted me with the organization and teaching of several courses (e.g. Biodynamics, Signal Processing), that included lectures when I was out of town in conferences and meetings of Advisory Committees, national panels etc. Finally, I am in the position to know that, as a reviewer, his reviews of papers submitted to international journals are of the highest value.

From the above, it is clear that Dr. Krishnamurthi's background and performance has been a great asset for my Brain Dynamics Laboratory during his tenure at ASU. His past education, training and expertise in Dynamics and Biocomplexity, combined with his excellent programming abilities (e.g. development of novel and modification of existing software for long-term prediction of epileptic seizures) and exposure to Biology, Physiology and Signal processing (Biomechanical and Bioelectrical fields) over the last 4.5 years since his Ph.D. from IIT, Madras, has made him a source of inspiration and knowledge, and a role model for my students in the Lab, as well as his colleagues in our Department.

Dr. Krishnamurthi is currently pursuing research in the realm of Biocomplexity within two broad categories: 1) theoretical work on the dynamics of information exchange between nonlinear systems in different coupling configurations, identification of the direction and strength of existing bi-directional information flow and transfer of entropy over time and space (applications to simulation data from mathematical models of Lorenz and Rossler chaotic oscillators in different configurations and coupling regimes), and 2) practical work on the characterization of the spatio-temporal dynamics and complexity in signals generated from complex biological and physical systems. He is involved with analysis of electrical signals from the human brain (EEG from scalp, cortex and hippocampus in epilepsy patients and epileptic rodents) with the dual goal of localization of abnormal regions and prediction of global, catastrophic transitions of the network, primate's brain (sensory and motor cortical spike train data in memory, plasticity and learning studies with rhesus monkeys), EMG from muscles, as well as pressure / posture signals in Parkinsons' patients.

Prediction and control of impending crises is a major thrust of our research. Our brain research in epilepsy in particular, continuously supported by NIH since 1993, has enjoyed a high publicity in the press in recent years (Discover magazine May, 2002; NYTimes Feb. 20, 2001 and Feb. 18, 2003; American Epilepsy Society top research priority, IEEE Spectrum July, 2003, etc.), with corresponding publications in national and international scientific journals, due to its potential for the development of novel therapeutic modalities, like brain intelligent stimulators / pacemakers. Dr. Krishnamurti is in charge of the experiments on the control of the aforementioned transition via timely, long prior to seizures, low-dose interventions in the brain in collaboration with the renowned Barrow Neurological Institute in Phoenix. NSF is recently preparing to announce several PAs in the field of complexity of interconnected systems across various scientific branches. Other funding agencies (e.g. NIH) move towards the same direction. In this sense, I believe that Dr. Krishnamurthi's training and expertise would be a unique asset for your University's effort to solicit external funds along these and other more conventional research avenues.

Narayanan has a very pleasant personality and is an independent thinker. He has very good interpersonal skills and is a fast learner and performer. He is an outstanding team player and cares about students' teaching and research performance. He has effectively presented his research at several national and international forums. I strongly believe that he has more than it takes to be a successful and effective researcher and an excellent, sensitive and effective teacher. I will be looking forward to a collaboration with Dr. Krishnamurthi's team in scientific publications, and most importantly, federal and private research grant proposals and projects.

Overall, I believe Dr. Krishnamurthi would be a great asset for IUB. Therefore, it is with great enthusiasm that I recommend him for a tenure-track faculty position in your department.

Best Regards,

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P.S. Please feel free to contact me in case you need any more information.