

UNIVERSITY OF ILLINOIS  
AT URBANA - CHAMPAIGN



114 Roger Adams Laboratory, Box C-3  
600 South Mathews Avenue  
Urbana, IL 61801-3602 USA



Professor Edmund G. Seebauer

Phone: (217) 244-9214

Fax: (217) 333-5052

E-mail: eseebaue@uiuc.edu

December 12, 2005

Professor Yves Brun  
Systems Biology/Microbiology Faculty Search  
Department of Biology  
Indiana University  
Jordan Hall 142  
1001 East Third Street  
Bloomington, IN 47405-7005

Dear Professor Brun:

I am very pleased to recommend **Rudiyanto Gunawan** for an assistant professor faculty position in your department. Rudi joined my group in 2000, having obtained his M.S. under the sole direction of my departmental colleague Richard Braatz. Prof. Braatz and I co-advised Rudi's doctoral thesis, which had a decidedly more practical focus than the theoretical work of the M.S.

Rudi was the primary driver behind bringing rigorous systems and control techniques to a crucial aspect of transistor manufacture for silicon-based microelectronic logic devices: the formation of extremely shallow *pn* junctions by ion implantation. The depths of such structures must decrease as device dimensions progressively shrink. The amount of dopant in these regions that is electrically active simultaneously must increase. To accomplish these simultaneous goals, the microelectronics industry has expended a great deal of effort attempting to model the complex reaction-diffusion network that describes undesired dopant diffusion and as together with the desired activation. This modeling has unfortunately offered correlative rather than predictive abilities for process development.

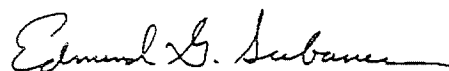
Rudi drove the development of an improved simulator with true predictive capabilities. With help from my graduate student Michael Jung, Rudi applied several systems-based parameter estimation methods to develop a set of activation energies and pre-exponential factors for the elementary steps that govern dopant diffusion and activation. His work permitted us to accurately simulate experimental dopant profiles of boron with no freely adjustable parameters. The simulations revealed exciting new possibilities for developing technologies based on surface chemistry that simultaneously reduce junction depth and increase dopant activation -- a "holy grail" of the microelectronics industry. The work has led to a patent application on which Rudi is listed as a co-inventor.

Rudi is easily the strongest intellect I've been privileged to advise, surpassing other faculty candidates from our department for at least the past five years. For his PhD study, Rudi mastered with ease some intricate concepts of condensed matter physics in which he had no formal training. A significant portion of his work was done in collaboration with the industry consortium International Sematech, so Rudi has acquired a strong sense of what is needed to apply his impressive mathematical skills to practical problems. This sense should serve him well as he broadens the scope of his academic interests toward systems biology. I have not followed his postdoctoral work at UCSB with Frank Doyle in detail, but my general impression is that its impact is likely to be as substantial as his PhD work.

On a personal level, Rudi is unassuming but very determined to excel in his work. He should make an unusually responsible departmental citizen. He is patient and concerned about people, which should also make him a fine educator. Rudi would make an attractive addition to your department, and he has my strongest endorsement.

Please do not hesitate to contact me if you have further questions.

Sincerely,

A handwritten signature in cursive script that reads "Edmund G. Seebauer". The signature is written in black ink and has a fluid, connected style.

Edmund G. Seebauer  
Professor and Interim Head