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Letter of Recommendation, Lucas Dietrich

Dear Members of the Selection Committee,

I am writing to enthusiastically support *Lucas Dietrich*, who is applying for the position of a Bioinformatician after he recently graduated from Friedrich-Schiller University Jena, Germany with an outstanding Master of Science degree. Lucas is an ideal candidate for an advanced career within the fields of Bioinformatics, Computer Science, Systems Biology, or related areas.

I have known Lucas for about three years. We became acquainted when he successfully conducted a scientific project within the course *Molecular Algorithms* which is focused on techniques and methods of biologically inspired information processing. By means of selected case studies, the students carry out a small research task to explore an unconventional state-of-the-art approach in performing development of simulation systems. He modelled and analysed a *minimal chemical oscillator* using a self-made software tool. I was very impressed to realise that Lucas successfully tackled the challenge to work in a highly interdisciplinary manner. We continued our collaboration by an additional project in which the *human blood circulation* had been under study from the perspective of a *control loop with multiple feedbacks*. Although corresponding models tend to be numerically instable, Lucas' fine-grained approach of a time-discrete event simulator produced excellent results for a variety of case studies taking into consideration dedicated malfunctions of the underlying human vascular systems. It became apparent that Lucas comes with a special extraordinary talent for software development for emulation of complex systems with a plethora of interactions and manifold interdependencies among its components.

In March this year, Lucas brilliantly finalised his Master thesis entitled *Development of a Configurable Visual Simulation System for the Effects of Protective Mechanisms by Plants against Herbivores* under my supervision in collaboration with the Leibniz Institute for High Performance Microelectronics (IHP). The scientific scope of this thesis work includes a complex modelling task. Plants come with many sophisticated strategies to combat their enemies. For instance, they produce and spread signalling substances in order to alert their neighbours. Plants are able to release specific mixtures of poisons and bitter drugs perfectly tailored to their attackers. Even substances attracting predators of the herbivores might be employed. Herbivores on their own have also been equipped with an arsenal of behavioural patterns to overcome some of plant's strategies for defence. What stands out is that

many subjects interact on a grid in a complex manner. Lucas' simulation system written in Python copes with this complexity and enables a detailed analysis of the underlying dynamical process which exhibits the success of protective mechanisms by plants. Engineers responsible for construction of robust wireless sensor networks can learn from those approved principles in nature. The results found by Lucas and the benefit of his software are a great asset for the future work in this field. We plan a common journal publication mainly based on these valuable findings.

From the beginning of our fruitful collaboration, I have been impressed by the creativity and soundness of Lucas' work which appropriately supplements his personality. From my point of view, Lucas' specialty lies in tackling challenging tasks of software development which demand a large amount of unconventional ideas in conjunction with a fresh mind away from the mainstream. Lucas' intellectual abilities include readiness of mind, capability of solving complex tasks requiring a high degree of innovation and management skills. I appreciate him as an ambitious and constructive person. In conducting all projects we tackled together, Lucas exhibited high thoroughness, produced new ideas, and showed that he is able to work scientifically. I was much more than satisfied how he enthusiastically and professionally dealt with challenging topics. In addition, he demonstrated profound technical skills. He is a clear thinker and brilliant analyst, which became apparent in his very productive, collaborative, precise and persistent style of working. I really enjoy working with him.

I expect that Lucas Dietrich will definitely be an intellectual benefit to your institution or enterprise, which perfectly complements his profound education at the crossroad between systems biology and computer science. I would be delighted if he would get the permission to show his qualification in the aspired position.

If you have further questions, please do not hesitate to contact me by email or phone.

Yours sincerely

PD Dr.-Ing. habil. Thomas Hinze