# DEAR PROFESSOR BOGDAN GABRYS,

I would like to express my strong interest in the PhD research studentship position on Faculty of Engineering and IT at University of Technology Sydney, studying 'Automatic composition, optimization and adaptation of multi-component predictive systems'. I believe that my background, experience and interest meet the objectives of the project and this position would be a perfect opportunity for me to gain knowledge, skills and experience as well as a big step in pursuing career in research by working with the best computer scientist.

Computer science is one of the fastest developing fields in science. With constantly increasing numbers of changes my curiosity grows. This is the driving force to continually extend and improve my knowledge in this field. My desire to explore is not limited only to study, but also to work in the comfort of my home and validate the results in real industrial environment. I believe that research in the field of data collection, analysis, technical computing as well as predictive systems is very important for modern world, where nearly everything is digital. The computing capabilities give a lot of opportunities to obtain results faster and more precise. The usage of high performance computing clusters is recently one of the domains in which I would like to work. In my opinion it has a remarkable potential, especially in biological data analysis, because it helps to get answers for most persistent questions about biological life. There are many systems which support recognition of number of diseases symptoms early enough to start curation on time. Different category of such computing systems purely analyse data to understand how to use the most advanced technology to help people. Moreover, I think that this strong computational foundation is perfect to use a full potential of machine learning algorithms and predictive systems. They currently are very strong and domain of many companies all around the world. The impact of the high quality predictive models as well as the scalability of the solution are crucial in the engineering world and varies depending on the deployment scenario.

I am Computer Science Engineer, experienced in developing desktop and web applications with strong interest in high performance computing, programming languages and paradigms. In my opinion I am very innovative and capable of working both in big and small development teams. I am constantly looking for challenges and improvements. I started my academic journey at Silesian University of Technology, Gliwice, Poland, where I was a one of the top students. In recognition of my academic achievements I was awarded 34,500 PLN scholarship for participation in project ZIP. By that time, I have learnt and touched the surfaces of many branches of Computer Science. I have been constantly focussed on the data storage strategies, processing of large data sets and utilizing the best of a computer architecture using technologies such as CUDA, JavaSpaces and PVM. I've understood the real power of a scalable solutions the power of the microprocessors and embedded systems such as FPGA. The one of the most interesting branches that I had opportunity to learn is machine learning and its own sub-branches such as rule-based and biologically inspired artificial intelligence. The possibility of creating predictive models and systems was always one of my favourites topics to learn and discuss. After the second year, I have decided to work for one of the biggest polish IT&T companies -Comarch S.A. I was hired at the position of a junior java developer. I was very successful and worked within a 20-people team on airline loyalty system, where the latency and processing time of transactions were crucial for many of our international customers. As my Bachelor thesis I designed a system for acquisition and preliminary analysis of user computer activity. System was capable of gathering information about currently used desktop application and visited websites which was very helpful for user to manage their time in order to be more productive. Additionally, the pluggable architecture created the possibility to create a hardware monitor, which was constantly monitoring CPU, GPU and memory. Based on all the information gathered, user could decide if the currently available setup is suitable for his activity. Because of my hard work and commitment, I finished the first cycle at the university with a very good results as an official BSc in Informatics with specialization in Computer Graphics and Software. My journey continued straight after graduation and I've started my second, more advanced course in Informatics at the beginning of 2016.  My academic achievements have granted an award of 14,000 GBP scholarship to Cranfield University in 2016/17 for Computational Techniques in Engineering on the Software Engineering for Technical Computing. I gained a massive experience in developing solution for HPC platforms as well as small scale parallel computing devices such as NVidia graphics card using CUDA platform and OpenMP for thread-based approach. Additionally, my main focus was always on the scalability and performance of my solutions. Most of the work that had done was written in C/C++ and Java depending on the needs and runtime requirements. I was constantly working in international groups on many projects.  All of them lied on the foundation of Computational Methods. The application that I had a chance to work on was about processing and analysing aerodynamic data of a plane structure. The projects were mostly using external computational devices such as Nvidia graphics cards (CUDA) and SpeedGoat for accelerating MatLab calculations. My MSc thesis goal was to optimise simulation of reduced order aeroelastic systems. I was working on a CA2LM framework which is a simulation framework of a flexible aircraft for engineering design. The project aimed to redesign a framework to simulate in approximation a flexible aircraft model of reduced complexity.

Tool was strongly utilised by researchers of Flight Simulation in School of Aerospace group at Cranfield University, which worked on this particular framework with Rolls Royce. Task required to explore scope for improvements in simulation run-times and design new engineering interfaces to improve learning curve of the framework (Simulink and MatLab). Final results yielded 2-fold speed improvements for post-processing tool which became a new real-time animation, new user-friendly interface and modular, maintainable software, while preserving existing framework capabilities. My hard-work and commitment was once again noticed and as a result I have finished the master courses at Silesian University of Technology and Cranfield University with a very good with distinction and First Class Honours result respectively.

During entire time of my education I constantly tried to use my knowledge by helping people from different domains in achieving their goals. I've proven that my background, analytical thinking and good communication skills are my strengths, which helps to quickly assimilate into new environment and solve complex engineering problems. My commitment to the work is great and I always try to fully utilise my skills as I think that it is my responsibility to deliver the best and fastest solution using top-notch technologies. I consider myself as a programming polyglot. I had tried many, but I specialise in C/C++ as it was my first language that I have learnt at the age of 16. The best commercial experience I've gained in Java and C# as they are the one of the most popular ones. Although, I have also experience in a scripting and more scientific related languages such as Python, R and MatLab. I've been working during my university time with them and I am confident to use them or any other as my daily tool. All the results of my work available on the GitHub (@Nimelo). Currently I am a part of a Titian Software engineering group. I help them developing software for pharmaceutical industries. We work for the biggest companies all around the world by revolutionising how biological collections are managed, processed and distributed. The processing time and optimisation is very crucial for all of them. That is the reason why all the prepared by me designs and implementation focuses on this aspect of programming.

Your project attracted my attention, as the subject under investigation is combining my interest of computer science and practical usage of data structures and optimal algorithms on high performance computing clusters. The optimisation and adaptation aspect of the project is very interesting and important for me as I optimise processing of data-sets on my day-to-day work. There is no doubt that the predictive models which are going to be developed are very important. The Auto-WEKA for MCPS is one of the examples of the great ideas how to help non-expert users to more effectively identify machine learning algorithms and settings appropriate to their applications. I would like to be a part of the research exploring this issue, analysing, designing and developing optimised solutions for mentioned models. I believe I would be a valuable member of your research group – during my education and industry time I have shown that I am a willing to learn, responsible and skilled engineer who seeks for challenges. In my opinion my technical background combined with multiple job experiences would be very beneficial for your research team. My big commitment for projects can be noticed by looking at my past. I would like to improve my knowledge in applied mathematics, computer science, machine learning and optimisation problems. I think that my background and experience obtained during studies and work are a good base for further deepening of knowledge.

I would like to thank you for considering my application. If you have any questions, please do not hesitate to contact me. I am hoping to hear from you, as I am strongly interested in your research and I would like to be a part of it.

Yours sincerely,

# MATEUSZ GASIOR