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**To The research laboratory Nikhef**  
*Motivational letter for PhD program*

July 25, 2021

To whom it may concern.

The aim of this letter is to describe my major reasons and interests to join your project. I stumbled on your PhD vacancy in a field of analog IC design, and I see it as an opportunity. For brief history, I spent the last 5 years in a team of exceptionally talented full stack chip developers in the MIPT lab. Their work was aimed to design chips for developing and testing new types of energy efficient FRAM and ReRAM based on  $Hf_{0.5}Zr_{0.5}O$  memory cells. During my Bachelor studies I was working with general memory design starting from building a Verilog A model for ferroelectric crystals and to a simple digital controller and analog components. All development was done in Cadence Virtuoso CAD, so I am familiar with SPECTRE, Layout XL, ADE L, and it's calculator, Calibre and Mentor LVS and DRC modules. Also was able to make installations of this software and maintain it on my personal machine and later on the server node. A lot of methodical learning was made during this period. Including memory architectures, analog to digital conversion etc. During my masters program I joined the team who was responsible for designing a special SMU chip on a 180nm SOI node. The goal of that research was to measure time domain behavior of functional materials and memory cells based on them. But conduct this material studies directly on a chip under very harsh conditions (temperature and radiation). On frequencies up to 100MHz of ADC and DAC operation. I was responsible for schematic and layout of small but vital analog subcircuits such as op amps, current sources, DACs etc. 180nm SOI processes adopted by local fab have few pre-designed components, so my skills of understanding transistor level design was really put under test. Also was made an attempt to predict crystal parasitics by method of mathematical optimization by reading external signals.

However, I think my main strength is not only my IC design experience, but broad-mindedness in general. During my study in University, I also gained some experience in other software and electrical engineering fields. I developed and programmed electronics for sampling blood tests, AI controlled logistic drones, heart pulse signal generators and 3D photogrammetry reconstruction. In these occupations I went through applications of electronics, PCB design, power design, programming, mechanical engineering, and management. Also, skills gained in a field of DevOps and System administration might be useful in setting up environments, automating analog simulation tests and adding a bit of machine learning to it in the process. Additionally, some skills help me fix stuff and create hardware architecture in my workplace that

others can use. Also as a character specific detail I can be very energetic, open and inspired by work as was previously mentioned by my colleagues.

I think my experience with ADCs and DACs in different processes can help with your research. Also my BS background in kvantum electronics and optics can be useful when working with sensors.

I see your vacancy as a unique way to continue to develop as an analog IC design engineer and a scientist because it's a very rare mix of state-of-the-art science and half a century old industry. It's not so common to have a small team of talented IC designers and scientists who commit a real value to the science and industry in future. I would be happy to join you in your intensive research and work with a full dedication.

Thank you for your attantion.

**Mikhail Solovyanov**