Curriculum Vitæ

"Computers are good at following instructions,
but not at reading your mind." – Donald Knuth

Contact Information

Name	Ayssar Benelhedi
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Date of birth	21. September 1995 in Sousse
Nationality	Tunisian

Education

09/2007 – 07/2010 **College**, *College Bhaier Hammem Sousse*, Sousse, Tunisia.

09/2010 – 07/2014 **High School**, *Lycée Pilote de Sousse*, Sousse, Tunisia.

09/2014 – 04/2015 **University**, *Institut Préparatoire Aux Études D'ingénieurs El Manar*, Tunis, Tunisia.

04/2015 – 08/2015 **Language School**, *Inlingua*, Stuttgart, Germany.

08/2015 – 10/2015 **Language School**, *Mannheim University*, Mannheim, Germany.

04/2016 – 4/2020 **University**, *RWTH Aachen University*, Aachen, Germany, *Bachelor*.
Computer Science

04/2020 – present **University**, *RWTH Aachen University*, Aachen, Germany, *Master*.
Computer Science

Experience

04/2018 – 09/2018 **Maths Tutor**, *RWTH Aachen University - Chair D of Mathematics*, Aachen.
A weekly lesson with almost 60 students, in which I correct the submissions of the previous week and discuss the possible solutions and prepare the students of the next subsequent submission tasks.

04/2019 – 08/2021 **Scientific Assistant Student: Software Developer**, *Fraunhofer IPT*, Aachen.

- Design of algorithms based on Bspline functions for solving geometric problems (C++).
- Designing and implementing new software plugin components for Rhinoceros 3D and Grasshopper 3D (Python, C#).
- Creating a Gateway between a machine sending sensor data and a remote database using a MQTT service (Javascript, Python).

09/2021 – present **Scientific Assistant Student: Software Developer**, *Forschungszentrum Jülich*, Jülich.

- Improving the software infrastructure of an open-source project in the context of computational neuroscience research.
- Automating the code generation of models in making them available at the runtime during the execution of the simulation (Python, CMake).
- Adjusting the data structure of custom-written models to utilize the efficiency of Cache that supports *SIMD* instructions (C++).
- Analyzing and fixing potential uncovered bugs (Python).

Thesis

03/2019 – 09/2019 **Bachelor Thesis**, *Chair of Computer Science 11 - Embedded Software*, Aachen.
A library for Boolean functions in algebraic normal form (Java).

01/2022 – 07/2022 **Master Thesis**, *Forschungszentrum Jülich*, Jülich.
Just-in-time (JIT) compilation for the NEST Simulator to push the boundaries of neural network sizes on HPC clusters (C++, Python).

Languages

Arabic	**Native**
German	**Advanced**
English	**Advanced**
French	**Intermediate**
Japanese	**Beginner**

IT Skills

Programming Languages	Java, C/C++, C#, Python, JavaScript, Typescript.
Additional Skills	Object-Oriented Programming, Interface Design and Implementation, API Design and Development.
IDE	JetBrains, Visual Studio Code, Eclipse.
Database	MongoDB, GraphQL.
Version Control	Git.

Free Time Activities

In my free time, I like solving some challenging programming task provided by an interesting platform called *Entwicklerheld*. It has the feature of giving a reward on successfully solving the chosen task. Depending on the hardness of the problem, the reward may have different values. In general, the reward is just points between 150 and 1000 points, and the user may afterwards exchange the reward into a voucher. At a certain time, I got addicted to the website, and it was really fun buying stuff by simply solving problems.

My second interesting hobby after programming is reading books about neuroscience, the secrets behind the human brain and quantum physics. My recent books are:

- Künstliche Intelligenz und der Sinn des Lebens –Richard David Precht.
- Wer bin ich und wenn ja, wie viele? –Richard David Precht.
- Something deeply hidden, quantum worlds and the emergence of spacetime –Sean Carroll.
- Die Physik des Bewusstseins über die zukunft des Geistes –Michio Kaku.

Motivation letter

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August 5, 2022

DoubleSlash Net-Business GmbH
Friedrichshafen, Germany

Junior Software Developer C#/.NET

After the successful completion of the academic chapter and embarking on a new journey to discover the limits of my current potential and transcend them, I am strenuously searching for new challenges and opportunities that should put me on the correct road to reveal a new part of my personality and sharpen my knowledge and my set of skills. As a student with a computer science background, I am very keen on algorithmically solving problems and thinking outside the box. Especially with the acquired knowledge during my study and the experiences I had, I am absolutely positive that I can contribute to the company's growth and create reliable technologies shaping the world around its users.

The preeminent character in my personality is perseverance, and I consider it a double-edged sword. To some extent, I can become obsessed with the problem and focus all my energy on it until I reach an acceptable solution. During my first experience in Fraunhofer IPT, I got involved in different projects. The first project was building a plugin for the Siemens NX in C++. The main task of the plugin was surface interpolation based on Bspline functions and deforming 3D objects. The second project involved creating components for the Grasshopper 3D software. The components were blocks written in C# that handle and process data, and they can be connected with each other to create a complete pipeline that can be deployed internally in the marketplace of the institute. The marketplace is a GUI based software that tracks the version of the deployed blocks and manage their installation workflow. The backend of the GUI is based on C# and the front end is using HTML and JavaScript. My last project in IPT was implementing a Gateway based on a MQTT service, and it is implemented in Python and Javascript. A milling machine sends its sensors data to the Gateway, and then the data are sent to a remote database. From there, another service may read the data from the database and generate a real time digital twin of the object being processed by the milling machine.

My new journey in the Forschungszentrum Jülich takes me to a different path, where computer science meets computational neuroscience. My task was to extend certain functionalities in an open-source software. The software is neural Simulation technology (NEST) and it is written in C++ and PYTHON. Users can write a custom model in the NESTML language (domain-specific language for neuron and synapse models) and then generate a C++ version of the models that can be loaded dynamically during the simulation from the PYTHON interface. My task was to split the generated C++ code into blocks and only compile and build the required block of the model when it is needed. To make this concept of Just-In-Time compilation be supported by NEST, I had to work with C++,

PYTHON and CMake.

Primarily, I am seeking an environment that provides the necessary support for shaping my talents and opening doors to new opportunity and to excel. Secondly, amusing teammates that do not only support each but also have common social activities that strengthen the trust and synergy between the members.

With my affinity for critical thinking and solving challenging problems, I strongly believe that giving me an opportunity to scale my potential and orienting them in the correct path, we can achieve the impossible and discover interesting and formidable solutions.

I would like the opportunity to meet with you and discuss the job opportunity. Please let me know if you have any further questions. I am always available either by phone or by email.

Thank you for considering my application.

Ayssar Benelhedi