Photosynthetic organisms will play a vital role in transitioning towards a sustainable economy and as a dedicated researcher with a strong practical and theoretical background, I am well equipped to work towards making this a reality. Through my time at Europe's flagship laboratory for life sciences (EMBL) and my theses I have honed my skills in genetically engineering *E. coli* as well as algae and cyanobacteria. My time competing in iGEM meanwhile, has helped me develop an eye for detail and an ability to function both independently and in an interdisciplinary team. These skills combined with a strong work ethic and a passion for bioenergy would make me an excellent candidate for the National Bioenergy Center.

Professional Experience

2017–present *European Molecular Biology Laboratory (EMBL)*, Rome, Italy

Job Title **Technical Officer**, *Genetic and Viral Engineering Facility*

Achievements
- Produced high-quality genetic constructs in *E. coli* and viral vector tools like recombinant AAV and lentivirus in HEK cells
- Established new protocols for the production of viral vector tools
- Automated calculations for experimental procedures using FileMaker database and Microsoft Excel
- Improved FileMaker database and accurately managed sample data
- Ensured functional laboratory (monitored lab supply, equipment and instruments, prepared stock solutions and media)

Research Experience

M.Sc. Thesis — Genetics & Experimental Bioinformatics

Topic *Biochemical analysis of the Cas6-1 RNA endonuclease associated with the subtype I-D CRISPR-Cas system in Synechocystis sp. PCC 6803. [2].*

Motivation Explore applicability of endogenous Synechocystis CRISPR/Cas system in metabolic engineering

Achievements
- Further characterized Synechocystis CRISPR-Cas system
- Successfully generated Synechocystis mutant strains via homologous recombination and transformed them with plasmid DNA via conjugation
- Analyzed crRNA processing *in vitro* with mutant Cas6 proteins expressed in *E. coli* and *in vitro* transcribed RNA, and in Synechocystis cultures with inducible artificial crRNA and mutant Cas6 proteins
- Assembled all genetic constructs in *E. coli* using Gibson cloning

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iGem Competition

Topic *Multiplexed antibody detection from blood sera by immobilization of in vitro expressed antigens and label-free readout via imaging reflectometric interferometry (iRIf). ([1]) (Team Website)*

Motivation Allow for a cheap and quick pre-test that screens for multiple diseases

Achievements
- Developed a prototype for multiplexed, microfluidics-based, label-free diagnostic tool
- Analyzed literature to find a commonly agreed on, high-impact project
- Overexpressed and purified proteins from *E. coli* via NiNTA column
- Successfully organized ourselves as an interdisciplinary team to ensure availability of sufficient funding and reagents and a functional lab
- Taught myself adobe illustrator and designed most of the explanatory illustrations for the *website*
- Accurately recorded and communicated results comprehensively for all team members, to a crowdfunding community and to a jury and fellow students at the final international conference at MIT
- Contributed to *interlab study [3]*

Awards Gold medal; nominated for Best Health and Medicine Project, Best Innovation in Medicine and Best Wiki.

B.Sc. Thesis — Cell Biology

Topic *Nannochloropsis oceanica as an expression system for recombinant proteins and studies on protein transport across the periplastidal membrane of Phaeodactylum tricornutum.*

Motivation Enlarge molecular toolbox for *P. tricornutum* and explore *N. oceanica* as expression platform for recombinant antibodies

Achievements
- Expressed recombinant single-chain antibody in *P. tricornutum* to study intracellular protein transport
- Assembled genetic constructs in *E. coli* using traditional cloning methods

Education

2014–2016 **M.Sc. Biology**, *Albert-Ludwigs-Universität Freiburg*, Germany, *GPA 4.0*.

2011–2014 **B.Sc. Biology**, *Philipps-Universität Marburg*, Germany, *GPA 4.0*.

Languages

German: *Native* **English:** *Fluent* **Italian:** *Fluent*

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Computer Skills

Office	Microsoft Excel, Word, PowerPoint	*very proficient*
Biology	Geneious, SnapGene	*very proficient*
Other	Adobe Illustrator, FileMaker database, LaTeX, GitKraken	*basic*

Publications

[1] Bender J. et al. "Multiplexed antibody detection from blood sera by immobilization of in vitro expressed antigens and label-free readout via imaging reflectometric interferometry (iRIf)." In: *Biosensors and Bioelectronics* (2018).

[2] Jesser R. et al. "Biochemical analysis of the Cas6-1 RNA endonuclease associated with the subtype I-D CRISPR-Cas system in Synechocystis sp. PCC 6803". In: *RNA Biology* (2018).

[3] Beal J. et al. "Reproducibility of Fluorescent Expression from Engineered Biological Constructs in E. coli." In: *PLoS One* (2016). Contributor.

References

EMBL **Dr. James Sawitzke:** *Head of Genetic and Viral Engineering Facility, EMBL Rome — Italy* james.sawitzke@embl.it +39 06 90091 268 https://www.embl.it/services/genetic-and-viral-engineering-facility/index.html

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