The Brazilian Program “Science without Borders” aims to enhance internationalization of technology and innovation through the mobility of students and researchers. The Fraunhofer-Gesellschaft, as a recognized organization for applied research, has signed a special agreement with CNPq to promote, among others, the exchange of doctoral students and post-doctoral researchers.

Within this cooperation the Fraunhofer IME is offering the following opportunity

**PhD position: Directed evolution of cellulases using flow cytometry based high throughput screening systems for increased thermal stability and activity**

at the
Fraunhofer IME
Division Molecular Biology
Forckenbeckstrasse 6
52074 Aachen

Field of study
Biochemical engineering and molecular biology

Key words
Directed protein evolution, cellulases, flow cytometry, emulsion technology, enzymatic assays

**Area of research**

Lignocellulose is one of the most abundant renewable energy sources on earth and the degradation of this compound to soluble sugars is of great commercial importance. The cellulase hydrolysis process can be achieved chemically or biologically. In the chemical process, the raw material must be treated with strong acids, resulting in product losses and equipment damage. Enzyme-based approaches are therefore advantageous in principle, but the cost/efficiency ratio of enzymes is not yet competitive. Increasing the enzyme activity under operational conditions and increasing the thermal stability would considerably lower the costs, making this a competitive process.

The successful candidate will work on developing mutant libraries starting from different cellulase genes by various molecular evolution techniques. He/she will have to optimize the expression systems by using either in vivo or in vitro systems and optimize the flow cytometry high throughput screening systems for gene libraries. Finally he/she will have to screen the libraries and characterize the improved mutants.
Special requirements
The candidate should hold a M.Sc. in (bio-)chemistry, molecular biology or a related field. She/he should be familiar with standard molecular biology and cell biology techniques. Hands on experience with flow cytometry would be a plus.

Mandatory level of German
optional
Mandatory level of English
fluent

Starting date
2013.04.01
Duration
3 years

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References
