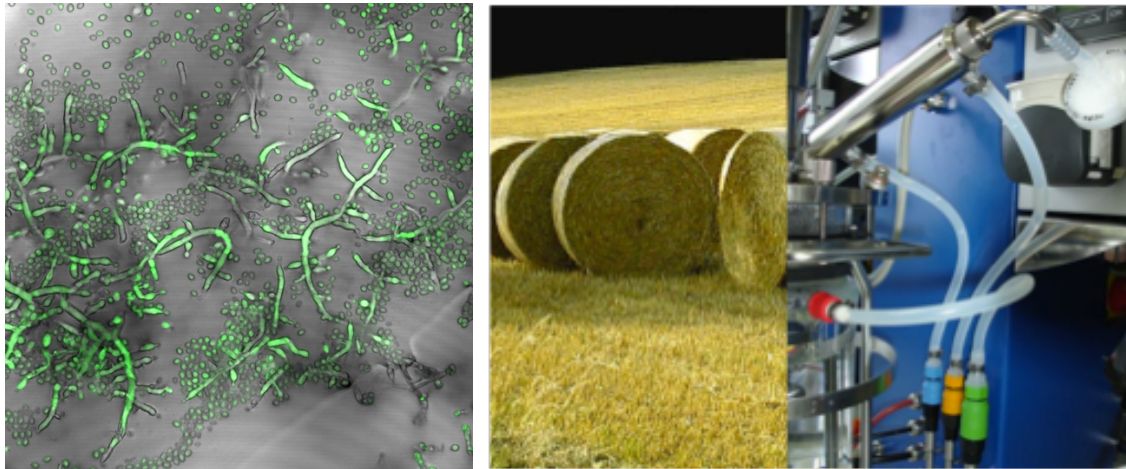# SECRETORY STRESS MANAGEMENT IN *TRICHODERMA REESEI*

Supervisory Team[1]

Primary Supervisor: *Astrid Mach-Aigner, Institute of Chemical, Environmental and Bioscience Engineering, Faculty of Technical Chemistry, TU Wien*

TU Wien project partners: *Ruth Birner-Grünberger, Institute of Chemical Technologies and Analytics, Faculty of Technical Chemistry, TU Wien*

Gerhard Schütz, Institute of Applied Physics, Faculty of Physics, TU Wien

Robert Mach, Institute of Chemical, Environmental and Bioscience Engineering, Faculty of Technical Chemistry, TU Wien

External industry partners: *Novozymes*

Project Description

This PhD project focuses on studying the expression of cellulases by the industrially employed fungus *Trichoderma reesei*. In nature, this fungus uses hydrolytic enzymes for degrading plant biomass (for example wheat straw) to cover its energy demand. In industry, highly productive strains of this fungus give yields in large-scale fermentation of up to 100 g/L protein, of which cellulases are of main interest. In this project the major aim is to learn whether the unwanted reduction of transcript levels of genes coding for these cellulases happens in *T. reesei* only at a transcriptional level, possibly by a mechanism called RESS (repression under secretion stress), or also on a post-transcriptional level. The hierarchical integration of RESS into unfold protein response (UPR), the mediators of RESS, and the targets of RESS will be determined by using reporter, deletion and overexpression strains of important UPR and RESS components.

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[1] The Early Stage Researchers (ESRs) will be accompanied during their thesis by an individual "Thesis Advisory Committee" (TAC), which will guide the ESR through the graduate studies. The TAC will consist of the thesis primary supervisor, and two additional members of the Supervisory Team selected by the ESR.

A novel life cell imaging technique will allow the monitoring of secretory stress in related organelles.

Key Goals and Tasks

The primary aim of this PhD thesis is to identify and understand the mechanism that causes the unwanted reduction of cellulase expression.

Project-specific Requirements

- Completed master studies in Biochemistry or Molecular Biology or Biotechnology or closely related field
- Knowledge on regulation of gene expression
- Experience and skills in cultivation of microorganisms, basic methods of molecular biology and microscopy
- Interest in working with microorganisms and developing new molecular tools
- Enthusiasm for scientific work
- Affinity for accepting the unexpected
- Willingness to travel to project meetings and scientific conferences
- Excellent English language skills in scientific field
- Personal skills: the ability to independently solve issues, a strong mind to cope with scientific challenges, a good documentation practice