View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by University of Groningen

University of Groningen

Bacterial protein sorting: experimental and computational approaches

Grasso, Stefano

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Grasso, S. (2020). *Bacterial protein sorting: experimental and computational approaches*. University of Groningen.

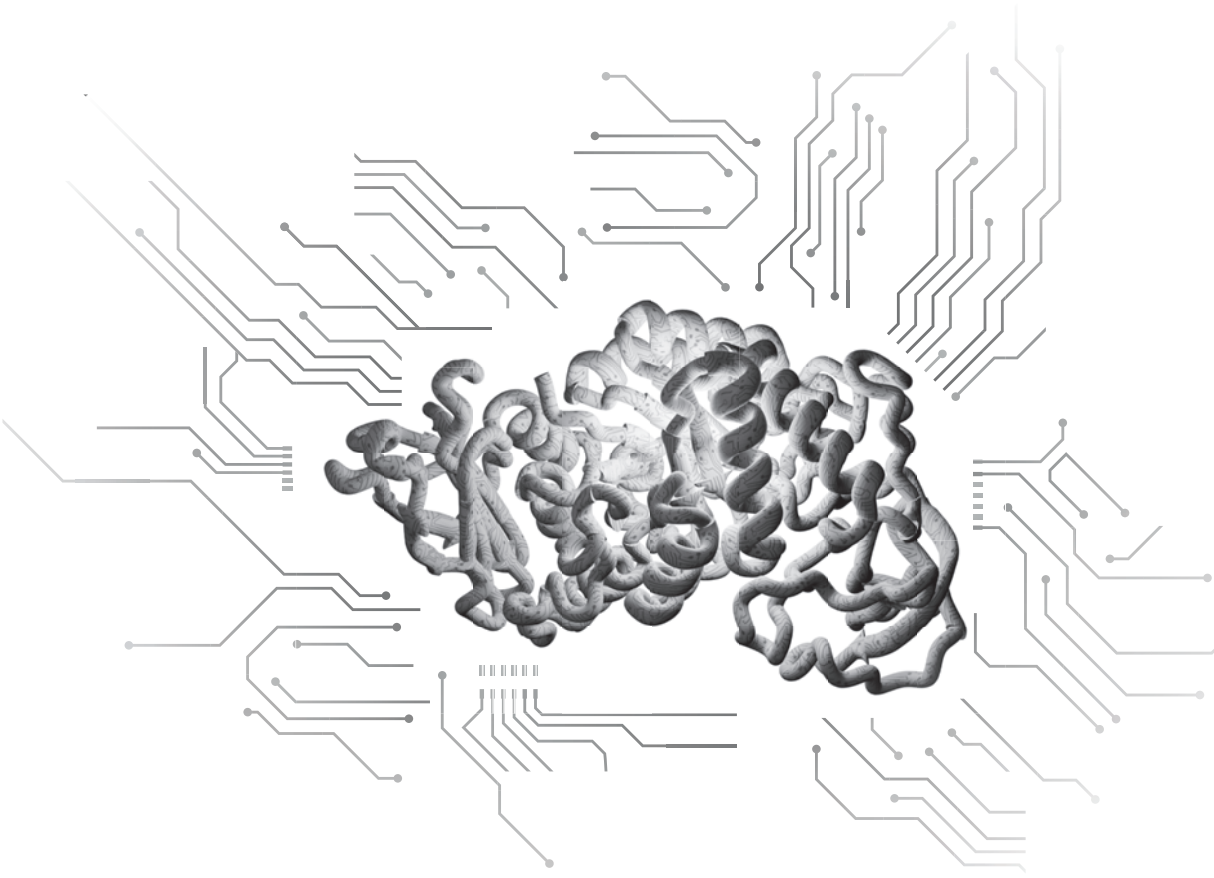
Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Download date: 26-12-2020

BACTERIAL PROTEIN SORTING: EXPERIMENTAL AND COMPUTATIONAL APPROACHES



STEFANO GRASSO

The research described in this thesis was performed in the laboratory of Molecular Bacteriology, Department of Medical Microbiology, Faculty of Medical Sciences of the University Medical Center Groningen and within the DSM Biotechnology Center in Delft.

This research was supported by the European Union's Horizon 2020 Program, Marie Skłodowska-Curie Actions (MSCA), under REA grant agreement no. 642836, the Graduate School of Medical Sciences of the University of Groningen and DSM. Printing of this thesis was supported by the Graduate School of Medical Sciences of the University of Groningen.

Bacterial protein sorting: experimental and computational approaches
Dissertation of the University of Groningen

Cover image: artistic reinterpretation of the α-amylase *amyQ* from *Bacillus amyloliquefaciens* (PDB ID: 1e43).

Printed by: Printenbind

Copyright © Stefano Grasso, 2020. All rights reserved. No part of this book may be reproduced, stored or transmitted in any form or by any means, without prior permission of the author. The copyright of previously published chapters of this thesis remains with the publisher or journal.

university of groningen

Bacterial protein sorting: experimental and computational approaches

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

Wednesday 16 December 2020 at 18:00 hours

by

Stefano Grasso

born on 27 June 1991
in Vercelli, Italy

Supervisor
Prof. J.M. van Dijl

Co-supervisor
Dr. T. van Rij

Assessment Committee
Prof. R.E. Dalbey
Prof. M. Heinemann
Prof. W.J. Quax

Paranymphs

Dr. S. Nepal
Dr. G. Gabarrini
Dr. V. Terlizzi

A mia sorella Silvia

CONTENTS

1 General introduction and scope of the thesis 1

2 GP^4: an integrated Gram-positive protein prediction pipeline for subcellular localization mimicking bacterial sorting 31
Briefings in bioinformatics 2020 Nov 24:bbaa302. Epub ahead of print.

3 Gingimaps: protein localization in the oral pathogen *Porphyromonas gingivalis* 53
Microbiology and Molecular Biology Reviews, 2020, 84(1):e00032-19

4 Signatures of cytoplasmic proteins in the exoproteome distinguish community- and hospital-associated methicillin-resistant *Staphylococcus aureus* USA300 lineages 101
Virulence, 2017, 8(6): 891-907

5 Explanation and prediction of signal peptide efficiency: a machine learning model trained on high-throughput data 133
Submitted for publication

6 Propeptides: from processing to profiting for protein production 165

7 General discussion and future perspectives 185

8 Nederlandse samenvatting (Dutch summary) 201

A Acknowledgments 223
Biography 229
List of publications 233