

Jury Report
Pfizer Prizes for Life Sciences 2020

1st Prize

L. (Louis) Boylan MSc, Maastricht University

An investigation of the Mechanical Properties and Cell Supporting Potential of Oxidised Alginate Hydrogels Crosslinked with Dynamic Covalent Imine Type Chemistry

The jury for this prize for exceptional study results in the life sciences had a difficult job this year. The quality of the work sent for this prize was exceptional.

However, the jury was almost immediately unanimous that the work of Louis Boylan deserved the highest award. The reason of his move from the UK to Maastricht remains undisclosed in his CV, but the result was remarkable. After a BSc in the Maastricht Science Program, he followed with his Master elective in the Tissue Regeneration Department. Many diseases are associated with the loss of tissue and the rapidly emerging field of regenerative medicine is concerned with the restoration of tissues. The required cells can be often grown but require an artificial environment which is like connective tissue, in which they can grow and mature and hopefully eventually become functional tissue.

Louis' work concerned the matrix between the cells. He performed the chemistry to generate alginate-based gels, but the mechanical properties of such cells have to be optimized to be a real supportive environment for cultured cells. He managed to affect these properties, using theoretical models of the mechanical and other aspects of the gels quantified by sophisticated equipment. His work is of an extremely high standard, combines theoretical and practical work and extends from the chemistry lab to biology, and has ultimate relevance for patient care. Being the most exceptional amongst an exceptional group of contestants for this prize is special and the jury also took notice of the fact that he will continue in a scientific career with a PhD. We agree with his supervisors that Louis will be an asset to such a program and wish him all possible success in his career.

2nd Prize

A. (Adina) Sauciuc, MSc, University of Groningen

Towards Ribosomally-Synthesized Teixobactin Analogues Employing a RiPP System

Adina Sauciuc had it coming. As a cum laude bachelor in Chemistry and a summa cum laude master in biomolecular sciences to be, she set out to redefine nature in the group of Prof. Oscar Kuipers by achieving a non-ribosomal antibiotic teixobactin through ribosomal synthesis.

The challenge she undertook was to differentially synthesise a bacterial antimicrobial by ribosomes to allow easier modification of antibiotics and produce them in vivo in aid of fighting always evolving antimicrobial resistance. For this she fully adapted a general ribosomally synthesized and post-translationally modified peptide (RiPP) approach to her own benefit.

As an eager and quick-learning student she readily took over and managed the project and became a full partner in the research team of Kuipers independently feeding knowledge into

complicated cyclisation chemistry and post-translational modifications of the ribosomal product leading to a mature antimicrobial peptide.

Although goals on antimicrobial activity of ribosomally synthesised teixobactin have still to be met, Adina established a route to biological production of these antimicrobial analogues that can be further optimised in the future. Many helpful recommendations for improvements have been made in the discussion of her thesis.

Her work is now prepared to be published, which is quite unusual for a 7 month project, emphasising this excellent team effort with Adina as a king pin. The jury congratulates her, wishes her well and is fully convinced of her future success.

3rd Prize

L.C.M. (Lieke) Michielsen MSc, Delft University of Technology

Cell identification in single-cell RNA-sequencing data

The introduction of the thesis of Lieke Michielsen started with an explanation that she considered wet lab work not 'her cup of tea' and that was an important reason to move to the mathematical side of biology; bioinformatics. She took her own career in her own hands. Her talent for computational analysis was swiftly recognized during her bachelor project, where she worked on a webtool called Brainscope. This resulted in a co-authorship in a publication in the prestigious journal Nucleic Acid Research. And this as a bachelor student!

She joined the Bioinformatics master and moved to the lab of Dr. Mahfouz to work on the problem of single cell RNA data. Together with Tamim Abdelaal, she evaluated the different methods presently available for single cell RNA-Seq analyses. She showed which methods works best and for what reason. This is again very important for the scientific community as they usually do not have any idea which method to apply. This also became an already highly cited publication in the journal Genome Biology.

All this illustrates the scientific maturity of Lieke. Two publications as a student, highlight talks at international meetings, collaborations with labs in Australia and playing a critical role in a Gravity program called Brainscape. If the committee would not have known better, they would have guessed that we were evaluating an excellent 3rd year PhD student! She has already contributed computational solutions to the scientific community and we expect that she will continue along this track, which is critical to many research groups in the world. We wish her a lot of success in this, also as it would benefit many of our research lines as well.

Prof. dr. T.M. (Tilman) Hackeng, Professor and chair of Biochemistry Maastricht University, Director Cardiovascular Research Institute Maastricht (CARIM)

Prof. dr. J.J.C. (Sjaak) Neeffjes, Professor and head of the Department of Cell and Chemical Biology Leiden University/LUMC, member of the Raad voor Aard- en Levenswetenschappen of KNAW (RAL-KNAW)

Prof. dr. A.F. (Adam) Cohen, Director Innovation Services CHDR, Emeritus Professor Clinical Pharmacology LUMC

The jury meeting took place on 2 November 2020, was chaired by Drs. M.L.L.E. (Marlies) Veldhuijzen van Zanten-Hyllner, Director KHMW and also attended by Prof. dr. R.B. (Rudy) Andeweg, Secretary of Humanities KHMW and S. (Saskia) de Boer (minutes).