200 JAAR UNIVERSITEIT GENT

FACULTEIT GENEESKUNDE EN GEZONDHEIDSWETENSCHAPPEN

Invitation for the public defence of the doctoral thesis of Ilya Kirov
Title of the thesis:

PHYSICAL MAPPING OF GENES ON PLANT CHROMOSOMES

The defence will take place on **Thursday, 09 February 2017**, **17hr,** at UZ Gent in Aud E (**Blok B**; **entrance 32**), De Pintelaan 185, 9000 Gent (see map attached)

The defence will be followed by a reception to which you are kindly invited.
Please confirm your attendance before February 1 to kirovez@gmail.com

Promoters

Prof. dr. Nadine Van Roy
Ghent University
Faculty of medicine and health sciences

Dr. ir. Katrijn Van Laere
Institute for Agricultural and Fisheries Research (ILVO)

Prof. dr. Ludmila I. Khrustaleva
Russian State Agrarian University (RSAU), Russian Timiryazev Agricultural Academy, Moscow, Russia

Members of the Jury

Prof. dr. Jan Gettemans
Chairman
Ghent University
Faculty of medicine and health sciences

Prof. dr. ir. Paul Coucke
Ghent University
Faculty of medicine and health sciences

Prof. dr. ir. Danny Geelen
Ghent University
Faculty of bioscience engineering
Dept. Plant Production

Prof. dr. ir. Winnok De Vos
Ghent University
Faculty of bioscience engineering, Dept. Molecular Biotechnology

Dr. Mohammed Bendahmane
Ecole normale supérieure de Lyon, France

Dr. Tom Ruttink
Institute for Agricultural and Fisheries Research (ILVO)

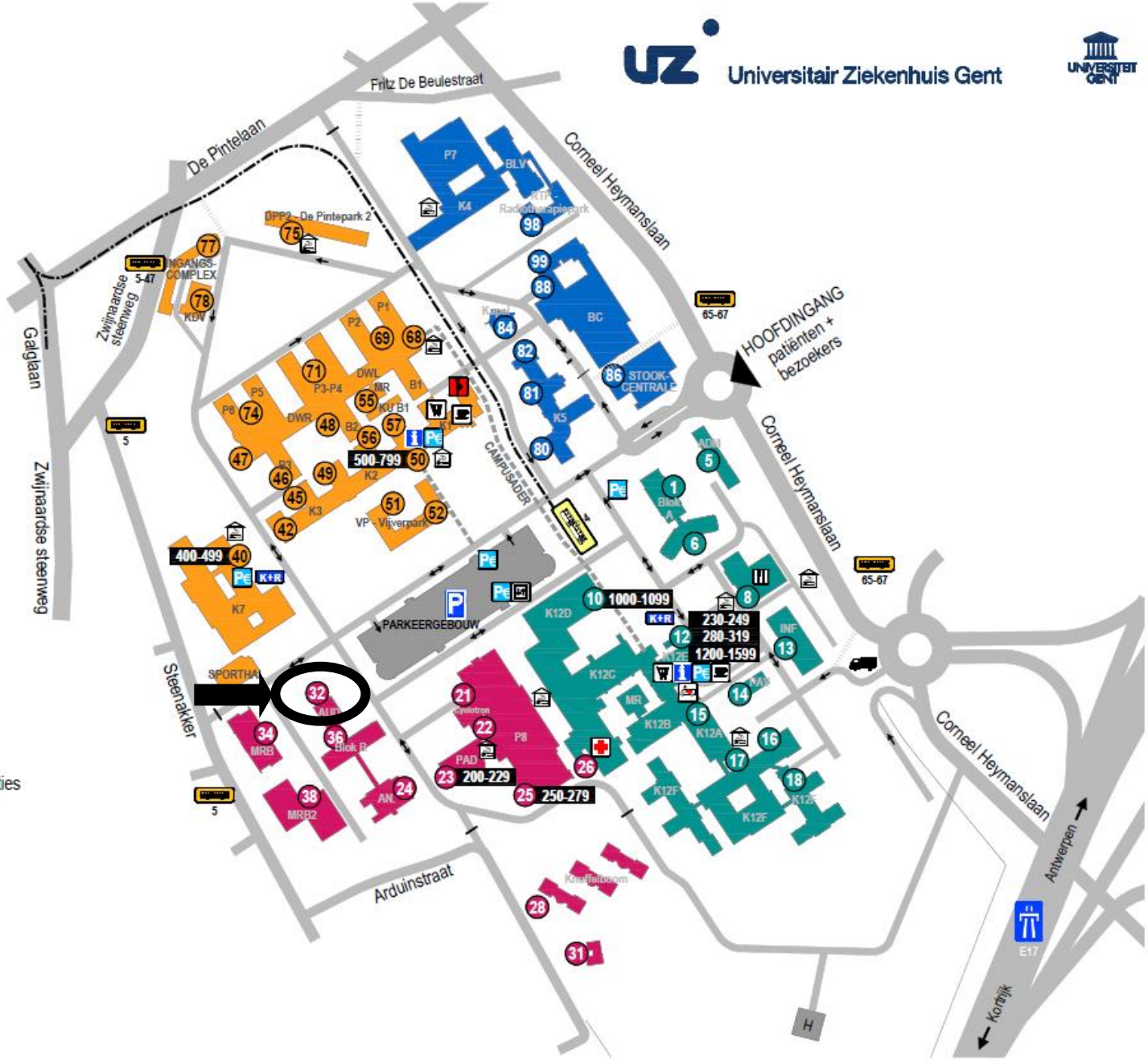
Abstract

Physical maps showing the real position of DNA sequences in the genome are a valuable tool for comparative genomics, study on genome organisation and gene isolation. Due to the genome complexity, development of a physical map by Fluorescence In Situ Hybridisation (FISH) visualization of genes on chromosomes is a very challenging task. Very sensitive methods, such as Tyramide-FISH, are required. The aim of this thesis was to optimize Tyramide-FISH for physical mapping of unique short DNA probes in plants. *Allium*, as a model plant, and *Rosa*, as a non-model plant, were used for this technology development, followed by its application for physical mapping of single-copy genes and physical map construction. A new protocol for chromosome preparation, named 'SteamDrop', was developed. The optimised Tyramide-FISH detection technique allowed to anchor three linkage groups to the physical chromosomes of *Rosa wichurana*. To further improve the Tyramide-FISH mapping procedure, multicolor and high-resolution Tyramide-FISH were established yielding a 10-20 times higher resolution for gene mapping. Using this approach, seven genes were successfully mapped on pachytene chromosomes 4 and 7 of *Rosa wichurana* and a detailed pachytene map was constructed for these chromosomes. In addition, FISH-based chromosome markers were designed for the chromosomes of *Rosa* and *Allium*. By combining these cytogenetic markers with chromosome morphology measurements, all 7 mitotic chromosomes of *R. wichurana* and all 8 chromosomes of *A. fistulosum* could be identified. The developed techniques allow easy visualization of genes as small as 1.1 Kb on plant chromosomes and circumvent technical issues that limited Tyramide-FISH applications previously. In the future, Tyramide-FISH will be valuable to accelerate and verify *Rosa* and *Allium* genome sequencing projects and will contribute to further progress in plant genome physical mapping and comparative genomics.

Short Curriculum Vitae

Ilya Kirov was born in Sobinka, Vladimir region (Russia) on 17 August 1989. He obtained his Bachelor of Science (2010) and Master degree (2012) in Plant genetics at the Russian State Agrarian University (RSAU), Moscow Timiryazev Agricultural Academy (Moscow, Russia). During the summers of 2009 to 2012, he got scholarships from the Institute for Agricultural and Fisheries Research (ILVO) to perform optimization of cytogenetic methods for *Rosa* species. In 2012 he started his joint PhD project between RSAU and ILVO. In the framework of his research he presented his scientific achievements at (inter)national conferences and participated in workshops. He is an author of 11 publications in international peer-reviewed journals. From 2015, he is assistant professor in the department of plant genetics and biotechnology in RSAU-MTAA and from 2016 he is involved as a researcher in the laboratory of proteomics in M.M. Shemyakin and Yu.A. Ovchinnikov Institute of Bioorganic Chemistry of the Russian Academy of Sciences.

Universitair Ziekenhuis Gent



Legende symbolen

- Parking patiënten en bezoekers
- Kiss & Ride zone
- Betaalautomaat parking
- Aanmelden en inschrijven
- Lift
- Cafetaria
- Restaurant
- Winkel
- Spoedgevallendienst
- Verloscomplex
- Ambulancesas niet-dringende interventies
- Tram
- Bus
- Rookpaviljoen

Legende routenummer

400-499 Routenummer

Legende ingang

12 Ingang