

# Sebastiaan Vanuytven

## Curriculum Vitae

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📄 <https://svanuytven.github.io/>

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Belgian

## Research Interests

- Single-Cell (multi-)omics
- Tumour heterogeneity
- Ageing
- Spatial omics
- Metastasis
- Computational biology

## Experience

- 2023–Present **Postdoctoral Researcher Computational Biology,**  
*Laboratory of Stem Cells and Cancer, Université Libre de Bruxelles, Belgium.*  
Studying the role of cell-cell communication and genomic aberrations in metastasis, therapy resistance and tumour heterogeneity
- 2017–2022 **PhD Student Computational Biology,**  
*Laboratory of Reproductive Genomics, KU Leuven, Belgium.*  
Studying for the first time the complete phenotype of a single cancer cell in its natural environment by combining single-cell multi-omics techniques and spatial transcriptomics
- 2017–2022 **Visiting Scientist,**  
*Cancer Genomics Laboratory, Francis Crick Institute, United Kingdom.*
- 2013–2014 **Research Rotations,**  
*KU Leuven, Belgium.*  
Internships in the research groups of Prof. Zeger Debyser, Prof. Stein Aerts and Prof. Johan Neyts

## Education

- 2015–2017 **Master of Science Bioinformatics, KU Leuven, Magna cum laude.**
- 2013–2015 **Master of Science Biomedical Sciences, KU Leuven, Magna cum laude.**
- 2010–2013 **Bachelor of Science Biomedical Sciences, KU Leuven, Cum laude.**

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## Master thesis

### Master of Science Bioinformatics

Title *Single-cell sequencing to understand the biology of cellular heterogeneity in cancer*  
Supervisors Prof. Thierry Voet, Prof. Stein Aerts, Dr. Alejandro Sifrim, Dr. Daniel Brown  
Description Development of novel analysis methods and robust pipelines for single-cell multi-omics experiments and analysis of large-scale single-cell sequencing datasets of primary breast cancers

### Master of Science Biomedical Sciences

Title *Development of safer MLV-based gene therapy vectors: studying BET protein-chromatin occupation and generation of p12-fusions*  
Supervisors Prof. Zeger Debyser, Prof. Rik Gijssbers, Dr. Jonas Demeulemeester  
Description Analysis of BET protein ChIP-seq data and generation of p12-fusions to understand the genotoxicity of MLV-based gene therapy vectors

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## Grants

2023	FNRS Télévie grant	<i>Personal Funding for my postdoctoral research</i>
2020	EACR travel fellowship	<i>Travel grant to visit Crick Institute</i>
2018-2022	FWO Strategic basic research grant	<i>Personal Funding for my PhD research</i>
2015	BBC2015 Student Fellowship	<i>Travel grant to attend BBC2015 conference</i>

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## Publications

### Journal Articles

- [1] Wanqiu Zhang\*, Xander Spotbeen\*, **Vanuytven, Sebastiaan**, Sam Kint, Tasiani Sarretto, Fabio Socciarelli, Katy Vandereyken, Jonas Dehairs, Jakub Idkowiak, David Wouters, Jose Ignacio Alvira Larizgoitia, Gabriele Partel, Alice Ly, Vincent de Laat, Maria José Q Mantas, Thomas Gevaert, Wout Devlies, Chui Yan Mah, Lisa M Butler, Massimo Loda, Steven Joniau, Bart De Moor, Alejandro Sifrim, Shane R. Ellis, Thierry Voet, Marc Claesen, Nico Verbeeck, and Johannes V. Swinnen. Integration of multiple spatial omics modalities reveals unique insights into molecular heterogeneity of prostate cancer. *bioRxiv*, 2023, <https://www.biorxiv.org/content/early/2023/08/28/2023.08.28.555056.full.pdf>.
- [2] **Vanuytven, Sebastiaan**\*, Koen Theunis\*, Florian Rambow, Daniel Brown, Michiel Van Der Haegen, Oskar Marin-Bejar, Aljosja Rogiers, Nina Van Raemdonck, Eleonora Leucci, Jonas Demeulemeester, Alejandro Sifrim, Jean-Christophe Marine, and Thierry Voet. Single-cell genome-and-transcriptome sequencing without upfront whole-genome amplification reveals cell state plasticity of melanoma subclones. *bioRxiv*, 2023, <https://www.biorxiv.org/content/early/2023/03/08/2023.01.13.521174.full.pdf>.
- [3] **Vanuytven, Sebastiaan**\*, Ievgenia Pastushenko\*, Justine Lengrand\*, Yura Song, David Venet, Rahul M Sarate, Melanie Bellina, Virginie Moers, Alice Boinet, Ale-

jandro Sifrim, et al. Pharmacological targeting of netrin-1 inhibits emt in cancer. *Nature*, 620(7973):402–408, 2023.

- [4] Elia Fernandez Gallardo\*, Alejandro Sifrim\*, Joel Chappell, Jonas Demeulemeester, Jennifer Clara Herrmann, Robin Vermotte, Alison Kerremans, Michiel Van der Haegen, Jens Van Herck, **Vanuytven, Sebastiaan**, Katy Vandereyken, Iain C. Macaulay, Joris Robert Vermeesch, Karen Peeraer, Sophie Debrock, Vincent Pasque, and Thierry Voet. A multi-omics genome-and-transcriptome single-cell atlas of human preimplantation embryogenesis reveals the cellular and molecular impact of chromosome instability. *bioRxiv*, 2023, <https://www.biorxiv.org/content/early/2023/03/10/2023.03.08.530586.full.pdf>.
- [5] Marine Denechaud\*, Sarah Geurs\*, Thomas Comptdaer, Séverine Bégard, Alejandro Garcia-Núñez, Louis-Adrien Pechereau, Thomas Bouillet, Yannick Vermeiren, Peter P. De Deyn, Romain Perbet, Vincent Deramecourt, Claude-Alain Maurage, Michiel Vanderhaegen, **Sebastiaan Vanuytven**, Bruno Lefebvre, Elke Bogaert, Nicole Déglon, Thierry Voet, Morvane Colin, Luc Buée, Bart Dermaut, and Marie-Christine Galas. Tau promotes oxidative stress-associated cycling neurons in s phase as a pro-survival mechanism: Possible implication for alzheimer’s disease. *Progress in Neurobiology*, page 102386, 2022.
- [6] Maria Xydia\*, Raheleh Rahbari\*, Eliana Ruggiero\*, Iain Macaulay, Maxime Tarabichi, Robert Lohmayer, Stefan Wilkening, Tillmann Michels, Daniel Brown, **Sebastiaan Vanuytven**, Svetlana Mastitskaya, Sean Laidlaw, Niels Grabe, Maria Pritsch, Raffaele Fronza, Klaus Hexel, Steffen Schmitt, Michael Müller-Steinhardt, Niels Halama, Christoph Domschke, Manfred Schmidt, Christof von Kalle, Florian Schütz, Thierry Voet, and Philipp Beckhove. Common clonal origin of conventional t cells and induced regulatory t cells in breast cancer patients. *Nature Communications*, 12(1), feb 2021.
- [7] Jordi Camps, Natacha Breuls, Alejandro Sifrim, Nefele Giarratana, Marlies Corvelyn, Laura Danti, Hanne Grosemans, **Vanuytven Sebastiaan**, Irina Thiry, Marzia Belicchi, et al. Interstitial cell remodeling promotes aberrant adipogenesis in dystrophic muscles. *Cell Reports*, 31(5):107597, 2020.
- [8] Anna-Marei Böhm\*, Naomi Dirckx\*, Robert J. Tower\*, Nicolas Peredo, **Vanuytven Sebastiaan**, Koen Theunis, Elena Nefyodova, Ruben Cardoen, Volkhard Lindner, Thierry Voet, Matthias Van Hul, and Christa Maes. Activation of skeletal stem and progenitor cells for bone regeneration is driven by pdgfrb signaling. *Developmental Cell*, 2019.

## Conference Posters

- [1] **Vanuytven Sebastiaan**, Justin Lengrand, Ievgenia Pastushenko, and Cédric Blanpain. Pharmacological targeting of netrin-1 inhibits EMT in cancer. In *Tumor Heterogeneity, Plasticity and Therapy 2023*, Leuven, Belgium, Mar. 2023.
- [2] **Vanuytven Sebastiaan**, Koen Theunis, Jean-Christophe Marine, and Thierry Voet. Single cell Genome-and-Transcriptome sequencing without upfront whole-genome amplification reveals cell state plasticity of melanoma subclones. In *Single Cell Biology | EK26 2021*, Leuven, Belgium, Mar. 2021.
- [3] **Vanuytven Sebastiaan**, Koen Theunis, Jean-Christophe Marine, and Thierry Voet. Single cell Genome-and-Transcriptome sequencing without upfront whole-genome amplification reveals cell state plasticity of melanoma subclones. In *Genome Informatics 2020*, Cambridge, UK, Oct. 2020.
- [4] **Vanuytven Sebastiaan**, Koen Theunis, Jean-Christophe Marine, and Thierry Voet. Single cell Genome-and-Transcriptome sequencing without upfront whole-genome amplification reveals cell state plasticity of melanoma subclones. In *Emerging Technologies in Single Cell Research 2020*, Leuven, Belgium, Nov. 2020.
- [5] **Vanuytven Sebastiaan**, Koen Theunis, Jean-Christophe Marine, and Thierry Voet. Single-cell genome-plus-transcriptome sequencing without upfront preamplification reveals genomic and transcriptomic heterogeneity in a human melanoma PDX model. In *Somatic Evolution and Tumour Microenvironment Symposium 2020*, London, UK, Dec. 2019.
- [6] **Vanuytven Sebastiaan**, Koen Theunis, Sarah Geurs, Peter Van Loo, Giuseppe Floris, and Thierry Voet. Single-Cell Multi-Omics Sequencing to Understand the Nature, Extent and Biology of Cellular Heterogeneity in Six Special Breast Cancer Cases. In *EACR Cancer Genomics 2019*, Cambridge, UK, June 2019.
- [7] **Vanuytven Sebastiaan**, Alejandro Sifirm, Mabel T Teng, Laura Mora Bitria, Daniel Brown, Elia Fernandez Gallardo, Koen Theunis, Sarah Geurs, Samira Majjaj, Hughes Duvilliers, Michail Ignatiadis, Francoisea Rothe, Christos Sotiriou, Peter Van Loo, Christine Desmedt, and Thierry Voet. Single-cell multi-omics sequencing to understand the nature, extent and biology of cellular heterogeneity in breast cancer. In *Single Cell Biology Conference*, Wellcome Genome Campus, Hinxton, UK, Mar. 2018.
- [8] **Vanuytven Sebastiaan**, Alejandro Sifirm, Mabel T Teng, Laura Mora Bitria, Daniel Brown, Elia Fernandez Gallardo, Koen Theunis, Sarah Geurs, Samira Majjaj, Hughes Duvilliers, Michail Ignatiadis, Francoisea Rothe, Christos Sotiriou, Peter Van Loo, Christine Desmedt, and Thierry Voet. Single-cell multi-omics sequencing to understand the nature, extent and biology of cellular heterogeneity in breast cancer. In *Benelux Bioinformatics Conference*, Leuven, Belgium, Dec. 2017.
- [9] **Vanuytven Sebastiaan**, Jonas Demeulemeester, Zeger Debyser, and Gijssbers Rik. Studying BET protein-chromatin occupation to understand genotoxicity of MLV-based gene therapy vectors. In *Benelux Bioinformatics Conference*, Antwerp, Belgium, Dec. 2015.

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## Talks

- 02/2021 **CRG Single Cell Genomics Symposium 2022**, *Barcelona*, Spain, Selected Speaker.  
Single cell Genome-and-Transcriptome sequencing without upfront whole-genome amplification reveals cell state plasticity of melanoma subclones
- 02/2021 **Introduction To Single-Cell Sequencing And Computational Analysis Symposium 2021**, *Leuven*, Belgium, Invited Speaker.  
The magic behind Genomics and Transcriptomics Sequencing
- 10/2020 **Crick Cancer Research Symposium 2020**, *London*, United Kingdom, Selected Speaker.  
Single cell Genome-and-Transcriptome sequencing without upfront whole-genome amplification reveals cell state plasticity of melanoma subclones
- 05/2019 **EMBO Single-cell Biology**, *Tokyo*, Japan, Selected Speaker.  
Single-Cell Multi-Omics Sequencing to Understand the Nature, Extent and Biology of Cellular Heterogeneity in Six Special Breast Cancer Cases
- 11/2018 **Genomics for diagnostics of Rare Diseases TRAINMALTA meeting**, *Leuven*, Belgium, Invited Speaker.  
Single-cell multi-omics to detect genetic variants in cancer and development
- 06/2018 **European Human Genetics Conference 2018**, *Milan*, Italy, Selected speaker.  
Single-cell multi-omics sequencing to understand the nature, extent and biology of cellular heterogeneity in breast cancer
- 05/2018 **Bioinformatics Student Symposium 2018**, *Antwerp*, Belgium, Selected speaker.  
Single-cell multi-omics sequencing to understand the nature, extent and biology of cellular heterogeneity in breast cancer
- 02/2018 **Belgian Human Genetics Conference 2018**, *Ghent*, Belgium, Selected speaker.  
Single-cell multi-omics sequencing to understand the nature, extent and biology of cellular heterogeneity in breast cancer
- 12/2015 **BBC2015 Student Conference**, *Antwerp*, Belgium, Selected speaker.  
Studying BET protein-chromatin occupation to understand genotoxicity of MLV-based gene therapy vectors

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## Reviewing activities

- Journals Cell (junior reviewer), Genome Biology  
Conferences ESHG 2018-2020

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## Scientific leadership experiences

- Organiser RGS Belgium student symposium 2019  
Representative Board of the Department of Human Genetics 2018-2021  
Representative University Council 2020-2021  
Representative Academic Council 2020-2021  
Representative Research Policy Council 2020-2021  
Representative Executive Committee Biomedical Sciences 2020-2021

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## Teaching

2019-2021 Computational Practical Human Genetics KU Leuven

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## Languages

Dutch Native language  
English Extensive Knowledge  
French Good knowledge  
German Basic knowledge  
Swedish Basic knowledge

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## Interests

2020-Present **Scientific Blogger**, <https://svanuytven.github.io/>.

2017-Present **Instructor**.

Teaching (single-cell) RNA-seq analysis to starting PhD students

2010-Present **Passionate mountaineer and runner**.

2018-2022 **Volunteer and KU Leuven representative**.

ISCB Regional Student Group Belgium

2015-2017 **Student representative and member of the education committee Bioinformatics KU Leuven**.

Organiser buddy system first year students

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## References

### **Cédric Blanpain Prof.**

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### **Alejandro Sifrim, Prof.**

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### **Thierry Voet, Prof.**

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### **Peter Van Loo, Prof.**

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### **Jonas Demeulemeester, Prof.**

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