

# Florian Wünnemann

POSTDOC IN THE GROUP OF DENIS SCHAPIRO

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**Research and scientific interests:** Spatial OMICS, Cardiovascular disease, Human genetics, Bioinformatics, Machine Learning, Computer vision

## Research experience

### University Hospital Heidelberg

POSTDOC IN THE SCHAPIRO LAB

- Investigation of cellular neighbourhoods and tissue architecture in myocardial infarction models using spatial OMICS technologies

Heidelberg, Germany

22-Jan - ongoing

### Montreal Heart Institute

POSTDOC IN THE LETTRE LAB

- Projects focused on high-throughput CRISPR screens, polygenic risk scores, genetics of heart valve disease and development of single-cell screens to investigate human cellular traits.

Montreal, Canada

18-Aug - 21-Aug

### Universite de Sherbrooke

PROFESSIONNEL RECHERCHE NIV. II

- Part of the GenAP initiative (www.genap.ca) as single-cell expert, to include single-cell tools into the GenAP2 platform. Development of Galaxy tools, Rshiny applications and docker containers for single-cell analysis.

Remote work

19-Jan - 16-Jan

### IEB, University of Münster

STUDENT RESEARCH ASSISTANT

- Acquisti group: Analysis of genomes and metagenomes in the context of nutrient limitation and fertilization.

Münster, Germany

11-Sep - 12-Jul

### IEB, University of Münster

STUDENT ASSISTANT

- Bornberg-Bauer group

Münster, Germany

11-Mar - 11-May

## Education

### University of Münster / CHU Sainte Justine Research Center

PH.D. (DR.RER.NAT) - LIFE SCIENCES

- Thesis title: The role of genetic factors in pathogenesis and progression of cardiac malformations

Münster, Germany / Montreal,

Canada

Apr.2014 - Apr.2018

### University of Münster

MSc IN LIFE SCIENCES

- Thesis title: Functional and genetic characterization of a novel arrhythmic syndrome

Münster, Germany

Oct.2011 - Feb.2014

### University of Münster

BSc IN LIFE SCIENCES

- Thesis title: Impact of nutrient limitation in insects: Comparative genomics of the pea aphid and the human body louse

Münster, Germany

Oct.2008 - Sep.2011

## Funding History

POSTDOCTORAL TRAINING (CANADIAN CITIZENS AND PERMANENT RESIDENTS) SCHOLARSHIP, FONDS DE RECHERCHE QUÉBEC

SANTÉ (FRQS)

2019 - 2021

## Achievements and Awards

2021/06	Poster prize: Prix Fonds de recherche du Québec (FRQS) (Recherche fondamentale doctorale / Postdoc)	Montreal, Canada
2019/06	Best oral presentation award, 22nd Montreal Heart Institute research day	Montreal, Canada
2017/05	Best oral presentation award, 32nd student congress at the CHU Sainte-Justine	Montreal, Canada
2016/05	Markwald award for best oral presentation, Weinstein Cardiovascular Development and Regeneration Conference 2016	Durham, USA

## Presentations

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### American Society of Human Genetics (ASHG) Meeting 2019

PRIORITIZATION OF GENOMIC LOCI FOR CORONARY ARTERY DISEASE USING TARGETED CRISPR SCREENS FOR ENDOTHELIAL DYSFUNCTION

*Houston, Texas, USA*

15.10.2019 - 19.10.2019

### XXIIe Journée de la recherche ICM

VALIDATION OF GENOME-WIDE POLYGENIC RISK SCORES FOR CORONARY ARTERY DISEASE IN FRENCH CANADIANS

*Montreal, Canada*

06.06.2019 - 06.06.2019

### 7th annual MGSE Symposium

SINGLE CELL LANDSCAPE OF MAMMALIAN HEART MATURATION

*Münster, Germany*

21.03.2018 - 22.03.2018

### American Society of Human Genetics (ASHG) Meeting 2017

IDENTIFICATION OF A NOVEL MARKER FOR VALVE MATURATION: LOSS OF ADAMTS19 FUNCTION CAUSES PROGRESSIVE VALVE DISEASE IN MICE AND MEN

*Orlando, Florida, USA*

18.10.2017 - 18.10.2017

### Congrès de la recherche des étudiantes des cycles supérieurs et des post-doctorants en recherche au CHU Sainte-Justine

HEART VALVE DYSFUNCTION IN MEN AND MICE IS CAUSED BY LOSS OF FUNCTION MUTATIONS IN ADAMTS19, A NOVEL MARKER FOR VALVULAR INTERSTITIAL CELLS

*Montreal, Canada*

26.05.2017 - 26.05.2017

### Weinstein Cardiovascular Development and Regeneration Conference 2016

LOSS OF ADAMTS19, A NOVEL MARKER FOR VALVULAR INTERSTITIAL CELL POPULATIONS DURING VALVE MATURATION, CAUSES AORTIC VALVE DYSFUNCTION

*Durham, North Carolina, USA*

18.05.2016 - 21.05.2016

### Evolgen, collaborative meeting on genome evolution

ACTRANSDB: AN ONLINE DATABASE FOR ACANTHAMOEBA CASTELLANI TRANSCRIPTS,

*Ciążeń, Poland*

27.06.2012 - 28.06.2012

### 2nd Muenster graduate school evolution symposium

BIOGEOCHEMISTRY MEETS MOLECULAR EVOLUTION VIA METAGENOMICS: TRACING NITROGEN FLUXES FROM ECOSYSTEMS TO GENOMES IN MICROBIAL COMMUNITIES

*Münster, Germany*

18.06.2012 - 19.06.2012

## Poster presentations

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### XXIIIe Journée de la recherche ICM

CRISPR PERTURBATIONS AT MANY CORONARY ARTERY DISEASE LOCI IMPAIR VASCULAR ENDOTHELIAL CELL FUNCTIONS

*Montreal, Canada*

17.06.2021 - 17.06.2021

### Cold Spring Harbor Laboratories: The Biology of Genomes

CRISPR PERTURBATIONS AT MANY CORONARY ARTERY DISEASE LOCI IMPAIR VASCULAR ENDOTHELIAL CELL FUNCTIONS

*Virtual*

11.05.2021 - 14.05.2021

### Weinstein Cardiovascular Development and Regeneration Conference

A SINGLE-CELL PERSPECTIVE ON GROWTH AND MATURATION PATHWAYS IN THE MOUSE HEART.

*Nara, Japan*

16.05.2018 - 18.05.2018

### American Society of Human Genetics (ASHG) 2014

DE NOVO MUTATION IN SOX18 CAUSES A NOVEL FORM OF HYPOTRICHOSIS-LYPHEDEMA-TELANGIECTASIA WITH SEVERE VASCULAR DEFECTS

*San Diego, California, USA*

18.10.2014 - 22.10.2014

### 42nd Annual Meeting of the Ecological Society of Germany, Austria and Switzerland 2012

SOIL METAGENOMICS TO UNRAVEL THE SIGNATURE OF FERTILIZERS ON THE MOLECULAR COMPOSITION OF THE BACTERIAL RIBOSOME

*Lueneburg, Germany*

10.09.2012 - 14.09.2012

## Publications

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1. Audain, E., Wilsdon, A., Breckpot, J., Izarzugaza, J. M., Fitzgerald, T. W., Kahlert, A.-K., Sifrim, A., Wünnemann, F., Perez-Riverol, Y., Abdul-Khaliq, H.others. (2021). Integrative analysis of genomic variants reveals new associations of candidate haploinsufficient genes with congenital heart disease. *PLoS Genetics*, 17(7), e1009679.
2. Wünnemann, F., Tadjó, T. F., Beaudoin, M., Lalonde, S., Lo, K. S., & Lettre, G. (2021). CRISPR perturbations at many coronary artery disease loci impair vascular endothelial cell functions. *bioRxiv*.
3. Wünnemann, F., Ta-Shma, A., Preuss, C., Leclerc, S., Vliet, P. P. van, Oneglia, A., Thibeault, M., Nordquist, E., Lincoln, J., Scharfenberg, F.others. (2020). Loss of ADAMTS19 causes progressive non-syndromic heart valve disease. *Nature Genetics*, 52(1), 40–47.
4. Gould, R. A., Aziz, H., Woods, C. E., Seman-Senderos, M. A., Sparks, E., Preuss, C., Wünnemann, F., Bedja, D., Moats, C. R., McClymont, S. A.others. (2019). ROBO4 variants predispose individuals to bicuspid aortic valve and thoracic aortic aneurysm. *Nature Genetics*, 51(1), 42–50.

5. Luyckx, I., Kumar, A. A., Reyniers, E., Dekeyser, E., Vanderstraeten, K., Vandeweyer, G., Wünnemann, F., Preuss, C., Mazzella, J.-M., Goudot, G.others. (2019). Copy number variation analysis in bicuspid aortic valve-related aortopathy identifies TBX20 as a contributing gene. *European Journal of Human Genetics*, 27(7), 1033–1043.
6. Wünnemann, F., Sin Lo, K., Langford-Avelar, A., Busseuil, D., Dubé, M.-P., Tardif, J.-C., & Lettre, G. (2019). Validation of genome-wide polygenic risk scores for coronary artery disease in french canadians. *Circulation: Genomic and Precision Medicine*, 12(6), e002481.
7. Gillis, E., Kumar, A. A., Luyckx, I., Preuss, C., Cannaerts, E., Van De Beek, G., Wieschendorf, B., Alaerts, M., Bolar, N., Vandeweyer, G.others. (2017). Candidate gene resequencing in a large bicuspid aortic valve-associated thoracic aortic aneurysm cohort: SMAD6 as an important contributor. *Frontiers in Physiology*, 8, 400.
8. Wünnemann, F., Kokta, V., Leclerc, S., Thibeault, M., McCuaig, C., Hatami, A., Stheneur, C., Grenier, J.-C., Awadalla, P., Mitchell, G. A.others. (2016). Aortic dilatation associated with a de novo mutation in the SOX18 gene: Expanding the clinical spectrum of hypotrichosis-lymphedema-telangiectasia syndrome. *Canadian Journal of Cardiology*, 32(1), 135–e1.
9. Preuss, C., Capredon, M., Wünnemann, F., Chetaille, P., Prince, A., Godard, B., Leclerc, S., Sobreira, N., Ling, H., Awadalla, P.others. (2016). Family based whole exome sequencing reveals the multifaceted role of notch signaling in congenital heart disease. *PLoS Genetics*, 12(10), e1006335.
10. Chetaille, P., Preuss, C., Burkhard, S., Côté, J.-M., Houde, C., Castilloux, J., Piché, J., Gosset, N., Leclerc, S., Wünnemann, F.others. (2014). Mutations in SGOL1 cause a novel cohesinopathy affecting heart and gut rhythm. *Nature Genetics*, 46(11), 1245.

## Computational skills

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- **General:** GWAS analysis, Exome/Genome variant calling, Plink, bedtools, Image analysis (Fiji, Napari, QuPath)
- **R:** Rshiny application development, Rmarkdown, Package development, OMICS data analysis (RNA-seq, single-cell OMICS), reticulate
- **Python:** Jupyter notebooks, basic computer vision applications, single-cell OMICS analysis
- **Containers:** Docker container creation, Singularity usage, Nextflow workflow creation and execution
- **Galaxy project:** Creation of galaxy tools and wrappers

## Languages

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- German (mother-language)
- English (fluent)
- French (fluent)