

Florian Wünnemann

POSTDOC IN THE SCHAPIRO LAB

Im Neuenheimer Feld 130, 69120 Heidelberg, Germany

✉ flowuenne@gmail.com

🏠 florianwuennemann.com | 📷 flowuenne | 🐦 flowuenne

Research and scientific interests: Human genetics, Single cell OMICS, Heart development, Bioinformatics, Machine Learning, Computer vision, Open source software

🔬 Research experience

University Hospital Heidelberg

POSTDOC IN THE SCHAPIRO LAB

Heidelberg, Germany

Jan2022 - ongoing

- Defining and modulating cellular neighbourhoods in myocardial infarction models using spatial OMICS technologies

Montreal Heart Institute

POSTDOC IN THE LETTRE LAB

Montreal, Canada

Aug2018 - Aug2021

- 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.

Universite de Sherbrooke

PROFESSIONNEL RECHERCHE NIV. II

Sherbrooke, Canada

Jan 2019 - ongoing

- 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.

IEB, University of Münster

STUDENT RESEARCH ASSISTANT

Münster, Germany

Sept2011 - Jul2012

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

IEB, University of Münster

STUDENT ASSISTANT

Münster, Germany

Mar2011 - May 2011

- Bornberg-Bauer group

🎓 Education

University of Münster / CHU Sainte Justine Research Center

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

Münster, Germany / Montreal, Canada

Apr.2014 - Apr.2018

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

University of Münster

MSc IN LIFE SCIENCES

Münster, Germany

Oct.2011 - Feb.2014

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

University of Münster

BSc IN LIFE SCIENCES

Münster, Germany

Oct.2008 - Sep.2011

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

\$ 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)	<i>Montreal, Canada</i>
2019/06	Best oral presentation award, 22nd Montreal Heart Institute research day	<i>Montreal, Canada</i>
2017/05	Best oral presentation award, 32nd student congress at the CHU Sainte-Justine	<i>Montreal, Canada</i>
2016/05	Markwald award for best oral presentation, Weinstein Cardiovascular Development and Regeneration Conference 2016	<i>Durham, USA</i>

Presentations

American Society of Human Genetics (ASHG) Meeting 2019	<i>Houston, Texas, USA</i>
PRIORITIZATION OF GENOMIC LOCI FOR CORONARY ARTERY DISEASE USING TARGETED CRISPR SCREENS FOR ENDOTHELIAL DYSFUNCTION	15.10.2019 - 19.10.2019
XXIIe Journée de la recherche ICM	<i>Montreal, Canada</i>
VALIDATION OF GENOME-WIDE POLYGENIC RISK SCORES FOR CORONARY ARTERY DISEASE IN FRENCH CANADIANS	06.06.2019 - 06.06.2019
7th annual MGSE Symposium	<i>Münster, Germany</i>
SINGLE CELL LANDSCAPE OF MAMMALIAN HEART MATURATION	21.03.2018 - 22.03.2018
American Society of Human Genetics (ASHG) Meeting 2017	<i>Orlando, Florida, USA</i>
IDENTIFICATION OF A NOVEL MARKER FOR VALVE MATURATION: LOSS OF ADAMTS19 FUNCTION CAUSES PROGRESSIVE VALVE DISEASE IN MICE AND MEN	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	<i>Montreal, Canada</i>
HEART VALVE DYSFUNCTION IN MEN AND MICE IS CAUSED BY LOSS OF FUNCTION MUTATIONS IN ADAMTS19, A NOVEL MARKER FOR VALVULAR INTERSTITIAL CELLS	26.05.2017 - 26.05.2017
Weinstein Cardiovascular Development and Regeneration Conference 2016	<i>Durham, North Carolina, USA</i>
LOSS OF ADAMTS19, A NOVEL MARKER FOR VALVULAR INTERSTITIAL CELL POPULATIONS DURING VALVE MATURATION, CAUSES AORTIC VALVE DYSFUNCTION	18.05.2016 - 21.05.2016
Evolgen, collaborative meeting on genome evolution	<i>Ciężka, Poland</i>
ACTRANSDB: AN ONLINE DATABASE FOR ACANTHAMOEBA CASTELLANI TRANSCRIPTS,	27.06.2012 - 28.06.2012
2nd Muenster graduate school evolution symposium	<i>Münster, Germany</i>
BIOGEOCHEMISTRY MEETS MOLECULAR EVOLUTION VIA METAGENOMICS: TRACING NITROGEN FLUXES FROM ECOSYSTEMS TO GENOMES IN MICROBIAL COMMUNITIES	18.06.2012 - 19.06.2012

Poster presentations

XXIIIe Journée de la recherche ICM	<i>Montreal, Canada</i>
CRISPR PERTURBATIONS AT MANY CORONARY ARTERY DISEASE LOCI IMPAIR VASCULAR ENDOTHELIAL CELL FUNCTIONS	17.06.2021 - 17.06.2021
Cold Spring Harbor Laboratories: The Biology of Genomes	<i>Virtual</i>
CRISPR PERTURBATIONS AT MANY CORONARY ARTERY DISEASE LOCI IMPAIR VASCULAR ENDOTHELIAL CELL FUNCTIONS	11.05.2021 - 14.05.2021
Weinstein Cardiovascular Development and Regeneration Conference	<i>Nara, Japan</i>
A SINGLE-CELL PERSPECTIVE ON GROWTH AND MATURATION PATHWAYS IN THE MOUSE HEART.	16.05.2018 - 18.05.2018
American Society of Human Genetics (ASHG) 2014	<i>San Diego, California, USA</i>
DE NOVO MUTATION IN SOX18 CAUSES A NOVEL FORM OF HYPOTRICHOSIS-LYPHEDEMA-TELANGIECTASIA WITH SEVERE VASCULAR DEFECTS	18.10.2014 - 22.10.2014
42nd Annual Meeting of the Ecological Society of Germany, Austria and Switzerland 2012	<i>Lueneburg, Germany</i>
SOIL METAGENOMICS TO UNRAVEL THE SIGNATURE OF FERTILIZERS ON THE MOLECULAR COMPOSITION OF THE BACTERIAL RIBOSOME	10.09.2012 - 14.09.2012

Preprints

1. 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*.
2. Churakov, G., Kuritzin, A., Chukharev, K., Zhang, F., Wünnemann, F., Ulyantsev, V., & Schmitz, J. (2020). A 4-lineage statistical suite to evaluate the support of large-scale retrotransposon insertion data to reconstruct evolutionary trees. *bioRxiv*.

Publications

1. Heckel, E., Cagnone, G., Agnihotri, T., Cakir, B., Das, A., Kim, J. S., Kim, N., Lavoie, G., Situ, A., Pundir, S.others. (2022). Triglyceride-derived fatty acids reduce autophagy in a model of retinal angiomatous proliferation. *JCI Insight*, 7(6).
2. 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.
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. Preuss, C., Wünnemann, F., & Andelfinger, G. (2017). At the heart of a complex disease “molecular genetics of congenital heart disease.” *eLS*, 1–9.
8. 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.
9. 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.
10. 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.
11. Wünnemann, F., & Andelfinger, G. U. (2016). Molecular pathways and animal models of hypoplastic left heart syndrome. In *Congenital heart diseases: The broken heart* (pp. 649–664). Springer, Vienna.
12. 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

- **General:** GWAS analysis, Exome/Genome variant calling, Plink, bedtools
- **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
- **Galaxy project:** Creation of galaxy tools and wrappers

Languages

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

- French (fluent)