Labhart-Schwyzer Scholarship
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August 23, 2024

Dear Members of the Labhart-Schwyzer Scholarship Committee,

I am writing to express my motivation and commitment to advancing healthcare through innovative genomic technologies. I have designed new methods and demonstrated high accuracy for rapid discovery of metabolic diseases in a pilot study via UZH with Prof. Dr. med. Luregn Schlapbach, PhD. I would like to complete this work by joining PD Dr Sean Froese, Principal Investigator in the Division of Metabolism at the University Children's Hospital Zurich.

My career, which began in the demanding fields of rare disease research, has been fundamentally shaped by the urgent need to hasten the translation of research into life-saving clinical applications. My experience in immunology wet-labs highlighted the urgent need for faster and more effective clinical diagnostics, which drove me to specialise in high-throughput multi-omics and bioinformatics during my PhD and postdoc. This shift was crucial for applying research more effectively in clinical settings.

I have joined UZH so that I can implement these innovations in our university hospitals, a setting where the impact of such advancements can be most tangible and immediate. The opportunity to lead the GenomeSwift project, which is dedicated to refining diagnostic processes for paediatric patients with rare genetic diseases, represents a culmination of my academic and professional pursuits.

Translational medicine can only be built with adherence to stringent regulatory standards. Therefore, I dedicated time to further education in Swiss and EU drug/device regulations and project leadership. However, this critical investment makes my academic age 4 years since the award of PhD, thus limiting my funding sources.

The support of the Labhart-Schwyzer Scholarship will be instrumental, enabling extensive collaboration and further development of GenomeSwift. This project not only promises to elevate my career as a leader in translational research but also aims to enhance Zürich's standing in the global scientific community by delivering cutting-edge solutions for our urgent needs, initially focusing on metabolic disease.

Yours sincerely,

Dylan Lawless, PhD.

Dylan Lawless

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Experience

2023–	Senior scientist. Bioinformatics, intensive care/neonatology unit, University of Zurich.
2018–2023	Senior postdoctoral scientist. Precision medicine, translational genomics, host-pathogen immunology, EPFL, Fellay lab.
2017–2023	Consultancy and genomic analysis via LawlesesGenomics.com.
2015–2018	Bioinformatics, genetic discovery in rare PID, University of Leeds, Savic lab.
2014–2015	Analytical Scientist, clinical trials, ACM global.
2014	Intracellular innate immunity, EPFL, Ablasser lab.
2013	Viral immunology, Trinity College Dublin, Bowie lab.
2012	Innate immunity in microbiology, University College Cork Morgan lab.

Education

2015–2020	PhD University of Leeds, School of Medicine and St. James's University Hospital. Novel genetic discoveries in rare primary immunodeficiencies.
2013–2014	MSc Immunology, Trinity College Dublin (1st class hon).
2009–2013	BSc Microbiology, University College Cork (Honours).
2022	Drug/device product development and regulation in Europe and US, epfl.ch/educate4life.

Expertise

- **Leadership in genomics and bioinformatics**: Orchestrated precision medicine studies, clinical and translational genomics, and design of statistical and visualization tools. Developed collaborations with SPHN, PHRT, Genomics England, UKBB, SPHN, NIHR-RD. Supervised numerous international research projects, MSc and PhD students, teaching in EPFL.
- **Contribution in rare diseases**: Directly involved in diagnosing severe rare diseases, leading to discovery of novel mechanisms and genetic disorders, enabling precise clinical interventions and enhancing patient care.
- **Proficiency in multi-omics**: Hands-on experience with DNAseq, RNAseq, methylation seq, proteomics, cytokine and antibody profiling, transcriptomics, GWAS, and FACS and flow cytometry single-cell analysis. Developed various statistical techniques for multi-modal data analysis and predictive modeling.

- **Pathogen genomics and immunology**: Parallel analyses of host, bacterial, viral, and fungal mechanisms in various contexts including neonatal sepsis and viral infection. Comprehensive understanding of immunodeficiencies, host-pathogen interactions, and immunogenomics.
- **Programming and statistics**: Strong command over R, bash, and other Unix/Linux tools, with ongoing interest in other languages and big data software. Proficient in diverse statistical techniques including mixed models, multivariable modelling, and sensitivity analysis.
- **Data visualization and regulation**: Ability to present complex genomic data to varied audiences. Knowledge of drug/device development, regulation, quality compliance, and project management from FDA, EUdraLex, and ICH.
- **Democratized genomics and wet-lab expertise**: Genomic analysis lead through LawlessGenomics including collaboration and cloud-based pipeline development. Significant wet-lab experience, including *in vitro* and *in vivo* models, molecular assays, and clinical cohort design.

Selected Publications

- *Journal of Allergy and Clinical Immunology*. Oct 2023; doi: 10.1016/j.jaci.2023.09.023. You AIn't using it right—artificial intelligence progress in allergy. - pdf
- *Journal of Allergy and Clinical Immunology*. Feb 2023; doi: 10.1016/j.jaci.2023.01.035. Prevalence of *CFTR* variants in PID patients with bronchiectasis - an important modifying co-factor. - pdf
- *The Journal of Infectious Diseases*. Nov 2022; doi: 10.1093/infdis/jiac442. Viral genetic determinants of prolonged respiratory syncytial virus infection among infants in a healthy term birth cohort - pdf
- *Blood*. Jun 2020; doi: 10.1182/blood.2020005844. Germline *TET2* loss-of-function causes childhood immunodeficiency and lymphoma. - pdf
- *Journal of Clinical Immunology*. 2019 Aug; doi: 10.1007%2Fs10875-019-00670-z. Predicting the occurrence of variants in *RAG1* and *RAG2*. - pdf
- *Frontiers in Immunology*. Jul 2018; doi: 10.3389/fimmu.2018.01527. A case of AOSD caused by a novel splicing mutation in *TNFAIP3* successfully treated with tocilizumab. - pdf
- *Journal of Allergy and Clinical Immunology*. Feb 2018; doi: 10.1016/ j.jaci.2018.02.007. Prevalence and clinical challenges among adult PID patients with recombination-activating gene deficiency. - pdf
- *eLife*. Dec 2021; doi: 10.7554/elife.72559. Biallelic mutations in calcium release activated channel regulator 2A (CRACR2A) cause a primary immunodeficiency disorder - pdf
- *Arthritis & Rheumatology*. Sep 2020; doi: 10.1002/art.41531. A novel RELA truncating mutation in familial Behçet's Disease-like mucocutaneous ulcerative condition. - pdf
- *Journal of clinical immunology*. Dec 2019; doi: 10.1007/s10875-019-00735-z. Expanding Clinical Phenotype and Novel Insights into the Pathogenesis of ICOS Deficiency. - pdf
- *Blood*. Dec 2018; doi: 10.1182/blood-2018-07-866939. A novel *RAG1* mutation reveals a critical in vivo role for HMGB1/2 during V(D)J recombination. - pdf
- *Science Translational Medicine*. 2016 Mar; doi: 10.1126/scitranslmed.aaf1471. Familial autoinflammation with neutrophilic dermatosis reveals a regulatory mechanism of pyrin activation. - pdf

Dylan Lawless,
Zurich, 23. August 2024