Christoph Sadée

Overview: Having grown up in Germany, I had the opportunity to attend boarding school in Ireland at age 16 to improve my English language skills. With my passion for science, I went on to study theoretical physics at the University College Dublin and get a master's in computational biology at University College London. For the past several years I have been working in RNA labs, first at the Francis Crick Institute and then at Stanford University. During my time at the Crick, I invented devices to optimize liquid handling for wet lab experiments. Recently I've joint the Gevaert lab at Stanford University to combine my diverse research experiences using data fusion to interpret molecular and imaging data. It is through this work that I have developed a profound appreciation for the complexity of biology and medicine, and interest of persuing a career in biomedical research.

Personal information

Place of Birth	Schweinfurt, Germany	19.10.1992
Citizenship	Germany / US permanent resident	
Website	www.chris-sadee.com	

Education

Master	MSc in Physics Univeristy College Dublin in collaboration with Harvard Wyss Institute (Ireland & USA)	2017 to 2019
Grade	Pending Graduation	
Master	MRes in Modeling Biological Complexity Univeristy College London (England)	2015 to 2016
Grade	Merit Translated GPA: **3.6**/4.0	
Bachelor	Honours BSc in Theoretical Physics University Collge Dublin (Ireland)	2011 to 2015
Grade	First Class Honours *GPA: **3.74**/4.2*	
Courses	Principles of Biochemistry Colorado State University (US) *Grade: A; GPA: **4.0**/4.0*	2017

Publications   *contributed equally

Preprint	Flora C. Y. Lee, Anob M. Chakrabarti, Heike Hänel, Elisa Monzón-Casanova, Martina Hallegger, Cristina Militti, Federica Capraro, **Christoph Sadée**, Patrick Toolan-Kerr, Osca Wilkins, Martin Turner, Julian König, Christopher R. Sibley, Jernej Ule. 2021. An improved iCLIP protocol. bioRxiv. https://www.biorxiv.org/content/10.1101/2021.08.27.457890v1.full.pdf
Under Review	**Christoph Y. Sadée**, Stefano Testa, Thomas Barba, Katherine Hartmann, Max Schuesseler, Alexander Thieme, George Church, Ifeoma Okoye, Tina

Hernandez-Boussard, Leroy Hood, Ilya Shmulevich, Ellen Kuhl, Olivier Gevaert, Medical Digital Twins: Enabling Precision Medicine and Medical AI. Cell

Yiheng Li, **Chris Sadee**, Francisco Carrillo-Perez, Heather Selby, Alexander Thieme, Olivier Gevaert A 3D Lung Lesion Variational Auto-Encoder. CellPress Portal

Ahmet Gorkem Er, Daisy Yi Ding, Berrin Er, Mertcan Uzun, Mehmet Cakmak, **Christoph Sadee**, Gamze Durhan, Mustafa Nasuh Ozmen, Mine Durusu Tanriover, Arzu Topeli, Yesim Aydin Son, Robert Tibshirani, Serhat Unal, Olivier Gevaert, Multimodal Biomedical Data Fusion Using Sparse Canonical Correlation Analysis and Cooperative Learning: A Cohort Study on COVID-19. NPJ Nature

Published Alexander H Thieme, Yuanning Zheng, Gautam Machiraju, **Christoph Sadée**, Mirja Mittermaier, Maximilian Gertler, Jorge L Salinas, Krithika Srinivasan, Prashnna Gyawali, Francisco Carrillo-Perez, Angelo Capodici, Maximilian Uhlig, Daniel Habenicht, Anastassia Löser, Maja Kohler, Maximilian Schuessler, David Kaul, Johannes Gollrad, Jackie Ma, Christoph Lippert, Kendall Billick, Isaac Bogoch, Tina Hernandez-Boussard, Pascal Geldsetzer, Olivier Gevaert, A deep-learning algorithm to classify skin lesions from mpox virus infection. Nature Medicine. 2023 Mar. doi: 10.1038/s41591-023-02225-7
https://pubmed.ncbi.nlm.nih.gov/36864252/#full-view-affiliation-5

Katherine Hartmann, **Christoph Y. Sadee**, et al. Imaging genomics: data fusion in uncovering disease heritability. Trends in Molecular Biology. 2022 Feb. doi: 10.1016/j.molmed.2022.11.002
https://pubmed.ncbi.nlm.nih.gov/36470817/

Jason K Iles, Raminta Zmuidinaite, **Christoph Sadee**, et al. Determination of IgG1 and IgG3 SARS-CoV-2 spike protein and nucleocapsid binding. Who is binding who and why? Int J Mol Sci. 2022 May 27;23(11):6050. doi: 10.3390/ijms23116050
https://pubmed.ncbi.nlm.nih.gov/35682724/

Jason Iles, Raminta Zmuidinaite, **Christoph Sadee**, Anna Gardiner, Jonathan Lacey, Stephen Harding, Jernej Ule, Debra Roblett, Jonathan Heeney, Helen Baxendale, Ray K Iles. SARS-CoV-2 Spike protein binding of glycated serum albumin - its potential role in the pathogenesis of the COVID-19 clinical syndromes and bias towards individuals with pre-diabetes/type 2 diabetes & metabolic diseases. Int J Mol Sci. 2022 Apr 8;23(8):4126. doi: 10.3390/ijms23084126.
https://pubmed.ncbi.nlm.nih.gov/35456942/

Christoph Y. Sadée*, Lauren D. Hagler*, Winston R. Becker, Inga Jarmoskaite, Pavanapuresan P. Vaidyanathan, Sarah K. Denny, William J. Greenleaf, Daniel Herschlag. A comprehensive thermodynamic model for RNA binding by the Saccharomyces cerevisiae Pumilio protein PUF4. Nat Commun. 2022 Aug 4;13(1):4522. doi: 10.1038/s41467-022-31968-z.
https://www.nature.com/articles/s41467-022-31968-z

Grech, L.*, Jeffares, D.*, **Sadee, C.Y.**, Rodriguez-Lopez, M., Bitton, D.A., Hoti, M., Biagosch, C., Aravani, D., Speekenbrink, M., Illingworth, C.J.

and Schiffer, P.H., 2019. Fitness Landscape of the Fission Yeast Genome. Molecular biology and evolution.
https://academic.oup.com/mbe/article/36/8/1612/5488193

Bertero, A., Brown, S., Madrigal, P., Osnato, A., Ortmann, D., Yiangou, L., Kadiwala, J., Hubner, N.C., de Los Mozos, I.R., **Sadee, C.,** et al. 2018. The SMAD2/3 interactome reveals that TGFbeta controls m6A mRNA methylation in pluripotency. Nature, 555(7695), p.256.
https://www.nature.com/articles/nature25784

Sadee, C. and Kashdan, E. (2016) 'A model of thermotherapy treatment for bladder cancer', Mathematical Biosciences and Engineering, 13(6), pp. 1169–1183. doi: 10.3934/mb.2016037.
http://chris-sadee.com/pdf/SadeeKashdan_5.pdf

Bozhok, A., Formato, G., **Sadee, C.,** et al. (2015) 'Patient-specific blood flow modeling'. European Consortium for Mathematics in Industry.
https://www.uc.pt/en/congressos/EcmiMW2015/Reports/ReportGroup5

Software   **Sadee, C.,** A., Pietrzak, M., Seweryn, M. and Rempala. Maintainer Maciej Pietrzak, G. (2017) 'Tools for Analysis of Diversity and Similarity in Biological Systems'. divo.R CRAN.
https://cran.r-project.org/web/packages/divo/divo.pdf

Patents   **Sadee, C** & The Francis Crick Institute 2020. Tip Ejector Block and Multi-channel Laboratory Tool. Patent#: WO2022018434A1

Sadee, C & The Francis Crick Institute 2018. Test Receptacle Rack. Patent#: WO 2019/145671 A1

Funding

Stanford HAI cloud computing credits		2022-2023
Stanford University (US)		
Google Cloud computing credits for developing a skin disease classifier for clinical use.		
Idea to Innovation (I2I) Grant		2018-2019
The Francis Crick Institute (UK)		
Translating 3D printed prototype for magnetic bead handling to industrial standard prototypes for subsequent beta testing.		
Visiting Scholar Stipend		2017
Jagiellonian University (Poland)		
Invitation to teach molecular technique (iCLIP) and collaborate on ongoing exosome project.		

Talks & Posters

Talks	**Idea to Innovation (I2I) Grant pitch**	Dec-17
	The Francis Crick Institute, London (UK)	
	Pitching my 3D printed prototype for magnetic bead handling to funding committee.	
	Funct. Genetic Variation in the non-coding Genome	Nov-16
	The Royal Society, London (UK)	

Website: www.genetics.org.uk

Selected for a talk about statistical analysis of saturating transposon mutagenesis in fission yeast (final Master's project)

Collaborative Research: Linking Labs

Nov-16

Institute of Child Health, London (UK)

Website: https://www.ucl.ac.uk/ich

Invited speaker for statistical analysis of saturating transposon mutagenesis in fission yeast (final Master's project)

UK Heat Transfer Conference 2015

Sep-15

Pollock Halls, University of Edinburgh (Scotland)

Website: http://www.see.ed.ac.uk/drupal/ukht/location/

Selected for talk about the analysis of the SB-TS 101 medical device (Bachelors project). Presented follow up poster.

Posters ## 7th Non-coding RNA & RNAi Therapeutics Conference

May-22

Stanford University, Boston (USA)

Presenting poster on deep learning skin disease classifier for clinical use.

7th Non-coding RNA & RNAi Therapeutics Conference

Sep-16

Hyatt Regency Hotel, Boston (USA)

Website: www.gtcbio.com/conferences/non-coding-rna-rnai-therapeutics-overview
Presenting poster about statistical analysis of saturating transposon mutagenisis in fission yeast (final Master's project).

Mathematical Methods in Systems Biology

Jun-15

University College Dublin (Ireland)

Website: http://mathsci.ucd.ie/mmsb/
Presenting poster about SB-TS 101 medical device (Bachelors project).

Experience

Work ## Data Scientist

Dec-21
to present

The Stanford University (US)

Principal Investigator Olivier Gevaert: ogevaert@stanford.edu
Data fusion of patient imaging and genomic data for personalized and predictive health care.

Research Professional I

Feb-20
to Feb-21

The Stanford University (US)

Quantitative biochemistry of RNA/protein interactions. Using high throughput data to predict PUF protein binding landscape.

Visiting Researcher

Feb-19
to Feb-20

The Francis Crick Institute (UK)

Managing and translating device initially patented in January 2018. Compiling data of beta testing in different labs around the Crick and industry partners.

<u>Research Technician in Biochem. wet-lab</u>

The Francis Crick Institute (UK)

Working on multiple projects related to RNA binding proteins and RNA methylation using variations of the iCLIP technique.

Nov-16
to Nov-17

<u>Nurse's assistant on hospital ward</u>

Evangelisches Krankenhaus Mettmann (Germany)

Recording health of patients, taking pulse, temperature and pressure.

Jul-13
to Sep-13

Master's Projects   <u>Development of microfluidic aerosol cartridge for drug delivery to organ-on-chips</u>

Ingber Lab, Harvard University (US)

Development of an aerosol device for precise delivery of biocompounds to lung-on-chip organoid.

Sep-17
to Dec-19

<u>Statistical analysis of saturating transposon mutagenesis in fission yeast</u>

Bähler Lab, University College London (UK)

Using Hidden Markov Model in R to analyse transposon library and identify essential regions, for log phase growth, in the yeast genome.

Jun-16
to Sept-16

<u>RNA expression profiles in Human Brain Autopsy tissues in Pharmacogenomics</u>

The Ohio State University (US)

Rewriting divo.R (R-package) in C for improved speed. Using divo.R to analyse microRNA interactions with RNA in brain tissue.

Mar-16
to May-16

<u>MRI flow and CFD comparison in a coarctation patient</u>

Biomech. Eng. group, Great Ormond Street Hospital (UK)

Setting up fluid simulation for aortic coarctation patient and comparing to MRI data. Making use of itk-SNAP (segmentation), Osirix (4D data extraction), Segment (2D data extraction) and ANSYS Fluen (simulation)

Jan-16
to Mar-16

<u>Photoacoustic sensing of lipids.</u>

Medical Physcis UCL (UK)

Detection of lipid plaques in tissue using a laser diode with a frequency modulated source to generate photoacoustic signal and lipid imaging.

Nov-15
to Jan-16

Internships   <u>Hospital – Clinical Genetics Department</u>

Great Ormond Street Hospital (UK)

Principal Investigator Peter Scambler: p.scambler@ucl.ac.uk

Shadowing Nurses and Clinicians at consultations and during treatment procedures in the Clinical Genetics Department.

Jun-16
to Oct-16

<u>Genetics Lab - Research Support</u>

Great Ormond Street Institute of Child Health (UK)

Principal Investigator Peter Scambler: p.scambler@ucl.ac.uk

Learning experimental techniques: western blotting, PCR and fluorescent imaging of the glomerulus. General lab support.

Jun-16
to Oct-16

Hospital - Medical Physics Department
Aug-15

Beacon Hospital Dublin (Ireland)

Chief Physicist Luke Rock: Luke.Rock@beaconhospital.ie

Q&A on Varian Linac, C-arm, CT and Gamma Camera. Radiotherapy treatment planning on sample prostate cancer. Making Cerrobend collimators for electron therapy.

Patient-specific blood flow modeling
Jul-15

European Consortium for Mathematics in Industry, ECMI Modeling Week 2015 Lisbon (Portugal)

Organiser, Prof. Nunes: cnunes@math.tecnico.ulisboa.pt

Modeling blood flow through arteries using incompressible Navier-Stokes equation. Analysing pressure and velocity fields in an anyeurism and downstream of a stenosis in FreeFEM++.

Simulation of two Scaffold Protein system in relation to MAPK pathway
May-15
to Jul-15

UCD Systems Biology Ireland (Ireland)

Research Fellow, Dr. Nguyen: lan.nguyen@ucd.ie

Analysing the behaviour of two competing scaffold protein systems. Solving set of 12 coupled ODE's based on Michaelis-Menten kinetics.

Simulation of Amyloid-ß (Protein fragment, potential cause of Alzheimer's) using Molecular Dynamics
Jun-14
to Jul-14

UCD Computational Biophysics group (Ireland)

Head of Research Group, Dr. Buchete: buchete@ucd.ie

Going through Molecular Dynamics tutorials for VMD and NAMD. Setting up own simulation of Amyloid-ß on a computer cluster.

Hospital - Nurse's assistant on ENT ward
Jun-13
to Jul-13

Evangelisches Krankenhaus Mettmann (Germany)

Hospital director asst.: m.keim-gabelin@evk-mettmann.de

Working in a team to facilitate the best care for patients.
Interacting with patients and giving mental support.

Hospital - Department rotations
Nov-11
to Jan-12

Sana-Krankenhaus Gerresheim (Germany)

Supervisor Prof. Dr. Andree: christoph.andree@sana.de

Rotating through Vascular Surgery, Plastic Surgery, Orthopedics and Radiology departments. Present for full procedures and interventions.

Integrative kindergarten for disabled children
Jan-08
to Feb-08

Heilpädagogische-Integrative Kindertagesstätte (Germany)

Taking care of and interacting with physically disabled children. Working as part of a team to ensure safety and well-being of children.

Teaching

Visiting Scholar at Jagiellonian University
Dec-2017

Jagiellonian University (Poland)

Funded invitation to introduce Omicron laboratory to irCLIP in the context of an ongoing collaboration on exosomes.

Teaching irCLIP and miCLIP
Jul-17
to Nov-17

The Francis Crick Institute (UK)

Introducing a Master's student, three PhD students and two post-docs to the irCLIP and miCLIP technique during Research Tech. position.

Programming & Software

python	General data analysis and figure generation for publications
R	Analing yeast genome using a Hidden Markov Model
C	Rewriting R-package to improve speed for high throughput data analysis
MATLAB®	Numerically solving Maxwell's equations for dispersive media (FDTD scheme) coupled to heat equation.
FreeFEM++	Numerically analysing incompressible Navier-Stokes equation to simulate blood flow through arteries.
ANSYS® Fluent	Simulating blood flow through an artery as Newtonian fluid and laminar flow.
LaTeX	Report writing and presentations in LaTeX Beamer.
MS Suite	Writing reports in Word, presenting in PowerPoint and data collection in Excel.