

Dr. Rémi Zallot

Lecturer

Department of Life Science

Manchester Metropolitan University

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Research Interests and Skills

Understanding uncharacterized microbial metabolism: a key in the fight against infectious pathogens and antimicrobial resistance (AMR)

Integrated multidisciplinary research

Identification and characterization of the biological function of key genes, enzymes and transporters in the context of health improvement.

Development, promotion and user training of the "Enzyme Function Initiative (EFI)" webtools

Key collaborator (NIGMS R24GM141196 - The Genomic Enzymology Web-Based Resource)

Significant experience

Bioinformatics (Comparative genomics, Genomic enzymology)

Biochemistry (Enzymatics, HPLC-MS, FPLC, GC)

Microbiology (Anaerobic prokaryotes, prokaryotes and eukaryotes)

Genetics (KO, KD, CRISPR-Cas9, over-expression, functional complementation)

Molecular biology (RNAi, PCR, gene cloning and expression in bacterial and plant systems)

Research Experience

Lecturer, Department of Life Sciences, Manchester Metropolitan University

Since June 2023

Characterisation of microbial genes relevant to health improvement

Research Associate

Manchester Institute of Biotechnology, The University of Manchester, Manchester, UK

May 2022 - May 2023

Supervisor: Jason Micklefield

Deciphering the biosynthesis of proteasome inhibitors cystargolides and belactosines (warhead β -Lactones) and antimicrobial C-nucleosides pseudouridimycin and malayamycin

Marie Skłodowska-Curie Fellow

Institute of Life Science, Swansea University, Swansea, Wales, UK

October 2019 - May 2022

Supervisor: Steven A. Kelly

deCrYPtion: Decrypting Mycobacterium cytochrome P450 (CYP) physiological functions by testing hypotheses emitted from large-scale comparative genomics analysis

Visiting Scholar at Carl Woese Institute for Genomic Biology

University of Illinois at Urbana-Champaign, USA

March 2017 - August 2019

Supervisor: John A. Gerlt

Enzyme function discovery in the human gut microbiome

Development, promotion and user training of the "Enzyme Function Initiative (EFI)" webtools

Postdoctoral Associate at University of Florida, USA

December 2011 - December 2016

Supervisors: Valérie de Crécy-Lagard and Andrew D. Hanson

Discovery and characterization of enzymes and transporters involved in B vitamin synthesis and queuosine tRNA modification, in microbes and plants

Graduate Research Assistant at Université Bordeaux Segalen, France

September 2008 - November 2011

Supervisor: Vincent Arondel

Characterization of a lipase involved in *Arabidopsis thaliana* germination

Awards

Manchester-Melbourne-Toronto (MMT) Research Funds - 2022

Missing Links in Global Sulphur Metabolism

Grant Number: P122678

Instructor for: Genomic Enzymology and Enzyme Function Initiative training in Melbourne (Aus)
Value £ 6 960

Marie Skłodowska-Curie Individual Fellowship - European Commission Horizon 2020

October 1st 2019 - March 30th 2022

Grant Number: 839116

Value € 212 933

Higher Education Investment and Recovery Fund - The Higher Education Funding Council for Wales (HEFCW)

August 1st 2021 - February 28th 2022

Value £33 954

Travel Grant (workshop instructor)

Institut Pasteur (Paris) - Inception program (Investissement d'Avenir - Grant ANR-16-CONV-0005)

June 17th to 21st 2019

From genes to function: a survival guide to web-based tools for microbiologists

Value € 3 000

Sêr Cymru II COFUND fellowship - Funded in July 2019

(Offer declined: I could not hold this fellowship at the same time as the MSCA Individual Fellowship)

Grant Number: SU190

Value £ 173 000

Travel Grant - Wales Marie Skłodowska-Curie Individual Fellowship summer school

May 17th and 18th 2018

Value £ 2 000

PhD Research Allowance Award - French Ministry of Higher Education and Research

(Allocation de recherche du Ministère de l'Enseignement Supérieur et de la Recherche)

September 2008 - November 2011

Value € 90 000

Education

**2021 Postgraduate Certificate Teaching in Higher Education
Fellow of the Higher Education Academy (FHEA)**

Swansea University Cohort 2019 - 2021

2011 Ph.D. in Plant Biology

Université Bordeaux Segalen, France

“Identification and characterization of a TAG-lipase expressed during Arabidopsis thaliana reserves hydrolysis.” Mentor: Vincent Arondel

2008 M.Sc. in Plant Biology and Biotechnology

Université Bordeaux I, France

“Study of special membrane domains: Membrane rafts – Study of conjugated sterols.”

Mentor: Sébastien Mongrand

2006 B.Sc. in Biology - Biochemistry

Université Bordeaux Segalen, France

**Teaching
Experience**

The University of Manchester

Instructor for the School of Biological Sciences

- Undergraduate - Year 2, Academic Tutorials - Group-Based Learning (GBL) (2022)
- Postgraduate - Year 4, MSci - Journal Clubs (2022)

Swansea University Medical School

Lecturer for the modules

- Undergraduate PM-256 - Communicating Medical Sciences (2020, 2021)
- Undergraduate PM-361 - Bioinformatics: From Sequence to Function (2020, 2021)
- Postgraduate PMGM15 - Application of Genomics in Infectious Disease (2020)

University of Illinois at Urbana-Champaign

Workshop organiser and instructor – Enzyme Function Initiative (EFI) tools use

June 2019 - Institut Pasteur (Paris), in the context of the “From genes to function: a survival guide to web-based tools for microbiologists” workshop - 24 attendees

May 2019 - UIUC Institute of Genomic Biology - 50 attendees

February 2019 - **Invited** - University of Florida - 40 attendees

July 2018 - GRC Enzymes, Coenzymes and Metabolic Pathways - 75 attendees

June 2018 - **Invited** - 2018 Bioinorganic Workshop at Penn State - 3 Sessions - 60 attendees

March 2018 - UIUC Institute of Genomic Biology - 50 attendees

University of Florida

Lecturer for the module BSC4434 : Introduction to bioinformatics (2013, 2014, 2015 and 2016)

	<p>Teaching assistant for the module PMCB5530: Plant Molecular Biology and Genomics (2014 and 2015)</p> <p>Workshop Assistant-instructor – Comparative Genomics Workshop 2012, 2013, 2014 and 2015</p> <p>Université Bordeaux Segalen</p> <p>Teaching assistant – U.E. Méthodologies – Classes 2009 and 2010</p>
Student Supervision	<p>The University of Manchester</p> <p>Graduate research student</p> <ul style="list-style-type: none"> - Characterization of enzymes involved in specialised metabolite production. <p>Swansea University</p> <p>3rd year research project</p> <ul style="list-style-type: none"> - PM-344 Capstone Project, 2021 - PM-362 Biomolecular Research Project, 2020 - PM-304 Biomolecular Research Project, 2019 <p>Summer Research Project</p> <ul style="list-style-type: none"> - Swansea University Internal Fellowship - £ 2 000 - Swansea University Medical School INSPIRE Student Summer Internship programme - £ 750 <p>University of Illinois at Urbana-Champaign</p> <p>Undergraduate research project</p> <ul style="list-style-type: none"> - August 2018 to August 2019
Public Engagement	<p>“Let’s have a look at DNA!”</p> <p>A practical demonstration I developed to demonstrate how genomic DNA can be extracted from fruits, using household products. This aims to start discussions about what DNA is, and how scientists work with DNA to gain a better understanding of living organisms.</p> <p>In person November 2021: Merthyr Tydfil for the Making Connections project</p> <p>Online via Zoom July 2021: Merthyr Tydfil Science Festival https://www.youtube.com/watch?v=TkpcFyEs_ic</p> <p>May 2021: Wales Gene Park Genomics Showcase February 2021: Cardiff Science Festival</p> <p>“Understand blood”</p> <p>March 2020: Oriel Science Super Sunday (Understand blood)</p> <p>“Scientific approach to identify an unknown white powder”</p> <p>January 2020: Primary Pupils Science Fayre being held at Merthyr College</p>
Reviewing Activities	<p>Journals:</p> <p>mSystems, Plos ONE, Nucleic Acids Research, DATABASE, Journal of molecular evolution, mBio, Biomolecules (MDPI), International Journal of Molecular Sciences (MDPI), Toxins (MDPI), Cells (MDPI), Environmental Microbiology and Environmental Microbiology Reports, Plos Computational Biology.</p> <p>Professional Funding Bodies:</p> <p>External referee for the French National Research Agency (ANR) Expert for the European Commission (EX2020D371426)</p>
Bibliometric Indicators	<p>Publications: 25 H-index: 20 I10-index: 22</p> <p>Information available at Google Scholar https://scholar.google.com/citations?user=sMUIExUAAAAJ</p>
Publications	<p>25 EFI-EST, EFI-GNT, and EFI-CGFP: Enzyme Function Initiative (EFI) Web Resource for Genomic Enzymology Tools. Oberge N, Zallot R, Gerlt JA. Journal of Molecular Biology. 2023 Feb 17:168018.</p> <p>24 Mechanistic and Structural Insights into the Specificity and Biological Function of Bacterial Sulfoglycosidases Zhang Z, Dong M, Zallot R, Ruan S, Blackburn GM, Wang N, Wang C, Chen L, Baumann P, Wu Z, Wang Z, Fan H, Roth C, Jin Y, He Y. Co-first author. ACS Catalysis 2022, 13, 1, 824–836</p> <p>23 Epoxyqueuosine Reductase QueH in the Biosynthetic Pathway to tRNA Queuosine Is a Unique Metalloenzyme</p>

Li Q, [Zallot R](#), MacTavish BS, Montoya A, Payan DJ, Hu Y, Gerlt JA, Angerhofer A, de Crécy-Lagard, Bruner SD.

Biochemistry **2021** 60 (42), 3152–3161

22 Discovery of new enzymatic functions and metabolic pathways using genomic enzymology web tools

[Zallot R](#), N Oberg, Gerlt JA. [First author](#).

Current Opinion in Biotechnology **2021** 69, 77–90

21 The Enzyme Function Initiative (EFI) suite of genomic enzymology web tools: Leveraging protein, genome, and metagenome databases to discover novel enzymes and metabolic pathways

[Zallot R](#), Oberg NO, Gerlt JA. [First author](#).

Biochemistry. **2019** 58(41), 4169–4182

20 Discovery of novel bacterial queuine salvage enzymes and pathways in human pathogens

Yuan Y, [Zallot R](#), Grove TL, Payan DJ, Martin-Verstrate I, Šepić S, Balamkundu S, Neelakandan R, Gadi VK, Liu C-F, Swairjo MA, Dedon PC, Almo SC, Gerlt JA and de Crécy-Lagard V. [Co-first author](#).

PNAS. **2019** 116(38), 19126–19135

19 ‘Democratized’ genomic enzymology web tools for functional assignment.

[Zallot R](#), Oberg NO, Gerlt JA. [First author](#).

Curr Opin Chem Bio. **2018** 47, 77–85

18 Functional assignment of multiple catabolic pathways for D-apiose.

Carter MS, Zhang X, Huang H, Bouvier JT, San Francisco B, Vetting MW, Al-Obaidi N, Bonanno JB, Ghosh A, [Zallot R](#), Andersen HM, Almo SC, Gerlt JA.

Nat Chem Biol. **2018** 14, 696–705

17 Gene Graphics: a genomic neighborhood data visualization web application.

Harrison KJ, de Crécy-Lagard V, [Zallot R](#). [Corresponding author](#)

Bioinformatics. **2018** 34(8), 1406–1408

16 The *Escherichia coli* COG1738 member YhhQ is involved in 7-Cyanodeazaguanine (preQ₀) transport.

[Zallot R](#), Yuan Y, de Crécy-Lagard V. [Corresponding author](#)

Biomolecules. **2017** 7(1), pii: E12

15 Identification of a novel epoxyqueuosine reductase family by comparative genomics.

[Zallot R](#), Ross R, Chen WH, Bruner SD, Limbach PA, de Crécy-Lagard V. [Corresponding author](#)

ACS Chem Biol. **2017** 12(3), 844–851

14 Arabidopsis TH2 encodes the orphan enzyme thiamin monophosphate phosphatase.

Mimura M, [Zallot R](#), Niehaus TD, Hasnain G, Gidda SK, Nguyen TN, Anderson EM, Mullen RT, Brown G, Yakunin AF, de Crécy-Lagard V, Gregory JF 3rd, McCarty DR, Hanson AD. [Co-first author](#).

Plant Cell. **2016** 28(10), 2683–2696

13 Functional Annotations of Paralogs: A Blessing and a Curse.

[Zallot R](#), Harrison KJ, Kolaczowski B, de Crécy-Lagard V. [Corresponding author](#)

Life (Basel). **2016** 6(3)

12 Systematic identification and analysis of frequent gene fusion events in metabolic pathways.

Henry CS, Lerma-Ortiz C, Gerdes SY, Mullen JD, Colasanti R, Zhukov A, Frelin O, Thiaville JJ, [Zallot R](#), Niehaus TD, Hasnain G, Conrad N, Hanson AD, de Crécy-Lagard V.

BMC Genomics. **2016** 17, 473

11 A family of metal-dependent phosphatases implicated in metabolite damage-control.

Huang L, Khusnutdinova A, Nocek B, Brown G, Xu X, Cui H, Petit P, Flick R, [Zallot R](#), Balmant K, Ziemak MJ, Shanklin J, de Crécy-Lagard V, Fiehn O, Gregory JF 3rd, Joachimiak A, Savchenko A, Yakunin AF, Hanson AD.

Nat Chem Biol. **2016** 12(8), 621–627

10 Bacterial and plant HAD enzymes catalyse a missing phosphatase step in thiamin diphosphate biosynthesis.

Hasnain G, Roje S, Sa N, [Zallot R](#), Ziemak MJ, de Crécy-Lagard V, Gregory JF 3rd, Hanson AD.

Biochem J. **2016** 473(2), 157–166

9 Functional diversity of haloacid dehalogenase superfamily phosphatases from *Saccharomyces cerevisiae*: BIOCHEMICAL, STRUCTURAL, AND EVOLUTIONARY INSIGHTS.

Kuznetsova E, Nocek B, Brown G, Makarova KS, Flick R, Wolf YI, Khusnutdinova A, Evdokimova E, Jin K, Tan K, Hanson AD, Hasnain G, [Zallot R](#), de Crécy-Lagard V, Babu M, Savchenko A, Joachimiak A, Edwards AM, Koonin EV, Yakunin AF.

J Biol Chem. **2015** 290(30), 18678–18698

8 Salvage of the thiamin pyrimidine moiety by plant TenA proteins lacking an active-site cysteine.

[Zallot R](#), Yazdani M, Goyer A, Ziemak MJ, Guan JC, McCarty DR, de Crécy-Lagard V, Gerdes S, Garrett TJ, Benach J, Hunt JF, Shintani DK, Hanson AD. [First author](#).
Biochem J. **2014** 463(1), 145–155

7 High-throughput comparison, functional annotation, and metabolic modeling of plant genomes using the PlantSEED resource.

Seaver SM, Gerdes S, Frelin O, Lerma-Ortiz C, Bradbury LM, [Zallot R](#), Hasnain G, Niehaus TD, El Yacoubi B, Pasternak S, Olson R, Pusch G, Overbeek R, Stevens R, de Crécy-Lagard V, Ware D, Hanson AD, Henry CS.
Proc Natl Acad Sci U S A. **2014** 111(26), 9645–9650

6 Plant, animal, and fungal micronutrient queuosine is salvaged by members of the DUF2419 protein family.

[Zallot R](#), Brochier-Armanet C, Gaston KW, Forouhar F, Limbach PA, Hunt JF, de Crécy-Lagard V.
ACS Chem Biol. **2014** 9(8), 1812–1825. [First author](#).

5 Identification of the thiamin salvage enzyme thiazole kinase in Arabidopsis and maize.

Yazdani M, [Zallot R](#), Tunc-Ozdemir M, de Crécy-Lagard V, Shintani DK, Hanson AD. [Co-first author](#).
Phytochemistry. **2013** 94, 68–73

4 Identification of mitochondrial coenzyme a transporters from maize and Arabidopsis.

[Zallot R](#), Agrimi G, Lerma-Ortiz C, Teresinski HJ, Frelin O, Ellens KW, Castegna A, Russo A, de Crécy-Lagard V, Mullen RT, Palmieri F, Hanson AD. [Co-first author](#).
Plant Physiol. **2013** 162(2), 581–588

3 Acyl-lipid metabolism.

Li-Beisson Y, Shorrosh B, Beisson F, Andersson MX, Arondel V, Bates PD, Baud S, Bird D, Debono A, Durrett TP, Franke RB, Graham IA, Katayama K, Kelly AA, Larson T, Markham JE, Miquel M, Molina I, Nishida I, Rowland O, Samuels L, Schmid KM, Wada H, Welti R, Xu C, [Zallot R](#), Ohlrogge J.
Arabidopsis Book. **2013** 11, e0161

2 Polyphosphoinositides are enriched in plant membrane rafts and form microdomains in the plasma membrane.

Furt F, König S, Bessoule JJ, Sargueil F, [Zallot R](#), Stanislas T, Noirot E, Lherminier J, Simon-Plas F, Heilmann I, Mongrand S.
Plant Physiol. **2010** 152(4), 2173–2187

1 Acyl-lipid metabolism.

Li-Beisson Y, Shorrosh B, Beisson F, Andersson MX, Arondel V, Bates PD, Baud S, Bird D, Debono A, Durrett TP, Franke RB, Graham IA, Katayama K, Kelly AA, Larson T, Markham JE, Miquel M, Molina I, Nishida I, Rowland O, Samuels L, Schmid KM, Wada H, Welti R, Xu C, [Zallot R](#), Ohlrogge J.
Arabidopsis Book. **2010** 8, e0133

Presentations

Invited Oral presentations

Understanding antimicrobial resistance requires characterising unknown genes identified involved Manchester Institute of Biotechnology Fellowship days, The University of Manchester
January 26, **2022**

Similarity Networks (SSNs) and Genome Neighborhood Networks (GNNs) for function assignment
School of Chemistry, Cardiff University April 3, **2021**

Genomic enzymology web tools for functional assignment: Generating and analysing Sequence Similarity Networks (SSNs) and Genome Neighborhood Networks (GNNs) with the EFI suite
Institut Pasteur (Paris), Centre of Bioinformatics, Biostatistics and Integrative Biology June 20 **2019**

Comparative genomics for the identification of unknowns genes, enzymes and transporters involved in Queuosine metabolism
University of Illinois at Urbana-Champaign August 5, **2016**

Production of molecules of interest from plants in Yeast, can comparative genomics help?
Université Université François Rabelais, Tours May 6, **2016**

Is *Streptomyces* secondary metabolism regulation involving lipid rafts?
Université Paris 11, Orsay May 17, **2016**

Salvage of the thiamin pyrimidine moiety by plant TenA proteins lacking an active site cysteine

Plant Biology, Portland, OR, USA July 12 to 16, **2014**

Posters

9 Comparative genomics and genomic enzymology approaches for functional assignment

R. Zallot

Manchester Institute of Biotechnology Annual Science Day, **2022**, Manchester, United-Kingdom

8 QueI and its associated activator QueJ are non- orthologous replacement of the nitrile reductase QueF in the queuosine biosynthesis pathway

R. Zallot, D.J. Payan, A.J. Arcinas, A. Ghosh, S. Chamala, J.E. Cronan, S.C. Almo, and J.A. Gerlt
Gordon Research Seminar and Conference, Enzymes, Coenzymes and Metabolic Pathways, **2018**, Waterville Valley, NH, USA

7 QueI and its associated activator QueJ are non- orthologous replacement of the nitrile reductase QueF in the queuosine biosynthesis pathway

R. Zallot, D.J. Payan, A.J. Arcinas, A. Ghosh, S. Chamala, J.E. Cronan, S.C. Almo, and J.A. Gerlt
2018 Frontiers in Metallobiochemistry Symposium and 2018 Bioinorganic Workshop, **2018**, The Pennsylvania State University, State College, PA, USA

6 Identification of missing enzymes and transporters involved in the synthesis and salvage of Queuosine by comparative genomics

R. Zallot, R. Ross, W.-H. Chen, S.D. Bruner, P. A. Limbach and V. de Crécy-Lagard,
EMBO Conference, Ribosome Structure and Function, **2016**, Strasbourg, France

5 Identification of missing enzymes and transporters involved in the synthesis and salvage of Queuosine by comparative genomics

R. Zallot, R. Ross, W.-H. Chen, S.D. Bruner, P. A. Limbach and V. de Crécy-Lagard
DOE JGI User meeting, Genomics of Energy & Environment Meeting, **2016**, Walnut Creek, CA, USA

4 Identification of genes involved in Queuosine Salvage

R. Zallot, F. Forouhar, J.F. Hunt, D. Iwata-Reuyl and V. de Crécy-Lagard
Gordon Research Conference, RNA editing, **2015**, Lucca (Barga), Italy

3 Identification of maize and Arabidopsis genes for the salvage of thiamin breakdown products

R. Zallot, M. Yazdani, M. Tunc-Ozdemir, G. Hasnain, D. K. Shintani, V. de Crécy-Lagard and A. D.
Hanson Gordon Research Conference, Plant Metabolic Engineering, **2013**, Waterville Valley, NH, USA

2 Identification of a potential queuine salvage gene in eukaryotes

R. Zallot, P. Thiaville, V. de Crécy-Lagard
XXIV tRNA Conference, **2012**, Olmué, Chile

1 Identification of a triacylglycerol-lipase from Brassica napus by functional proteomics

R. Zallot, R. Dhouib and V. Arondel
5th European Symposium on Plant Lipids, **2011**, Gdansk, Poland

This poster was selected for a short oral presentation.